
From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/1/2020 10:03:15 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites - EIR/EIS Assumptions

Hi Ali,

Thank you for the update. To confirm, I think you meant to state the Dunnigan alignment east of CBD; the alignment west of CBD is fairly set unless we encounter real-estate challenges.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Tuesday, September 1, 2020 9:55 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>
Subject: Sites - EIR/EIS Assumptions

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I talked to Kevin this morning on a few of our assumptions. Here's some quick notes below.

TRR – He agreed to stay with the current location. There is a land management meeting this afternoon to discuss the other possible locations, so we should see how this plays out over the next few weeks.

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In thinking more about construction, it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.

Thanks all!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Draft_0003574

including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

From: Williams, Nicole [Nicole.Williams@icf.com]
Sent: 9/1/2020 10:33:06 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Briard, Monique [Monique.Briard@icf.com]
CC: Luu, Henry [Henry.Luu@hdrinc.com]
Subject: RE: Sites - EIR/EIS Assumptions

Hi Ali –

Thank you for the confirmations. This is generally in line with what you will see in the Chapter 2 Alternatives Description we submitted yesterday, with the exception of “it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.” We’ll need to know if we have to evaluate that and which groundwater basins the water might come from.

We can look into SGMA and the basin status. We cannot really hazard a guess at this point as to how we affect the basin compliance until we understand the current pumping, the current basin status and get estimates from HR on the volume of water/pumping required during construction. Although, if we find out the basin status is very healthy then even if the construction requires a lot of water to be pumped, it may ultimately be okay, but we’d still need to discuss estimates of volumes needed during construction in order to make those types of statements.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
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o 916.231.9614
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From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, September 01, 2020 10:14 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>
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Subject: RE: Sites - EIR/EIS Assumptions

Hi all – Henry reminded me that I have my east and west mixed up. Corrected below. Thanks Henry!

Ali

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From: Unsworth, Ellen [Ellen.Unsworth@icf.com]
Sent: 9/1/2020 11:47:31 AM
To: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
CC: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Alicia Forsythe [aforsythe@sitesproject.org]; John Spranza [John.Spranza@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Berryman, Ellen [Ellen.Berryman@icf.com]; Williams, Nicole [Nicole.Williams@icf.com]
Subject: RE: Sites Reservoir - HR TM and drawings

Hi Jelica.

Thanks so much. I have a three requests related to the August HR/HC TMs.

- Two of the TMs did not have a track changes version: the **I-O Works TM** and the **Roads & Bridge TM**. Could you please send us the track changes version for those two TMs so we can update the alternatives description with the latest information.
- We received two track changes versions of the **Reservoir Levels and Emergency Release TM** (Reservoir Levels and Emergency Release TM_HR 2.94_Final_trk chgs_Editor_mpf and TM Draft Final 1.5 MAF Reservoir Levels and Emergency Release JB_trk chgs_HDR Review). Most substantive changes are shown in the latter (JB) file, but the former (Editor) file also has a substantive change under 4.0, Emergency Drawdown. Could we please get a single track changes version.
- Also in the **Reservoir Levels and Emergency Release TM**, two spillway options are proposed. Could you tell us whether a spillway option has been selected.

Thanks so much for you help and let me know if you have any questions.

Ellen U

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Tuesday, August 25, 2020 5:28 PM
To: Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; John Spranza <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>
Subject: FW: Sites Reservoir - HR TM and drawings

Hello

Henry has uploaded the August technical memorandums to the project description folder. See link below.

Thanks again Henry.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



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Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Draft_0003578

Jelica.Arsenijevic@hdrinc.com

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From: Luu, Henry

Sent: Tuesday, August 25, 2020 4:47 PM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>

Cc: Heydinger, Erin <Erin.Heydinger@hdrinc.com>

Subject: Sites Reservoir - HR TM and drawings

Hi folks,

Just wanted to let you know that I copied the August deliverables for HR TMs and drawings to the Project Description folder and is available @

https://sitesreservoirproject.sharepoint.com/:f:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir?csf=1&web=1&e=J9bpcV. Note that the team provided two Word documents – one clean/final version and the other has track-changes/comments from the draft review. HC-Conveyance documents will follow Friday/Monday. Please pass this information along to the rest of the environmental team.

Thank you,

Henry H. Luu, PE

D 916.679.8857 M 916.754.7566

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From: Williams, Nicole [Nicole.Williams@icf.com]
Sent: 9/2/2020 7:21:52 AM
To: Luu, Henry [Henry.Luu@hdrinc.com]; Unsworth, Ellen [Ellen.Unsworth@icf.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
CC: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Alicia Forsythe [aforsythe@sitesproject.org]; John Spranza [John.Spranza@hdrinc.com]; Berryman, Ellen [Ellen.Berryman@icf.com]
Subject: RE: Sites Reservoir - HR TM and drawings

Hi Henry,

For bullet point two and the **Reservoir Levels and Emergency Release TM** – has (will?) integration reviewed both tracked changes versions and reconciled any conflicting edits?

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, September 01, 2020 4:30 PM
To: Unsworth, Ellen <Ellen.Unsworth@icf.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; John Spranza <John.Spranza@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Subject: RE: Sites Reservoir - HR TM and drawings

Hi Ellen U,

See responses below in your email (shown in red). Let me know if you need additional clarifications.

Thanks,
Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Unsworth, Ellen [mailto:Ellen.Unsworth@icf.com]
Sent: Tuesday, September 1, 2020 11:48 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
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Hi Jelica.
Thanks so much. I have a three requests related to the August HR/HC TMs.

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- Two of the TMs did not have a track changes version: the **I-O Works TM** and the **Roads & Bridge TM**. Could you please send us the track changes version for those two TMs so we can update the alternatives description with the latest information. I-O Works TM updates are discussed in comments/responses within https://sitesreservoirproject.sharepoint.com/:w:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir/I-O%20Works%20TM_HR2.93_Draft_2020-08-17_ITR2_HDR.docx?d=w0c1917cf868a4afe861ca8b57bf140c5&csf=1&web=1&e=e47GQj. Track changes for Roads & Bridge TM has been uploaded to SharePoint at https://sitesreservoirproject.sharepoint.com/:w:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir/Roads%20%20Bridge%20Draft%20TM_HR2.96_trk%20chgs_HDR%20Comments_HM1_MF_Editor.docx?d=w5ffef4bdc7834f8ab15ca24670f67d74&csf=1&web=1&e=Ou6217.
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- Also in the **Reservoir Levels and Emergency Release TM**, two spillway options are proposed. Could you tell us whether a spillway option has been selected. Refer to TM Section 3.3.3 for recommendation. The engineering team is proceeding with spillway Option 2 to fully contain the PMF. Refinements will occur during consultation with DWR DSOD.

Thanks so much for your help and let me know if you have any questions.

Ellen U

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Sent: Tuesday, August 25, 2020 5:28 PM

To: Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>

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From: Williams, Nicole [Nicole.Williams@icf.com]
Sent: 9/2/2020 7:26:40 AM
To: Luu, Henry [Henry.Luu@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Briard, Monique [Monique.Briard@icf.com]
Subject: RE: Sites - EIR/EIS Assumptions

Thanks Henry. And HC facilities would be in addition to this estimate, as the Dunnigan Pipeline and all the Funks PGP and TRR PGP facilities would add to this estimated amount, I expect. Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
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o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, September 01, 2020 4:21 PM
To: Williams, Nicole <Nicole.Williams@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

Hi Nicole,

The engineering team will be providing a more in-depth analysis of construction schedule and water usage as part of the Phase 2 work, but rough estimate of water required for construction of reservoir facilities are on the magnitude of 750,000 to 1,000,000 gallons/day (500 to 700 gpm).

Water uses include:

- moisture conditioning of the embankment fill materials
- watering of rock, sand filter and gravel drain materials in the fill
- concrete mixing
- grouting
- quarrying/processing
- dust suppression on access roads (dam footprints, stockpiles, staging and haul roads)
- other construction activities

Hopefully this information is useful,

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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Sent: Tuesday, September 1, 2020 10:33 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
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Hi all – Henry reminded me that I have my east and west mixed up. Corrected below. Thanks Henry!

Ali

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From: Thad Bettner [tbettner@gcid.net]
Sent: 9/2/2020 8:26:38 AM
To: Jerry Brown [jbrown@sitesproject.org]; Fritz Durst [fritz.durst@gmail.com]
Subject: RE: Follow-up Trinity Issue
Attachments: image001.png; image004.png

Thanks Jerry, I agree something makes sense, not sure the language is quite right but we can get there with counsel.

I think something simpler to the effect of Sites will be obtaining new water rights for the project from the Sacramento River watershed and will not divert water under Reclamations water rights, which includes the Trinity River. Sites and Reclamation may exchange water under their respective water rights in cases that will benefit the environment and other users of water.

Thaddeus L Bettner PE, General Manager
Glenn-Colusa Irrigation District
PO Box 150
Willows, CA 95988
530.934.8881 (office)
530.588.3450 (cell)



From: Jerry Brown <jbrown@sitesproject.org>
Sent: Wednesday, September 2, 2020 6:25 AM
To: Fritz Durst <fritz.durst@gmail.com>; Thad Bettner <tbettner@gcid.net>
Subject: Follow-up Trinity Issue

As a follow-up to our discussion Friday, when the water rights attorney comes on board we are going to discuss the Humboldt County's requested water rights terms that was described in their Dec 17, 2019 letter (in italics below).

It is our understanding that Sites Project Authority representatives have stated that the temperature modeling results have limited accuracy due to the methods and assumptions; however, we are not reassured. Although your letter assured us that no harm would be caused to the Trinity River, we are concerned that the modeling results published in your Draft EIR/EIS show that the operations of the Sites Project would likely cause irreversible harm to migrating salmon and the document does not discuss alternatives or mitigations to address these impacts.

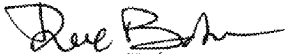
Based on the findings by Kamman Hydrology and the lack of robust and binding assurances, we specifically request that a water right term and condition be placed on the water rights application for the Sites Reservoir Project as follows:

"Trinity River water shall not be used to fill Sites Reservoir unless the Trinity River Division of the Central Valley Project is releasing water as a result of storage conditions requiring "Safety of Dams" releases beyond normal operating plans and concurrently when Shasta Reservoir is making flood control releases. Furthermore, Humboldt County's 1959 water contract with the Bureau of Reclamation, Trinity River Record of Decision (ROD) flows, and releases to implement the Bureau of Reclamation's Long-Term Plan to Project Adult Salmon in the Lower Klamath River shall not be reduced or negatively impacted in any way as a result of any Sites Reservoir decisions, modeling, operational plans, and water rights petitions."

Alternatively, we would consider entering into a Memorandum of Understanding with the Bureau of Reclamation and Sites Project Authority with clearly defined obligations and commitments to ensure that Humboldt County's 1959 water contract with the Bureau of Reclamation and our interests in the Trinity River are sufficiently protected.

We request a response by January 15, 2020, after which we will consider whether to withdraw our conditional support for the proposed Sites Reservoir Project.

Sincerely,



Rex Bohn, Chairman
Humboldt County Board of Supervisors

cc: Senator Dianne Feinstein
Senator Kamala Harris
Congressman Jared Huffman
Congressman John Garamendi
Congressman Doug LaMalfa
Senator Mike McGuire
Trinity County Board of Supervisors
Karuk Tribal Council
Hoopa Valley Tribal Council
Yurok Tribal Council
California Water Commission
Charles Bonham, Director CA Dept. of Fish and Wildlife
Karla Nemeth, Director CA Department of Water Resources
Ernest Conant, Regional Director Bureau of Reclamation

From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/2/2020 11:51:00 AM
To: Williams, Nicole [Nicole.Williams@icf.com]; Unsworth, Ellen [Ellen.Unsworth@icf.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
CC: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [John.Spranza@hdrinc.com]; Berryman, Ellen [Ellen.Berryman@icf.com]
Subject: RE: Sites Reservoir - HR TM and drawings

Hi Nicole,

I do not believe there are conflicting edits between the track-change documents. However, although helpful in gauging updates between the draft and final documents, I recommend the team review and reference the final documents (without track-changes/comments) as sources.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Williams, Nicole [mailto:Nicole.Williams@icf.com]
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To: Luu, Henry <Henry.Luu@hdrinc.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <John.Spranza@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>
Subject: RE: Sites Reservoir - HR TM and drawings

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Henry,

For bullet point two and the **Reservoir Levels and Emergency Release TM** – has (will?) integration reviewed both tracked changes versions and reconciled any conflicting edits?

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, September 01, 2020 4:30 PM
To: Unsworth, Ellen <Ellen.Unsworth@icf.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; John Spranza <John.Spranza@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Subject: RE: Sites Reservoir - HR TM and drawings

Hi Ellen U,

See responses below in your email (shown in red). Let me know if you need additional clarifications.

Thanks,

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Unsworth, Ellen [<mailto:Ellen.Unsworth@icf.com>]
Sent: Tuesday, September 1, 2020 11:48 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Subject: RE: Sites Reservoir - HR TM and drawings

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jelica.

Thanks so much. I have a three requests related to the August HR/HC TMs.

- Two of the TMs did not have a track changes version: the **I-O Works TM** and the **Roads & Bridge TM**. Could you please send us the track changes version for those two TMs so we can update the alternatives description with the latest information. I-O Works TM updates are discussed in comments/responses within https://sitesreservoirproject.sharepoint.com/:w:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir/I-O%20Works%20TM_HR2.93_Draft_2020-08-17_ITR2_HDR.docx?d=w0c1917cf868a4afe861ca8b57bf140c5&csf=1&web=1&e=e47GQj. Track changes for Roads & Bridge TM has been uploaded to SharePoint at https://sitesreservoirproject.sharepoint.com/:w:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir/Roads%20%20Bridge%20Draft%20TM_HR2.96_trk%20chgs_HDR%20Comments_HM1_MF_Editor.docx?d=w5ffef4bdc7834f8ab15ca24670f67d74&csf=1&web=1&e=Ou6217.
- We received two track changes versions of the **Reservoir Levels and Emergency Release TM** (Reservoir Levels and Emergency Release TM_HR 2.94_Final_trk chgs_Editor_mpf and TM Draft Final 1.5 MAF Reservoir Levels and Emergency Release JB_trk chgs_HDR Review). Most substantive changes are shown in the latter (JB) file, but the former (Editor) file also has a substantive change under 4.0, Emergency Drawdown. Could we please get a single track changes version. Please refer to both documents. The former (Editor) reflects additional changes as noted.
- Also in the **Reservoir Levels and Emergency Release TM**, two spillway options are proposed. Could you tell us whether a spillway option has been selected. Refer to TM Section 3.3.3 for recommendation. The engineering team is proceeding with spillway Option 2 to fully contain the PMF. Refinements will occur during consultation with DWR DSOD.

Thanks so much for your help and let me know if you have any questions.

Ellen U

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Tuesday, August 25, 2020 5:28 PM

To: Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>

Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>; John Spranza <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>

Subject: FW: Sites Reservoir - HR TM and drawings

Hello

Henry has uploaded the August technical memorandums to the project description folder. See link below.

Thanks again Henry.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Luu, Henry

Sent: Tuesday, August 25, 2020 4:47 PM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>

Cc: Heydinger, Erin <Erin.Heydinger@hdrinc.com>

Subject: Sites Reservoir - HR TM and drawings

Hi folks,

Just wanted to let you know that I copied the August deliverables for HR TMs and drawings to the Project Description folder and is available @ https://sitesreservoirproject.sharepoint.com/:f:/r/ProjectDescription/Reference%20Docs/WSIP%20Feasibility_August%202020_Technical%20Memorandums%20and%20Drawings/HR-Reservoir?csf=1&web=1&e=J9bpcV. Note that the team provided two Word documents – one clean/final version and the other has track-changes/comments from the draft review. HC-Conveyance documents will follow Friday/Monday. Please pass this information along to the rest of the environmental team.

Thank you,

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/3/2020 9:13:47 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Summary of NGO and Tribal letters on 2017 EIR/EIS
Attachments: NGO_Tribal letter summaries.docx

Hi Ali,

Please see attached for a summary of NGO and Tribal Govt comment letters received on the 2017 Draft EIR/EIS. I have also uploaded this to the Environmental Planning working documents folder in SharePoint:

https://sitesreservoirproject.sharepoint.com/:w:/r/EnvPlanning/Shared%20Documents/NGO_Tribal%20letter%20summaries.docx?d=w9719ed8cbd6149d29a34abab604abed6&csf=1&web=1&e=9dRPZP

This may be useful as a reference when we talk at 10:00 am.

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

Supplier Clearinghouse Women Business Enterprise (#16000323)

<http://phenixenv.com/>

NGO Letters

NRDC Letter (1/15/18) Summary #12

- **EIR/EIS fails to consider a reasonable range of alternatives (I)**
 - Alternatives that reduce water diversions from the Sacramento River (particularly during all but wet water year types and during periods of moderate and low flows) would result in reduced adverse effects on native fish and wildlife in Sacramento River and Bay-Delta estuary
 - Claim “**tiering**” from **CALFED ROD** which was improper
 - Must analyze more than one operational alternative in order to identify alternatives that would minimize or avoid adverse environmental impacts of the project (per their scoping comments).
 - Alternative that would not result in substantial reductions in Delta outflow during winter and spring months
 - One or more alternatives that result in increase in Delta outflow during winter and spring
 - Additional alternative that is consistent with the water operational requirements being proposed for California WaterFix
 - CDFW potential **operational criteria** to protect flows and reduce adverse impacts on salmon, sturgeon, longfin smelt, Delta smelt, and other native fish species need to be evaluated
 - Consider **other storage alternatives such as groundwater storage**, conjunctive use, and/or reoperation of reservoirs to improve water supplies and ecosystem protection
- **Reclamation violated FWCA (II)**
 - Claim FWCA report required to be included in draft EIS
- **Failure to use an accurate environmental baseline (III)**
 - Fails to include several permit conditions imposed prior to the NOP which will be implemented prior to 2030 (primarily the **Revised Shasta RPA and Yolo Bypass restoration including the proposed Fremont Weir notch**)
 - **Fall X2** per 2008 Delta Smelt BO not appropriately addressed
 - Flawed because it is assumed full **contract deliveries** which have never occurred (never more than 75% of contract amounts)
 - **Need to include climate change assumptions in baseline (IV)**
 - Suggests incorporation into baseline rather than separate discussion in Chapter 25
- **2010 CALSIM** model inappropriately used (instead of 2015 version) **(V)**
 - States inconsistency in Appendix 6D related to Delta Alt D outflow
- **Fails to accurately assess impacts to aquatic resources from proposed operations (VI)**
 - **Arbitrary thresholds of significance** - 5-10 % flow reductions will have significant adverse effects
 - **Longfin smelt** impacts greater than 0 are significant (mandatory finding of significance)
 - Operational impacts of greater than 5% are not called significant
 - Impacts to salmon and steelhead inadequate
 - Ignore reduced flows
 - Assume no impact at **fish screens**
 - Fail to assess impacts from **reduced floodplain inundation**

- **Ineffective mitigation measures**
 - **Fail to use existing life cycle models**
- Consider feasible mitigation measures, including minimum bypass flows
- **Delta smelt** impacts
- **Fails to accurately assess impacts to terrestrial biological resources (VII)**
 - Mitigation measures too broad - revise Mitigation Measure Wild-1b – more specificity by species including **ratios/performance standards**
 - Coordination with CDFW not consistently identified
 - **Giant Garter Snake** impacts and mitigation inadequate
 - **Outdated survey information** – inaccurate estimation of impacts
 - Inadequate assessment of impacts to **wildlife refuges – bird strikes associated with powerlines** and overall **impacts to Delevan NWR** as well as surrounding private lands; need to evaluate impacts to **Colusa and Sutter NWRs**
 - No impacts associated with the **TRR**
- **Fails to adequately analyze cumulative impacts and fails to disclose potentially significant adverse impacts to aquatic resources (VIII)**
 - Need to incorporate **WaterFix and Shasta Lake WRI**
 - Cite prior MBK work that identifies significantly reduced Delta outflows and Sac River flows
- **Presentation of Existing Conditions/No Action Alternative is flawed (IX)**
 - Appendix 12F
 - Appendix 6A
 - Examples of misleading and inaccurate descriptions of modeling results

Additional Analysis Requested:

- 1) Explanation of range of alternatives and reasons for considering single operational alternative;
- 2) Address environmental baseline flaws such as contract delivery assumptions, failure to include climate change, Shasta RPA, Yolo Bypass
- 3) Analyze more alternatives such as: alternatives that reduce water diversions from Sac River (especially in wet year types and during moderate and low flows), alternative that would not result in substantial reduction in Delta outflow, alternative that increases Delta outflow in winter and spring, and alternative that is consistent with Waterfix operational requirements;
- 4) Need to include evaluation of CDFW potential operational criteria to protect flow and reduce impacts on native fish species,
- 5) Consider other storage alternatives (groundwater storage, conjunctive use etc.);
- 6) Update CALSIM model to the most recent model
- 7) 7) Need FWCA report
- 8) Reanalysis of impacts to Aquatic and Terrestrial resources including updated surveys and mitigation measures for potentially significant adverse impacts

AquAlliance Letter (1/15/18) #17

- **CEQA lead should be DWR** given DSOD oversight and need to coordinate operations with SWP
- **Inadequate project description** – lacks detail/inappropriate impact analysis, improper

segmentation of environmental review (cites tie with SVWMA), seismic activity not addressed, **deferred surveys**, inadequate statement of objectives/P&N

- **Hydrology/water quality (selenium, mercury, hazardous materials, salt)** impacts,
- Additional **wetland survey and mitigation** required, stream flow depletion, concerns related to past CVP/SWP operations and regulatory processes/documents and supposed to tie Sites operations and intentions
- **Cultural resources** evaluations, impacts, and mitigation not completed or appropriately identified (including cumulative impacts)
- **Cumulative impacts** not fully analyzed including recent water transfers – provides many projects/actions suggested to be included

Pacific Coast Federation of Fisheries Associations/Institute for Fisheries Resources/Save California's Salmon/San Francisco Baykeeper/Winnemem Wintu Tribe (1/15/18) #20

- EIR/EIS should be prepared a part of a **FERC license application**; numerous deficiencies
- Use of **Existing Conditions/No Project/Action baseline** biases the analysis and avoids CEQA mitigation requirements
- Document needs to include an **operations plan and diversion schedule**
- Use of old information in the **modeling**; outdated and insufficient model
- **Cumulative impacts** evaluation needs to identify numerous other projects and actions (provides list)
- States on-going **economic impacts** associated with salmon decline
- **Modeling** is problematic – monthly modeling insufficient for addressing fisheries needs
- EIR/EIS does not discuss **flow management impacts** of the project
- Proposed project does not adequately account for importance of flow fluctuations and fishery habitat needs
- Impacts to important **floodplains (including Sutter and Yolo bypasses)** – need to be identify impact to fish production and water quality
- **Water quality** impacts – diversion will further impact **water temperatures** downstream of the proposed diversions
- Reduced flows from Shasta and Keswick – concerns over **metals and reduced dilution**; reduced cold/fresh water to the Delta
- Potential **salinity** issues from Sites Reservoir releases – need a reservoir management plan
- **Climate change** impacts not evaluated
- **Fishery impacts** not properly addressed – no analysis of current state of Delta or Sacramento

fisheries as well as Sacramento River tributaries and Trinity system.

- **No economic analysis** – cite 8% reduction in appendixes in highwater years and 11% increase in normal years
- Impacts to **Klamath and Trinity River salmon** populations not properly analyzed – need to reference recent legal decisions since ROD
- **Sacramento River/Delta fisheries** impacts not properly analyzed – project will exacerbate current problems – **winter and spring flows** need to be maintained; project would result in increased **Delta reverse flows**
- **Water quality** conditions will encourage propagation of **non-native fish species**
- **Tribal beneficial uses** (i.e. water and salmon) impacts not disclosed as well as **public trust** resources – need to reference **reintroduction of salmon and fish passage above Shasta Dam** and potential Project effects

California Indian Water Commission (1/15/18) #21

- **Support the No Project** – project counterintuitive to the laws of nature
- **Ecological effects of the project inadequately analyzed** – suggest consulting with tribes; access from the top of contributing watersheds
- **Recommend use of Mauri-o-meter** to assess impacts to the environment – considers cultural wellbeing (inclusive of metaphysical aspects), social wellbeing, and economic wellbeing using a series of questions that are filtered through a heuristic model

CSPA/AquAlliance/California Water Impact Network (1/13/18) #23

- **Inadequate project description** – need to identify who will operate project, how decisions will be made, and responsibility including prioritizing use of Sites releases
- **Operating rules** too vague – speculative and hypothetical
- Averaging of **model results** masks real impacts
- Potential **thermal impacts** associated with reservoir releases
- **Insufficient range of alternatives**
 - Does not include more restrictive bypass requirement than existing standards
 - Need an alternative that includes operations with WaterFix in place
- Inadequately addresses required **water right** amount, timing, and **relationship with CVP and SWP**
- No discussion as to how **water transfers** would be facilitated
- Does no disclose impacts associated with **decreased floodplain inundation**

Friends of the River (1/15/18) #24

- Inadequate **project description** – need to identify how the project will be operated, inconsistencies with Reclamation's feasibility report
- Inadequate **range of alternatives** – speculative and hypothetical
- Lack of meaningful information about **water rights** – how will the project insure only tributary water will be diverted to Sites
- Fails to adequately consider **impacts of Sacramento River diversions**:
 - Models – analysis depends on models with known deficiencies
 - Environmental Standards – existing flow standards inadequate
 - Public Lands and Land Use – analysis barely acknowledges public lands along Sacramento River
- Inadequate description of **impacts on Sacramento River water quality**
 - Models inadequate to accurately assess temperature impacts
- Fails to adequately address **reservoir-triggered seismicity** on local communities and structures – needs to fully examine the role of frequent filling/emptying of reservoir in triggering earthquakes
- Inadequate in addressing **greenhouse gases** - recommends use of World Bank's guidelines on GHG measurement
- Inadequate evaluation of **rare plants** – analysis should include guidelines and sufficient information
- Overstates **project benefits for threatened and endangered salmonids** – not a net benefit of Sites
- Other specific comments on Draft EIR/EIS regarding:
 - Range of alternatives – need to look at smaller reservoirs
 - Surface water resources – needs to address water rights over-allocation issue
 - Fluvial Geomorphology – analysis is adversely affected by Sacramento River between Colusa and Red Bluff considered part of Secondary Study area
 - Terrestrial Biology – disputes findings of the technical analysis, mitigation lacks detail
 - Geology, Minerals, Soils and Paleontology – no mention of mercury
- Request **withdrawal of the Draft EIR/EIS**, revision and recirculation

**Friends of the River, Sacramento River Preservation Trust, Sierra Club (1/15/18)
#25 (expanded version of comments provided in Letter #24)**

- Expanded version of Letter #24 – includes all comments list above and:
 - Appendices 6B and 6C – review of appendices indicates alarming flow impacts to the Sacramento River and Sutter Bypass, particularly drought years
- Request withdrawal of the Draft EIR/EIS, revision and recirculation

Klamath Riverkeeper (1/15/18) #27

- Compliance with **California and Federal Endangered Species Acts** – increased Sacramento River flows and increased outflows from the Delta necessary to support native fish and wildlife; EIR/EIS fails to provide a consistent operational plan

- Compliance with **California Reasonable Use Doctrine** not demonstrated - reasonableness requires evaluation of alternative water supplies to meet given need and evaluation of the impacts of new water uses on existing legal uses and water users
- Compliance with **Public Trust Doctrine and Tribal Trust Obligations** – suggests that reduced flows would occur in Sacramento, Trinity and Klamath rivers and failure to comply with Public Trust doctrine and protect Tribal Trust resources
- Must accommodate **Humboldt County’s Trinity River water right** – county may wish to preserve its water right to augment rather than satisfy flows to comply ESA
- Fully analyze the **No Project Alternative** – fails to include operational plans and does not evaluate how No Project Alternative could satisfy consumptive and instream water supply needs
- The Final EIR/EIS must demonstrate that future instream flow requirements will not render Sites Reservoir a “stranded asset”

Save the American River Association (n/d) #30

- Analysis based on false premise that **current flow and water quality standards** for the river are adequate
- Entire project based on the false premise that there is **excess water in the Sacramento River** not needed for the environment
- Urges **new environmental document** be prepared and released for public review

Sierra Club, Shasta Group Mother Load Chapter (1/14/18) #31

- Sacramento River **water temperature** – reliability of the water temperature model, Sites Reservoir will have extremely poor water quality
- **Recreational opportunities** will be practically nonexistent due to shallow lake levels
- Site-specific **geotechnical data** missing
- The **summary of environmental effects** by resource (Table ES-2) reflects the “opinion” of the writers of the report, should be independent review to confirm if “opinion” is scientific defensible
- Source of rockfill material for riprap - further field investigation is needed to verify local bedrock is suitable
- Number of saddle dams indicative of poor project feasibility
- Sufficient water for agriculture, more water needs to be used in the Sacramento/San Joaquin Delta to **improve health of the aquatic habitat** – no mention of crop usage and future food types likely to be used in California in the future and associated impacts
- Funds for this project could be used and distributed to improving the health of the Sacramento/San Joaquin Delta
- Unclear if **hydropower** will be part of the project
- **No new facilities** should be constructed in the Sacramento River

- **No Project/No Action Alternative** should be selected

Sacramento Valley Chapter, California Native Plant Society (1/11/18) #122

- Project will destroy 15,000 acres of intact California **natural communities** including oak woodlands, chaparral, California prairie, riparian areas, and fresh and alkaline wetlands
- **Biological surveys**, including rare plants, inadequate

Save California Salmon, California Sportfishing Protection Alliance, California Water Impact Network, Environmental Water Caucus, Southern California Watershed Alliance, Friends of the River, Pacific Coast Federation of Fishermen's Associations & Institute for Fisheries Resources, Safe Alternatives for our Forest Environment, Butte Environmental Council, Sacramento Valley Chapter of the California Native Plant Society, Protect American River Canyons, Fly Fishers of Davis, Coast Action Group, Friends of the River, Sacramento River Council, Planning and Conservation League, The Environmental Justice Coalition for Water, Golden Gate Salmon Association, Conservation Fly Fishers International Northern California Council, The Bay Institute, Winnemem Wintu Tribe, Water Climate Trust, Chico 350, Women's International League for Peace And Freedom Earth Democracy (March 17, 2019) #140

- Foreseeable Impacts to Trinity River Water Temperature Objectives Associated with Sites Project Operations Need to be Evaluated with an Accurate Temperature Model.
- Foreseeable Impacts to Trinity River Water Temperature Objectives Associated with Sites Project Operations Need to be Evaluated with an Accurate Temperature Model.
- Inaccurate Existing (Baseline) TRD Water Operations.
- Incomplete Cumulative Impact Assessment Pertaining to TRD Operations.
- Mitigation for Trinity/Lower Klamath Impacts. Effective mitigation measures must be recommended to ensure that fishery/fish habitat management objectives for the Trinity River and lower Klamath River will be met. The Bureau of Reclamation has used the auxiliary outlet on Trinity Dam to release colder water during drier years, but this action results in the loss of power generation and this impact on CVP power generation needs to be evaluated as it relates to revised Trinity operations as proposed for Sites.
- Narrow Scope of Alternatives.
- No Action Alternative and Existing Conditions. Assuming the existing conditions and No Action alternatives are the same is inappropriate, compromises the ability to compare impacts across alternatives, and may minimize the magnitude of some of the impacts. The faulty assumption that State and Federal water contractors would be projected to use their full contracted water volumes (2030 projected conditions) does not reflect the current water management (existing condition) and likely provides inaccurate impact results. Because of this, the no action alternative minimizes potential impacts and greatly reduces the mitigation responsibilities required under CEQA.
- Sites Project Water Rights and Potential Unforeseen/Undisclosed Impacts.
- Cumulative Impacts.
- Sites Reservoir Operating Procedures/Priorities Absent.
- Compliance with California Endangered Species Act (CESA).
- Tribal Consultation and Mitigation Absent.

- Hydropower Licensing.
- Environmental Baseline/Modeling.
- Bypass Flows and Diversion Rates.
- Reduced Delta Outflows and impacts on Delta Smelt and Other Important Bay-Delta Species.
- Delta and Longfin Smelt Impacts due to Old and Middle River Reverse Flows.
- Water Quality and Beneficial Use Impacts.
- Sacramento River Flow and Temperature Modeling.
- Sacramento River Temperature Effects.
- Impacts to Floodplain Habitat.
- Evaluation of Fishery Impacts Lacking.
- Water Quality
 - Toxic Metals.
 - Methylmercury.
 - Noxious Algal Blooms.
 - Salinity.
- Geomorphology.
- Entrainment Losses of Native Fish.
- Fish Screens.
- Impacts on Funks and Stone Corral creeks.
- Reservoir Fishery Impacts from Pumping Plant Operation:
- Recreation.
- Wildlife Mitigation Actions.
- Need for a Natural Community Conservation Plan (NCCP).
- Nesting Birds.
- Giant Garter Snake.
- Botanical Surveys. Information contained in the DEIS/EIR is insufficient to determine the impacts on botanical resources within the Sites Project area. Botanical surveys must be redone, data included in the DEIS/EIR are from the late 1990's and early 2000's, and must include all areas affected by the project. Accepted scientific protocols should be used to conduct these surveys.
 - Botanical Resources Mitigation.

Letters from Tribal Governments

Colusa Indian Community Council (January 4, 2018) #4

- Project will have a direct impact on the **Indian Trust Assets** of the CICC, Tribal Trust Lands and several Fee Simple Lands owned by the Tribe coated downstream
- Need to ensure **water availability** to meet Tribal water demands; Bureau of Reclamation could provide funding to the Tribe to address water supply impacts of the project
- Delevan Intake/Discharge Facility will lead to **increased erosion downstream** which could impact Tribal Water Diversion downstream.
- Impacts to **cultural resources** including burials within the reservoir footprint and the vicinity of the Sacramento River.
- Construction of the Delevan pipeline will require **traffic diversions** that will impact Tribal Fee Land and put Tribal **agricultural land** out of production.

Karuk Tribe (3/6/19) #139

- **Tribal Consultation and Mitigation** absent - no consultation outside of footprint area, need to conduct additional AB 52 consultation
- Need to 'honestly' evaluate **foreseeable impacts to Trinity River water temperature objectives** associated with project operations – revised Trinity River Division (TRD) water operations associated with Sites Projects violates 2000 Trinity Record of Decision (ROD)
- Need to analyze foreseeable impacts to the Trinity River associated with **Trinity Lake carryover storage** – analysis assumes minimum Trinity Reservoir carryover storage, without sufficient carryover storage would not achieve Trinity River temperature objectives
- Inaccurate **baseline associated with TRD** water operations – analysis did not consider use of Humboldt County's 50 TAF water contract included in the Trinity River Division Act
- Effective **mitigation for Trinity River/Lower Klamath impacts** needed
- Incomplete **cumulative impact assessment** pertaining to TRD operations – impact of carryover storage to meet **temperature objectives** during multi-year droughts; impact on **CVP power generation**
- Any adverse impacts on **fishery resources of the Karuk Tribe** need to be thoroughly evaluated and disclose



Topic: **Joint Authority Board and Reservoir Committee Meeting Agenda Item 3.2** 2020 September 17

Subject: **Key Operations Modeling Refinements**

Requested Action:

Review and comment on the key refinements and new capabilities of the updated Sites Project CalSim model.

Detailed Description/Background:

During Amendment 1B, staff and consultants worked to update and improve the capability of the Sites Project CalSim model that is being used as the basis for the environmental planning, environmental permitting, and feasibility report efforts as part of Amendment 2.

As a result of project changes related to the Sites Project Value Planning Alternatives Appraisal Report as well as the October 2019 Biological Opinions on Long-term Operations of the Central Valley Project and State Water Project (ROC on LTO BiOps) and the March 2020 Incidental Take Permit for Long-term Operations of the State Water Project (SWP ITP), several refinements to the Sites Project Calsim model have been made.

Several components of the model have been refined over the past year to make the model current with regulatory and Sites Project Authority decisions. Refinements include the following:

1. Use of ROC on LTO BiOps as the baseline, with further adjustments forthcoming based on an updated SWP Delivery Capability Report (DCR) 2019 with SWP ITP actions
2. Participation levels to reflect Amendment 2
3. Facilities to reflect Value Planning changes
4. Operational changes related to the Bureau of Reclamation participation from the Federal Feasibility Report

Due to previous model limitations, the team has “tested” a number of components using post-processing methodologies – applying rules and parameters to Calsim modeling results to get an approximation without fully coding the refinements in the Sites Project Calsim model. Over the past year, the team has improved the ability of the Calsim model to refine and test a number of different scenarios in the model itself. Improved abilities in the Sites Project Calsim model include the following:

- Federal participation options have been expanded:
 - Reclamation as an exchange partner with Shasta Lake (which could also apply to Folsom Lake)
 - Reclamation as a financial participant with a storage account in Sites Reservoir (refinements made to previous assumptions)
 - No federal participation
- SWP facility coordination options have been expanded:

- Deliveries made in coordination with Oroville operations (refinements made to previous assumptions)
 - Deliveries through SWP conveyance facilities only
- South of Delta (SOD) Participant demand assumptions revised:
 - Model now explicitly tracks water deliveries to SOD Participants through the export facilities
- Diversion and environmental criteria updated:
 - Sutter Bypass weir spills (Ord Ferry, Moulton Weir, Colusa Weir, Tisdale Weir). The magnitude, duration and timing of inundation were refined and can be adjusted.
 - Fremont Weir Notch and Yolo Bypass. The magnitude, duration and timing of inundation were refined and can be adjusted.
 - Freeport bypass flow criteria options revised to allow for adjustments
 - Pulse flow protections were refined
 - Delta Outflow criteria was added
 - Red Bluff, Hamilton City, and Wilkins Slough bypass or scaled flows was refined to allow for adjustments
 - Diversion and release maintenance windows were revised
- Environmental water management flexibility:
 - Flows into Colusa Basin Drain conveyed to Cache Slough via the Knights Landing Ridge Cut (previous assumption)
 - Incremental Level 4 Refuge water supply (previous assumption)
 - Working with California Department of Fish and Wildlife to confirm and refine environmental water uses and ensure flexibility in the analysis
- Sites Project Facilities refinements to reflect Value Planning:
 - Reservoir capacity adjustments
 - Dunnigan Pipeline facilities were added

The fundamental principles of the modeling have not changed, particularly as it relates to water rights and overall diversion priorities. In general, the model assumes that Sites is a junior water rights holder and therefore can divert after all other water rights are met, including water rights, contractual obligations and Tribal trust responsibilities in the Trinity River system. In addition, diversions can only take place when environmental requirements are met and when "excess" conditions exist in the Delta. The model is being refined to remove the anomalies and correctly indicate there are no effects or impacts on the Trinity River from the Sites Project.

Initial CalSim results are being checked by the operations and fisheries team. Following the initial review, iterative model simulations will be run to assess aquatic resource and water quality effects and further refinements to diversion criteria. Full modeling results will be available for the December Reservoir Committee and Authority Board meetings.

Prior Action:

None.

Fiscal Impact/Funding Source:

None.

Staff Contact:

Ali Forsythe

Attachments:

None.

Sent: 9/4/2020 6:49:00 PM
To: Kevin Spesert (kspesert@sitesproject.org) [kspesert@sitesproject.org]
Subject: FW: Sites - Construction Water Needs and Groundwater Basin Information

FYI on groundwater basin info.

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Williams, Nicole <Nicole.Williams@icf.com>
Sent: Friday, September 4, 2020 4:52 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

Hello,

Basin Facts:

- Sites Reservoir inundation area overlaps nearly all of Funks Creek groundwater basin (5-090) in the north and Antelope Creek groundwater basin (5-091) in the south, both of which have a very low SGMA Basin Prioritization
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- Colusa Groundwater Authority GSA: Joint Powers Authority comprised of:
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 - o City of Williams, Glenn Colusa Irrigation District
 - o Colusa County Water District
 - o Princeton-Codora-Glenn Irrigation District
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 - o Westside Water District
 - o Reclamation District 108
 - o Reclamation District 479
 - o Colusa Drain Mutual Water Company
 - o The JPA Board also consists of two private pumper representatives from the Colusa County Groundwater Commission appointed by the Colusa County Board of Supervisors, and serving as Directors on the Board of the Authority.

Considerations:

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- If the source ends up being groundwater, consider obtaining groundwater from within the Inundation area (e.g., Funks Creek groundwater basin); while it is unknown exactly how much groundwater is pumped from the inundation area currently, this area is a very low priority basin; there might be some indirect effect to Funks Creek and exchange with the Funks Creek Groundwater Basin, or indirect effect on Colusa by pumping from Funks Creek Groundwater Basin, but that might be considered more reasonable than pumping from a known high priority groundwater basin like Colusa

- Alternatively, comparing the overall volume of water needed for construction relative to overall pumping of the Colusa Basin might show the project volume is relatively small; however, pumping from the Colusa Basin could unnecessarily ruffle feathers given the priority status of the basin.

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Are we authorized to speak to the Colusa Basin Point of contact based on the information Henry provided about pumping? Please advise.

Have a nice weekend.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Wednesday, September 02, 2020 11:54 AM
To: Williams, Nicole <Nicole.Williams@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

Nicole,

That's correct. The HC team will be working to provide that information.

Henry N. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Williams, Nicole [<mailto:Nicole.Williams@icf.com>]
Sent: Wednesday, September 2, 2020 7:27 AM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

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Thanks Henry. And HC facilities would be in addition to this estimate, as the Dunnigan Pipeline and all the Funks PGP and TRR PGP facilities would add to this estimated amount, I expect. Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
[icf.com](mailto:nicole.williams@icf.com)

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, September 01, 2020 4:21 PM
To: Williams, Nicole <Nicole.Williams@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

Hi Nicole,

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Water uses include:

- moisture conditioning of the embankment fill materials
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- concrete mixing
- grouting
- quarrying/processing
- dust suppression on access roads (dam footprints, stockpiles, staging and haul roads)
- other construction activities

Hopefully this information is useful,

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Williams, Nicole [<mailto:Nicole.Williams@icf.com>]
Sent: Tuesday, September 1, 2020 10:33 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>
Subject: RE: Sites - EIR/EIS Assumptions

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Hi Ali –

Thank you for the confirmations. This is generally in line with what you will see in the Chapter 2 Alternatives Description we submitted yesterday, with the exception of “it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.” We’ll need to know if we have to evaluate that and which groundwater basins the water might come from.

We can look into SGMA and the basin status. We cannot really hazard a guess at this point as to how we affect the basin compliance until we understand the current pumping, the current basin status and get estimates from HR on the volume of water/pumping required during construction. Although, if we find out the basin status is very healthy then even if the construction requires a lot of water to be pumped, it may ultimately be okay, but we'd still need to discuss estimates of volumes needed during construction in order to make those types of statements.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
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o 916.231.9614
icf.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, September 01, 2020 10:14 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>
Subject: RE: Sites - EIR/EIS Assumptions

Hi all – Henry reminded me that I have my east and west mixed up. Corrected below. Thanks Henry!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Tuesday, September 1, 2020 9:55 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>
Subject: Sites - EIR/EIS Assumptions

I talked to Kevin this morning on a few of our assumptions. Here's some quick notes below.

TRR – He agreed to stay with the current location. There is a land management meeting this afternoon to discuss the other possible locations, so we should see how this plays out over the next few weeks.

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In thinking more about construction, it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.

Thanks all!

Ali

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From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/5/2020 11:05:10 AM
To: Kevin Spesert [kspesert@sitesproject.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Sites - Construction Water Needs and Groundwater Basin Information

Hi Kevin,

Just forwarding in case you did not receive Ali's email below.

Have a wonderful weekend,
Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Friday, September 4, 2020 6:51 PM
To: Williams, Nicole <Nicole.Williams@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

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This is great Nicole. Thank you for taking a look into this and for the nice concise summary.

I am comfortable with you and your team talking to Mary Fahey. Is there something in particular your team would like to check in on or just generally understand the opportunities and constraints?

Kevin, FYI for groundwater information.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Cheers, Nicole

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D 916.679.8857 M 916.754.7566

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Sent: Tuesday, September 1, 2020 10:33 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>;

Briard, Monique <Monique.Briard@icf.com>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>

Subject: RE: Sites - EIR/EIS Assumptions

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From: Alicia Forsythe <aforsythe@sitesproject.org>

Sent: Tuesday, September 01, 2020 10:14 AM

To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>

Subject: RE: Sites - EIR/EIS Assumptions

Hi all – Henry reminded me that I have my east and west mixed up. Corrected below. Thanks Henry!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Tuesday, September 1, 2020 9:55 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>;
Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>
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Thanks all!

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/9/2020 10:44:18 AM
To: Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Micko, Steve/SAC [Steve.Micko@jacobs.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Ops Update

Hi all,

Here's the ops update I'd like to send out to the team. Please let me know if you have changes.

- There is a high-level CalSim results meeting with the operations and ICF fisheries team this afternoon, 9/9. A second meeting will be scheduled for early next week (9/14 or 9/15) to discuss the CalSim results in more detail. These results will be able to provide the environmental, permitting, and engineering teams with more detail related to the timing and quantity of flows throughout the modeling period *[note to ops team – this question was specifically posed to me by the engineers this morning]*
- The team will be working on finalizing the operations parameters that will be included in the full modeling suite in the impacts analysis for the EIR/EIS and BA. This will include assumptions about Reclamation involvement, SWP integration, etc.
- The team is working on the process for engaging CDFW to discuss the diversion criteria that will be included in the modeling. The timing of this will be discussed as will any impacts it may have on the overall schedule.

Thanks,
Erin

Erin Heydinger, PE, PMP
Asst. Project Manager
Water/Wastewater

HDR
2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
☎ 916.679.8863 📠 651.307.9758

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From: Williams, Nicole [Nicole.Williams@icf.com]
Sent: 9/9/2020 10:58:28 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Luu, Henry [Henry.Luu@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Briard, Monique [Monique.Briard@icf.com]; John Spranza [John.Spranza@hdrinc.com]; Kevin Spesert [kspesert@sitesproject.org]
Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

Ali – I'll agree with you about waiting to talk to Mary.

All – it just occurred to me, I believe the modeling Jacobs is doing would incorporate some type of groundwater modeling (and/or spreadsheet calculations). Would the pumping rates that HR has estimated for construction be included in any groundwater modeling Jacobs is doing? I know typically construction water supply/pumping might not be quantitatively evaluated/modeled, but given the potential volumes, I just thought I would ask. Thanks for the input.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 09, 2020 10:49 AM
To: Williams, Nicole <Nicole.Williams@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>; John Spranza <John.Spranza@hdrinc.com>; Kevin Spesert <kspesert@sitesproject.org>
Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

Thanks Nicole. Yes, I meant to add Kevin but forgot. Thank you for noticing!

Lets hold off on talking to Mary. I wasn't sure if there was something we needed / wanted to talk to her about now. But I am now thinking that lets give HR and HC some time to refine estimates and think a bit more about water needs. Then we can talk with Mary with more firm numbers and approach. Maybe in the November / December timeframe. Although now that I say that, I do wonder if she has any info on current pumping amounts in the Sites Valley that would be useful for the EIR/EIS analysis. I definitely think we want to talk to her with enough information that is meaningful but in time to be able to incorporate any changes / thoughts into the EIR/EIS. I feel like we are still a little ways out on this.

Kevin, let me know if you think we should talk with Mary earlier.

Thanks Nicole for keeping this moving!

Ali

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aforsythe@sitesproject.org | www.SitesProject.org

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Draft_0003614

From: Williams, Nicole <Nicole.Williams@icf.com>

Sent: Wednesday, September 9, 2020 7:08 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Luu, Henry <Henry.Luu@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>; John Spranza <John.Spranza@hdrinc.com>

Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

Hi Ali –

- Did you mean to cc Kevin – I don't think he was on the response email – see highlight recipients below.
- Regarding speaking to Mary – it was something suggested in your original email by Kevin *"He also suggested that we eventually talk to the local Colusa County SGMA coordinator once we have some numbers on potential pumping."* The numbers Henry provided are about potential pumping; I'm wondering if they are too preliminary and if the range of possible pumping will be narrowed, and/or the timing and duration of pumping will become more specific, so that we can convey a potential total volume of water pumped to Mary.
- FYI: Per the Small Water Quality working group yesterday the group seemed to support pumping within the Valley (and keeping that water within the Valley), and then possibly using surface water for construction of facilities outside of the Valley (unclear the volume, timing, duration of that water needed given its HC and they are working on it).

Hello John – I know there are a lot of emails, but I'm adding you to this email per the discussion in the small water quality working group yesterday. You can see below preliminary groundwater basin facts (less about quality, more about quantity) and the suggestion for possibly keeping pumping from the valley in the valley and maybe consider not pumping outside of the valley, which is consistent with what we discussed yesterday with Jeff Herrin.

Cheers, Nicole

NICOLE L. WILLIAMS
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To: Williams, Nicole <Nicole.Williams@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>

Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

This is great Nicole. Thank you for taking a look into this and for the nice concise summary.

I am comfortable with you and your team talking to Mary Fahey. Is there something in particular your team would like to check in on or just generally understand the opportunities and constraints?

Kevin, FYI for groundwater information.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Draft_0003615

From: Williams, Nicole <Nicole.Williams@icf.com>

Sent: Friday, September 4, 2020 4:52 PM

To: Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>

Subject: RE: Sites - Construction Water Needs and Groundwater Basin Information

Hello,

Basin Facts:

- Sites Reservoir inundation area overlaps nearly all of Funks Creek groundwater basin (5-090) in the north and Antelope Creek groundwater basin (5-091) in the south, both of which have a very low SGMA Basin Prioritization
- Facilities to the east of the inundation area (e.g., Funks PGP, TRR, TRR PGP) would be located in the Colusa Groundwater Subbasin (5-021.52), which has a SGMA Basin Prioritization of high; this basin reaches westward along Funks Creek and probably has some exchange with Funks Creek
- Colusa Groundwater Authority and Glenn Groundwater Authority are developing a single Groundwater Sustainability Plan (GSP) for the Colusa Subbasin
- Colusa Groundwater Authority Point of Contact: Mary Fahey, Water Resources Manager; (mfahey@countyofcolusa.org); 530-458-0719
- Colusa Groundwater Authority GSA: Joint Powers Authority comprised of:
 - o County of Colusa, City of Colusa
 - o City of Williams, Glenn Colusa Irrigation District
 - o Colusa County Water District
 - o Princeton-Codora-Glenn Irrigation District
 - o Provident Irrigation District, Maxwell Irrigation District
 - o Westside Water District
 - o Reclamation District 108
 - o Reclamation District 479
 - o Colusa Drain Mutual Water Company
 - o The JPA Board also consists of two private pumper representatives from the Colusa County Groundwater Commission appointed by the Colusa County Board of Supervisors, and serving as Directors on the Board of the Authority.

Considerations:

- Would 1,000,000 gallons/day be needed for the entire (seven years?) duration of reservoir facility construction? Are we talking something on the order of 10 TAF for the life of the project?
- If the source ends up being groundwater, consider obtaining groundwater from within the Inundation area (e.g., Funks Creek groundwater basin); while it is unknown exactly how much groundwater is pumped from the inundation area currently, this area is a very low priority basin; there might be some indirect effect to Funks Creek and exchange with the Funks Creek Groundwater Basin, or indirect effect on Colusa by pumping from Funks Creek Groundwater Basin, but that might be considered more reasonable than pumping from a known high priority groundwater basin like Colusa
- Alternatively, comparing the overall volume of water needed for construction relative to overall pumping of the Colusa Basin might show the project volume is relatively small; however, pumping from the Colusa Basin could unnecessarily ruffle feathers given the priority status of the basin.

- If facilities east of the inundation area need water, perhaps it could be transported from the inundation area or could be provided via a surface water supply from member participants, rather than pumping from the Colusa Basin

Are we authorized to speak to the Colusa Basin Point of contact based on the information Henry provided about pumping? Please advise.

Have a nice weekend.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Wednesday, September 02, 2020 11:54 AM
To: Williams, Nicole <Nicole.Williams@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

Nicole,

That's correct. The HC team will be working to provide that information.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Williams, Nicole [<mailto:Nicole.Williams@icf.com>]
Sent: Wednesday, September 2, 2020 7:27 AM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

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Thanks Henry. And HC facilities would be in addition to this estimate, as the Dunnigan Pipeline and all the Funks PGP and TRR PGP facilities would add to this estimated amount, I expect. Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, September 01, 2020 4:21 PM
To: Williams, Nicole <Nicole.Williams@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: RE: Sites - EIR/EIS Assumptions

Hi Nicole,

The engineering team will be providing a more in-depth analysis of construction schedule and water usage as part of the Phase 2 work, but rough estimate of water required for construction of reservoir facilities are on the magnitude of 750,000 to 1,000,000 gallons/day (500 to 700 gpm).

Water uses include:

- moisture conditioning of the embankment fill materials
- watering of rock, sand filter and gravel drain materials in the fill
- concrete mixing
- grouting
- quarrying/processing
- dust suppression on access roads (dam footprints, stockpiles, staging and haul roads)
- other construction activities

Hopefully this information is useful,

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Williams, Nicole [<mailto:Nicole.Williams@icf.com>]

Sent: Tuesday, September 1, 2020 10:33 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>

Subject: RE: Sites - EIR/EIS Assumptions

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Ali –

Thank you for the confirmations. This is generally in line with what you will see in the Chapter 2 Alternatives Description we submitted yesterday, with the exception of “it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.” We’ll need to know if we have to evaluate that and which groundwater basins the water might come from.

We can look into SGMA and the basin status. We cannot really hazard a guess at this point as to how we affect the basin compliance until we understand the current pumping, the current basin status and get estimates from HR on the volume of water/pumping required during construction. Although, if we find out the basin status is very healthy then even if the construction requires a lot of water to be pumped, it may ultimately be okay, but we’d still need to discuss estimates of volumes needed during construction in order to make those types of statements.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner

ICF
o 916.231.9614

icf.com

From: Alicia Forsythe <aforsythe@sitesproject.org>

Sent: Tuesday, September 01, 2020 10:14 AM

To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>

Subject: RE: Sites - EIR/EIS Assumptions

Hi all – Henry reminded me that I have my east and west mixed up. Corrected below. Thanks Henry!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe

Sent: Tuesday, September 1, 2020 9:55 AM

To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Williams, Nicole <Nicole.Williams@icf.com>; Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>

Subject: Sites - EIR/EIS Assumptions

I talked to Kevin this morning on a few of our assumptions. Here's some quick notes below.

TRR – He agreed to stay with the current location. There is a land management meeting this afternoon to discuss the other possible locations, so we should see how this plays out over the next few weeks.

Dunnigan alignment east of CBD – He agrees that we should use the first alignment with the turns / following property lines.

Construction water – He thinks our approach is okay. But did suggest that we look into the local SGMA considerations. Is the area covered in a basin? How might we affect the basin compliance? He also suggested that we eventually talk to the local Colusa County SGMA coordinator once we have some numbers on potential pumping. Nicole, do you have someone who could look into these groundwater issues from a very general sense now? I'd like to be able to answer these questions generally if they come up at the Board meeting this month.

In thinking more about construction, it might be a combination of both buying water from TC districts for areas like Funks and groundwater up in the Sites valley.

Thanks all!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

From: Micko, Steve/SAC [Steve.Micko@jacobs.com]
Sent: 9/9/2020 12:31:01 PM
To: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]
Subject: RE: Ops Update

Hi Erin,

Looks good to me.

Just to confirm, the question from the engineering team is about timing and magnitude of flow?

I removed the “throughout modeling period” phrase because I infer that as a timeseries analysis.

I tend to steer away from language that may lead folks to think that CalSim II results are analyzed as a timeseries.

When reviewing results, the focus is on statistics: exceedance plots, long-term averages, water year type averages, etc.

See strikethrough and notes in orange below.

Feel free to accept or ignore additions.

Please let me know if you have any questions.

Best,
Steve

From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Wednesday, September 9, 2020 10:44 AM
To: Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: [EXTERNAL] Ops Update

Hi all,

Here’s the ops update I’d like to send out to the team. Please let me know if you have changes.

- There is a high-level CalSim results meeting with the operations and ICF fisheries team this afternoon, 9/9. A second meeting will be scheduled for early next week (9/14 or 9/15) to discuss the CalSim results in more detail. These results will be able to provide the environmental, permitting, and engineering teams with more detail related to the timing and ~~quantity~~ magnitude of flows ~~throughout the modeling period~~ [note to ops team – this question was specifically posed to me by the engineers this morning]
- The team will be working on finalizing the operations parameters that will be included in the full modeling suite in the impacts analysis for the EIR/EIS and BA. This will include assumptions about ~~facility sizing~~, Reclamation involvement, SWP integration, etc.
- The team is working on the process for engaging CDFW to discuss the diversion criteria that will be included in the modeling. The timing of this will be discussed as will any impacts it may have on the overall schedule.

Thanks,
Erin

Erin Heydinger, PE, PMP
Asst. Project Manager
Water/Wastewater

HDR

2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
D 916.679.8863 M 651.307.9758

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/9/2020 12:54:06 PM
To: Micko, Steve/SAC [Steve.Micko@jacobs.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]
Subject: RE: Ops Update

Steve,

Thanks for the comments. That's correct re: engineering team.

Ali – do you want me to send this out to the team or do you have other items you'd like to send along with it?

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Wednesday, September 9, 2020 12:31 PM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>
Subject: RE: Ops Update

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Erin,

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I removed the “throughout modeling period” phrase because I infer that as a timeseries analysis.

I tend to steer away from language that may lead folks to think that CalSim II results are analyzed as a timeseries.

When reviewing results, the focus is on statistics: exceedance plots, long-term averages, water year type averages, etc.

See strikethrough and notes in orange below.

Feel free to accept or ignore additions.

Please let me know if you have any questions.

Best,
Steve

From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Wednesday, September 9, 2020 10:44 AM
To: Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>

Cc: Alicia Forsythe <aforsythe@sitesproject.org>

Subject: [EXTERNAL] Ops Update

Hi all,

Here's the ops update I'd like to send out to the team. Please let me know if you have changes.

- There is a high-level CalSim results meeting with the operations and ICF fisheries team this afternoon, 9/9. A second meeting will be scheduled for early next week (9/14 or 9/15) to discuss the CalSim results in more detail. These results will be able to provide the environmental, permitting, and engineering teams with more detail related to the timing and ~~quantity~~ magnitude of flows throughout the modeling period [note to ops team – this question was specifically posed to me by the engineers this morning]
- The team will be working on finalizing the operations parameters that will be included in the full modeling suite in the impacts analysis for the EIR/EIS and BA. This will include assumptions about facility sizing, Reclamation involvement, SWP integration, etc.
- The team is working on the process for engaging CDFW to discuss the diversion criteria that will be included in the modeling. The timing of this will be discussed as will any impacts it may have on the overall schedule.

Thanks,
Erin

Erin Heydinger, PE, PMP
Asst. Project Manager
Water/Wastewater

HDR
2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
D 916.679.8863 M 651.307.9758

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From: Alicia Forsythe [aforsythe@sitesproject.org]
Sent: 9/9/2020 1:31:50 PM
To: laurie.warner.herson@phenixenv.com; john.spranza@hdrinc.com; 'Heydinger, Erin' [Erin.Heydinger@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Fisher, Linda [Linda.Fisher@hdrinc.com]; Henry.Luu@hdrinc.com; Monique Briard (Monique.Briard@icf.com) [Monique.Briard@icf.com]; Lecky, Jim [Jim.Lecky@icf.com]; Williams, Nicole [Nicole.Williams@icf.com]; Rude, Pete/RDD [Pete.Rude@jacobs.com]; Jim Watson [jwatson@sitesproject.org]; Boling, Robert M. [Robert.Boling@hdrinc.com]; Forrest, Michael [michael.forrest@aecom.com]; Jeff.Herrin@aecom.com; Berryman, Ellen [Ellen.Berryman@icf.com]; Unsworth, Ellen [Ellen.Unsworth@icf.com]; Jerry Brown [jbrown@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; conner@cmdwest.com; Smith, Jeff/SAC [Jeff.Smith1@jacobs.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Marcia Kivett [MKivett@sitesproject.org]; Alexander, Jeriann [jalexander@fugro.com]; connermcdonald@gmail.com; Micko, Steve/SAC [Steve.Micko@jacobs.com]
Subject: RE: Sites - Project Description Team

Hi all – Two quick updates below in lieu of our meeting today.

Filling the Remaining Data Gaps:

The Integration Team is in the process of identifying the remaining data gaps and informational needs required to complete the project description, and developing / coordinating on the process that will be implemented to address those gaps. Additional information will be provided prior to the next scheduled meeting.

Operations Modeling Status:

- There is a high-level CalSim results meeting with the operations and ICF fisheries team this afternoon, 9/9. A second meeting will be scheduled for early next week (9/14 or 9/15) to discuss the CalSim results in more detail. These results will be able to provide the environmental, permitting, and engineering teams with more detail related to the timing and magnitude of flows
- The team is working on finalizing the operations parameters that will be included in the full modeling suite in the impacts analysis for the EIR/EIS and BA. This will include assumptions about facility sizing, Reclamation involvement, SWP integration, etc.
- The team is working on the process for engaging CDFW to discuss the diversion criteria that will be included in the modeling. The timing of this will be discussed as will any impacts it may have on the overall schedule.
- We will provide a high-level overview of the operations modeling status, schedule and results at our September 23 Project Description Team meeting.

Don't hesitate to contact me or your integration lead with any questions, thoughts or concerns you might have.

Have a great week and stay safe out there!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Tuesday, September 8, 2020 3:55 PM

Draft_0003625

To: laurie.warner.herson@phenixenv.com; john.spranza@hdrinc.com; 'Heydinger, Erin' <Erin.Heydinger@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Fisher, Linda <Linda.Fisher@hdrinc.com>; Henry.Luu@hdrinc.com; Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; robert.tull@jacobs.com; Rude, Pete/RDD <Pete.Rude@jacobs.com>; 'Jim Watson, General Manager' <jwatson@sitesproject.org>; Boling, Robert M. <Robert.Boling@hdrinc.com>; Forrest, Michael <michael.forrest@aecom.com>; Jeff.Herrin@aecom.com; Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Jerry Brown <jbrown@sitesproject.org>; 'Kevin Spesert (kspesert@sitesproject.org)' <kspesert@sitesproject.org>; conner@cmdwest.com; Smith, Jeff/SAC <Jeff.Smith1@jacobs.com>
Cc: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Marcia Kivett <MKivett@sitesproject.org>; Alexander, Jeriann <jalexander@fugro.com>; connermcdonald@gmail.com; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Subject: RE: Sites - Project Description Team

Hi all – We have a really light agenda for tomorrows meeting. With this, I thought I would save everyone the time and cancel our meeting tomorrow. We will pick back up on September 23 and talk about operations modeling along with filling the remaining data gaps in the project description.

I will also get out a few updates via email tomorrow.

Have a great day!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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-----Original Appointment-----

From: Marcia Kivett **On Behalf Of** Alicia Forsythe

Sent: Monday, May 11, 2020 6:41 AM

To: laurie.warner.herson@phenixenv.com; Alicia Forsythe; Ali Forsythe; john.spranza@hdrinc.com; 'Heydinger, Erin'; Arsenijevic, Jelica; Fisher, Linda; Henry.Luu@hdrinc.com; Monique Briard (Monique.Briard@icf.com); Lecky, Jim; Williams, Nicole; robert.tull@jacobs.com; Rude, Pete/RDD; Jim Watson, General Manager; Boling, Robert M.; Forrest, Michael; Jeff.Herrin@aecom.com; Berryman, Ellen; Unsworth, Ellen; Jerry Brown; Kevin Spesert (kspesert@sitesproject.org); conner@cmdwest.com; Smith, Jeff/SAC

Cc: Leaf, Rob/SAC; Marcia Kivett; Alexander, Jeriann; connermcdonald@gmail.com; Micko, Steve/SAC

Subject: Sites - Project Description Team

When: Wednesday, September 9, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).

Where: +1 213-379-5743 Conference ID: 576 656 37#

This is a recurring, bi-weekly meeting.

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Conference ID: 576 656 37#

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A Brown and Caldwell Teams meeting has been created for this event.

[Help](#)

From: Briard, Monique [Monique.Briard@icf.com]
Sent: 9/9/2020 1:52:41 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Laurie Warner Herson (Laurie.Warner.Herson@phenixenv.com) [Laurie.Warner.Herson@phenixenv.com]; John Spranza [John.Spranza@hdrinc.com]
Subject: RE: Sites - Project Description Team

Thank you for the update. Will we still receive the PD comments from Sites and Reclamation this week so that we can move forward with the development of the EIR/S, specifically the construction appendix? We had used a one week review period based on the PD PMP guidelines on review cycles and hadn't heard from the team otherwise.

Going forward, Mike Hendrick rather than Jim Lecky will be participating on these calls for ICF. I forwarded the invite to Mike today and Jim is supposed to send you a cancellation but thought I'd give you a heads-up. The timing of the transition seemed right to facilitate the data coordination between Mike and Ellen B and to help Jim move into his strategic role for the project.

Thanks,
Monique

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 9, 2020 1:32 PM
To: laurie.warner.herson@phenixenv.com; John Spranza <John.Spranza@hdrinc.com>; 'Heydinger, Erin' <Erin.Heydinger@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Fisher, Linda <Linda.Fisher@hdrinc.com>; Henry.Luu@hdrinc.com; Briard, Monique <Monique.Briard@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; Rude, Pete/RDD <Pete.Rude@jacobs.com>; Jim Watson <jwatson@sitesproject.org>; Boling, Robert M. <Robert.Boling@hdrinc.com>; Forrest, Michael <michael.forrest@aecom.com>; Jeff.Herrin@aecom.com; Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; conner@cmdwest.com; Smith, Jeff/SAC <Jeff.Smith1@jacobs.com>; Leaf, Rob/SAC <Rob.Lead@jacobs.com>; Marcia Kivett <MKivett@sitesproject.org>; Alexander, Jeriann <jalexander@fugro.com>; connermcdonald@gmail.com; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Subject: RE: Sites - Project Description Team

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- The team is working on the process for engaging CDFW to discuss the diversion criteria that will be included in the modeling. The timing of this will be discussed as will any impacts it may have on the overall schedule.
- We will provide a high-level overview of the operations modeling status, schedule and results at our September 23 Project Description Team meeting.

Don't hesitate to contact me or your integration lead with any questions, thoughts or concerns you might have.

Have a great week and stay safe out there!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe

Sent: Tuesday, September 8, 2020 3:55 PM

To: laurie.warner.herson@phenixenv.com; john.spranza@hdrinc.com; 'Heydinger, Erin' <Erin.Heydinger@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Fisher, Linda <Linda.Fisher@hdrinc.com>; Henry.Luu@hdrinc.com; Monique Briard (Monique.Briard@icf.com) <Monique.Briard@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; robert.tull@jacobs.com; Rude, Pete/RDD <Pete.Rude@jacobs.com>; 'Jim Watson, General Manager' <jwatson@sitesproject.org>; Boling, Robert M. <Robert.Boling@hdrinc.com>; Forrest, Michael <michael.forrest@aecom.com>; Jeff.Herrin@aecom.com; Berryman, Ellen <Ellen.Berryman@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>; Jerry Brown <jbrown@sitesproject.org>; 'Kevin Spesert (kspesert@sitesproject.org)' <kspesert@sitesproject.org>; conner@cmdwest.com; Smith, Jeff/SAC <Jeff.Smith1@jacobs.com>

Cc: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Marcia Kivett <MKivett@sitesproject.org>; Alexander, Jeriann <jalexander@fugro.com>; connermcdonald@gmail.com; Micko, Steve/SAC <Steve.Micko@jacobs.com>

Subject: RE: Sites - Project Description Team

Hi all – We have a really light agenda for tomorrows meeting. With this, I thought I would save everyone the time and cancel our meeting tomorrow. We will pick back up on September 23 and talk about operations modeling along with filling the remaining data gaps in the project description.

I will also get out a few updates via email tomorrow.

Have a great day!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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-----Original Appointment-----

From: Marcia Kivett **On Behalf Of** Alicia Forsythe

Sent: Monday, May 11, 2020 6:41 AM

To: laurie.warner.herson@phenixenv.com; Alicia Forsythe; Ali Forsythe; john.spranza@hdrinc.com; 'Heydinger, Erin'; Arsenijevic, Jelica; Fisher, Linda; Henry.Luu@hdrinc.com; Monique Briard (Monique.Briard@icf.com); Lecky, Jim; Williams, Nicole; robert.tull@jacobs.com; Rude, Pete/RDD; Jim Watson, General Manager; Boling, Robert M.; Forrest, Michael; Jeff.Herrin@aecom.com; Berryman, Ellen; Unsworth, Ellen; Jerry Brown; Kevin Spesert (kspesert@sitesproject.org); conner@cmdwest.com; Smith, Jeff/SAC

Cc: Leaf, Rob/SAC; Marcia Kivett; Alexander, Jeriann; connermcdonald@gmail.com; Micko, Steve/SAC

Subject: Sites - Project Description Team

When: Wednesday, September 9, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).

Where: +1 213-379-5743 Conference ID: 576 656 37#

This is a recurring, bi-weekly meeting.

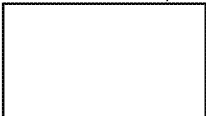
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A Brown and Caldwell Teams meeting has been created for this event.

[Help](#)

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 9/9/2020 2:00:26 PM
To: Marcia Kivett [MKivett@sitesproject.org]
Subject: Please forward
Attachments: Sites_Overview PPT.pdf

This note and attachment to the invited SWRCB staff for yesterday's meeting and cc Ali.

SWRCB Board and Staff – Thank you for your time yesterday to allow us to give you an update on the Sites Reservoir Project. As I mentioned yesterday, we are on a good track now with progressing the project and look forward to working with on the water rights process beginning with the release of the Revised Draft EIR/Supplemental EIS in July 2021 and a water rights applications by close of 2021. Here is the slide deck that we walked through in our discussion yesterday. Please don't hesitate to reach out if you have any questions or concerns.

Thanks
Jerry

Operations Modeling Criteria and Assumptions Overview

Technical Memorandum



To: Ad Hoc Operations and Engineering Workgroup
Date: September 9, 2020
From: Rob Leaf, Reed Thayer, Steve Micko
Quality Review by: Erin Heydinger
Authority Agent Review by: Ali Forsythe

1.0 Introduction

- Purpose of memo This memo describes the adjustable features in the Sites Project modeling
 - Federal participation
 - State facilities coordination
 - Participant demands
 - Diversions and environmental criteria
 - Sites Project facilities

Formatted

2.0 Modeling Assumptions

- Overview of fundamental assumptions that have not changed in the model:
 - Junior water right holder – Sites gets water “last”
 - Diversions after environmental requirements are met
 - Only when excess conditions exist

3.0 Changes to the Model

- Changes over the last year:
 - Baseline
 - Phase 2 project participation
 - Value planning process
 - Improvements from the Federal Feasibility Report
 - Improved ability to refine items listed in Section 4.0
 - Other?

4.0 Modeling Capabilities

- Overview of the “knobs” we can adjust ~~or the “12-layer cake”~~

4.1 Federal Participation

- No use of facilities
- As exchange partner (Shasta)
 - Benefits to Reclamation:

Status: Predecisional Working Draft, subject to change
Filename: OPS-TMS-ModelingCriteriaOverview-20200909

Phase: 2 Revision:
Date: [DATE \@ "MMMM d, yyyy"]

Notes:

Page: [PAG E] of [NUM PAG ES]

- * Improvements to Shasta cold water pool management
- * Improvements to Fall stability flows
- o Benefits to Sites:
 - * Additional release capacity in exchange years
 - * Sites receives credit for improving winter-run Chinook salmon habitat
- o Parameters:
 - * Frequency (which years)
 - * Conditions for exchange
 - Conditions for release
- * With storage account in Sites
 - o Inclusive of exchange at Shasta
 - * May allow for carryover at Shasta
 - o With storage account at Sites, Reclamation priorities are to improve:
 - * water supply to CVP contractors
 - * water supply to Wildlife Refuges
 - * anadromous fish habitat
 - * Delta water quality
 - o Parameters
 - * Volume of storage/participation
 - * Prioritization of Reclamation operations as compared to Delta Participant operations

4.2 State Facilities Facilities Coordination

- * Conveyance facilities only
- * Oroville reoperations
 - o Very important for Sites to have adequate release capacity
 - o Parameters
 - * Volume limit to storage of Sites water in Oroville
 - * Duration of allowable storage
 - Could Sites water carryover into proceeding water years

4.3 Participant Demands

- * North of Delta
 - o TCCA and others (Colusa Groundwater Recharge)
 - * General agricultural demand patterns (June through September; peak in Jul and Aug)
 - * TCCA targets remaining unmet allocation 100% in Shasta Non-Critical years and 75% in Shasta Critical years
 - o RD108 and GCID
 - * April and May in Shasta Critical years
- * South of Delta
 - o Model explicitly tracks water deliveries to SOD participants
 - o Demand patterns:
 - * Sites to provide water when capacity is available (current assumption)
 - * Sites to provide water on Table A demand patterns
- * Updated so SOD participants take what when it's available, vs on Table A
- * Overview NOD demand patterns assumed
- * Explicit tracking of SOD participants water deliveries

4.5.4.4 Diversions and Environmental Criteria

Commented [MS1]: These criteria are specific to modeling. Criteria that cannot be modeled are not included.

- * Provide overview of what model is capable of changing — do not need to include existing modeling assumptions (i.e. specific numbers)
- * Sutter bypassBypass weir spills (Ord Ferry, Moulton Weir, Colusa Weir, Tisdale Weir)
 - Magnitude, duration and timing of inundation
- * Fremont Weir Notch and Yolo Bypass
 - Magnitude, duration and timing of inundation
- Freeport bypass flow criteria
- Pulse Flow Protections
- Delta Outflow
- Red Bluff, Hamilton City, and Wilkins Slough bypass or scaled flows
- Diversion and release maintenance windows

4.5 Sites Project Facilities

- * Reservoir capacity
- * Additional intake/release pipeline (Delevan)
 - Conveyance capacity
- * Dunnigan Pipeline
 - Conveyance capacity
 - Extends to Colusa Basin Drain or Sacramento River
- How water is conveyed to the Yolo Bypass
 - TRR to Colusa Basin Drain
 - TCC to Dunnigan Pipeline to Colusa Basin Drain

5.0 Next Steps

- * Initial CalSim results
- * Review of initial CalSim results
- * Conduct secondary model simulations with preliminary CalSim results to assess:
 - o Water quality effects
 - * HEC5Q
 - * DSM2
 - o Aquatic resources effects
 - * Anderson
 - * Marlin
 - * OBAN
 - * IOS
 - * SALMOD
 - * DPM
 - o Economic effects
 - * SWAP
 - CWEST
- * Preliminary OBAN? Review suite of model results
- * Specific criteria finalizedFinalize model criteria
- Full modeling complete to support EIR/EIS, BA

From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/11/2020 9:11:40 AM
To: Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Micko, Steve/SAC [Steve.Micko@jacobs.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Modeling TM
Attachments: 03-02 Key Operations Modeling Parameters and Assumptions.docx

Hi Reed,

Please see attached. We decided to go a slightly different direction and incorporate the main points from the TM directly in the staff report. Can you take a quick look and make sure there are no fatal flaws?

Also – please let me know who should be included in a diversion criteria meeting with ICF and a separate schedule meeting. I will put get these on the calendar.

Thanks!
Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Sent: Wednesday, September 9, 2020 8:24 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Cc: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Subject: Sites Modeling TM

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ali and Erin,

I have attached the Operations Modeling Criteria and Assumptions Overview TM.

Reed Thayer, PE | [Jacobs](http://Jacobs.com) | Water Resources Engineer
O: 916.286.0228 | M: 831.233.2141 | reed.thayer@jacobs.com
2485 Natomas Park Dr, Ste 600 | Sacramento, CA 95833 | USA

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Topic: **Joint Authority Board and Reservoir Committee Meeting Agenda Item 3.2** 2020 September 17

Subject: **Key Operations Modeling Refinements**

Requested Action:

Review and comment on the key refinements and new capabilities of the updated Sites Project CalSim model.

Detailed Description/Background:

During Amendment 1B, staff and consultants worked to update and improve the capability of the Sites Project CalSim model that will be used as the basis for the environmental planning, environmental permitting, and feasibility report efforts as part of Amendment 2.

As a result of project changes related to the Sites Project Value Planning Alternatives Appraisal Report as well as the October 2019 Biological Opinions on Long-term Operations of the Central Valley Project and State Water Project (ROC on LTO BiOps) and the March 2020 Incidental Take Permit for Long-term Operations of the State Water Project (SWP ITP), several refinements to the Sites Project Calsim model have been made.

Several components of the model have been refined over the past year to make the model current with regulatory and Sites Project Authority decisions. Refinements include the following:

1. Use of ROC on LTO BiOps as the baseline, with further adjustments forthcoming based on an updated SWP Delivery Capability Report (DCR) 2019 with SWP ITP actions
2. Participation levels to reflect Amendment 2
3. Facilities to reflect Value Planning changes
4. Operational changes related to the Bureau of Reclamation participation from the Federal Feasibility Report

Due to previous model limitations, staff and the consultant team "tested" a number of components using post-processing methodologies – applying rules and parameters to Calsim modeling results to get an approximation without fully coding the refinements in the Sites Project Calsim model. Over the past year, the team has improved the ability of the Calsim model to refine and test a number of different scenarios in the model itself. Improved abilities in the Sites Project Calsim model include the following:

- Federal participation options have been expanded:
 - No use of federal facilities
 - Reclamation as an exchange partner with Shasta Lake
 - Reclamation as a financial participant with a storage account in Sites Reservoir (refinements made)
- SWP facility coordination options have been expanded:

- Use of SWP conveyance facilities only with no reservoir reoperations or exchange
 - Oroville reoperations, so that Sites water can be backed into Oroville (refinements made)
- South of Delta (SOD) Participant demand assumptions revised:
 - Model now explicitly tracks water deliveries to SOD Participants
- Diversion and environmental criteria updated:
 - Sutter Bypass weir spills (Ord Ferry, Moulton Weir, Colusa Weir, Tisdale Weir). The magnitude, duration and timing of inundation were refined and can be adjusted.
 - Fremont Weir Notch and Yolo Bypass. The magnitude, duration and timing of inundation were refined and can be adjusted.
 - Freeport bypass flow criteria options revised to allow for adjustments
 - Pulse flow protections were refined
 - Delta Outflow criteria was added
 - Red Bluff, Hamilton City, and Wilkins Slough bypass or scaled flows was refined to allow for adjustments
 - Diversion and release maintenance windows were revised
- Sites Project Facilities refinements to reflect Value Planning:
 - Reservoir capacity adjustments
 - Dunnigan Pipeline facilities were added

The fundamental principles of the modeling have not changed, particularly as it relates to water rights and overall diversion priorities. In general, the model assumes that Sites is a junior water rights holder and therefore can divert after all other water rights are met. In addition, diversions can only take place when environmental requirements are met and when "excess" conditions exist in the Delta.

Initial CalSim results are now available and are being reviewed by the operations and fisheries team. Following the initial review, secondary, iterative model simulations will be run to assess aquatic resource and water quality effects and diversion criteria will be refined. The team will then review the suite of model results to finalize the modeling and diversion criteria. Finally, the full modeling will be complete to support the EIR/EIS, Biological Assessment, and California Water Commission Feasibility Report. Modeling activities generally remain on schedule and full results are expected in November.

Prior Action:

None.

Fiscal Impact/Funding Source:

None.

Staff Contact:

Ali Forsythe

Attachments:

None.

From: Shelly Murphy [ccwd2@frontiernet.net]
Sent: 9/11/2020 2:17:17 PM
To: Marcia Kivett [MKivett@sitesproject.org]; Jerry Brown [jbrown@sitesproject.org]
CC: 'JP Robinette' [JRobinette@BrwnCald.com]
Subject: RE: Colusa County Water District - Second Amendment

All –

Per JP's call today, attached is CCWD's signed Second Amendment to 2019 Reservoir Project Agreement aka "Phase 2B". As you will see the acre-feet did decrease however, there is still a little over 9,000 af of interest (9,373).

Hope you are all staying healthy especially given the air quality throughout the State.

Have a great weekend.

Shelly Murphy
General Manager
Colusa County Water District
530.476.2669

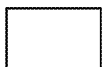
From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Friday, September 11, 2020 12:44 PM
To: Shelly Murphy <ccwd2@frontiernet.net>
Cc: JP Robinette <JRobinette@BrwnCald.com>
Subject: Sites Call Request

Hi Shelly,

I hope you are doing well; I know it's been very hot and extremely smokey there. JP needs to talk with you as soon as possible. Today, if possible. Can you let us know if that is possible and what would be the best number to call you at?

Thank you for your consideration and have a fantastic weekend.

Marcia Kivett
Sites Project Admin
Phone: 561.843.9740
Email: mkivett@sitesproject.org
Web: www.SitesProject.org
P.O. Box 517
122 Old Hwy 99W
Maxwell, CA 95955



Virus-free. www.avg.com

From: Shelly Murphy [ccwd2@frontiernet.net]
Sent: 9/11/2020 2:17:26 PM
To: 'Marcia Kivett' [MKivett@sitesproject.org]; 'Jerry Brown' [jbrown@sitesproject.org]
CC: 'JP Robinette' [JRobinette@BrwnCald.com]
Subject: RE: Colusa County Water District - Second Amendment
Attachments: image001.jpg

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Shelly Murphy
General Manager
Colusa County Water District
530.476.2669

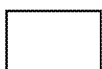
From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Friday, September 11, 2020 12:44 PM
To: Shelly Murphy <ccwd2@frontiernet.net>
Cc: JP Robinette <JRobinette@BrwnCald.com>
Subject: Sites Call Request

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Marcia Kivett
Sites Project Admin
Phone: 561.843.9740
Email: mkivett@sitesproject.org
Web: www.SitesProject.org
P.O. Box 517
122 Old Hwy 99W
Maxwell, CA 95955



Virus-free. www.avg.com

From: Rude, Pete/RDD [Pete.Rude@jacobs.com]
Sent: 9/14/2020 4:50:11 PM
To: Luu, Henry [Henry.Luu@hdrinc.com]
CC: Highstreet, Allan/SAC [Allan.Highstreet@jacobs.com]; Jerry Brown [jbrown@sitesproject.org]
Subject: RE: Sites HC - TRR Alternatives Effort - Additional Scope and Fee

Hi Henry,

Per a number of discussions you and I have had, including one with Geosyntec on Tuesday morning September 8, I believe we are in consensus on the path forward:

- 1) Geosyntec will analyze the Stone Corral Creek (SCC) Terminal Regulating Reservoir (TRR) alternative to the same degree they did for BCM-1,2,and 3 and will track SCC separately under HC 58.1 to an amount not to exceed \$15,000.
- 2) The high level cost information the Land Management Work Group desired will be provided on critical key items (like excavation, ground improvement, pipeline length) that are significantly different between the five alternatives. This effort will have no cost impacts to our current contract.
- 3) The effort by Jacobs that I outlined below will have no cost impacts to our current contract.
- 4) We will update the August 28 Alternatives TRR TM with this new information and have it ready in draft form for the next Land Management Group meeting on or before September 28.
- 5) We have been moving forward in good faith since Tuesday morning September 8 to meet the deadline of the next Land Management Group Meeting.

Thanks

Peter H. Rude, PE (CA, HI, CO) /Jacobs/ Civil Engineer & Principal Project Manager
1-530-229-3396 (office)/ 1-530-917-4164 (mobile)/ 2525 Airpark Drive, Redding, CA 96001
pete.rude@jacobs.com / www.jacobs.com

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Friday, September 04, 2020 12:09 PM
To: Rude, Pete/RDD <Pete.Rude@jacobs.com>
Cc: Highstreet, Allan/SAC <Allan.Highstreet@jacobs.com>; Jerry Brown <jbrown@sitesproject.org>
Subject: [EXTERNAL] RE: Sites HC - TRR Alternatives Effort - Additional Scope and Fee

Hi Pete,

The Authority disputes the estimated fees associated with efforts to provide cost comparisons for the BCM alternatives and ground improvements at the existing TRR location. It is expected that the work/basis of assumptions from the Alternatives to the TRR TM can be used to inform a high level cost comparison between the alternatives.

Analysis of the Stone Corral Creek alternative location for the TRR was a result from the Land Management Committee meeting, and may be considered additional scope. Please proceed with this work as support under task HC58.1 Engineering Support for the TRR and Funks Reservoir, and track as a separate cost. It is anticipated that this analysis will be consistent with what was completed for the BCM alternatives, and estimated to cost no more than \$10K - \$15K to complete.

Please let me know if clarifications or additional directions are required.

Thank you,

Henry N. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Rude, Pete/RDD [<mailto:Pete.Rude@jacobs.com>]
Sent: Thursday, September 3, 2020 6:06 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Highstreet, Allan/SAC <Allan.Highstreet@jacobs.com>
Subject: Sites HC - TRR Alternatives Effort - Additional Scope and Fee

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Hi Henry,

As we discussed, we reviewed the Alternatives to the TRR TM with the Sites Land Management Ad-Hoc Work Group meeting on Tuesday September 1. As a result of that meeting, Sites would like us to expand the analysis to include a new geographic location where Stone Corral Creek Crosses the GCID Main Canal (new Stone Corral Creek Regulating Reservoir) and provide a high level construction cost estimate for the alternatives and ground improvement at the existing TRR. Sites has also requested that this TM be completed by September 30 so that it can go back in front of the Land Management Work Group, and then proceed in October through the Ops/Engineering Work Group, Reservoir Committee and Board meeting.

Attached is the scope and fee that Geosyntec needs to conduct the majority of this new work. Jacobs needs about 32 hours to provide the topographic mapping between Stone Corral Creek and Funks Reservoir, develop construction costs for enlarging the GCID Canal between Funks Creek to Stone Corral Creek from current 900 cfs channel to 1,800 cfs channel, figure out the routing of the pipeline from Stone Corral Creek Reservoir to Funks Reservoir, and coordinate with GCID to get existing canal information between Funks Creek and Stone Corral Creek. Jacobs is willing to cover these hours under our existing contract.

Please let us know in the next few days how we should proceed.

Thanks

Peter H. Rude, PE (CA, HI, CO) /jacobs/ Civil Engineer & Principal Project Manager
1-530-229-3396 (office)/ 1-530-917-4164 (mobile)/ 2525 Airpark Drive, Redding, CA 96001
pete.rude@jacobs.com / www.jacobs.com

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/15/2020 4:58:27 PM
To: Luu, Henry [Henry.Luu@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Jerry Brown [jbrown@sitesproject.org]
Subject: Re: Sites - Reservoir Ops & Engineering Work Group

Friday at 10 works for me.

Erin

Erin Heydinger, PE
Assistant Project Manager

On Sep 15, 2020, at 6:12 PM, Luu, Henry <Henry.Luu@hdrinc.com> wrote:

Hi Ali,

I think a quick chat will be very helpful. I am available this Friday at 10am.

Generally, I think the team needs more time to evaluate and provide meaningful status on some of the topics. My comments are in red below.

a. the Incidental Power generation and FERC license as a discussion item. I am interested in what the estimated hydropower generation size at Funks and TRR if not limited by the FERC licensing threshold.

The conveyance team is currently tracking. An unknown variable at the moment, and I believe we will be receiving this information soon, is input from operations on extent of releases to Funks and TRR. I think we can take a wag at the amount of power generation once we get a better understanding.

b. status of evaluation of earthfill, earth/rockfill and hardfill dam construction.

Dam type selection requires DSOD input. We are progressing with feasibility design assuming earth/rockfill, which has a larger impact footprint compared to earthfill and likely be more receptive by DSOD than a hardfill configuration.

c. status of emergency release evaluation (watersheds, flow rates, downstream absorptive capacity)

Analysis of emergency releases have not been initiated. This task is scheduled to be completed between now and February 2021.

d. status of CBD capacity analysis.

We will provide an update on CBD findings at the next Ops & Engineering workgroup.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Tuesday, September 15, 2020 2:59 PM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Jerry Brown <jbrown@sitesproject.org>
Subject: FW: Sites - Reservoir Ops & Engineering Work Group

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See below. The Environmental Planning and Permitting Workgroup meeting today went well and stimulated a lot of questions from Rob Kunde. He sent me the email below on the next Reservoir Ops and Engineering Workgroup.

Erin and Henry, I am wondering if we should schedule a quick call to chat about these items and plan out a next meeting? Maybe Friday morning at 10 AM?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rob Kunde <rkunde@wrwmsd.com>
Sent: Tuesday, September 15, 2020 2:39 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Sites - Reservoir Ops & Engineering Work Group

Ali:

Has the next Reservoir Operations and Engineering Work Group meeting been set? My calendar says no.

At that next meeting, please include as agenda items:

- a. the Incidental Power generation and FERC license as a discussion item. I am interested in what the estimated hydropower generation size at Funks and TRR if not limited by the FERC licensing threshold.
- b. status of evaluation of earthfill, earth/rockfill and hardfill dam construction.
- c. status of emergency release evaluation (watersheds, flow rates, downstream absorptive capacity)
- d. status of CBD capacity analysis.

Separate email to follow on minor edits to "Sites Reservoir Project - Preliminary Project Description - September 2020".

Robert J. Kunde, P.E.

Retired Annuitant

Wheeler Ridge-Maricopa Water Storage District

12109 Highway 166, Bakersfield, CA 93313

cell: 661-345-3719 email: rkunde@wrwmsd.com

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 9/15/2020 5:33:48 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]
CC: Marcia Kivett [MKivett@sitesproject.org]
Subject: Re: Sites - Reservoir Ops & Engineering Work Group

Yes, 10 Friday works for me. Don't respond to Mr. Kunde. Paste Henry's responses to the questions on a slide - we're done. Our Friday discussion needs to be about workgroup meeting management.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Tuesday, September 15, 2020 at 2:59 PM
To: "Heydinger, Erin" <Erin.Heydinger@hdrinc.com>, "Luu, Henry" <Henry.Luu@hdrinc.com>, Jerry Brown <jbrown@sitesproject.org>
Subject: FW: Sites - Reservoir Ops & Engineering Work Group

See below. The Environmental Planning and Permitting Workgroup meeting today went well and stimulated a lot of questions from Rob Kunde. He sent me the email below on the next Reservoir Ops and Engineering Workgroup.

Erin and Henry, I am wondering if we should schedule a quick call to chat about these items and plan out a next meeting? Maybe Friday morning at 10 AM?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rob Kunde <rkunde@wrmwsd.com>
Sent: Tuesday, September 15, 2020 2:39 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Sites - Reservoir Ops & Engineering Work Group

Ali:

Has the next Reservoir Operations and Engineering Work Group meeting been set? My calendar says no.

At that next meeting, please include as agenda items:

- a. the Incidental Power generation and FERC license as a discussion item. I am interested in what the estimated hydropower generation size at Funks and TRR if not limited by the FERC licensing threshold.
- b. status of evaluation of earthfill, earth/rockfill and hardfill dam construction.
- c. status of emergency release evaluation (watersheds, flow rates, downstream absorptive capacity)
- d. status of CBD capacity analysis.

Separate email to follow on minor edits to "Sites Reservoir Project - Preliminary Project Description - September 2020".

Robert J. Kunde, P.E.

Retired Annuitant

Wheeler Ridge-Maricopa Water Storage District

12109 Highway 166, Bakersfield, CA 93313

cell: 661-345-3719 email: rkunde@wrmwsd.com

From: Fritz Durst (Guest)
Sent: 9/16/2020 11:44:24 AM
To: Kevin Spesert [kspesert@sitesproject.org]; Sara M. Katz* [skatz@katzandassociates.com]; Roger Gwinn [rgwinn@tfgnet.com]; Garrett Durst [garrett@naturalresourceresults.com]; Jerry Brown [jbrown@sitesproject.org]; Thad Bettner [tbettner@gcid.net]; Pryor, Valerie [vpryor@zone7water.com]; Sara Katz; Jeff; jerry brown [jerry@waterologyconsulting.com]; 8:teamsvisitor:b51ad7753cce4b23a39af9814410d5cc

We might be able to get some NGO support with blogs if we don't ask them to support the project, rather support some of the benefits.

From: Herrin, Jeff [jeff.herrin@aecom.com]
Sent: 9/16/2020 12:45:34 PM
To: Marcia Kivett [MKivett@sitesproject.org]; Joe Trapasso [jtrapasso@sitesproject.org]; Henry Luu [Henry.Luu@hdrinc.com]; Erin Heydinger [Erin.Heydinger@hdrinc.com]
Subject: RE: Internal CWC Feasibility Team
Attachments: 091820.pptx

I put some slides together with topics/questions that I am aware of. It's up to you whether to use these or not for the meeting, but I wanted to get the issues on paper.

-----Original Appointment-----

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Monday, September 14, 2020 11:40 AM
To: Marcia Kivett; Joe Trapasso; Herrin, Jeff; Henry Luu; Erin Heydinger
Subject: [EXTERNAL] Internal CWC Feasibility Team
When: Friday, September 18, 2020 8:00 AM-9:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

Join Microsoft Teams Meeting

+1 213-379-5743 United States, Los Angeles (Toll)
(888) 404-2493 United States (Toll-free)

Conference ID: 436 416 952#

[Local numbers](#) | [Reset PIN](#) | [Learn more about Teams](#) | [Meeting options](#)



A Brown and Caldwell Teams meeting has been created for this event.

[Help](#)

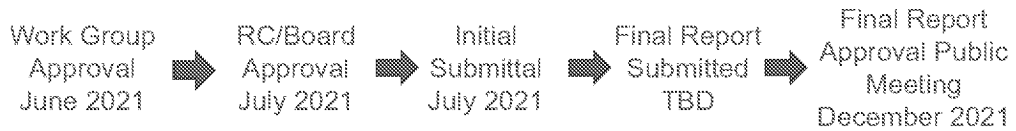
SITES RESERVOIR FEASIBILITY REPORT

SEPTEMBER 18, 2020



Revised: Carolina, 2020 Mar 19. Draft: Sites to Change

FEASIBILITY REPORT



- CWC requirements established in WSIP Technical Reference (November, 2016)
- What about Authority requirements and expectations?
- Need to adjust schedule for public review process?



FEASIBILITY REPORT REQUIREMENTS

- PROJECT BENEFITS
- PROJECT DESCRIPTION – RECOMMEND USING DESCRIPTION FROM EIR/S
- TECHNICAL FEASIBILITY – IS IT FEASIBLE TO DELIVER THE PUBLIC BENEFITS AT PROJECTED LEVELS - OPERATIONS
- ECONOMIC FEASIBILITY – PRIMARILY JUDGED IN TERMS OF BCR
- FINANCIAL FEASIBILITY – FINANCE PLAN APPROACH
- ENVIRONMENTAL FEASIBILITY – FROM EIR/S TEAM
- CONSTRUCTABILITY – CONSTRUCTION APPENDIX TO EIR/S SHOULD ADDRESS

3



PROJECT BENEFITS – OUTSTANDING ISSUES

- WHAT MIX OF PUBLIC BENEFITS DO WE WANT TO PROPOSE (WILL AFFECT COST ALLOCATION)?
- HOW DO WE WANT TO ADDRESS FLOOD BENEFITS (PREVIOUSLY ESTABLISHED IN APPLICATION REVIEW – BUT COUNTY WANTS TO UPDATE)? DOES THIS GET ADDRESSED IN THE FEASIBILITY REPORT OR ELSEWHERE?

TECHNICAL FEASIBILITY/OPERATIONS PLAN

- SHOULD BE SIMILAR TO PLAN INCLUDED IN THE WSIP APPLICATION, BUT UPDATED
- FOCUS ON THE ABILITY OF THE OPERATIONS PLAN (SHOULD BE IN PROJECT DESCRIPTION) TO DELIVER THE PUBLIC BENEFITS
- NEED TO DEVELOP AN OUTLINE FOR THIS AND GET CWC BUYOFF

ECONOMIC FEASIBILITY

FOCUS ON BCR

BCR = ESTIMATED BENEFITS/COST

- ESTIMATED BENEFITS CALCULATED BY AECOM USING CALSIM RESULTS
- COST ESTIMATE FROM AECOM/JACOBS (LEVEL 4) – NEED TO ESTABLISH FORMAT AND MARKUPS, SUMMARY SHEET FOR ENTIRE ESTIMATE
- BOARD/RC REQUIREMENTS FOCUS ON \$/AF INSTEAD, MORE RESTRICTIVE – MAY NOT WANT TO INCLUDE IN FR
- VALUE SHOULD BE FAVORABLE WITH VP7 COST SAVINGS

6



FINANCIAL FEASIBILITY

- **SUMMARIZE COMMITMENT FOR PARTICIPATION (PROPOSE FORMAT TO CWC TO GET THEIR BUYOFF)**
- **SUMMARIZE FINANCING APPROACH**
- **LIKELY NEEDS TO ADDRESS SWP AGREEMENTS FOR SOD CONTRACTORS**

ENVIRONMENTAL FEASIBILITY

- **NEED TO IDENTIFY HOW SIGNIFICANT ENVIRONMENTAL IMPACTS WILL BE MITIGATED**
- **WILL THERE BE A FILLING FOR A STATEMENT OF OVERRIDING CONSIDERATIONS**
- **FORMAT FOR THIS SECTION IS POORLY DEFINED**
- **NEED A STRATEGY FOR HOW WE WILL INCORPORATE EIR/S COMMENTS INTO THE REPORT**

CONSTRUCTABILITY

- ENGINEERING FEASIBILITY IS DEALT WITH HERE
- POORLY DEFINED IN GUIDANCE
- SUGGEST WE HAVE DISCUSSION OF DSOD PROCESS AND PROGRESS
- WILL HAVE A CONSTRUCTION APPENDIX FOR THE EIR/S (AVAILABILITY OF CONSTRUCTION MATERIALS, WORK FORCE, AND EQUIPMENT) — SHOULD SERVE FOR THE FR
- WILL NEED A CONSTRUCTION AND START-UP SCHEDULE

OTHER

ALLOCATION AND ASSIGNMENT

AUTHORITY NEEDS?

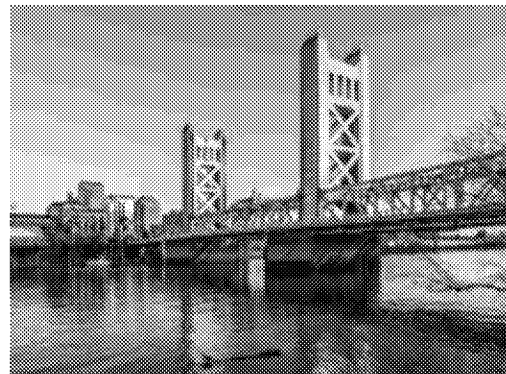
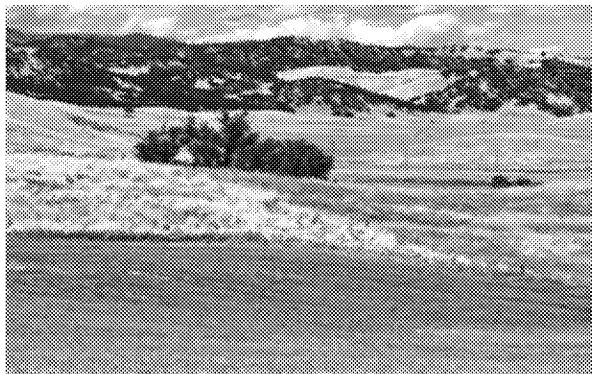
- NOT SURE THE FEASIBILITY REPORT AS DEFINED BY THE CWC WILL SUPPORT THE AUTHORITY'S DECISION MAKING PROCESS FOR THE NEXT PHASE
- THE CWC DOES NOT REQUIRE US TO DETERMINE \$/AF (PROS AND CONS TO DOING SO)
- NOTE THAT SOME MEMBERS OF THE AUTHORITY COULD BE SURPRISED/DISAPPOINTED WITH A FEASIBILITY REPORT THAT MEETS ALL CWC REQUIREMENTS
- NEED STRATEGY TO EITHER (1) CONTROL EXPECTATIONS (2) PROVIDE A SUPPLEMENTAL REPORT, OR (3) IDENTIFY AND ADD INFORMATION THE AUTHORITY NEEDS INTO THE REPORT

Sites Reservoir



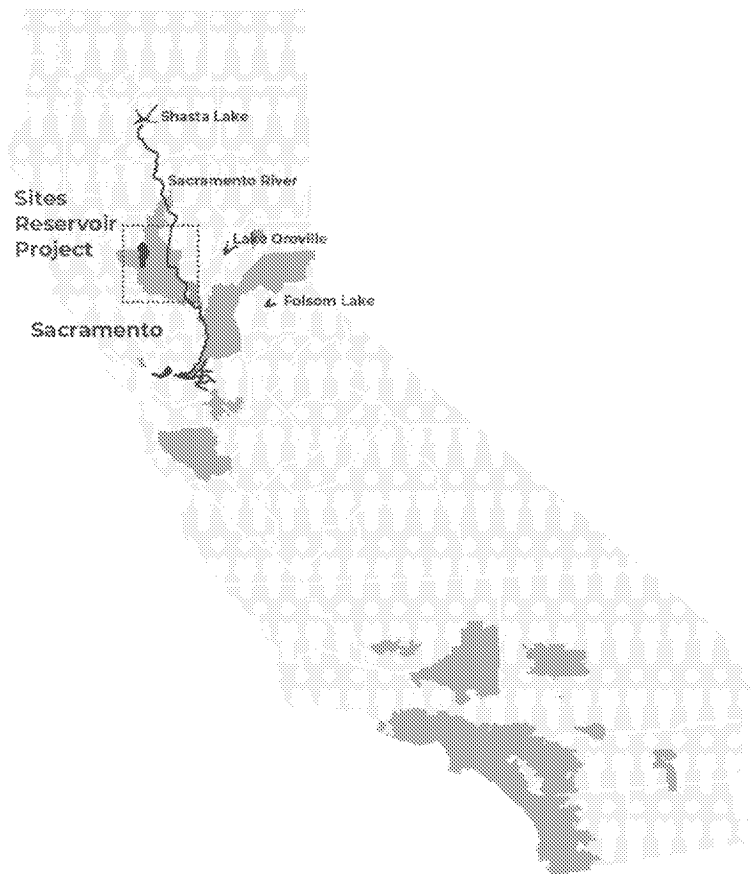
21st Century Solution to California's Water Reliability Challenges

Sites Reservoir is a generational opportunity to construct a multi-benefit water storage project that helps restore **flexibility, reliability, and resiliency** to our statewide water supply



Our Strength is in Our Broad Statewide Participation

Diverse statewide representation of public agencies advancing Sites Reservoir



Participants include
counties, cities, water
and irrigation districts

Urban and Rural

Sacramento Valley

San Joaquin Valley

Bay Area

Southern California



Our Strength is in Our Broad Statewide Participation

Sacramento Valley

Carter Mutual Water Company
City of American Canyon
Colusa County
Colusa County Water Agency
Cortina Water District
Davis Water District
Dunnigan Water District
Glenn County
Glenn-Colusa Irrigation District
LaGrande Water District
Placer County Water Agency
Reclamation District 108
City of Roseville
Sacramento County Water Agency
City of Sacramento
Tehama-Colusa Canal Authority
Westside Water District
Western Canal Water District

Bay Area

Santa Clara Valley Water District
Zone 7 Water Agency

San Joaquin Valley

Wheeler Ridge-Maricopa Water Storage
District

Southern California

Antelope Valley - East Kern Water Agency
Coachella Valley Water District
Desert Water Agency
Metropolitan Water District
San Bernardino Valley Municipal Water District
San Gorgonio Pass Water Agency
Santa Clarita Valley Water Agency



Rightsized to Meet Our Current and Future Water Supply Needs

Sites Reservoir has been designed and optimized to meet our water supply needs for today and in the future

The Sites Project Authority conducted a rigorous Value Planning effort to review the project's proposed operations and facilities to develop a project that is "right sized" for our investors and participants while still providing water supply reliability and enhancing the environment

Rightsizing the reservoir was responsive to input from state and federal agencies, NGOs, elected officials, landowners and local communities

The feedback we received through a robust outreach effort was critical to developing a reservoir that is the right size for both people and the environment

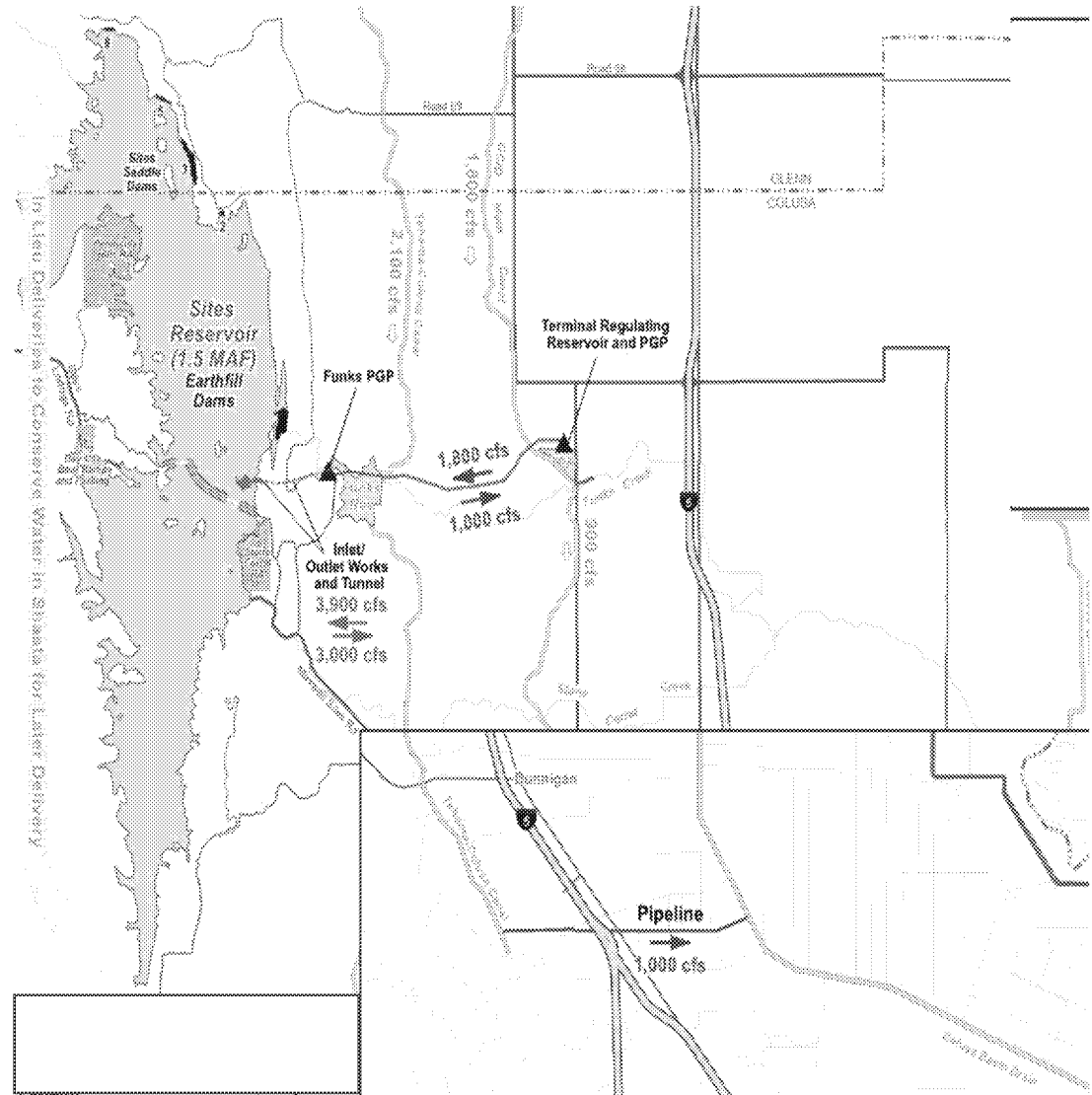


Rightsized to Meet Our Current and Future Water Supply Needs

1.5 million acre-feet

Utilizes the existing **Glenn-Colusa Irrigation District** and **Tehama-Colusa Canal Authority** canals to convey water to Sites Reservoir from the Sacramento River

Delivers water back to the Sacramento River through the **Tehama-Colusa Canal** and through the **Colusa Basin Drain** for participant deliveries and for the environment



Rightsized to Meet Our Current and Future Water Supply Needs

Member	Reservoir Participation(AFY)
Public Water Agencies	
North of Delta	52,142
South of Delta	140,750
Subtotal Public Water Agencies	192,892
State of CA	~ 40,000
Total Requirement	~230,000

Participant Demand

Participant water subscriptions allocated in the current participation agreement

Allocation of State of California water subscription is based on the **Proposition 1 water investment**

- Water for Delta Smelt
- Water for Refuges

Release Capacity from Sites

The “rightsized” project can deliver water to meet the demands of our participants and California’s investment of water for the environment

Long term average ~240,000 AFY

Year Type	1,000 cfs Release Capacity (AFY) to the Colusa Basin Drain
Wet	90 - 120
Above Normal	260 - 290
Below Normal	245 - 275
Dry	355 - 385
Critically Dry	210 - 240



Assumed Diversion and Operations Criteria

Location	Criteria
Wilkins Slough Bypass Flow	8,000 cfs April/May 5,000 cfs all other times
Fremont Weir Notch	Prioritize the Fremont Weir Notch, Yolo Bypass preferred alternative, flow over weir within 5%
Flows into the Sutter Bypass System	No restriction due to flow over Moulton, Colusa, and Tisdale Weirs
Freeport Bypass Flow	Modeled WaterFix Criteria (applied on a daily basis) Post-Pulse Protection (applied on a moving 7-day average) Post-Pulse (3 levels) = January–March Level 2 starts January 1 Level 1 is initiated by the pulse trigger
Net Delta Outflow Index (NDOI) Prior to Project Diversions	44,500 cfs between March 1 and May 31

Assumed Release Criteria

Most releases occur in dry years for water supply and environmental benefits

Priority of releases assume the following:

- Provide water to project participants north and south of the delta

- Provide water to Cache Slough area via Yolo bypass

- Provide water for incremental Level 4 refuge deliveries

- Support Reclamation goals through exchanges

Deliveries to SWP contractors supplement Table A (start @ 85% allocation and more aggressive releases starting @ 65%)

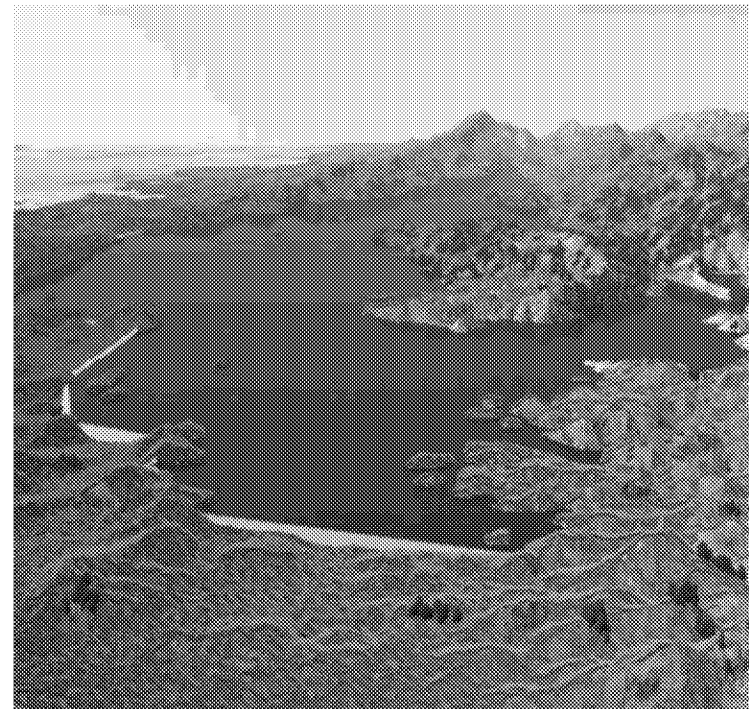
Rightsized to Meet Our Current and Future Water Supply Needs

The Value Planning process has resulted in a project that has a smaller footprint and operated in a different manner than originally designed

Due to these changes the Authority will revise and recirculate its Draft EIR

Work with landowners, tribes, stakeholders, NGOs, and local communities to develop a collaborative environmental review process

It is essential that we build a project now that makes sense for all our participants - local, state, and federal



Rightsized to Meet Our Current and Future Water Supply Needs

Reservoir Size (MAF)	1.5
Project Cost (2019\$, billions)	\$2.4 - \$2.7
Contingency Cost (2019\$, billions)	\$0.6
Total Project Cost (2019\$, billions)	\$3.0 - \$3.3
Annualized AFY release	240,000
Range of Annual Costs During Repayment Without WIFIA Loans (2020\$, \$/AF)	\$650 - \$710
Range of Annual Costs During Repayment With WIFIA Loans (2020\$, \$/AF)	\$600 - \$660

The rightsized project is roughly **\$2 Billion** less than the 2017 preferred alternative

Cost savings primarily from the removal of the **Delevan Diversion** facility on the Sacramento River and the **Delevan Pipeline**

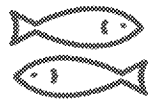
Lowered the Annual Cost during repayment (\$/AF)

Significant savings to participants with finance through a **WIFIA** government backed loan



Provides Statewide Benefits for Generations to Come

Sites Reservoir provides many multi-layered benefits



Off-stream Storage

Does not create a barrier to native fish migration

Federal and State Agencies Manage Environmental Water



Adaptable to current and future conditions and priorities

Local Leadership and Cooperation



Aligns with Sacramento Valley's values and fosters regional and statewide collaboration



Cooperative Operation

Increases effectiveness and efficiency of existing water storage infrastructure

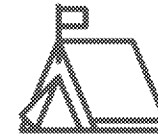
Adaptable to Climate Change



Contributes to system reliability and performance with climate change

Dry Year Water Supply

Reliable dry year water supply for California communities, farms and businesses

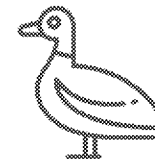


Recreational Opportunities

Provides northern Sacramento Valley with additional opportunities for recreation

Environmental Support

Provides environmental water in drier periods for native fish, and habitat for native species and birds



Provides Statewide Benefits for Generations to Come

Sites Reservoir provides water dedicated to environmental use

A significant portion of the Sites Reservoir Project's annual water supplies will be dedicated to environment uses:

Preserve cold-water pool in Lake Shasta later into the summer months to support salmon development, spawning and rearing

Provide a reliable supply of refuge water to improve Pacific Flyway habitat for migratory birds and other native species

Provide water dedicated to help improve conditions for the Delta Smelt

Water dedicated for the environment provided by Sites Reservoir will be managed by state resources agency managers who will decide how, and when, this water would be used - creating a water asset for the state that does not currently exist



Possibilities of Environmental Water Uses

Member	Reservoir Participation (AFY)
Public Water Agencies	
North of Delta	52,142
South of Delta	140,750
Subtotal Public Water Agencies	192,892
State of CA	~ 40,000
Total Requirement	~230,000

Sites creates a resource that can be managed for the benefit of the species.

Water for the environment is managed by state resource agencies.

Potential Beneficiary
Level 4 refuge water
Enhanced Delta Ecosystem
Improve Survival of Anadromous Fish

There is flexibility to manage these benefits each year.

The range of possibilities will be covered in the recirculated Draft EIR.



Provides Statewide Benefits for Generations to Come

Sites Reservoir provides regional flood protection benefits

Provides significant regional flood protection benefits for the Sacramento Valley

Will capture and store flood flows that would normally impact the community of Maxwell - protecting homes, business and farms

Will help to limit “down stream” flooding issues by capturing storm flows that sometimes overwhelm the regions flood control facilities



Provides Statewide Benefits for Generations to Come

Sites Reservoir will benefit the local and regional economy

Create hundreds of construction-related jobs during each year of the construction period, and long-term jobs related to operations

Creates new recreation opportunities in the Sacramento Valley which adds to the region's economy

Adding resiliency to the water supply will strengthen the statewide economy and business that rely on a reliable source of water for their operations - particularly agriculture



We are On-Track to Deliver This Vital Project for the People of California

Key Milestones Through 2021

Meet eligibility requirements under Prop 1 (WSIP) in order to access the remainder of the \$816 Million in funding

Recirculate Draft EIR for public comment, proactively engage stakeholders, develop responses to comments to support environmental feasibility determination

Complete Feasibility Report

Secure environmental permit certainty and draft permit applications

Update and refine cost estimate and affordability analysis

Develop Plan of Finance

Improve definition of SWP/CVP exchange, including Operations Plan

Enhance landowner, stakeholder & NGO engagement

Develop Operating Agreement Term Sheets with: DWR, USBR, TCCA, GCID, CBD Authority



Questions



From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/16/2020 6:01:29 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites - Alternative 2 Question from Members

Hi Ali,

We unfortunately have not evaluated the Dunnigan Pipeline release capacities under Alternative 2. This will be analyzed as part of Amendment 2 efforts.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Wednesday, September 16, 2020 4:36 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Subject: Sites - Alternative 2 Question from Members

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Henry – We got a question yesterday in the work group meeting that I couldn't answer and thought you might be able to help with. A member asked, under alternative 2, what would be the release capacity to the CBD, what would be the release capacity to the river?

Have we identified these different capacities yet? If so, what are they? If not, that's okay too, I can just say this is part of the Amendment 2 effort.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/17/2020 6:11:51 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites - RC and AB Presentation
Attachments: AppendixJ_Letter of Authority.pdf

The letter was included in the 2019 draft revisions to the Feasibility Report. I need to check to see if they included it in the final version. We were not given all of the appendices to review when we had our 24 hour review period.

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Thursday, September 17, 2020 5:57 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - RC and AB Presentation

Do you have the letter? Can you send it over? I don't think I have seen it. We can also do this after today's meeting with the RC and AB selecting Alt 1 as the preferred project.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 5:40 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites - RC and AB Presentation

Ok, thanks. I will be listening today in case something comes up.

I'm concerned with what Reclamation may say and whether we should have formally rescinded the letter the Authority sent in 2017 identifying the 1.8MAF (Alt D) as the local preferred project.

On Sep 17, 2020, at 5:32 AM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Thanks Laurie. I just made some changes and wrapped it up. It's in the Res Comm SharePoint folder now.

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, September 16, 2020 1:23 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites - RC and AB Presentation

Hi Ali,

I'm not sure you can reduce the number of slides but maybe streamline content and presentation. I have a couple of suggestions, below.

1. Slides 2 and 9 are essentially the same – are you including the rationale for designating Alt 1 as the project twice for emphasis? I think you could eliminate the sub bullets and discussion from slide 2 (as below) but leave it in slide 9 when you actually recommend the action.

- CEQA Guidelines require that an EIR identify a proposed project / preferred alternative
- Staff is recommending the designation of Alternative 1 as the Authority's preferred alternative
- Meets the intent and the goals of the Value Planning effort
- Close alignment with VP-7, the Authority's recommended project in Value Planning
- Meets the project objectives
- Would also be the proposed project for all permitting efforts

2. Since the focus is selection of Alternative 1 as the Authority's project, I also don't think you need to spend a lot of time on walking through 'changes' to alternatives in the table shown in slides 5 and 6 – they haven't changed that much – but focus on clarifying the differences between the two alternatives.

I assume we will discuss this later but are we going to make a change to the following (as noted) based work group input?

Conveyance Release / Dunnigan Release	Release 1,000 cubic feet per second (cfs) into new pipeline to Colusa Basin Drain to meet member participant demands and Proposition 1 needs	Release into new pipeline to Sacramento River to meet member participant demands, <u>with partial release into the Colusa Basin Drain to meet member participant demands and fulfill the Proposition 1 needs.</u>
--	---	--

If you agree, I can make the above changes to the PowerPoint.

Thanks,

Laurie

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Wednesday, September 16, 2020 12:57 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites - RC and AB Presentation

Hi Laurie – I cut down our work group presentation substantially for the RC and AB tomorrow. I have 20 minutes to present, with questions. Can you take a look at the attached and let me know if you have any suggested changes?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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RECLAMATION

Appendix J Letter from Authority Requesting Locally Preferred Alternative

North-of-the-Delta Offstream Storage Investigation



February 2019

Draft_0003682

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Mr. David Murillo
Regional Director
U.S. Bureau of Reclamation – Mid Pacific Region
2800 Cottage Way
Sacramento, CA 95825

June 25, 2018

Submitted via email: KOsborn@usbr.gov

Regarding: Selection of Alternative D as the Proposed Project for Federal Participation

Dear Mr. Murillo,

The Sites Project Authority (Authority) greatly appreciates Reclamation's participation and partnership to advance the Sites Project in an expeditious and cost-effective manner.

As the planning process is nearing completion, the Authority requests Reclamation use Alternative D as the basis for implementing the project and for identifying the federal interest. The current Reclamation-prepared draft Feasibility Report, dated August 14, 2017, identified Alternative D as providing the highest net Regional Economic Development (RED) benefits and as representing the Locally Preferred Alternative; which aligns with the Authority's decision on June 13, 2016, to formally select Alternative D as our proposed project under CEQA and as the basis for our Proposition 1 application to the Water Commission. Details supporting our request are provided in Attachment A.

Additionally, we concur with your stated assumption that all alternatives would be used to implement Sites as a State-led project, with the Sites Project Authority leading the development, construction, and operations in order to provide national, regional, and local benefits. Your staff recently reviewed our phase 2 work plan and monthly cash flow analysis that supports this assumption and also demonstrates the consistency of this plan with both the cost sharing agreement and the requirements of the WIIN Act (2016).

As we continue to prepare for the project's phase 2, we look forward to working with your team to develop mutually acceptable agreements for the use and operation of applicable federal facilities needed to meet some or all of the goals in the CALFED ROD and the Authority's goals.

Sincerely,

A handwritten signature in black ink that reads 'Fritz Durst'.

Fritz Durst
Chair, Sites Project Authority



P.O. Box 517
Maxwell, CA 95955
530.438.2309



CC: Ali Forsythe
David Van Rijn
Mike Dietl
Don Bader
Jim Watson
Rob Thomson

File: 12.233-14.321.40



P.O. Box 517
Maxwell, CA 95955
530.438.2309

Reclamation’s efforts relate to the Preferred Program Alternative as described in the August 28, 2000 CALFED Bay-Delta Programmatic Record of Decision. The CALFED ROD, which identified a need for up to 6 million acre-feet (MAF) of new storage in California—including up to 3 MAF of storage north of the Delta—to restore flexibility and resiliency to CVP and SWP operations. The Sites Reservoir Project was identified in this process and can help to achieve a portion of the recommended 3 MAF of storage north of the Delta.

The Sites Reservoir Project’s Draft Feasibility Report (prepared by Reclamation in association with the Authority) and its associated draft EIR/EIS developed, evaluated, and compared four action alternatives to the No Project Alternative. The action alternatives incorporate two reservoir sizes, two conveyance measures having different points of diversion, two combinations of recreation areas, two access road alignments, and two transmission line routes. Alternatives A, B, and C were developed by the California Department of Water Resources (DWR) and Reclamation. Alternative D has been developed by the Sites Project Authority and on June 13, 2016, it was selected by the Authority to be the proposed project for CEQA and is the basis for the application we submitted in accordance with California’s Proposition 1 Water Bond (2014).

Table 1: Range of Alternatives

Alt	Primary Differences	Economics	Operations
A	1.3 MAF Reservoir 3 points of diversion		Same as Alternative C
B	1.8 MAF Reservoir 2 points of diversion		Same as Alternative C
C	1.8 MAF Reservoir 3 points of diversion	Maximum National Economic Development	Maximizing deliveries to south of Delta water users and dedicates significant releases to the Delta for water quality improvements.
D	1.8 MAF Reservoir 3 points of diversion Alternative powerline alignment to reduce impacts to NWR	Maximum Regional Economic Development	Distribute water deliveries more equally between Northern and Southern California, reduced deliveries south of the Delta, releases for Delta water quality, and provide significantly more water for coldwater pool improvements, specifically in Shasta.
Operational Difference:			Demonstrates the range of operational flexibility to adjust to future needs and priorities of both the natural and built environments.

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From: Alicia Forsythe [aforsythe@sitesproject.org]
Sent: 9/17/2020 6:17:11 AM
To: Fisher, Linda [Linda.Fisher@hdrinc.com]; Michael Azevedo [mjazevedo@countyofcolusa.com]; Heather Dyer [heatherd@sbvmwd.com]; Thad Bettner [tbettner@gcid.net]; Robert J. Kunde [rkunde@wrmsd.com]; Eric Leitterman [eleitterman@valleywater.org]; Robert Cheng [Rcheng@cvwd.org]; Bill Vanderwaal [WVanderwaal@rd108.org]; Jeff Davis [jdavis@sgpwa.com]; Jeff Sutton [jsutton@tccanal.com]; Ben Barker [bbarker@pcwa.net]; Dee Bradshaw [VBradshaw@mwdh2o.com]; Randall Neudeck [rneudeck@mwdh2o.com]; Jason Marks [JTMarks@roseville.ca.us]; Trevor Joseph [TJoseph@roseville.ca.us]; Chuching Wang [cwang@mwdh2o.com]; Stephen Arakawa [sarakawa@mwdh2o.com]; Katrina Jessop [KJessop@valleywater.org]; Cindy Kao [CKao@valleywater.org]; Marcia Kivett [MKivett@sitesproject.org]; Jerry Brown [jbrown@sitesproject.org]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Spranza, John [John.Spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Monique Briard [Monique.Briard@icf.com]; Jim Lecky [Jim.Lecky@icf.com]; Nicole Williams [Nicole.Williams@icf.com]
Subject: RE: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

Ad Hoc Workgroup – I wanted to follow up on a few questions / suggestions at our meeting earlier this week that we didn't close out on our call. Below are the items I had "open" along with our follow up.

1. Objectives – Is habitat management clear in objective 2? - Based on the comment, we will revised the objective to state “. . . enhance opportunities for habitat and fisheries management . . .”. Listing habitat first should make it more clear that this goes beyond fisheries habitat.
2. Objectives – Should we be more clear on CBD in objective 4? – We believe this objective should stay as written. Floodplain is intended to represent a wide, broad area in the Sacramento Valley.
3. Alt 2 – How much capacity to release into CBD vs River? Can all be released into river? Can all be released into the CBD? - We have not yet evaluated and determined the Dunnigan Pipeline release capacities under Alternative 2. This will be analyzed as part of our Amendment 2 efforts. While Alternative 2 is intended to have a primary release to the Sacramento River (to distinguish it from Alternative 1), we agree that some of the member water could likely be released into the Colusa Basin Drain. We will revise the alternative accordingly as we further refine this alternative moving forward.

Thanks for the great discussion on Tuesday. Please let me know if you have any questions or concerns on the above items or our responses.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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-----Original Appointment-----

From: Alicia Forsythe
Sent: Friday, September 11, 2020 5:32 AM
To: Alicia Forsythe; Fisher, Linda; Michael Azevedo; Heather Dyer; Thad Bettner; Robert J. Kunde; Eric Leitterman; Robert Cheng; Bill Vanderwaal; Jeff Davis; Jeff Sutton; Ben Barker; Dee Bradshaw; Randall Neudeck; Jason Marks; Trevor Joseph; Chuching Wang; Stephen Arakawa; Katrina Jessop; Cindy Kao; Marcia Kivett; Jerry Brown; Arsenijevic, Jelica; Spranza, John; Laurie Warner Herson; Monique Briard; Jim Lecky; Nicole Williams
Subject: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting
When: Tuesday, September 15, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

9/15/20, 12:30 PM Update: Meeting Presentation attached

Join Microsoft Teams Meeting

+1 916-538-7066 United States, Sacramento (Toll)

Conference ID: 208 813 858#

[Local numbers](#) | [Reset PIN](#) | [Learn more about Teams](#) | [Meeting options](#)

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/17/2020 6:28:58 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites - RC and AB Presentation
Attachments: AppendixK_Implementation.docx

These are changes we provided for the Appendix K after specifically asking for the appendix so we could revise the language Rob included in the 2019 version.

And, by the way, the environmental staff has been briefed on value planning, provided revised objectives and alternatives, informed that the Delevan intake was not going to be studied but that we were looking at the 1.3MAF reservoir with changes in conveyance, and that we would only be looking at Alts 1 and 2 in the EIS.

During a call with Nate, Ryan, Dan C. and Stacey Leigh on July 24th to discuss changing the EIS from a "Revised EIS" to a "Supplemental EIS" I explained to them that I thought the reason Russ suggested using "Revised EIS" was because it was essentially a new document - that we were looking at new alternatives and we were not carrying any of the prior alternatives forward. Nate seemed surprised but there was no real push back.

Our NEPA meeting on Friday was typical -- we updated them on the Authority's staff report and pending designation of a preferred alternative for the purposes of CEQA. There was little input or questions.

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Thursday, September 17, 2020 5:57 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - RC and AB Presentation

Do you have the letter? Can you send it over? I don't think I have seen it. We can also do this after today's meeting with the RC and AB selecting Alt 1 as the preferred project.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 5:40 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites - RC and AB Presentation

Ok, thanks. I will be listening today in case something comes up.

I'm concerned with what Reclamation may say and whether we should have formally rescinded the letter the Authority sent in 2017 identifying the 1.8MAF (Alt D) as the local preferred project.

On Sep 17, 2020, at 5:32 AM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Thanks Laurie. I just made some changes and wrapped it up. It's in the Res Comm SharePoint folder now.

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, September 16, 2020 1:23 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites - RC and AB Presentation

Hi Ali,

I'm not sure you can reduce the number of slides but maybe streamline content and presentation. I have a couple of suggestions, below.

1. Slides 2 and 9 are essentially the same – are you including the rationale for designating Alt 1 as the project twice for emphasis? I think you could eliminate the sub bullets and discussion from slide 2 (as below) but leave it in slide 9 when you actually recommend the action.

- CEQA Guidelines require that an EIR identify a proposed project / preferred alternative
- Staff is recommending the designation of Alternative 1 as the Authority's preferred alternative
- ~~Meets the intent and the goals of the Value Planning effort~~
- ~~Close alignment with VP-7, the Authority's recommended project in Value Planning~~
- ~~Meets the project objectives~~
- Would also be the proposed project for all permitting efforts

2. Since the focus is selection of Alternative 1 as the Authority's project, I also don't think you need to spend a lot of time on walking through 'changes' to alternatives in the table shown in slides 5 and 6 – they haven't changed that much – but focus on clarifying the differences between the two alternatives.

I assume we will discuss this later but are we going to make a change to the following (as noted) based work group input?

Conveyance Release / Dunnigan Release	Release 1,000 cubic feet per second (cfs) into new pipeline to Colusa Basin Drain to meet member participant demands and Proposition 1 needs	Release into new pipeline to Sacramento River to meet member participant demands. <u>with partial release into the Colusa Basin Drain to meet member participant demands and fulfill the Proposition 1 needs.</u>
--	---	--

If you agree, I can make the above changes to the PowerPoint.

Thanks,

Laurie

From: Alicia Forsythe [<mailto:aforsythe@sitesproject.org>]
Sent: Wednesday, September 16, 2020 12:57 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites - RC and AB Presentation

Hi Laurie – I cut down our work group presentation substantially for the RC and AB tomorrow. I have 20 minutes to present, with questions. Can you take a look at the attached and let me know if you have any suggested changes?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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RECLAMATION

Appendix K Implementation Considerations

North-of-the-Delta Offstream Storage Investigation

Preliminary Draft – Subject to Change



April 2020

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Appendix K Implementation Considerations

Preliminary Draft – Subject to Change

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Appendix K Implementation Considerations

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Appendix K Implementation Considerations

K.1 Project Implementation Strategy

The lead agencies would need to determine the project implementation strategy prior to developing the applications for completing NEPA/CEQA and permit applications and before beginning project construction. While there are merits to building Sitas Reservoir at full capacity, some facilities and project capacity can be built in the future when the lead agencies better understand changes in cropping patterns, urban demands and the needs of the environment that can be fulfilled by the Project. The Authority has initiated the preparation of specific development concepts that will allow the evaluation of initial construction options that would allow for the development of a scalable project. Over the past several months, the Authority has undertaken a rigorous Value Planning effort to review the project's proposed operations and facilities in an effort to develop a project that is "right sized" for current participants while still providing water supply reliability and enhancing the environment. This feasibility report characterizes the range of Federal interest, dependent on final sizing of the project. A reservoir between 1.3-million-acre-foot (MAF) and 1.5-MAF would significantly contribute to the CALFED goal for an additional 3 MAF of storage north of the Delta.

Commented [LWH1]: This language was suggested before the Authority conducted the value planning process and may not be appropriate now.

Commented [LWH2R1]: See revised text 6/1/2020

It is important that the lead agencies plan and build a project that makes sense for project participants – local, state and federal. This means right-sizing and optimizing the project for current conditions, while maintaining flexibility to adapt the project to changing conditions. The Authority is committed to evaluating a project to create benefits for today and still ensuring there is we have adaptability and flexibility to meet future needs. In the determination of the implementation strategy, the Authority recognizes that participants and investments should be allocated based on the benefits each investor receives and will continue considering this balance in both programmatic and individual investor discussions.

To implement the project, the lead agencies may need to consider variations on the alternatives presented in this feasibility report. Should alternative facilities, operations, or alternatives be developed, a post-authorization report would be needed to confirm benefits and costs.

K.2 Permits and Approvals

The lead agencies would need to obtain various permits and regulatory authorizations before beginning project construction. The lead agencies would also have to comply with a number of environmental regulatory requirements as part of the National Environmental Policy Act/California Environmental Quality Act (NEPA/CEQA) process. Table K-1 summarizes the potential major permits, approvals, and agreements for project implementation; and Table K-2 summarizes the applicable laws, policies, plans, and permits potentially required to implement the project.

Commented [JH3]: Need to eliminate white space under this paragraph. Add text after the tables here.

Appendix K Implementation Considerations

Table K-1. Summary of Potential Major Permits, Approvals, and Agreements for Project Implementation

Appendix K Implementation Considerations

Preliminary Draft – Subject to Change

Agency Permit/ Approval/Agreement	Recommended Prerequisites for Submittal	Estimated Processing Time	Anticipated Fees
Federal			
USACE Clean Water Act Section 404	<ul style="list-style-type: none"> • Application • ESA compliance document for submittal to USFWS/NMFS/CDFW • Section 401 Water Quality Certification permit or application • NEPA documentation (environmental compliance documents) • NHPA Section 106 compliance documentation • Wetland delineation • CWA Section 404(b)(1) evaluation and identification of the Least Environmentally Damaging Practicable Alternative • Mitigation and Monitoring Plan 	24 months	\$100 per individual permit
USACE Rivers and Harbors Act of 1899 Section 14 (33 U.S.C. 408) (Section 408 Application)	<ul style="list-style-type: none"> • Compliance with EC 1165-2-216, <i>Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 U.S.C. 408</i> • Engineering studies and justification documentation 	24 months	None
USFWS/NMFS Endangered Species Act Section 7 Consultation	<ul style="list-style-type: none"> • Regular informal technical consultation • ESA compliance documentation • Draft Biological Assessment • Draft environmental compliance documents 	12 months	None
NMFS Essential Fish Habitat Assessment	<ul style="list-style-type: none"> • Regular formal and informal technical consultation • Biological Assessment • Draft environmental compliance documents 	18 months	None
USFWS Fish and Wildlife Coordination Act	<ul style="list-style-type: none"> • Service agreements among USFWS, NMFS, and CDFW • Regular informal technical consultation • ESA compliance documentation • Draft environmental compliance documents 	12 months	None
USFWS Bald and Golden Eagle Protection Act	<ul style="list-style-type: none"> • Application • EIR/EIS compliance document • Pre-construction survey report(s) • Eagle Management Plan 	TBD	TBD
ACHP/SHPO National Historic Preservation Act, Section 106	<ul style="list-style-type: none"> • Historic Property identification and effects assessment • Consultation with native tribes and interested parties • Programmatic agreement 	36 months	None
State			
Central Valley RWQCB Clean Water Act Section 401	<ul style="list-style-type: none"> • Application • Fish and Wildlife Code Section 1602 application • CWA Section 404 permit or application • Draft environmental compliance documents • Mitigation and Monitoring Plan (if needed) 	6 months	\$500+
CDFW California ESA Section 2081 – Incidental Take Permit or Section 2080.1 Consistency Determination	<ul style="list-style-type: none"> • Informal technical consultation • Application, if requesting a Section 2081 Incidental Take Permit • Biological Opinion and incidental take statement, if requesting a consistency determination 	9 months	None

Appendix K Implementation Considerations

Agency Permit/ Approval/Agreement	Recommended Prerequisites for Submittal	Estimated Processing Time	Anticipated Fees
CDFW Fish and Game Code Section 1600 Streambed Alteration Agreement	<ul style="list-style-type: none"> • Application • CWA Section 401 Water Quality Certification permit or application • CWA Section 404 permit or application • Draft environmental compliance documents • Mitigation Plan 	9 months	\$4,000
Central Valley Flood Protection Board Title 23 California Code of Regulations Waters: Encroachment Permit	<ul style="list-style-type: none"> • Application 	9 months	None
SWRCB Water Rights	<ul style="list-style-type: none"> • Application • Probable petition for assignment of State-filed applications • Draft (possibly final) environmental compliance documents 	24 months	TBD
State of California Department of Transportation (Caltrans) Encroachment Permit	<ul style="list-style-type: none"> • Application • Environmental compliance documents • Permit Engineering Evaluation Report 	60 days	None
California Department of Conservation Williamson Act	<ul style="list-style-type: none"> • Application 	TBD	TBD
Glenn and Colusa Counties Construction-Related Permits	<ul style="list-style-type: none"> • Demolition, grading, building, mechanical, utility construction and encroachment permits, and easements 	TBD	TBD
Glenn County Air Pollution Control District Fugitive Dust Control Plan Authority to Construct Permit to Operate	<ul style="list-style-type: none"> • Dust Control Plan • Dust Control Training Course • Pre-application meeting (encouraged) • Authority to Construct Permit Application • Required conformity and inclusion in the State Implementation Plan • Annual Operating Permit 	6 months	TBD
Colusa County Air Pollution Control District Fugitive Dust Control Plan Authority to Construct Permit to Operate	<ul style="list-style-type: none"> • Dust Control Plan • Dust Control Training Course • Pre-application meeting (encouraged) • Authority to Construct Permit Application • Required conformity and inclusion in the State Implementation Plan • Annual Operating Permit 	6 months	TBD

Appendix K Implementation Considerations

Preliminary Draft – Subject to Change

Notes for Table K-1

- ACHP = Advisory Council on Historic Preservation
- Caltrans = California Department of Transportation
- CDFW = California Department of Fish and Wildlife
- CWA = Clean Water Act
- EC = Engineer Circular
- EIR = Environmental Impact Report
- EIS = Environmental Impact Statement
- ESA = Endangered Species Act
- NEPA = National Environmental Policy Act
- NHPA = National Historic Preservation Act
- NMFS = National Marine Fisheries Service
- RWQCB = Regional Water Quality Control Board
- SHPO = State Historic Preservation Officer
- SWRCB = State Water Resources Control Board
- TBD = to be determined
- U.S.C. = United States Code
- USACE = United States Army Corps of Engineers
- USFWS = United States Fish and Wildlife Service

Table K-2. Summary of Applicable Laws, Policies, Plans, and Permits Potentially Required

Level	Laws, Policies, Plans, and Permits
Federal	Americans with Disabilities Act
	Architectural Barriers Act
	Bald and Golden Eagle Protection Act
	Clean Water Act (Sections 401, 402, 404)
	Clean Air Act
	Essential Fish Habitat
	Executive Orders 13112 (Safeguarding the Nation from the Impacts of Invasive Species), 11990 (Protection of Wetlands), 11988 (Floodplain Management), and 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)
	Farmland Protection Policy
	Federal Endangered Species Act
	Federal Energy Regulatory Commission permitting requirements
	Federal land use policies
	Federal Water Project Recreation Act
	Fish and Wildlife Coordination Act
	Indian Trust Assets
	Magnuson-Stevens Fishery Conservation and Management Act
	Migratory Bird Treaty Act
	National Historic Preservation Act, Section 106
	Rehabilitation Act
	Rivers and Harbors Act Sections 10 and 14
Uniform Relocations Assistance and Real Properties Acquisition Act of 1970, as amended (P.L. 91-646)	
Surface Transportation and Uniform Relocation Assistance Act of 1987 (P.L. 100-17)	
U.S. Army Corps of Engineers Reservoir Regulation Requirements	
State	California Endangered Species Act
	California Fish and Wildlife Code Section 1600 – Streambed Alteration
	California Fish and Wildlife Code Section 5937 – Minimum Flow Requirements
	Porter-Cologne Water Quality Control Act
	California water rights law
	California Flood Protection Board Encroachment Permit (Title 23 California Code of Regulations)
California Department of Transportation encroachment permit and activities	

Appendix K Implementation Considerations

Level	Laws, Policies, Plans, and Permits
	California State Lands Commission lands lease
	California Land Conservation Act (Williamson Act)
	California Native Plant Protection Act
	California Wild and Scenic Rivers Act
	California Department of Boating and Waterways activities and programs
	California Department of Water Resources, Division of Safety of Dams
	California Scenic Highway Program
	California Public Resources Code
	State of California General Plan Guidelines
	California Environmental Quality Act
	Clean Water Act Section 401
	California Fish and Game Code – Fully Protected Species
	California Native Plant Society – California Rare Plant Ranking System
	California Government Code
	California Water Code
Local	Tehama, Glenn, and Colusa County Air Quality Management Districts
	Tehama, Glenn, and Colusa County Department of Public Works encroachment permit
	Tehama, Glenn, and Colusa County General Plans
	Tehama, Glenn, and Colusa County Zoning Plans
	Other local permits and requirements
	Glenn County Air Pollution Control District Dust Control Plan
	Colusa County Air Pollution Control District Authority to Construct and Permit to Operate
	California Government Code General Plan Requirements (municipal general plans)
	Glenn County General Plan
	Colusa County General Plan
	Any county public works grading or encroachment permits

P.L. = Public Law

Coordination and Outreach

Efforts to engage the public, Federally recognized Indian tribes, Native American groups, non-governmental organizations (NGOs), public agencies, and other stakeholders in decisions affecting the implementation of the North-of-the-Delta offstream storage (NODOS) project would continue to play an important role in the investigation.

Future public outreach activities to support the NODOS Investigation would include additional formal public meetings, focused stakeholder workshops, and increased outreach activities to landowners in the project footprint and local public agencies. Outreach to regional and statewide communities, civic and business organizations, NGOs, and public agencies would be continued as summarized in Table K-3.

Appendix K Implementation Considerations

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Table K-3. Outreach

Outreach	Date	Purpose
Sites Project Authority Board meetings	Held monthly	Project progress and issues
California Water Commission meetings	Held monthly	(State) WSIP funding
Tribal coordination meeting with Colusa Indian Community Council	July 2018	Project awareness and progress; tribal feedback/concerns
Landowner meetings (formal and informal)	Held monthly	Project awareness and progress; solicit feedback and address concerns
Stakeholder meetings (community, civic, business, NGO meetings)	Held monthly or as needed	Project awareness and progress; solicit feedback and address concerns
Study Area tours	As needed	Project awareness and progress
Local public agencies	As needed	Project feedback and coordination

NGO = non-governmental organization
 WSIP = Water Storage Investment Program

The outreach activities would continue to support the goals of expanding awareness of the project, obtaining community support for the project, maintaining transparency and accountability to the public, reducing legal risk, and providing opportunities for public input at appropriate investigation milestones.

Indian Tribe Consultation and Coordination

Since the initiation of the NODOS Investigation, agency representatives have provided Indian tribes with status updates and opportunities to comment on issues or resources of concern through meetings, telephone calls, and correspondence. Communication regarding the proposed Sites Reservoir area in particular has been ongoing with the Colusa Indian Community Council, the Cortina Rancheria, the Grindstone Indian Rancheria, and the Paskenta Band of Nomlaki Indians. The Colusa Indian Community Council and the Cortina Rancheria are NEPA cooperating agencies. The Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) describes supporting analyses, studies, coordination, impacts, and mitigation, as necessary, of resources and topics of concern to Indian tribes. Numerous cultural resources would be affected by the implementation of any of the action alternatives. Tribal participation will continue through the National Historic Preservation Act Section 106 and NEPA processes, in accordance with Executive Orders 13175 and 12898, and through other Federal requirements.

Agency Coordination

Agency consultation and involvement has occurred throughout the NODOS Investigation to date; both informally and formally. The NODOS Investigation study management structure encompasses the active participation of numerous cooperating agencies pursuant to NEPA/CEQA, representatives from resources agencies, and other stakeholders.

Key elements of forthcoming agency coordination activities are the Final EIR/EIS, the Planning Aid Memorandum and Coordination Act Report, and documents to be issued by United States Army Corps of Engineers (USACE) under Clean Water Act (CWA) Section 404. The Bureau of Reclamation has been coordinating with United States Fish and Wildlife Service (USFWS) under the Fish and Wildlife Coordination Act; however, USFWS has been unable to provide the draft Fish and Wildlife Coordination Act report at the time of the publication of this final Federal Feasibility Report.

Appendix K Implementation Considerations

USACE

USACE has responsibilities relative to issuing permits for wetland impacts, construction of facilities in navigable waters, and flood management. Early coordination with USACE would support obtaining permits for the project, should it move forward to implementation.

TCCA

The Tehama-Colusa Canal Authority (TCCA) performs operation, maintenance, and replacement of the Corning and Tehama-Colusa Canals, and the associated pumping plant facilities at Red Bluff. The Authority will need to contract for alternative power for pumping water out of the Sacramento River at Red Bluff for the diversion of non-Central Valley Project (CVP) water, because only CVP water pumping is eligible to use CVP power. Further, the Authority will need to contract with Reclamation to cover the conveyance costs for moving water to Holthouse Reservoir.

GCID

Similar to the TCCA, the Glenn-Colusa Irrigation District (GCID) Canal is under consideration for diversion and conveyance of the Sacramento River supplies to Sites Reservoir in all of the alternatives.

Colusa and Glenn County

Extensive coordination with the counties will be required regarding land use, air emissions, haul routes, roads, and numerous other items. Colusa and Glenn County are both members of the Authority.

Local Property Owners' Land and Water Rights

Lands in the proposed area of the Sites Reservoir would be inundated. Consequently, assessments have been made to determine the extent of impacts to lands and structures; and potential mitigations. The Authority provides opportunities for regular landowner involvement, including weekday access to staff at the Maxwell project office. Any water rights connected to the land acquired for the footprint of Sites Reservoir will likely be extinguished and part of the settlement with the landowners for the acquisition of the land.

Acronyms and Abbreviations

ACHP Authority	Advisory Council on Historic Preservation Sites Project Authority
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CVP	Central Valley Project
CWA	Clean Water Act
DWR	California Department of Water Resources
EC	Engineer Circular
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act (Federal)
GCID	Glenn-Colusa Irrigation District
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NODOS	North-of-the-Delta offstream storage
P.L.	Public Law
RWQCB	Regional Water Quality Control Board
SHPO State	State Historic Preservation Officer State of California
SWRCB	State Water Resources Control Board
TCCA	Tehama-Colusa Canal Authority
TDS	total dissolved solids
TRR	Terminal Regulating Reservoir
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WSIP	Water Storage Investment Program

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/17/2020 6:55:00 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites - RC and AB Presentation
Attachments: Reclamation Feasibility - Project Purpose and Planning Objectives.docx

Final email on this topic – I have attached Reclamations Project Purpose and Planning Objectives from the 2020 Feasibility Report Executive Summary. And, I confirmed that they included our changes to Appendix K – Implementation is now Appendix J - but I did not find the letter in the version of the Feasibility Report that we have in SharePoint.

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Thursday, September 17, 2020 6:29 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - RC and AB Presentation

Well apparently I did get the letter as I am listed as a cc. LOL. The firehouse of the front office. I forwarded this to Jerry so he is aware and will talk with him about what to do with this and our transition.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 6:12 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites - RC and AB Presentation

The letter was included in the 2019 draft revisions to the Feasibility Report. I need to check to see if they included it in the final version. We were not given all of the appendices to review when we had our 24 hour review period.

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Thursday, September 17, 2020 5:57 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - RC and AB Presentation

Do you have the letter? Can you send it over? I don't think I have seen it. We can also do this after today's meeting with the RC and AB selecting Alt 1 as the preferred project.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 5:40 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites - RC and AB Presentation

Ok, thanks. I will be listening today in case something comes up.

I'm concerned with what Reclamation may say and whether we should have formally rescinded the letter the Authority sent in 2017 identifying the 1.8MAF (Alt D) as the local preferred project.

On Sep 17, 2020, at 5:32 AM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Thanks Laurie. I just made some changes and wrapped it up. It's in the Res Comm SharePoint folder now.

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, September 16, 2020 1:23 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites - RC and AB Presentation

Hi Ali,

I'm not sure you can reduce the number of slides but maybe streamline content and presentation. I have a couple of suggestions, below.

1. Slides 2 and 9 are essentially the same – are you including the rationale for designating Alt 1 as the project twice for emphasis? I think you could eliminate the sub bullets and discussion from slide 2 (as below) but leave it in slide 9 when you actually recommend the action.

- CEQA Guidelines require that an EIR identify a proposed project / preferred alternative
- Staff is recommending the designation of Alternative 1 as the Authority's preferred alternative
- ~~Meets the intent and the goals of the Value Planning effort~~
- ~~Close alignment with VP-7, the Authority's recommended project in Value Planning~~
- ~~Meets the project objectives~~
- Would also be the proposed project for all permitting efforts

2. Since the focus is selection of Alternative 1 as the Authority's project, I also don't think you need to spend a lot of time on walking through 'changes' to alternatives in the table shown in slides 5 and 6 – they haven't changed that much – but focus on clarifying the differences between the two alternatives.

I assume we will discuss this later but are we going to make a change to the following (as noted) based work group input?

Conveyance Release / Dunnigan Release	Release 1,000 cubic feet per second (cfs) into new pipeline to Colusa Basin Drain to meet member participant demands and Proposition 1 needs	Release into new pipeline to Sacramento River to meet member participant demands. <u>with partial release into the Colusa Basin Drain to meet member participant demands and fulfill the Proposition 1 needs.</u>
--	---	--

If you agree, I can make the above changes to the PowerPoint.

Thanks,

Laurie

From: Alicia Forsythe [<mailto:aforsythe@sitesproject.org>]
Sent: Wednesday, September 16, 2020 12:57 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites - RC and AB Presentation

Hi Laurie – I cut down our work group presentation substantially for the RC and AB tomorrow. I have 20 minutes to present, with questions. Can you take a look at the attached and let me know if you have any suggested changes?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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Reclamation - Project Purpose and Planning Objectives

The alternatives were formulated to achieve the primary objectives, as described below, and evaluated to assess their effectiveness in achieving these objectives. The alternatives are not formulated to maximize the secondary objectives, but opportunities to achieve them were included in the alternatives and evaluated. There were two rounds of evaluation with initial and refined project objectives. The initial objectives included the following:

Water Supply (Primary Objective)

NODOS would provide increased water supply and improve the reliability of water deliveries for municipal, industrial, and agricultural uses, especially during drought conditions.

Incremental Level 4 Water Supply to CVPIA Wildlife Refuges (Primary Objective)

NODOS would provide water that is needed to meet the Incremental Level 4 (IL4) refuge water supply demands established in the CVPIA (P.L. 102-575, Title 34). IL4 refuge water supply obligations established by the CVPIA are not being fully met at all refuges. From 1994 to 2016, average annual IL4 refuge water supply deliveries were less than 50 percent of required volumes. During the peak of California's drought in 2014 and 2015, the Refuge Water Supply Program (RWSP) was unable to acquire any water supplies because of scarcity and high prices.

Anadromous Fish (Primary Objective)

NODOS would benefit anadromous fish (including endangered winter-run Chinook salmon) and other aquatic species by facilitating cooperative operations of existing reservoirs to improve temperatures and flows in the Sacramento, Feather, and American rivers. Conserving higher storage levels in CVP reservoirs to be used for operational flexibility provides a distinct opportunity for benefits through preserving coldwater pools, and improves downstream water temperature management in Below Normal, Dry, and Critical water years.

Delta Environmental and Export Water Quality (Initial Primary Objective)

Improved water quality in the Delta is needed for drinking water, agriculture, and the Delta ecosystem. Releases to augment outflow during summer and fall months are needed to increase estuarine habitat and shift the position for X2.¹ A NODOS project could improve water quality in the Delta by releasing water during periods when water quality is impaired.

Sustainable Hydropower Generation (Secondary Objective)

¹ X2 is a Delta management tool that is defined as the distance in kilometers from the Golden Gate Bridge to the location where the tidally averaged near-bottom salinity in the Delta measures two parts per thousand.

Equipping a NODOS reservoir with pumped storage capability supports the integration of other forms of renewable energy (e.g., wind and solar) into the power grid.

Recreation (Secondary Objective)

Recreation in the immediate vicinity of NODOS would provide opportunities for hiking, fishing, camping, boating, and mountain biking.

Flood Damage Reduction (Secondary Objective)

The NODOS Sites Reservoir Project would provide an opportunity to reduce flooding in local watersheds.

Following the initial evaluation of the project, the project objectives were refined and additional modeling was performed using the revised objectives. The water quality objective was replaced with CVP Operational Flexibility and Delta Ecosystem Enhancement.

CVP Operational Flexibility (Refined Primary Objective)

CVP Operational Flexibility is the benefit accruing to the Federal government from an increased ability to allocate additional water supplies through an investment by the United States in a water supply project. The investment would enable the Federal Government to deliver benefits and better meet project purposes by increasing the efficiency, reuse, or multiple use of existing supplies or by reducing impacts of regulatory or capacity constraints on an existing Reclamation project. The NODOS Sites Reservoir Project would provide additional water to relieve some of the existing operational constraints in the CVP system, and meet obligations under Federal law (including regulations). This would include providing environmental benefits to anadromous fish, refuges, and water quality, as well as restoration of CVP water made available for delivery that has been lost due to regulatory changes.

Delta Ecosystem Enhancement (Refined Primary Objective)

NODOS would enhance the Delta ecosystem by providing water to convey food resources from the floodplain to the Delta, thereby improving the foodchain and quality of the Delta's estuarine habitat for use by Delta smelt and other species.

From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/17/2020 7:09:35 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: Kunde Comments/Edits to "Sites Reservoir Project - Preliminary Project Description - September 2020"

Ali,

Thanks for the heads up!

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Thursday, September 17, 2020 6:53 AM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: FW: Kunde Comments/Edits to "Sites Reservoir Project - Preliminary Project Description - September 2020"

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Henry – See below and the attached from Kunde. I think I have closed this out for now, but heads up that he will be asking about invasive mussels and design aspects for them at some point in time. We will include control/inspection/etc. in the Recreation Management Plan – to try to control the spread to Sites. But I wasn't sure if we have any design aspects for them.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Thursday, September 17, 2020 6:50 AM
To: 'Rob Kunde' <rkunde@wrnwds.com>
Subject: RE: Kunde Comments/Edits to "Sites Reservoir Project - Preliminary Project Description - September 2020"

Thanks Rob. These are helpful.

You are correct, we have not yet developed the Reservoir Management Plan. We have a very rough outline that really has no more than what is in this staff report. We'll be drafting this in the coming months as part of Amendment 2.

We will address invasive mussels. I haven't quite decided if this in the Reservoir Management Plan or in a future Recreation Management Plan. Really the mechanism for transport of these to Sites would be recreation watercraft. If we have them in the TC or GCID canal, then they are in the Sacramento River and we are all in a world of hurt. But it will be in one plan or the other.

I will talk with the design team about what they are doing on design aspects for invasive mussels. I know Reclamation continues to spend a good deal of funds and effort on exploring new technologies / coatings / etc to address invasive mussels.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rob Kunde <rkunde@wrmsd.com>
Sent: Tuesday, September 15, 2020 3:27 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Kunde Comments/Edits to "Sites Reservoir Project - Preliminary Project Description - September 2020"

Ali:

I have mostly used the Post-It note feature in Acrobat to provide comment and suggested minor edits in the attached. Use your discretion on the edits. You do not need to respond to comments except that I would like your brief response on my "Reservoir Management Plan" comments i.e. an item to be developed in the future with consideration to invasive clam exclusion/control.

Robert J. Kunde, P.E.

Retired Annuitant

Wheeler Ridge-Maricopa Water Storage District

12109 Highway 166, Bakersfield, CA 93313

cell: 661-345-3719 email: rkunde@wrmsd.com

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 9/17/2020 7:16:36 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Re: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

Good job!

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Thursday, September 17, 2020 at 6:17 AM
To: "Fisher, Linda" <Linda.Fisher@hdrinc.com>, Michael Azevedo <mjazevedo@countyofcolusa.com>, Heather Dyer <heatherd@sbsvmwd.com>, Thad Bettner <tbettner@gcid.net>, "Robert J. Kunde" <rkunde@wrmwsd.com>, Eric Leitner <eleitner@valleywater.org>, Robert Cheng <Rcheng@cvwd.org>, Bill Vanderwaal <WVanderwaal@rd108.org>, Jeff Davis <jdavis@sgpwa.com>, Jeff Sutton <jsutton@tccanal.com>, Ben Barker <bbarker@pcwa.net>, Dee Bradshaw <VBradshaw@mwdh2o.com>, Randall Neudeck <rneudeck@mwdh2o.com>, Jason Marks <JTMarks@roseville.ca.us>, Trevor Joseph <TJoseph@roseville.ca.us>, Chuching Wang <cwang@mwdh2o.com>, Stephen Arakawa <sarakawa@mwdh2o.com>, Katrina Jessop <KJessop@valleywater.org>, Cindy Kao <CKao@valleywater.org>, Marcia Kivett <MKivett@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>, "Arsenijevic, Jelica" <Jelica.Arsenijevic@hdrinc.com>, "Spranza, John" <John.Spranza@hdrinc.com>, Laurie Warner Herson <laurie.warner.herson@phenixenv.com>, Monique Briard <Monique.Briard@icf.com>, Jim Lecky <Jim.Lecky@icf.com>, Nicole Williams <Nicole.Williams@icf.com>
Subject: RE: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

Ad Hoc Workgroup – I wanted to follow up on a few questions / suggestions at our meeting earlier this week that we didn't close out on our call. Below are the items I had "open" along with our follow up.

1. Objectives – Is habitat management clear in objective 2? - Based on the comment, we will revised the objective to state “. . . enhance opportunities for habitat and fisheries management . . .”. Listing habitat first should make it more clear that this goes beyond fisheries habitat.
2. Objectives – Should we be more clear on CBD in objective 4? – We believe this objective should stay as written. Floodplain is intended to represent a wide, broad area in the Sacramento Valley.
3. Alt 2 – How much capacity to release into CBD vs River? Can all be released into river? Can all be released into the CBD? - We have not yet evaluated and determined the Dunnigan Pipeline release capacities under Alternative 2. This will be analyzed as part of our Amendment 2 efforts. While Alternative 2 is intended to have a primary release to the Sacramento River (to distinguish it from Alternative 1), we agree that some of the member water could likely be released into the Colusa Basin Drain. We will revise the alternative accordingly as we further refine this alternative moving forward.

Thanks for the great discussion on Tuesday. Please let me know if you have any questions or concerns on the above items or our responses.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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-----Original Appointment-----

From: Alicia Forsythe

Sent: Friday, September 11, 2020 5:32 AM

To: Alicia Forsythe; Fisher, Linda; Michael Azevedo; Heather Dyer; Thad Bettner; Robert J. Kunde; Eric Leitterman; Robert Cheng; Bill Vanderwaal; Jeff Davis; Jeff Sutton; Ben Barker; Dee Bradshaw; Randall Neudeck; Jason Marks; Trevor Joseph; Chuching Wang; Stephen Arakawa; Katrina Jessop; Cindy Kao; Marcia Kivett; Jerry Brown; Arsenijevic, Jelica; Spranza, John; Laurie Warner Herson; Monique Briard; Jim Lecky; Nicole Williams

Subject: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

When: Tuesday, September 15, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).

Where: Microsoft Teams Meeting

9/15/20, 12:30 PM Update: Meeting Presentation attached

Join Microsoft Teams Meeting

+1 916-538-7066 United States, Sacramento (Toll)

Conference ID: 208 813 858#

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From: Bradshaw,Dee [VBradshaw@mwdh2o.com]
Sent: 9/17/2020 7:43:24 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Neudeck,Randall D [rneudeck@mwdh2o.com]
Subject: RE: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

Good morning Ali,
I have no questions or concerns regarding on your responses to the open items.

Dee

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, September 17, 2020 6:17 AM
To: Fisher, Linda <Linda.Fisher@hdrinc.com>; Michael Azevedo <mjazevedo@countyofcolusa.com>; Heather Dyer <heatherd@sbvmwd.com>; Thad Bettner <tbettner@gcid.net>; Robert J. Kunde <rkunde@wrmwsd.com>; Eric Leitterman <eleitterman@valleywater.org>; Robert Cheng <Rcheng@cvwd.org>; Bill Vanderwaal <WVanderwaal@rd108.org>; Jeff Davis <jdavis@sgpwa.com>; Jeff Sutton <jsutton@tccanal.com>; Ben Barker <bbarker@pcwa.net>; Bradshaw,Dee <VBradshaw@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>; Jason Marks <JTMarks@roseville.ca.us>; Trevor Joseph <TJoseph@roseville.ca.us>; Wang,Chuching <cwang@mwdh2o.com>; Arakawa,Stephen N <sarakawa@mwdh2o.com>; Katrina Jessop <KJessop@valleywater.org>; Cindy Kao <CKao@valleywater.org>; Marcia Kivett <MKivett@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Monique Briard <Monique.Briard@icf.com>; Jim Lecky <Jim.Lecky@icf.com>; Nicole Williams <Nicole.Williams@icf.com>
Subject: RE: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

Ad Hoc Workgroup – I wanted to follow up on a few questions / suggestions at our meeting earlier this week that we didn't close out on our call. Below are the items I had "open" along with our follow up.

1. Objectives – Is habitat management clear in objective 2? - Based on the comment, we will revised the objective to state “. . . enhance opportunities for habitat and fisheries management . . .”. Listing habitat first should make it more clear that this goes beyond fisheries habitat.
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Thanks for the great discussion on Tuesday. Please let me know if you have any questions or concerns on the above items or our responses.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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-----Original Appointment-----

From: Alicia Forsythe

Sent: Friday, September 11, 2020 5:32 AM

To: Alicia Forsythe; Fisher, Linda; Michael Azevedo; Heather Dyer; Thad Bettner; Robert J. Kunde; Eric Leitterman; Robert Cheng; Bill Vanderwaal; Jeff Davis; Jeff Sutton; Ben Barker; Dee Bradshaw; Randall Neudeck; Jason Marks; Trevor Joseph; Chuching Wang; Stephen Arakawa; Katrina Jessop; Cindy Kao; Marcia Kivett; Jerry Brown; Arsenijevic, Jelica; Spranza, John; Laurie Warner Herson; Monique Briard; Jim Lecky; Nicole Williams

Subject: Sites - Ad Hoc Environmental Planning and Permitting Work Group Meeting

When: Tuesday, September 15, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).

Where: Microsoft Teams Meeting

9/15/20, 12:30 PM Update: Meeting Presentation attached

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From: Jerry Brown [jbrown@sitesproject.org]
Sent: 9/17/2020 11:24:33 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Re: Sites: Staff Report for Value Planning & Prior Approved Facilities Table

thanks

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Thursday, September 17, 2020 at 10:59 AM
To: Jerry Brown <jbrown@sitesproject.org>
Subject: FW: Sites: Staff Report for Value Planning & Prior Approved Facilities Table

So I was cleaning out a few emails and came across this – this is the 2016 “facilities” table approval. It looks like the Board simply approved the table. I guess it implied that they approved a preferred project as Alternative D was identified in the table as “JPA”. Assume that was intended to mean the JPA’s preferred project. But its really not clear in the table and the minutes are pretty vague also.

Anyway, I don’t see that this is something that needs to be “rescinded”. I think its superseded by our new alternatives. But I don’t see the Board needing to take an action to pull this back.

Thought I’d send on incase you were curious as to what this 2016 approval was.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Jim Watson <jwatson@sitesproject.org>
Sent: Friday, April 3, 2020 2:33 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; lee.frederiksen@hdrinc.com
Cc: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: Sites: Staff Report for Value Planning & Prior Approved Facilities Table

All

I’d like to schedule a call to address the Board’s prior approval of a facilities table in Feb 2016 (see attached) and the need to supersede it with the results of the value planning. This table was approved as a way to limit changes as we prepared our WSIP application, draft EIR, and draft Feasibility.

I’m not sure the April meeting is appropriate, but we should have a plan for when.

Jim Watson, PE
Sites Project Authority
Phone: 530.410.8250

Email: jwatson@SitesProject.org

Web: www.SitesProject.org

P.O. Box 517

122 Old Hwy 99W

Maxwell, CA 95955

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From: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Sent: 9/17/2020 3:46:04 PM
To: Berryman, Ellen [Ellen.Berryman@icf.com]; Williams, Nicole [Nicole.Williams@icf.com]
CC: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Spranza, John [John.Spranza@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Sites HC: Stone Corral Creek TRR Alt Figure
Attachments: Stone Corral TRR_GSC_r3.pdf

Hey there

See attached file from Pete. No GIS/kmz is available – only line-work on the PDF.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Rude, Pete/RDD [mailto:Pete.Rude@jacobs.com]
Sent: Tuesday, September 15, 2020 4:24 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Subject: Sites HC: Stone Corral Creek TRR Alt Figure

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Hi Henry and Jelica,

As we discussed with ICF on Friday afternoon, attached is a revised figure that shows the Pipeline alignment that we will be using. It runs from the northwest corner of the Stone Corral Creek TRR to the west side of Funks Reservoir – where it would follow the same path up to the Inlet/outlet tunnels.

Now ICF has what they need for their cultural resources and biological analysis for this alternative. If we could get their input by September 23 that would be best. Let me know if anyone has questions.

Thanks

Peter H. Rude, PE (CA, HI, CO) /Jacobs/ Civil Engineer & Principal Project Manager
1-530-229-3396 (office)/ 1-530-917-4164 (mobile)/ 2525 Airpark Drive, Redding, CA 96001
pete.rude@jacobs.com / www.jacobs.com

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Funks Reservoir

TCCA

Intersection of
McDermott Rd &
Wadliegh Rd

Potential Pipeline
Alignment

GCID Main Canal

SCC Option
(sized the same as TRR)

Private Lateral

GCID Re-Route

Maxwell Sites Rd

Stone Corral Creek

Stone Corral TRR

From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/17/2020 4:42:51 PM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: FW: [EXTERNAL] Sites Project Interconnection
Attachments: image001.gif; image002.gif; image003.gif

Hi Jerry,

Speaking with the design team, CH2M and Vanderweil recommends moving forward with the LGIP application. It will take 2-3 weeks to pull together the required information for this application, but I was assured that this will not impact support of permitting/planning data needs or project schedule/deliverables. With this assurance, I recommend directing the team to prepare the LGIP application. Do you have concerns with this approach before I notify Joe? We will presumably go through the payment of claims process based on the 2-3 week duration required to complete the LGIP application.

Thank you,
Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Ward, Raymond [mailto:Ward@WAPA.GOV]
Sent: Friday, September 11, 2020 3:44 PM
To: Fishman, Larry <LFishman@Vanderweil.com>; Andrews, Page <Andrews@WAPA.GOV>; Witherspoon, Ira <Withersp@WAPA.GOV>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>; Pete/RDD Rude <pete.rude@jacobs.com>; Demirchian, Garen <GDemirchian@Vanderweil.com>
Subject: RE: [EXTERNAL] Sites Project Interconnection

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Larry,

Thanks for the quick call today. As we discussed, the subject is a bit complicated given the pump and load nature of the proposed project. I'll try to capture highlights of what we discussed... and I apologize for the lengthy email needed to touch on the subject.

The LGIP of WAPA's Open Access Transmission Tariff (OATT) addresses the pro forma processes and studies needed to assess reliability impacts (and associated upgrades required) due to proposed large generator projects seeking interconnection to the WAPA system. WAPA also has a separate process vehicle that addresses proposed interconnections not covered under WAPA's OATT. That vehicle would typically cover load interconnections (those not tied to a generator project), and is referred to as WAPA's "General Requirements for Interconnection" (GRI). The GRI contains processes and study requirements that parallel those of the WAPA OATT for generation interconnection. So there is significant overlap between the LGIP and GRI in terms of what is assessed and how its accomplished. The OATT processes, however, are more granular and require customers to provide important data necessary for WAPA to perform studies that offer meaningful insight into impacts due to a proposed generator interconnection. These include the characteristics unique to each generation project, specification of the type of interconnection service being requested, etc. Further information can be found in the LGIP. All of this information is essential to being able to provide meaningful study results.

The Sites project is being proposed as a generator, and also a load. Given the generation aspects, the LGIP is the appropriate vehicle to move the project forward and allow for the full project scope to be assessed by WAPA. We propose that both the gen and load can be studied as part of a single queue project. That would allow for WAPA to study reliability impacts and system upgrade requirements holistically rather than piece meal. This minimizes only getting a 50% insight into the project by studying one aspect independent of the other, and eliminates having to track multiple queue projects and studies for the same project. The combined load and gen studies will likely extend study timelines and scope, requiring additional time and labor to complete... but they may also allow for some efficiencies and cost savings to the project.

From our call I understand the generation characteristics of the Sites project remain TBD. This was what I recall from prior discussions with the Site project staff, which is why we weren't expecting an interconnection request for the project this year. You asked if the load and gen studies could be separated for purposes of assessing interconnection feasibility options, and if WAPA could only study the load now until Sites has more information on the generation models. And yes... we can study only the load if that's what Sites is requesting. However, that will only give the project half the picture in terms of feasibility to connect and operate on the WAPA system. Under such a scenario, WAPA would need a revised GRI application that's exclusive to the load interconnection only. WAPA would then have to do a separate future study for the generator interconnection following receipt of the LGIP application once the project has modeling data for the generator.

The above scratches the surface of the LGIP/GRI processes for assessing system reliability and required system upgrades to reach interconnection agreements for load & gen, but the LGIP and GRI don't address or convey transmission services. Outside of the LGIP, WAPA's OATT also includes provisions for requesting and receiving transmission service. Those provisions would apply to both the load and the generator aspects of the project. The project will eventually need to submit separate transmission service requests to WAPA for its desired contractual uses of the WAPA transmission system, in accordance with the transmission service provisions of the OATT.

Please feel free to reach out with any questions you may have.

Kind regards,

Ray Ward | Power Operations Advisor

Western Area Power Administration | Sierra Nevada Region

114 Parkshore Drive, Folsom CA 95630

O 916.353.4766 | C 916.292.1914 | ward@wapa.gov

From: Fishman, Larry <LFishman@Vanderweil.com>

Sent: Friday, September 11, 2020 1:20 PM

To: Andrews, Page <Andrews@WAPA.GOV>; Witherspoon, Ira <Withersp@WAPA.GOV>; Ward, Raymond <Ward@WAPA.GOV>

Cc: Luu, Henry <Henry.Luu@hdrinc.com>; Pete/RDD Rude <pete.rude@jacobs.com>; Demirchian, Garen <GDemirchian@Vanderweil.com>

Subject: [EXTERNAL] Sites Project Interconnection

My name is Larry Fishman, I work with RG Vanderweil, we are working with the Sites Project as a consultant.

Following up on the email chain below, Sites had originally submitted an interconnection application.

I am hoping you can help answer a question regarding interconnecting the proposed Sites project with the WAPA system.

The question we have is as the project will be exporting power at times with an expected total generation equal to 60 Mw and also requiring power at times to run its pumps, if we submit an the LGIP application does that cover the transmission for power import as well as the power export to interconnect to the WAPA system?

As you can see in the description below the project is not the usual large power generator.

The Proposed Project consists of two pumping/hydroelectric generators stations at Terminal Regulating Reservoir (TRR) and Funks Reservoir. A new 230 kilovolt (kV) transmission system would deliver power required for the Project. The Project will require the delivery of energy to the Project substations where it will convert it from 230 kV to 13.8 kV. At the Funks site the net pumping energy demand is estimated at 80 MVA and at the TRR site the net pumping demand is estimated to be 90 MVA, totaling 170 MVA of demand load.

Funks Reservoir is estimated to have a net generating capacity to the grid equal to 55.0 MVA and TRR a net generating capacity of 31 MVA. The Project's total net generating capacity to the grid is estimated to be 86 MVA.

The Project estimated pumping energy requirements and power generation are summarized are as follows:

Pumping Power Requirements					
	Net Pumping Power (MW)	Other Auxiliary Loads	Transformer and T Line Losses (MW)	Total Pumping Power (MW)	Total Pumping Power @ 0.85 PF (MVA)
Funks	67.1	1	0.1	68.2	80.2
TRR	75.4	1	0.1	76.5	90.0
Totals	142.4			144.7	170.2

Power Generation					
	Net Pumping Power (MW)	Other Auxiliary Loads (MW)	Transformer and T Line Losses (MW)	Total Power Generation to Grid (MW)	Total Power Generation to Grid @ 0.85 PF (MVA)
Funks	48.1	1	0.1	47.0	55.3
TRR	27.4	1	0.1	26.3	31.0
Totals	75.5			73.3	86.2

The proposed Point of Interconnection (POI) to a 230 kV transmission line is located approximately 1.7 miles to the West of the TRR site and 1.7 mile to the East of Funks. To minimize cost and land area requirements, the Preliminary 230 kV Schematic Plan SKS-01-S depicts the POI looping in and then back out of the new Funks substation. The Funks substation then connects to the new TRR substation. This allows the POI to be created without locating a third substation in the vicinity of the POI; though, the interconnection configuration is subject to approval by the Utility and CAISO.

Thank you
Larry

Larry Fishman
Senior Project Manager, Power Group

R.G. Vanderweil Engineers, LLP
T 617.956.4421 | C 617.872.0727

www.vanderweil.com



From: Jerry Brown <jbrown@sitesproject.org>
Sent: Friday, September 11, 2020 10:55 AM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Rude, Pete/RDD <Pete.Rude@jacobs.com>
Subject: FW: [EXTERNAL] RE: Sites Project Application

FYI

From: Ward, Raymond <Ward@WAPA.GOV>
Sent: Friday, September 4, 2020 12:44 PM
To: Jerry Brown <jbrown@sitesproject.org>
Cc: Bolden, Amy (CONTR) <Bolden@WAPA.GOV>; Andrews, Page <Andrews@WAPA.GOV>; Witherspoon, Ira <Withersp@WAPA.GOV>
Subject: Sites Project Application

Good Afternoon Mr. Brown:

Thank you again for the brief call this morning. We look forward to staying engaged with you and learning more about the role WAPA, and potentially Reclamation as our sister agency, may play in the Sites project. Our understanding at this time is Reclamation's role in the project remains undetermined, and Sites is requesting the interconnection to WAPA under its own non-Federal interests. The interconnection request to WAPA is concurrent with other interconnection options being explored by the project for non-WAPA transmission facilities in the vicinity of the project.

I hope the information we discussed regarding WAPA's abilities to provide balancing area ancillary services and transmission services was helpful. As we discussed, WAPA's limited ancillary services, and the potential involvement of the CAISO in providing such services to your project, implies that the Sites project may operate as a pseudo-tie interconnected to the WAPA system. Decisions around Reclamations participation may influence this, but an operating solution that ties the project to another balancing area carries the same implications. There are operational complexities and pancaked transmission services that come into play under a pseudo-tie scenario. We previously shared these challenges with Mr. Jim Watson and it's helpful for your project to understand those complexities as you consider your interconnection options.

Upon further review of the attached application, I noted that the project is seeking to interconnect and operate as both pump load and generator. WAPA maintains an Open Access Transmission Tariff (OATT) with Large Generator Interconnection Procedures (LGIP) that govern the interconnection process for generation resources greater than 20 MW seeking to interconnect to the WAPA system. The application received on 9/3/20 used an application under WAPA's General Requirements for Interconnection (GRI), which is limited to only those proposed interconnections that are not subject to WAPA's OATT.

As a proposed 86 MVA (~76 MW) generation project, this request will need to be submitted in accordance with the WAPA LGIP. I'm including a link to the LGIP for ease of reference:

<http://www.oasis.oati.com/WAPA/WAPAdocs/WAPA-OATT-LGIP-Effective-2020-0211.pdf>

At your convenience, please review the LGIP and complete the application in Appendix 1 (along with Attachment A to Appendix 1). Submission of the application will need to include deposits as specified in Section 3 of the LGIP, which include a \$10,000 application deposit plus potential additional deposits based on demonstration of site control.

In order to receive any deposits, WAPA will need information from the Sites Project to set you up as a customer in our financial system. I've cc'd Amy Bolden from WAPA Finance who can walk you through the information needed.

Given the LGIP application requires submission of additional deposits, we appreciate your input on how you would prefer WAPA to manage the \$5,000 check previously submitted with the GRI application. Amy Bolden would be best

suited to field any questions in that regard as it pertains to our ability to accept the deposits without an accepted application for interconnection.

Lastly, just a reminder that I will be out of the office returning 9/21. Page Andrews or Ira Witherspoon (cc'd here) may be able to support any LGIP questions you may have in my absence. Page is the supervisor for our regional Transmission Planning group. Ira the supervisor over our regional transmission scheduling team – both have familiarity with the OATT and interconnection procedures.

Kind regards,

Ray Ward | Power Operations Advisor

Western Area Power Administration | Sierra Nevada Region

114 Parkshore Drive, Folsom CA 95630

O 916.353.4766 | C 916.292.1914 | ward@wapa.gov

From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/21/2020 6:37:16 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Luu, Henry [Henry.Luu@hdrinc.com]
Subject: RE: Sites - Reservoir Ops & Engineering Work Group

Hi Ali,

As you know, I'm working with Linda thru schedule with CH and ICF right now. For the first cut, I am proposing to John and team we take a negotiating strategy for CDFW to closed-session in October. That would also include the operating criteria, or a range of criteria, we'll be using for discussions with CDFW.

I'd like to talk to you and John about this in more detail, but my thought is that one of the ways we can keep on schedule is to get the workgroup, RC and AB to approve a negotiating framework and a range of diversion criteria to be included in the rest of our analysis for the year. We wouldn't necessarily have "final" diversion criteria yet, but I am wondering if they would delegate the final selection if we give them the sideboards.

All of that leads to us having a discussion with the WG about proposed operating criteria in early October. I haven't fully vetted that with the group yet – I extended our modeling meeting by 30 minutes tomorrow to add this to the discussion.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, September 21, 2020 6:21 AM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>
Subject: FW: Sites - Reservoir Ops & Engineering Work Group

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As I was drafting this, I was thinking about when we would have our next workgroup. I suspect sometime in October? What do you guys think about items and timing for an October workgroup meeting?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, September 21, 2020 6:19 AM
To: 'Rob Kunde' <rkunde@wrmsd.com>
Cc: Luu, Henry <Henry.Luu@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: RE: Sites - Reservoir Ops & Engineering Work Group

Draft_0003727

Rob – Thanks for the email. I've coordinated with Henry and below are quick updates on the status of the items you identified.

a. the Incidental Power generation and FERC license as a discussion item. I am interested in what the estimated hydropower generation size at Funks and TRR if not limited by the FERC licensing threshold.

The conveyance team is currently talking with FERC to understand the requirements better – and understand if FERC would view our facilities as one project, or multiple projects. We should be receiving information on this in the coming weeks. We are also working on a few operations components relative to this. We can take a wag at the amount of power generation once we get a better understanding of how FERC would view the project and have some of the operational components worked out. Overall, we're likely a few weeks / month out before we can do anything meaningful on this while we work out some of the uncertainties that currently exist.

b. status of evaluation of earthfill, earth/rockfill and hardfill dam construction.

Ultimately, dam type selection requires DSOD input. We are progressing with feasibility design assuming earth/rockfill, which has a larger impact footprint compared to earthfill and likely be more receptive by DSOD than a hardfill configuration.

c. status of emergency release evaluation (watersheds, flow rates, downstream absorptive capacity)

Analysis of emergency releases have not been initiated. This task is scheduled to be completed between now and February 2021.

d. status of CBD capacity analysis.

We can provide an update on CBD findings at the next Ops & Engineering workgroup.

Overall, we think only item d would be ready for meaningful discussion at our next workgroup meeting. The rest of the items are all in progress and a little ways out. Let me know how you'd like to proceed and whether we should continue to have all of these items on next workgroup agenda.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rob Kunde <rkunde@wrmwsd.com>
Sent: Tuesday, September 15, 2020 2:39 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Sites - Reservoir Ops & Engineering Work Group

Ali:

Has the next Reservoir Operations and Engineering Work Group meeting been set? My calendar says no.

At that next meeting, please include as agenda items:

- a. the Incidental Power generation and FERC license as a discussion item. I am interested in what the estimated hydropower generation size at Funks and TRR if not limited by the FERC licensing threshold.
- b. status of evaluation of earthfill, earth/rockfill and hardfill dam construction.
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- d. status of CBD capacity analysis.

Separate email to follow on minor edits to "Sites Reservoir Project - Preliminary Project Description - September 2020".

Robert J. Kunde, P.E.

Retired Annuitant

Wheeler Ridge-Maricopa Water Storage District

12109 Highway 166, Bakersfield, CA 93313

cell: 661-345-3719 email: rkunde@wrmwsd.com

From: Luu, Henry [Henry.Luu@hdrinc.com]
Sent: 9/21/2020 6:53:05 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Subject: RE: Sites - Reservoir Ops & Engineering Work Group

Hi Ali,

Our next Reservoir Committee meeting is on October 16, so I recommend we have the next Ops & Engineering Work Group within the Week of October 5th. There are a few engineering items we would like concurrence from the Work Group, RC, and AB:

- Level of Service
 - High level comparison of Value Planning assumptions with current facility sizing and ops modeling, and verify project diversions and releases are acceptable.
 - Red Bluff -> TCC -> Funks Reservoir -> Sites -> CBD
 - Hamilton City -> GCID -> TRR -> Sites
 - Review CBD hydraulic model results and receive direction to continue analyzing releases into CBD.
 - Review TRR alternative locations and receive direction to proceed with a preferred location.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Monday, September 21, 2020 6:21 AM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>
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Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Cc: Luu, Henry <Henry.Luu@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: RE: Sites - Reservoir Ops & Engineering Work Group

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We can provide an update on CBD findings at the next Ops & Engineering workgroup.

Overall, we think only item d would be ready for meaningful discussion at our next workgroup meeting. The rest of the items are all in progress and a little ways out. Let me know how you'd like to proceed and whether we should continue to have all of these items on next workgroup agenda.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rob Kunde <rkunde@wrmwsd.com>
Sent: Tuesday, September 15, 2020 2:39 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Sites - Reservoir Ops & Engineering Work Group

Ali:

Has the next Reservoir Operations and Engineering Work Group meeting been set? My calendar says no.

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- d. status of CBD capacity analysis.

Separate email to follow on minor edits to "Sites Reservoir Project - Preliminary Project Description - September 2020".

Robert J. Kunde, P.E.

Retired Annuitant

Wheeler Ridge-Maricopa Water Storage District

12109 Highway 166, Bakersfield, CA 93313

cell: 661-345-3719 email: rkunde@wrnwsd.com

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 9/21/2020 8:44:22 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: CDFW's recovery strategies

Sounds good. I think that the approach of identifying the range of potential effects was a good first step, and turning the focus to identifying the areas we have or could have a "+" (value, enhance, implement) is the logical next step. I'll pass the concept along to the team and get them moving forward while we work with Thad and Lewis on our parts.

Do you want to talk at our normal call today or schedule a separate time?

Also, I created a file folder for this effort:

<https://sitesreservoirproject.sharepoint.com/envpermitting/Working%20Documents/Forms/AllItems.aspx?viewid=4797e7a5%2D545e%2D4646%2Daeff%2Dec8ada9df12a&id=%2Fenvpermitting%2FWorking%20Documents%2FSites%20Species%20Benefits>

John Spranza

D 916.679.8858 M 818.640.2487

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Friday, September 18, 2020 1:51 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: CDFW's recovery strategies

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Thanks John. I uploaded a file with a few thoughts – changes in it to the same folder. In general, I'd like to flip the question around. Instead of how does Sites impact these things – how can Sites add value, enhance, implement these things? What can we do with Sites water or mitigation actions to implement and further salmon and smelt recovery? See my new table at the end.

Take a look and then lets talk. I think we should maybe talk to Thad and Lewis to see if they have any ideas coming out of the VA process. I am looking for ways we can contribute to the recovery of the species. I love the flyway, its amazing. But between CVPIA and rice decomp water, waterfowl has made a tremendous turnaround. What can we do with Sites to help salmon and smelt do the same?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Monday, September 14, 2020 8:47 AM

Draft_0003733

To: Alicia Forsythe <aforsythe@sitesproject.org>

Subject: FW: CDFW's recovery strategies

The link below contains the current draft of the ICF memo that covers the aquatic component. I'll be reviewing this on SharePoint now.

John Spranza

D 916.679.8858 M 818.640.2487

From: Briard, Monique [<mailto:Monique.Briard@icf.com>]

Sent: Monday, September 14, 2020 8:39 AM

To: Spranza, John <John.Spranza@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Hassrick, Jason <Jason.Hassrick@icf.com>; Wilder, Rick <Rick.Wilder@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Oakes, Harry <Harry.Oakes@icf.com>

Subject: RE: CDFW's recovery strategies

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John,

The memo has been uploaded to the Sites SP folder -

<https://sitesreservoirproject.sharepoint.com/envpermitting/Working%20Documents/Forms/AllItems.aspx> For this deliverable, the analysis has focused on the review of the recovery plans for fish species only. Next step will be to update the memo for terrestrial species and then to add in mitigation opportunities.

Thanks,
Monique

Monique Briard | Sr. Managing Director, Environmental Planning | +1.916.231.9551 direct
| monique.briard@icf.com | icf.com

ICF | 980 9th Street, Suite 1200, Sacramento, CA 95814 USA | +1.916.842.0894 mobile

From: Spranza, John <John.Spranza@hdrinc.com>

Sent: Friday, September 11, 2020 1:32 PM

To: Briard, Monique <Monique.Briard@icf.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Hassrick, Jason <Jason.Hassrick@icf.com>; Wilder, Rick <Rick.Wilder@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Oakes, Harry <Harry.Oakes@icf.com>

Subject: RE: CDFW's recovery strategies

I just wanted to check were we are on this. Is there an updated version of the 2020-0902 document?

John Spranza

D 916.679.8858 M 818.640.2487

From: Briard, Monique [<mailto:Monique.Briard@icf.com>]

Sent: Friday, September 4, 2020 8:38 AM

To: Berryman, Ellen <Ellen.Berryman@icf.com>; Spranza, John <John.Spranza@hdrinc.com>; Hassrick, Jason

<Jason.Hassrick@icf.com>; Wilder, Rick <Rick.Wilder@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Oakes, Harry <Harry.Oakes@icf.com>

Subject: RE: CDFW's recovery strategies

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Hi Ellen, My recommendation for this first round of the deliverable is that we add a placeholder for your discussions with Point Blue so that we can forward it to John. John definitely widened the scope with the addition of mitigation, which is not what we focused on and I think that that not including it for this first round is fine. We'll want to pull in Harry for the next step to start evaluating mitigation opportunities (cc'd with memo attached so that he can see what's been evaluated so far). Thoughts? Monique

From: Berryman, Ellen <Ellen.Berryman@icf.com>

Sent: Friday, September 4, 2020 6:51 AM

To: John Spranza <John.Spranza@hdrinc.com>; Hassrick, Jason <Jason.Hassrick@icf.com>

Cc: Briard, Monique <Monique.Briard@icf.com>

Subject: RE: CDFW's recovery strategies

I apologize if I'm late in diving in here. I'm trying to set up a meeting with some folks at Point Blue to discuss beneficial uses of the reservoir for migratory birds, but their availability appears to be fairly limited. When is the drop-dead date for providing the info?

Also, it was my understanding that we were looking for benefits related to the project itself, not mitigation for the project. If the task involves looking at great mitigation opportunities that contribute to listed species recovery, then the horizons have opened quite a bit. 😊 Let me know.

From: Spranza, John <John.Spranza@hdrinc.com>

Sent: Wednesday, September 2, 2020 1:59 PM

To: Hassrick, Jason <Jason.Hassrick@icf.com>; Berryman, Ellen <Ellen.Berryman@icf.com>

Cc: Briard, Monique <Monique.Briard@icf.com>

Subject: CDFW's recovery strategies

Hey Jason and Ellen,

I know that you guys are looking at the USFWS and NMFS Recovery Plans and preparing a memo for us, I was wondering if you could add something for the CDFW recovery strategies that we may be able to influence as well. I think that the only official Recovery Strategy document is for Coho, but I wanted to check with you two and see if there were any others. We are looking to identify areas that we could either propose needed mitigation that is highly desirable to the CDFW or identify specific components in the recovery strategy(s) that we could identify benefits for.

I'd be happy to chat though this if it helps.

Thanks,

John

John Spranza, MS, CCN

Senior Ecologist / Regulatory Specialist

HDR

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Sacramento, CA 95833

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Draft_0003735

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 9/21/2020 9:01:10 AM
To: Hassrick, Jason [Jason.Hassrick@icf.com]; Hendrick, Mike [Mike.Hendrick@icf.com]; Chris Fitzer [cfitzer@esassoc.com]; Greenwood, Marin [Marin.Greenwood@icf.com]; Leaf, Rob/SAC (Rob.Leaf@jacobs.com) [Rob.Leaf@jacobs.com]; Monique Briard (monique.briard@icf.com) [monique.briard@icf.com]; Leaf, Rob/SAC (Rob.Leaf@jacobs.com) [Rob.Leaf@jacobs.com]; Lecky, Jim [Jim.Lecky@icf.com]
CC: Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: NGO concerns and citations

Morning,

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Citations:

- Stuart Munch et al 2020. *Science for integrative management of a diadromous fish stock: interdependencies of fisheries, flow and habitat restoration*, Can. J. Fish. Aquat. Sci. 77: 1487–1504 (2020) [dx.doi.org/10.1139/cjfas-2020-0075](https://doi.org/10.1139/cjfas-2020-0075);
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- Notch, Jeremy et al 2020. *Outmigration survival of wild Chinook salmon smolts through the Sacramento River during historic drought and high water conditions*. Environ Biol Fish, <https://doi.org/10.1007/s10641-020-00952-1>
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From: Chris Fitzer [CFitzer@esassoc.com]
Sent: 9/21/2020 9:58:17 AM
To: Hassrick, Jason [Jason.Hassrick@icf.com]; John Spranza [John.Spranza@hdrinc.com]; Hendrick, Mike [Mike.Hendrick@icf.com]; Marin.Greenwood [Marin.Greenwood@icf.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Briard, Monique [Monique.Briard@icf.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Lecky, Jim [Jim.Lecky@icf.com]
CC: Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: NGO concerns and citations
Attachments: 20200630_Flow_threshold_paper_ecosphere.pdf

Thanks, Jason.

Attached is the draft manuscript from Michel et al that we briefly discussed last week. The paper describes flow-survival in the Sac River as being a non-linear, step function, with application to functional flows framework.

Chris Fitzer

Fisheries Program Manager

Working from Home - Reachable via email or text/ph 916.806.7834

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From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Monday, September 21, 2020 9:32 AM
To: John Spranza <John.Spranza@hdrinc.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Chris Fitzer <CFitzer@esassoc.com>; Marin.Greenwood <Marin.Greenwood@icf.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Briard, Monique <Monique.Briard@icf.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: Heydinger, Erin <Erin.Heydinger@hdrinc.com>; aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: RE: NGO concerns and citations

Hi all,

Attached are the papers cited below.

JASON HASSRICK | ICF | 530.312.3275

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Monday, September 21, 2020 9:01 AM
To: Hassrick, Jason <Jason.Hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Chris Fitzer <cfitzer@esassoc.com>; Greenwood, Marin <Marin.Greenwood@icf.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Briard, Monique <Monique.Briard@icf.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Lecky, Jim <Jim.Lecky@icf.com>
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Sent: 9/21/2020 4:13:34 PM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: FW: NGO concerns and citations
Attachments: Papers.zip

I haven't looked at these, but because you asked for the papers cited by NRDC previously, I thought I would send these on. One more to follow. No action on these

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Modeling composite effects of marine and freshwater processes on migratory species

WHITNEY R. FRIEDMAN,^{1,2,4,†} BENJAMIN T. MARTIN,² BRIAN K. WELLS,² PETE WARZYBOK,³ CYRIL J. MICHEL,^{1,2} ERIC M. DANNER,² AND STEVEN T. LINDLEY²

¹*Institute of Marine Sciences, University of California, 100 McAllister Way, Santa Cruz, California, USA*

²*Fisheries Ecology Division, Southwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic Atmospheric Administration, 110 McAllister Way, Santa Cruz, California, USA*

³*Point Blue Conservation Science, Petaluma, California, USA*

Citation: Friedman, W. R., B. T. Martin, B. K. Wells, P. Warzybok, C. J. Michel, E. M. Danner, and S. T. Lindley. 2019. Modeling composite effects of marine and freshwater processes on migratory species. *Ecosphere* 10(7):e02743. 10.1002/ecs2.2743

Abstract. Life histories of migratory species such as anadromous fishes make them particularly susceptible to composite effects of processes experienced across distinct habitats and life stages. Therefore, their population dynamics are difficult to quantify and manage without tools such as life-cycle models. As a model species for which life-cycle modeling is particularly useful, we provide an analysis of influential processes affecting dynamics of the Central Valley fall-run Chinook salmon (CVFC) population (*Oncorhynchus tshawytscha*). This analysis demonstrates how, through identification of covariates that affect this population at each life stage and their relationship to one another, it is possible to identify actions that best promote sustainability for this anadromous species. We developed a life-cycle model for CVFC examining primary processes influencing variability in observed patterns of escapement from 1988 to 2016. CVFC are a valuable fishery along the US West Coast; however, their natural population is a fraction of its historic size, and recent low escapements have resulted in substantial restrictions on the fishery. Our model explains 68.3% of variability in historic escapement values. The most influential processes include temperatures experienced during egg incubation, freshwater flow during juvenile outmigration, and environmentally mediated predation during early marine residence. This work demonstrates the need, and methodology, for considering the interactions between freshwater and marine dynamics when evaluating the efficacy of managerial practices in freshwater and the ocean, especially in the context of increased environmental variability, climate change, and dynamic predator populations. The methodology developed in this study can be used toward improved conservation and management of other anadromous fishes and migratory species.

Key words: anadromous fishes; California Current; climate change; composite effects; ecological interactions; ecosystem-based fisheries management; life-cycle model; migratory; salmon.

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† **E-mail:** friedman@nceas.ucsb.edu

INTRODUCTION

Worldwide, a significant number of anadromous fishes have experienced dramatic declines

in abundance, including as much as 90–99% in North America (Limburg and Waldman 2009). Their complex life histories involving obligatory migrations and dependence upon freshwater,

estuarine, and marine habitats make anadromous fish sensitive to human activities in these varied environments, and especially challenging to manage. To aid in recovery of anadromous species and sustain recovery gains, a life-cycle modeling approach is useful for identifying the most sensitive life stages and for developing effective management strategies. This approach is particularly useful for highly migratory species such as anadromous fishes because it accounts for additive consequences across the full life cycle, allowing for population-level assessments of the efficacy and impact of managerial practices affecting one or more stages or habitats.

We focus on California Central Valley Chinook salmon (*Oncorhynchus tshawytscha*) as a model species subject to composite effects across a wide range of habitats and life stages, and for which a life-cycle modeling approach is particularly informative (Zabel et al. 2006, Crozier et al. 2008, Hendrix et al. 2014). Pacific salmon are a forage item for predators in fresh (Michel et al. 2015) and marine waters (Wells et al. 2017), a dominant prey item in mammalian diets (Chasco et al. 2017), and provide a valuable fishery along the West Coast (Satterthwaite et al. 2015, Riddell et al. 2018). However, coincident with lost and degraded freshwater habitat (Yoshiyama et al. 1998, Williams 2006) and increased variability in the marine environment (Sydemann et al. 2013), the dominant California Chinook population (fall-run, hereafter “CVFC”; Pyper et al. 2013) has declined to a fraction of its historic size (Yoshiyama et al. 1998) and has shown enormous variability in freshwater returns over the last 30 yr (Appendix S1: Fig. S1; Satterthwaite and Carlson 2015, Pacific Fishery Management Council 2017b). For example, in 2008 and 2009 extremely low spawner escapement resulted in the near-complete closure of the Chinook salmon fisheries off California and much of Oregon; surprisingly, this event followed the highest recorded escapement in recent decades only six years prior (Lindley et al. 2009; Appendix S1: Fig. S1). All four Central Valley Chinook runs are managed under federal and state conservation initiatives; winter and spring runs are both protected under the Endangered Species Act (ESA), while fall- and late-fall runs have been listed as a Species of Concern by the National Marine Fisheries Service (NMFS). Describing how this

population responds to different natural and anthropogenic processes informs strategic management initiatives for stock rebuilding, increased genetic portfolios (Carlson and Satterthwaite 2011), conservation of predators reliant on it (Chasco et al. 2017, Wells et al. 2017), and sustainability of the fishery (Lindley et al. 2009).

Central Valley fall-run Chinook salmon life history and pressures on the population

Central Valley fall-run Chinook salmon spawn from late September to December in the Sacramento River, its tributaries, and tributaries to the San Joaquin River (Fisher 1994, Yoshiyama et al. 1998, Fig. 1). Egg development time and survival are sensitive to water temperature (Zeug et al. 2012, Martin et al. 2017), as well as to increased or variable flows that can destroy eggs, modulate oxygen availability, or expose them to desiccation (Becker et al. 1982, Lapointe et al. 2000, Martin et al. 2017). Most locations where CVFC spawn are below reservoirs, which moderate flows and alter temperatures downstream. Egg and embryo survival can also be reduced by redd superimposition, which occurs at higher rates with increased adult abundance and decreased spawning habitat (McNeil 1964). After emergence, juveniles may rear near their place of birth or disperse downstream or onto floodplains, where growth rates are usually higher (Sommer et al. 2001). In the spring, juveniles undergo transformation to the smolt stage and migrate to the coastal ocean. Tagging studies show that survival during this period has been shown to increase with river discharge (Michel et al. 2015, Perry et al. 2018), and survival can be quite low during dry periods, most likely due to predation by other fish (Sabal et al. 2016). CVFC must migrate through the Sacramento—San Joaquin Delta, which has been heavily modified by channelization, diking, and the operations of a complex water supply infrastructure that alters the hydrodynamics and water quality of the estuary (Nichols et al. 1986). Survival rates for juvenile salmon migrating through the interior Delta are notably low (Buchanan et al. 2013). Hatchery-produced salmon may avoid or experience different mortality sources when released in different locations throughout the system (Huber and Carlson 2015). Very little is known about how

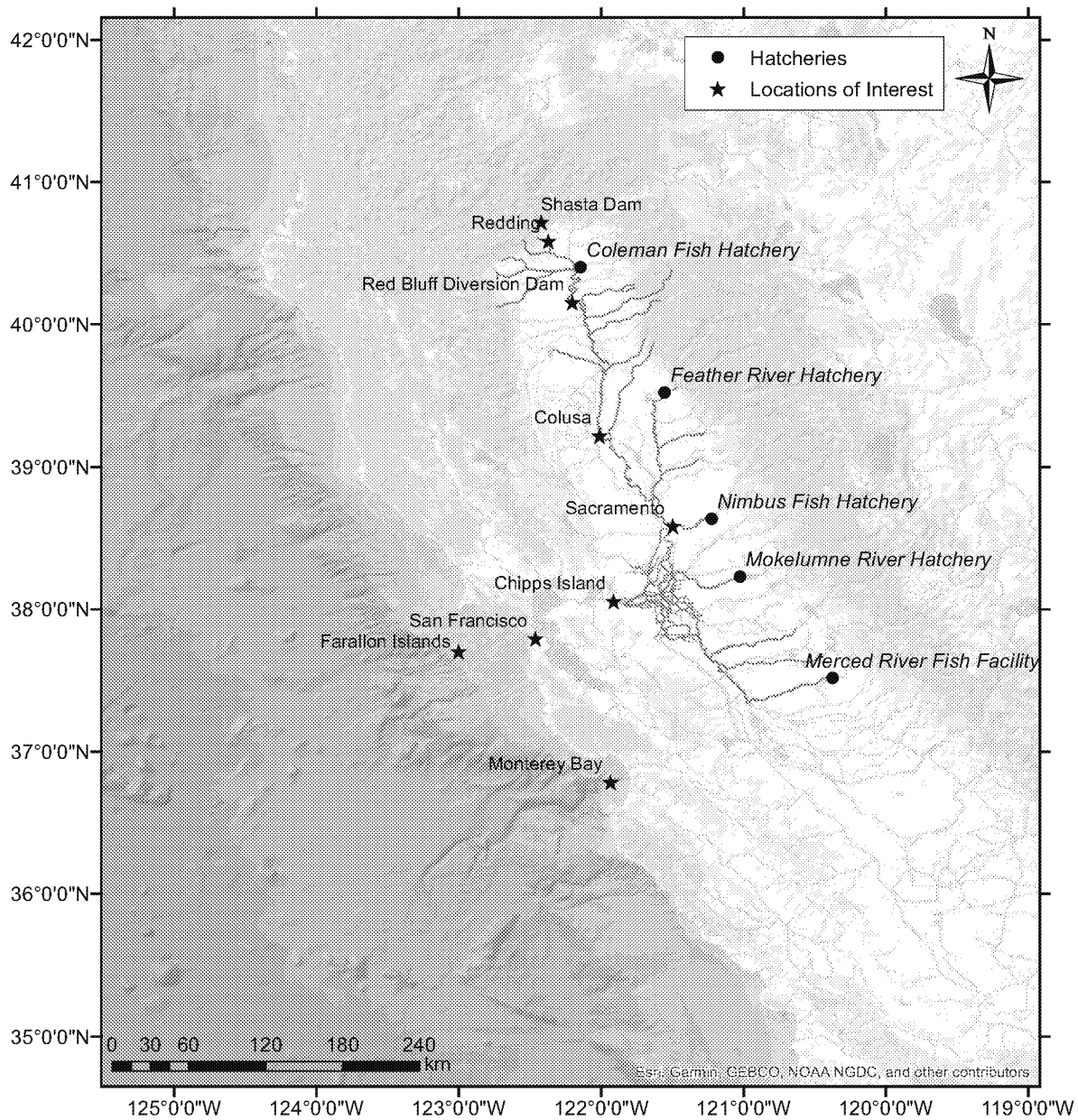


Fig. 1. Map of Central Valley fall-run Chinook habitat, hatchery locations (dots), and key locations (stars).

present conditions in the San Francisco Bay affect growth and survival of juvenile salmon. Survival of CVFC following ocean entry is dependent on predation risk and relatedly to the availability of suitable forage (Wells et al. 2012, Friedman et al. 2018), growth (Woodson et al. 2013, Fiechter et al. 2015), density dependence (Miller et al. 2013), and the occurrence of fronts enhancing

trophic interactions (Woodson and Litvin 2015). These processes are affected by environmental variability modulating predator-prey relationships (Emmett and Krutzikowsky 2008, Wells et al. 2017). Factors affecting later ages, other than fishing, are less well understood, although size-at-age is variable and related to ocean conditions, and because mortality rates are often

size-dependent, ocean climate variation may influence survival of later ages as well as young-of-the-year salmon (Heath et al. 1994, Wells et al. 2007).

Scope of study

Conservation and recovery efforts for this population require identification of those variables that most affect population dynamics and those that can be affected through management. In this study, we developed a model of CVFC population dynamics (FC α) to identify the processes that best explain the observed variability in CVFC population dynamics over the last three decades, as well as how additive effects among such processes relate to salmon escapement. Building from identification of key processes as well as their relationship to one another over time, we use the parameterized FC α model to illustrate potential effects of two management scenarios: changes to freshwater temperature during incubation and changes to freshwater flow during outmigration. This methodology may be applied toward conservation and management of other types of anadromous fishes and migratory species.

METHODS

Model description

FC α is an age- and stage-structured population dynamics model that produces model-based predictions of year t annual adult escapement based on observed returns $t-2$, $t-3$, and $t-4$ yr prior, together with covariates affecting the estimated survival of each brood year cohort. The model predicts the abundance of male (M'_t) and female (F'_t) returns separately; adding the two values provides a model-predicted estimate of total spawner escapement for each year (E'_t). Covariate data were assembled from 1983 to 2016, and model predictions are provided over the period of 1988–2016. A conceptual diagram of the full model is presented in Fig. 2. The model was written and tested in R (version 3.5.1; R Core Team 2018).

Base model.—To quantify the effect of different covariates on annual adult escapement, we first constructed a base model representing known dynamics of the CVFC life cycle. Model testing included the base model and iterative combinations of non-collinear covariates. Eq. 1 shows the

base model underlying FC α . This model predicts annual spawner returns (E'_t) based on the number of reported spawners estimated to be female 2, 3, and 4 yr prior (F_{t-2} , F_{t-3} , F_{t-4} ; described below); the historic average proportion of males and females that return at ages 2, 3, and 4 ($R_{m,2}$, $R_{m,3}$, $R_{f,3}$, described below); published values of survival at ages 2, 3, and 4 in the ocean (S_2 , S_3 , S_4) (Magnusson and Hilborn 2003); background survival terms for natural-origin fry (S_{bN}), hatchery origin releases (S_{bH}), and juvenile survival ($S_{b\phi}$) estimated by model fitting; and an annual ocean harvest survival index (S_{Vt} ; described below). Each female was assumed to have a fecundity (Y) of 5401 (Quinn 2005), and eggs were assumed to be 50% male and female. The model-predicted estimates of male spawners (M'_t) and female spawners (F'_t) were summed to provide a model-predicted estimate of total annual escapement (E'_t). Model-predicted estimates were compared to spawner escapement values reported by the Pacific Fishery Management Council (PFMC; Pacific Fishery Management Council 2017b) for the Sacramento River and San Joaquin River combined, for the period of 1983–2016 (E_t). These values result from annual surveys conducted throughout the Sacramento and San Joaquin basins (Kano 2006, Killam et al. 2016); they are treated as observed values in model fitting but are themselves best estimates. Further descriptions of all variables can be found in Table 1. During this period, 93.8% of all CVFC adult escapement was comprised of spawners returning to the Sacramento Basin.

The PFMC escapement data report the total number of adult spawners and jacks returning in each year, but do not differentiate males and females. To estimate these values, we used 11 yr (2000–2010) of spawner return data from Coleman National Fish Hatchery and Feather River Fish Hatchery in the Sacramento River Basin (California Hatchery Scientific Review Group 2012) to construct a relationship between the proportion of jacks to total and proportion of adult males to total returning to the hatcheries (Appendix S1: Fig. S2). Data from these two hatcheries were used as they had the longest overlapping time series and most complete data over the time period. Total females returning each year (F_t) were estimated as $E_t - M_t$, with M_t estimated using the hatchery relationship.

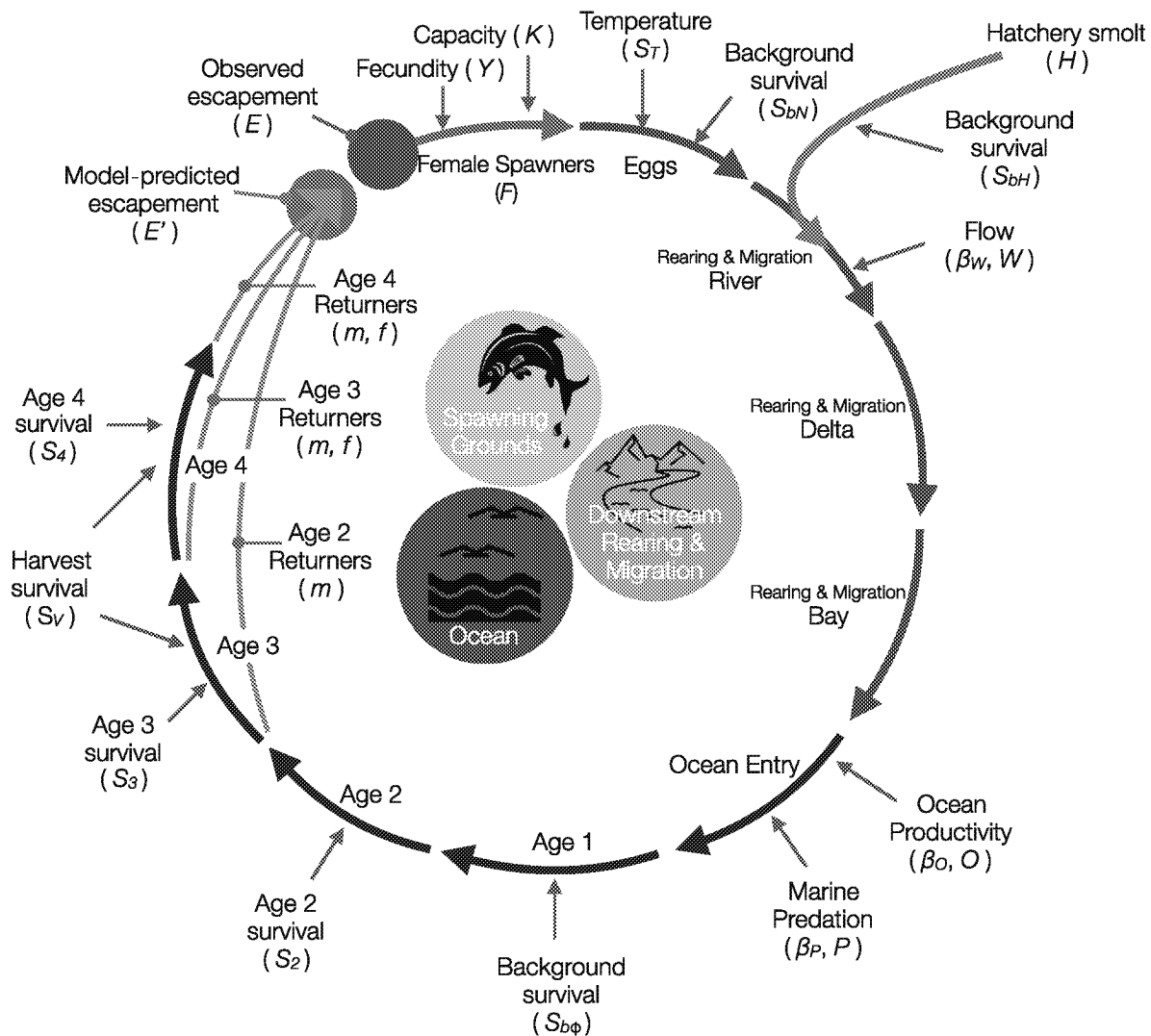


Fig. 2. Simplified diagram of the fall-run life-cycle model (FC α) showing the processes affecting a single brood year cohort. Note annual model-predicted escapement is the sum of these processes across multiple brood year cohorts (for more detail see Appendix S1: Eq. S1).

The average proportion of males and females returning by age category (corresponding to $R_{m,2}$, $R_{m,3}$, $R_{f,3}$; Table 1) were derived from the database of coded-wire-tagged fish maintained by the Regional Mark Processing Center (www.rmhc.org). We queried “Standard Reporting, All Recoveries” for all recoveries of Chinook salmon recorded over the maximum available time period (1990 to 2015) and “Standard Reporting, All Releases” for all releases of Chinook salmon recorded over the same period (1986–2014). We used only Central Valley fall-run Chinook

salmon released as fry or smolts in the Sacramento River or its tributaries by Coleman National Fish Hatchery, for which there were data on release, spawner return, and the sex of recovered individuals. We estimated returning age-group percentages for each sex, based on all returns from salmon released over the 29-yr period (Appendix S1: Fig. S3). In FC α , male return estimates are the sum of estimates for age 2, 3, and 4 males (capturing 98% of the returning population; Appendix S1: Fig. S3). Female return estimates are the sum of estimates for age 3 and

Table 1. FC α model terms and descriptions. Observed data are those reported or derived from published annual escapement data.

Variable	Value	Description
t	{1983,1984, ...,2016}	Year
E	E_t	Number of total spawners observed in year t
F	F_t	Number of female spawners observed in year t
Y	5401	Average fecundity for an adult female chinook salmon
b_T	$0.024^{\circ}\text{C}^{-1}\cdot\text{d}^{-1}$	Slope at which mortality rate increases above T_{crit}
S_T	$S_{T,t}$	Annual temperature-dependent survival
S_2	0.6	Survival for age 2 chinook at sea
S_3	0.7	Survival for age 3 chinook at sea
S_4	0.8	Survival for age 4 chinook at sea
S_V	$S_{V,t}$	Annual ocean harvest survival index
$R_{m,2}$	0.220	Mean proportion of CWT males returning at age-2
$R_{m,3}$	0.583	Mean proportion of CWT males returning at age-3
$R_{f,3}$	0.665	Mean proportion of CWT females returning at age-3
Parameter estimates		
T_{crit}	11.56 (10.80, 12.99)	Temperature threshold at RBDD
S_{bN}	0.043 (0.003, 0.758)	Background survival for naturally spawned fry
S_{bH}	0.403 (0.060, 1.000)	Background survival for hatchery fish released in rivers
$S_{b\phi}$	0.246 (0.083, 0.658)	Background survival for natural and hatchery fish to age-2
β_W	1.448 (0.787, 2.098)	Coefficient for flow-dependent survival
β_P	-1.185 (-1.664, -0.797)	Coefficient for marine predation risk
β_O	-	Coefficient for survival based on ocean productivity
K	-	Spawner capacity
Model-based predictions		
E'	E'_t	Model-predicted number of total spawners in year t
F'	F'_t	Model-predicted number of female spawners in year t
M'	M'_t	Model-predicted number of male spawners in year t

Notes: References and further explanation of variables can be found in methods. 95% confidence intervals are reported in parentheses next to parameter estimates for covariates included in the final model (Model 1). Dashes indicate parameters that were tested but not included in the final model.

4 females (capturing 96% of the returning population; Appendix S1: Fig. S3).

During the last 30 yr, the five primary hatcheries on the Sacramento and San Joaquin rivers and tributaries (Coleman, Feather, Nimbus, Mokelumne, Merced) have released an annual average of 28.3 million hatchery-raised CVFC throughout the system (Huber and Carlson 2015) over the same period as natural fall-run juvenile outmigration. To capture the contribution of hatchery smolts to the return population, we included the total number of sub-yearling salmon released by the five major hatcheries (H). Hatchery release data for 1970–2016 were collected by Huber and Carlson (2015), Appendix B) and A. M. Sturrock et al. (*unpublished manuscript*).

We derived an annual ocean harvest survival index (S_V) from published harvest rates and population estimates defined as

$S_V = 1 - (\text{ocean harvest/Sacramento Index})$ (O'Farrell et al. 2013, Pacific Fishery Management Council 2017a). Ocean harvest is the annual sum of ocean troll and sport harvest of SRFC south of Cape Falcon, OR, between September 1 and August 31 (Pacific Fishery Management Council 2017a). The Sacramento Index approximates the total population of spawners in a given year as the sum of ocean harvest, river harvest, and annual escapement (O'Farrell et al. 2013). S_V was allowed to affect only individuals greater than age 2, corresponding to those individuals typically large enough to be harvested by ocean fisheries (Pacific Fishery Management Council 2017b; Satterthwaite et al. 2017).

Error in our model is represented by the difference between predicted and observed data. We estimate the distribution of error as a normal distribution, with a mean equal to zero and a variance equal to the variance of our residuals.

$$\begin{aligned}
 M'_i &= \left(F_{i-2} \times \frac{Y}{2} \times S_{bN} + \frac{H_{i-1}}{2} \times S_{bH} \right) \times S_{b\phi} \times S_2 \times R_{m,2} + \\
 &\quad \left(F_{i-3} \times \frac{Y}{2} \times S_{bN} + \frac{H_{i-2}}{2} \times S_{bH} \right) \times S_{b\phi} \times S_2 \times S_3 \times S_{V,t} \times R_{m,3} + \\
 &\quad \left(F_{i-4} \times \frac{Y}{2} \times S_{bN} + \frac{H_{i-3}}{2} \times S_{bH} \right) \times S_{b\phi} \times S_2 \times S_3 \times S_4 \times S_{V,t-1} \times S_{V,t} \times (1 - (R_{m,2} + R_{m,3})) \\
 F'_i &= \left(F_{i-3} \times \frac{Y}{2} \times S_{bN} + \frac{H_{i-2}}{2} \times S_{bH} \right) \times S_{b\phi} \times S_2 \times S_3 \times S_{V,t} \times R_{f,3} + \\
 &\quad \left(F_{i-4} \times \frac{Y}{2} \times S_{bN} + \frac{H_{i-3}}{2} \times S_{bH} \right) \times S_{b\phi} \times S_2 \times S_3 \times S_4 \times S_{V,t-1} \times S_{V,t} \times (1 - R_{f,3}) \\
 E'_i &= M'_i + F'_i
 \end{aligned} \tag{1}$$

Sub-models

Temperature-dependent egg mortality.—We used a temperature-dependent mortality sub-model (Martin et al. 2017) to estimate annual survival (S_T) for eggs incubating in the Sacramento and San Joaquin and their tributaries. The model relates the temperature experienced by an embryo during the i th day of its development (T_i) to its instantaneous mortality rate ($h_i; d^{-1}$) with two parameters: T_{crit} , the temperature below which there is no mortality due to temperature, and b_T , the slope at which mortality rate increases with temperature above T_{crit} (Eq. 2)

$$h_i = b_T \times \max(T_i - T_{crit}, 0) \tag{2}$$

Central Valley fall-run Chinook salmon spawn in the Sacramento River and its tributaries, as well as tributaries of the San Joaquin River (Yoshiyama et al. 2000, Palmer-Zwahlen and Kormos 2015). To minimize complexity and data scarcity, we chose a single site, Red Bluff Diversion Dam (RBDD), to approximate patterns in temperature across the system. RBDD is located on the Sacramento River near Red Bluff CA (40°09'16"N, 122°12'07"W). We extracted daily minimum and maximum water temperature data from 1983 to 1989 from California Department of Water Resources reports (Turek 1990) and calculated the mean of these values for each day. We approximated missing data using iterative singular spectrum analysis, a nonparametric method which uses temporal and spatial correlation to fill data gaps (Kondrashov and Ghil 2006). We used daily mean water temperature at Bend Bridge, CA (USGS site 11377100) and from the RMA-11 model (Deas 2002) for this

temperature reconstruction. We used temperature data for RBDD from 1990 to 2016 from the River Assessment for Forecasting Temperature (RAFT) model, which uses hydrodynamic and heat transport equations to model water temperature (Pike et al. 2013). RAFT output has a 15-min temporal resolution and 2-km spatial resolution. We averaged the sub-daily data and used linear interpolation to obtain daily mean water temperature at RBDD. To verify RBDD data were representative of the system, we compared mean daily temperatures recorded at RBDD to daily temperatures recorded at 9 other major spawning regions for CVFC and found high correlations between all sites and RBDD (Pearson’s $r = 0.76$ – 0.91 ; Table 2). Data for each of the 9 sites were downloaded from the California Department of Water Resources California Data Exchange Center (CDEC).

Table 2. Correlations (Pearson’s r) between daily temperature at Red Bluff Diversion Dam (RBDD) and temperatures recorded throughout spawning range of CVFC.

Region	Site ID	Data Coverage	Correlation to RBDD (r)
Clear Creek	IGO	1996–2017	0.80
Butte Creek	BCK	1998–2017	0.82
Feather River	FRA	2002–2017	0.85
Yuba River	YRS	2001–2017	0.83
American River	AFD	1998–2017	0.76
Mokelumne River	MOK	2008–2017	0.91
Stanislaus River	SOK	2001–2017	0.85
Tuolumne River	TTS	2004–2017	0.83
Merced River	CRS	2000–2017	0.85

Note: Site IDs are those used by CDEC.

We used published data on annual CVFC spawning periods (Vogel and Marine 1991, Williams 2006) to estimate temporal patterns in redd constructions over the spawning period (a normal distribution with peak spawning occurring on November 15, and 99.9% of redds spawned from October 1 to December 1). Incubation periods (n , days), starting at each possible fertilization day (October 1 through December 1), were determined using a temperature-dependent maturation function (Zeug et al. 2012, Martin et al. 2017), where the relative developmental state at fertilization equals 0 and increases at a rate, $0.001044(^{\circ}\text{C}^{-1}\cdot\text{d}^{-1}) \times T_i + 0.00056(\text{d}^{-1})$. Incubation periods ended when the temperature-dependent developmental state exceeded 1.

Temperature-dependent survival throughout the entire embryonic period (S_T) is the product of the daily temperature-dependent survival probabilities for each year (Eq. 3).

$$S_T = 1 - \prod_{i=1}^n \exp(-h_i) \quad (3)$$

Given our temperature data do not represent the exact conditions experienced by the widespread CVFC, and to minimize model complexity, we used the published value of b_T from Martin et al. (2017) $0.024^{\circ}\text{C}^{-1}\cdot\text{d}^{-1}$. In that study (2017), estimates for b_T were found to be similar across laboratory and field contexts, and laboratory datasets that b_T was fit to include both fall and winter-run embryos, which displayed similar thermal performance curves. T_{crit} was estimated simultaneously with all other model parameters. It is important to note that our T_{crit} estimate does not represent a physiological thermal limit, rather the temperature at one site (RBDD) above which mortality is expected to be high throughout the system.

Density-dependent superimposition of redds.—Capacity effects in spawning grounds have not been well quantified for CVFC, though are presumed to occur (Hallock 1977, Williams 2006) and are considered in the conservation objectives for the population (Pacific Fishery Management Council 2016). In particular, there may be limited optimal habitat for spawning, leading to an increased probability of redds being superimposed by later spawners when female spawner abundance (F) is high (Essington et al. 2000). We

evaluated whether female spawner density affects naturally spawned egg-to-smolt survival (S_N) by testing the inclusion of a Beverton-Holt density dependence term (Beverton and Holt 1959) in our models. We note that other factors, such as competition for resources, may also contribute but are untestable at present due to limited data.

$$S_N = S_{bN}/(1 + F/K) \quad (4)$$

In Eq. 4 S_{bN} is the expected egg-to-smolt survival probability in the absence of temperature- or density-dependent survival, and K is a capacity parameter representing the maximum number of spawners.

Environmental covariates

River conditions during outmigration (W).—Flow data used in the model were from a gauge on the Sacramento River at Colusa, CA ($39^{\circ}12'51''\text{N}$, $121^{\circ}59'57''\text{W}$; USGS site 11389500). Data were downloaded from the USGS National Water Information System (<https://waterdata.usgs.gov/nwis>). We calculated an annual median value for flow in February, aligning with the period at which at 50% of sampled CVFC juveniles were captured by rotary screw traps at Red Bluff Diversion Dam from 2005 to 2017. These data were derived from the Juvenile Salmonid Monitoring biweekly reports provided by USFWS (Poytress et al. 2014).

Delta conditions during outmigration.—Among the possible covariates relating to conditions in the Sacramento–San Joaquin River delta during the peak outmigration period (March to May), the net delta outflow index (NDOI; <http://www.water.ca.gov>) provides the best approximation of the amount of water and potential habitat available to juvenile salmon. However, mean NDOI during this period was positively correlated with February flow (W , described above) (Pearson's $r = 0.62$) in the Sacramento River. All other potential variables were less descriptive of delta habitat, and those that were marginally descriptive were correlated to February flow at $r > 0.60$. In order to control for collinearity, we only included February flow in our model.

Early marine residence: ocean productivity (O) and marine predation (P).—The North Pacific Gyre

Oscillation (NPGO) is derived from analyses of Northeast Pacific sea-surface temperature and sea-surface height and is an indicator of upwelling strength, nutrient fluxes, and current strength in the California Current Large Marine Ecosystem (CCLME) (Di Lorenzo et al. 2008). Upwelling and nutrient availability influence the production and retention of krill and forage fish on which outmigrating juvenile salmon depend (Dorman et al. 2011, 2015, Wells et al. 2012), and the annual NPGO variability has been shown to influence synchrony of juvenile Chinook salmon survival along the CCLME (Kilduff et al. 2015). We tested the inclusion of NPGO as a covariate of juvenile salmon survival during early marine residence. Monthly NPGO indices were downloaded from a public repository (www.o3d.org/npgo) and summarized as annual means (O) (Kilduff et al. 2015). We also tested seasonal averages describing fall, winter, spring, and summer conditions, but found no significant differences in model performance over the less restrictive annual estimates used by Kilduff et al. (2015).

To test whether inter-annual variation in predation risk was significant in the larger population dynamics of CVFC, we included an annual index of marine predation on juvenile outmigrants equal to the annual estimated abundance of common murre (*Uria aalge*) at Southeast Farallon Island multiplied by the annual proportion of murre diet consisting of salmon (Ainley et al. 1990, Roth et al. 2007, Wells et al. 2017). Common murre were chosen as a proxy for marine predation (P) during early marine residence based on the findings of Wells et al. (2017). Both population estimates and diet composition data were available for all years in the present study. Many other known and potential predators are showing increasing population trends, and may be having similar or greater impacts on juvenile salmon survival, but annual data on population and diet were not available to include in our model.

Transformations, model fitting, and model selection

We converted time series for the survival covariates (W , O , P) to standard scores and estimated coefficients for each covariate (β_W , β_O , β_P), capacity (K), and background survival (S_{bN} , S_{bH} , $S_{b\phi}$) through model optimization. We used the R

package *optimx* (Nash and Varadhan 2011) to implement a box-constrained non-linear minimization routine (*nlsminb*), iterating over possible beta-parameter values in concert to find a solution that minimized the sum of squared error (SSE) between log-transformed values of observed versus predicted escapement. Within the model, we multiplied standard scores of the survival covariates (W , O , P) by the corresponding coefficient, then transformed these time series using an inverse-logit function (R package *boot*) to scale the variables as survival probabilities from 0 to 1 (function *il* in Eq. 5, Appendix S1: Eq. S1). We constructed profiles of the log-likelihood surfaces for each estimated parameter to obtain 95% confidence intervals.

We used Akaike's Information Criterion (AIC; Sakamoto et al. 1986) to select the most parsimonious model among 32 candidates. All models included the base model and its associated parameters (S_{bN} , S_{bH} , $S_{b\phi}$; Eq. 1). The set of models tested included the base model with no additional parameters (Eq. 1) and all possible combinations of the base model with additional terms and associated parameters (K , S_D , β_W , β_O , β_P ; e.g., all possible terms, Appendix S1: Eq. S1). Pairwise correlation coefficients (Pearson's $|r|$) among covariates ranged from 0.001 to 0.467, below established threshold values for collinearity (Dormann et al. 2013).

All models within a AIC difference (Δ) ≤ 4 are reported (Burnham and Anderson 2002, Deriso et al. 2008). Additional descriptive statistics reported include sum of squared error (SSE) between log-transformed values of observed versus predicted escapement, the proportion of variance predicted by the model (R^2), and goodness of fit (logL; log-likelihood ratio statistic). We used bootstrap resampling to estimate error in the model predictions.

Scenario testing

We used the parameterized FC α to evaluate the effect of two simple scenarios reflecting changes in freshwater temperatures during incubation and freshwater flow during outmigration. In the temperature scenario, the daily mean temperature matrix used to estimate egg-fry survival was varied from -3 to $+3^\circ\text{C}$. These values correspond to those derived by Isaak et al. (2018) for projected increases in river temperatures in the

northwestern United States. In the flow scenario, observed annual February flow values were varied from -3 to $+3$ standard deviations from the mean of the original time series (1 SD = 11,762 cfs).

RESULTS

Model performance

The model with the most support included temperature-dependent egg mortality, freshwater flow, and the marine predation index (Model 1; Table 3, Eq. 5). This model explained 68.3% of the variation in spawner returns observed from 1988 to 2016 (Fig. 3). The second best model (Model 2; $R^2 = 0.715$; Table 3) was distinguished by an AIC difference of only 0.176 from the top model and included the spawner capacity sub-model. However, confidence intervals for K were extremely wide, and post hoc model testing revealed a relationship between model estimates of K and background survival for natural-origin smolts (S_{bN}), with higher values of K estimated

as S_{bN} were minimized. Lacking further data to constrain K , and because these two models are statistically equivalent, we conclude there is a lack of strong evidence for spawner capacity in these models and focus our results on the more parsimonious Model 1 (see *Discussion* for further detail). All additional models had ΔAIC values > 2 from the top model; those with ΔAIC values ≤ 4 are included in Table 3. The null model (Eq. 1) explained only 1% of the variation in spawner returns. Analysis of variable importance indicated that freshwater flow (W) and predation during the period of early ocean entry (P) were the most influential terms in our model (Fig. 4). Error in model predictions, estimated via bootstrap resampling, was minimal except in the case of a few years (Appendix S1: Fig. S5).

Final model covariates

The median daily temperature recorded from October to December each fall ranged from 10.0°C in 1983 to 14.4°C in 2014, with a positive trend over the 34-yr study period (Fig. 5A.1; see

Table 3. Best performing models found after model selection ($\Delta AIC \leq 4$).

Model	Terms	R^2	SSE	$-\log\text{Lik}$	AIC	ΔAIC	EP
1	T_{crit} β_W β_P	0.683	6.110	22.582	-33.164	0.000	6
2	T_{crit} K β_W β_P	0.715	5.737	23.494	-32.988	0.176	7
3	T_{crit} β_W β_{Ov} β_P	0.680	6.114	22.573	-31.147	2.017	7
4	β_W β_P	0.607	7.511	19.588	-29.175	3.988	5

Notes: All models include the three estimated parameters (EP) from the base model (S_{bN} , S_{bHL} , $S_{b\phi}$). Model 1 is discussed in text.

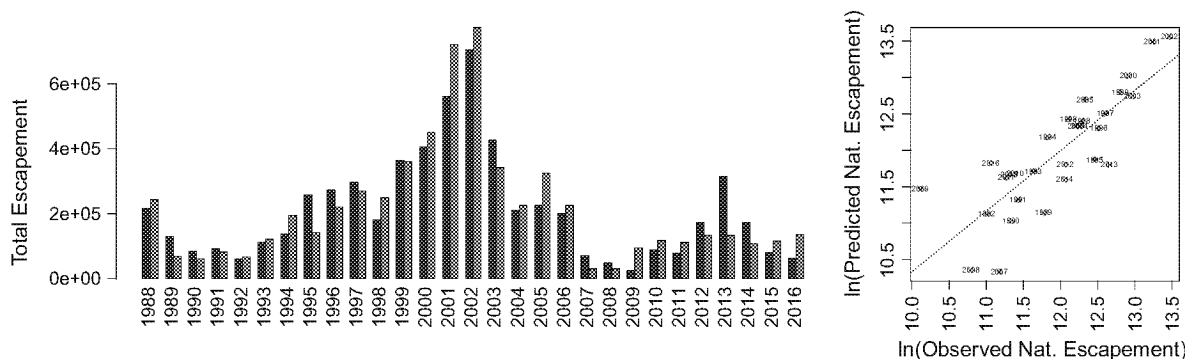


Fig. 3. Final model. Black bars indicate observed escapement; blue bars represent model-predicted escapement by $FC\alpha$. 1988, 2002 peaks are captured, as are valleys in 1992 and 2008. The 2013 peak is not captured, and returns for 2001 are overestimated.

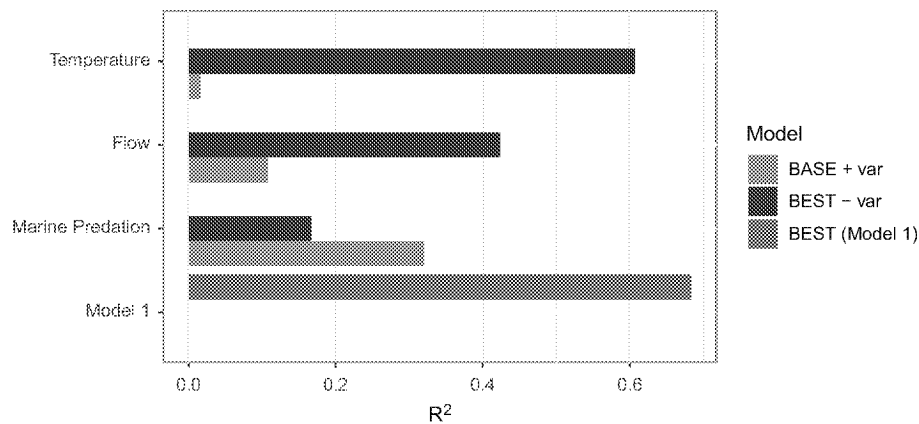


Fig. 4. Variable importance. Shown are all terms that occur in the best model (Model 1), the performance of the base model plus each term individually (gray), and the performance of the best model with that term excluded (dark blue), against the performance of the best model with all terms included (Model 1; blue).

Beer and Anderson 2013, Isaak et al. 2018, for more detailed analyses of temperature trends in this region).

The temperature-dependent mortality model estimated an annual survival based on estimated spawning date, temperature-dependent incubation period, and temperatures experienced during incubation. Therefore, while the median temperature from October to December describes some of the pattern of estimated mortality, it is not a complete depiction of experienced temperatures. Estimated survival based on temperature (Fig. 5A.2, A.3) ranged from <0.01 in 1991, 1996, and 2014 to 0.88 in 2011. The estimate for T_{crit} was 11.56°C (95% CI 10.80, 12.99).

Freshwater flow significantly affected model performance. With flow excluded, the model explained only 42.3% of the variation in CVFC escapement (Fig. 4). The estimate for the flow coefficient (β_W) was 1.448 (95% CI 0.787, 2.098). Significantly, above-average annual flows were uncommon during the period of our analysis, but corresponded to high survival estimates for the years when they occurred (1983, 1986, 1998–2000) (Fig. 5B.1, B.2).

The marine predation index contributed significantly to model performance. Without the inclusion of marine predation, the model explained only 16.7% of the variation in CVFC escapement (Fig. 4). The estimate for the marine predation coefficient (β_P) was -1.185 (95% CI

$-1.664, -0.797$). Marine predation was especially high in the early 2000s and was above average for 11 yr between 2002 and 2016 (Fig. 5C.1, C.2).

Scenarios

We used $FC\alpha$ to evaluate the effect of two simple scenarios reflecting plausible changes in freshwater temperatures during incubation and freshwater flow during outmigration. Results should be interpreted as annual one-year-ahead predictions rather than multi-year patterns.

In years when observed escapement was mid to high (1996–2006), decreases in temperature during the incubation period predicted appreciably higher values of escapement than what was observed. However, in years when observed escapement was low, changes to temperature during the incubation period showed marginal effects. Overall, even a +1°C or -1°C degree shift in incubation temperatures showed substantial effects across years (Fig. 6A).

Increases in flow showed broad effects across years, with higher escapement predicted by increases in flow during the outmigration period in all years except for 2007–2008, when escapement has been shown to have been largely modulated by variability in ocean processes and related predation events (Lindley et al. 2009, Wells et al. 2017). Across all years, the -2 SD and -3 SD flow scenarios were associated with substantially lower escapement. (Fig. 6B).

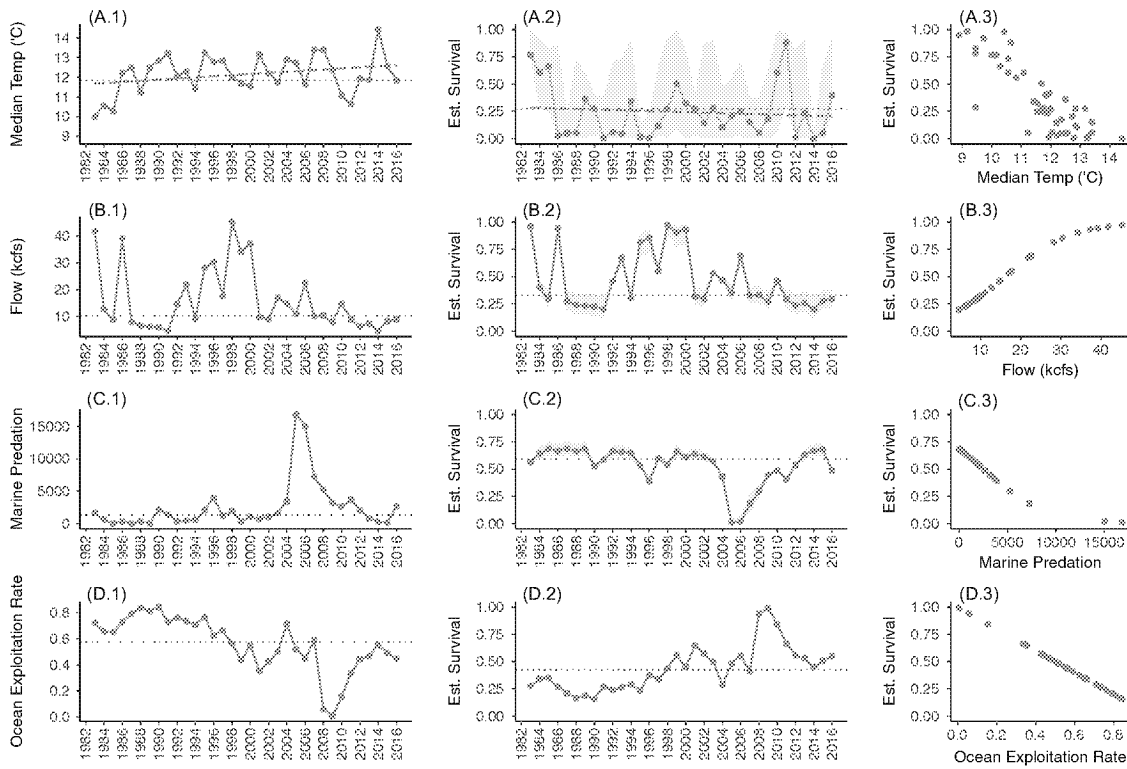


Fig. 5. Annual observed values for final environmental covariates (Temp, Flow, Marine Predation) and annual ocean harvest rate (A.1–D.1). Covariate relationships to model-predicted survival each year based on final parameter values (Table 1) are shown in A.2–D.2. Gray ribbons around model-predicted survival reflect 95% confidence intervals around parameter estimates for T_{crit} , β_W and β_P (A.2., B.2, C.2, respectively). The median values for each covariate across the study period are shown as gray dotted lines. A trend line for median incubation temperatures (A.1) and temperature-dependent survival (A.2) is shown in red (dashed). A.3–D.3 shows covariate relationships to survival. Note, presented here are median temperature values during the spawning period from October to December to summarize the range of conditions included in the temperature-mortality model.

$$\begin{aligned}
 M'_t &= \left(F_{t-2} \times \frac{Y}{2} \times S_{T,t-2} \times S_{bN} + \frac{H_{t-1}}{2} \times S_{bH} \right) \times il(\beta_W W_{t-1}) \times il(\beta_P P_{t-1}) \times S_{b\phi} \times S_2 \times R_{m,2} + \\
 &\quad \left(F_{t-3} \times \frac{Y}{2} \times S_{T,t-3} \times S_{bN} + \frac{H_{t-2}}{2} \times S_{bH} \right) \times il(\beta_W W_{t-2}) \times il(\beta_P P_{t-2}) \times S_{b\phi} \times S_2 \times S_3 \times S_{V,t} \times R_{m,3} + \\
 &\quad \left(F_{t-4} \times \frac{Y}{2} \times S_{T,t-4} \times S_{bN} + \frac{H_{t-3}}{2} \times S_{bH} \right) \times il(\beta_W W_{t-3}) \times il(\beta_P P_{t-3}) \times S_{b\phi} \times S_2 \times S_3 \times S_4 \times S_{V,t-1} \\
 &\quad \times S_{V,t} \times (1 - (R_{m,2} + R_{m,3})) \\
 F'_t &= \left(F_{t-3} \times \frac{Y}{2} \times S_{T,t-3} \times S_{bN} + \frac{H_{t-2}}{2} \times S_{bH} \right) \times il(\beta_W W_{t-2}) \times il(\beta_P P_{t-2}) \times S_{b\phi} \times S_2 \times S_3 \times S_{V,t} \times R_{f,3} + \\
 &\quad \left(F_{t-4} \times \frac{Y}{2} \times S_{T,t-4} \times S_{bN} + \frac{H_{t-3}}{2} \times S_{bH} \right) \times il(\beta_W W_{t-3}) \times il(\beta_P P_{t-3}) \times S_{b\phi} \times S_2 \times S_3 \times S_4 \times S_{V,t-1} \\
 &\quad \times S_{V,t} \times (1 - R_{f,3}) \\
 E'_t &= M'_t + F'_t
 \end{aligned}
 \tag{5}$$

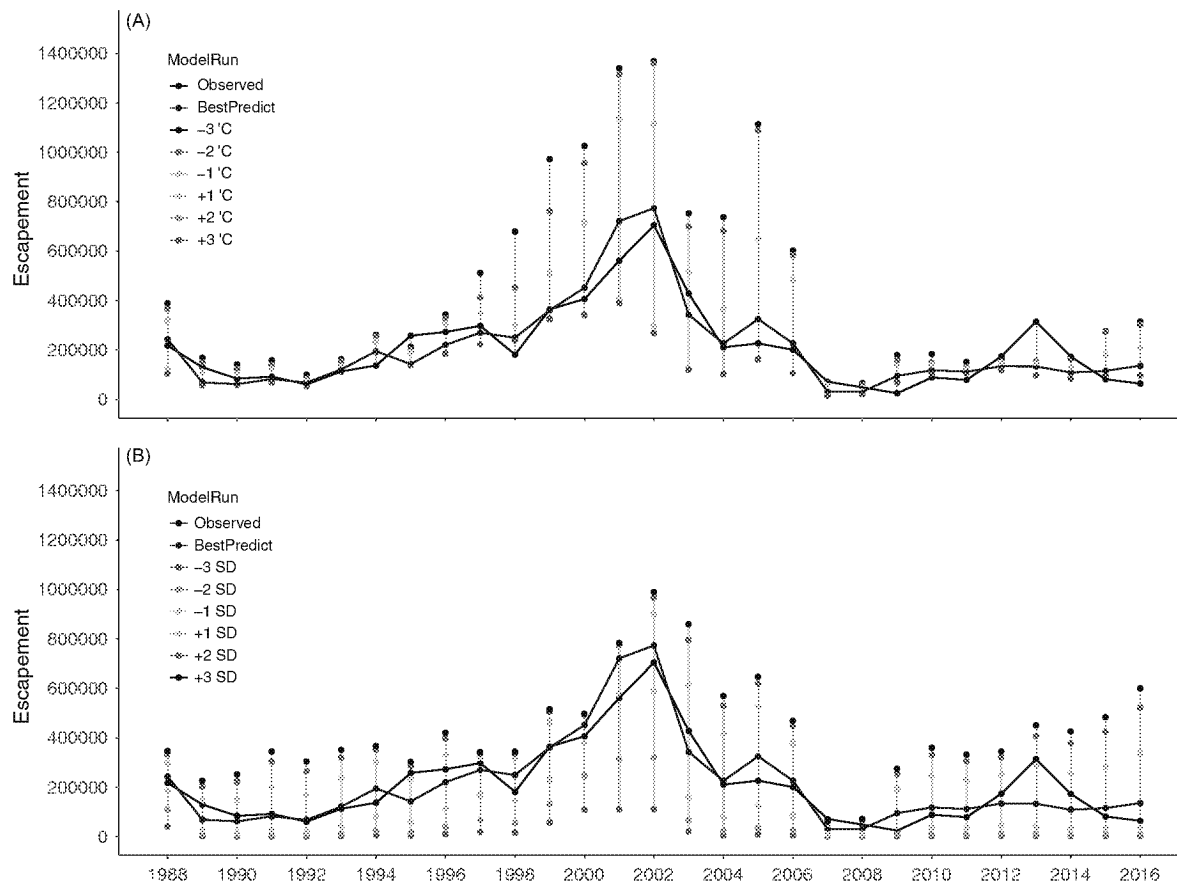


Fig. 6. Annual point estimates of escapement in response to scenarios of increased or decreased freshwater temperatures during incubation (A), and flow during outmigration (B). 1 SD pertains to a fixed variation of 11762 cfs applied to the observed flow each year. Results should be interpreted as annual point estimates rather than multi-year or cumulative patterns.

DISCUSSION

Our results show that population dynamics of CVFC result from composite effects of processes in the freshwater and marine environment. For example, during the limited years of high flow observed in this time series our model predicted high survival when other processes were more typical (1998–2000; Fig. 5). In 2006, above-average flows corresponded to a higher survival estimate for juvenile outmigrants, but marine predation during the early marine residence period was particularly high. Notably, 2006 was the year of outmigration for much of the adult cohort that contributed to the low returns observed in 2008. In a different phase of the system, the fall of 1995 was estimated to have extremely low

egg-fry survival corresponding to high incubation temperatures. However, flow in the spring of 1996 was particularly high, which may have compensated for the temperature effect and contributed to relatively high returns in 1999 (Figs 3, 5).

We observed a positive trend in fall incubation temperatures throughout the study period (Fig. 5A.1), and the temperature-dependent mortality model was included in three of the four top models. Temperature-dependent mortality has also been shown to affect Central Valley winter-run Chinook salmon (Martin et al. 2017). Given the increasing trend toward warmer temperatures and known egg-fry mortality, it is likely this covariate will become increasingly important as we focus on the current period and near future.

This may be especially so for CVFC as they spawn in lower-foothill reaches of the Sacramento and San Joaquin rivers (Fisher 1994, Yoshiyama et al. 1998), likely making them more susceptible to intra-annual temperature fluctuations as well as increasing temperature trends. This situation may be exacerbated by the effects of reservoirs, which typically elevate water temperatures in the fall and winter in downstream river reaches (Caissie 2006, Olden and Naiman 2010).

Flow has direct and indirect effects on juvenile salmon outmigration dynamics. Freshwater flow, moderated by snowmelt, rain, and water operations, affects outmigration timing, size, and survival of juvenile Chinook salmon. Timing of juvenile salmon outmigration coincides with peak flows (Kjelson et al. 1982, Healey 1991, Williams 2006). Michel et al. (2015) and Wells et al. (2017) demonstrated higher survival for juvenile Central Valley Chinook salmon outmigrating during higher flows. Sturrock et al. (2015) found significant differences in the phenology of outmigrating CVFC between a wet and dry year, with fry contributing to a higher proportion of returning spawners from the same broodyear, and evidence suggesting higher in-river mortality in the drier year. High flows in the Sacramento and San Joaquin rivers are positively correlated with turbidity, which has been associated with higher survival, likely due to increased ability to avoid predation (Gregory and Levings 1998). Higher flows likely create improved rearing and migration habitat (e.g., increased woody debris, primary productivity, and access to flooded sloughs and wetlands; Quinn 2005). From the standpoint of management, high flows are related to pumping operations and routing probabilities in the Sacramento–San Joaquin Delta, and higher survival among outmigrants in this region has been observed during higher flows (Brandes and McLain 2001). Water management and habitat modifications (e.g., dams, diversions) have altered freshwater flow and temperatures experienced by outmigrating CVFC (Yoshiyama et al. 2001). These changes coupled with reduced genetic and phenotypic diversity in the population (see Satterthwaite and Carlson 2015, Herbold et al. 2018) mean the population is likely more susceptible to inter-annual variations in temperature and flow resulting from natural

processes, climate change, and management practices (Lindley et al. 2009, Herbold et al. 2018). Thus, the effects of freshwater flow and temperature described here may be increased over what we expect with a more diverse population.

The inclusion of the marine predation index had the most significant effect on model performance. Common murre, among several predator populations, have been recovering in the Gulf of the Farallones region and have shown a sharply increasing abundance since 2001 (Wells et al. 2017). Predation was exceptionally high during 2005–2006 when there were very low abundances of krill and juvenile rockfish (Schroeder et al. 2014). Predation pressure remained higher than the median for the majority of years following Common murre increases in the early 2000s (Fig. 5). In the absence of preferred prey (juvenile rockfish), common murre shift to a diet dominated by northern anchovy, which overlap spatially and temporally with outmigrating juvenile salmon, resulting in significant incidental impacts on salmon (Wells et al. 2017, Warzybok et al. 2018). It is likely that under similar circumstances additional predators switch to forage inshore on anchovy, further increasing predation risk on juvenile salmon (e.g., rhinoceros auklet (*Cerorhinca monocerata*), Warzybok et al. 2018). For example, Fleming et al. (2016) reported a similar phenomenon for humpback whales in the central California Current ecosystem whose isotopic ratios indicated a switch to diets consistent with sardine and anchovy during years of low krill abundance. With increasing environmental variability in the CCLME (Sydeman et al. 2013), and increasing predator populations (e.g., California sea lions (*Zalophus californianus*), Laake et al. 2018; harbor seals (*Phoca vitulina*), Carretta et al. 2016; common murre, Wells et al. 2017; Brandt's cormorants (*Phalacrocorax penicillatus*), Capitolo et al. 2014), it is likely there will be increasingly higher and more variable predation risk for outmigrating juvenile salmon, especially in years in which primary forage are less abundant. This is likely to cause greater variability in adult population dynamics and increased likelihood of reductions in the fishery and escapement.

Recruitment to the fishery and ultimately escapement variability may be more dependent

on ocean conditions for CVFC than other Central Valley Chinook runs. For example, the ocean condition during winter, when late-fall and winter-run salmon outmigrate (Fisher 1994), is less variable temporally and spatially than the spring when CVFC outmigrate (Checkley and Barth 2009). In winter, upwelling intensity is lower (Checkley and Barth 2009), the associated mesoscale features (e.g., fronts, upwelling shadows, eddies) are less common (Graham and Largier 1997, Wing et al. 1998), and the salmon prey-scape is less rich (Ainley et al. 1996). However, when upwelling begins in late winter, it promotes a more abundant forage base in the spring (Schroeder et al. 2013, Fiechter et al. 2015, Friedman et al. 2018). Optimal upwelling in spring and summer creates heterogeneous retentive areas in which forage is available to outmigrating salmon (Graham and Largier 1997, Wing et al. 1998); however, if upwelling is too intense forage can be advected offshore (Cury and Roy 1989). Such physical and biological dynamics are largely responsible for variability in forage and, ultimately, survival of CVFC salmon during their first spring and summer at sea (Fiechter et al. 2015, Wells et al. 2016, Henderson et al. 2019). Reduced prey availability leads to reduced growth (Fiechter et al. 2015, Henderson et al. 2019) and increased predation on smaller fish (Woodson et al. 2013), including from predators seeking alternative prey (Wells et al. 2017). This process, emergent from a series of regional conditions, is likely the reason basin-scale covariates such as annual NPGO were uninformative when predation was included in the model (note, post hoc analyses using seasonal averages of NPGO also did not improve model performance); that is, while NPGO describes some of the underlying processes mediating forage availability and predation pressure, predation pressure is the more proximate covariate of outmigration survival. Importantly, our results indicate that a life cycle model parameterized with demonstrated processes will improve fit above the inclusion of coarse ecosystem indicators alone.

Our analysis was inconclusive on whether female spawner densities (K) affect egg-to-fry survival in CVFC. A comparison of Model 1 and Model 2 (which included K) showed the main effect of including K was to substantially decrease the starting number of natural-origin

fry the model, while increasing the estimate of background survival (S_{bN}) for those natural fry remaining. The low capacity (K) estimated in Model 2 effectively decoupled the relationship between the number of spawners and the number of emergent fry, leading to similar estimates of natural-origin fry abundance regardless of spawner densities. Unfortunately, we cannot differentiate between these two models without additional data on the number of natural-origin fry in the system, or their proportion relative to hatchery-origin fry. Importantly, all other final parameters (T_{crit} , S_{bH} , $S_{b\psi}$, β_W , β_P) were similar between the two models, with marine predation, flow, and temperature showing the strongest relationship to variability in annual escapement. Improved estimates of spawning habitat availability over time would be particularly useful for future models.

Our model examines the effects of environmental factors on the productivity of CVFC. However, as discussed by Lindley et al. (2009), there has likely been a reduction in the underlying productivity of this stock related to physiological changes in individuals (e.g., reduced egg size, age at maturation, reduced genetic diversity; Heath et al. 2003, Satterthwaite and Carlson 2015), brought on by large-scale habitat modification (Yoshiyama et al. 2001) and hatchery introgression (Willmes et al. 2018). Due to a lack of physiological time series and knowledge of confounding effects with environmental covariates (Heath et al. 1994), we were unable to include these physiological effects in the model presented here. However, we separately tested the inclusion of a survival term that decreased over time (corresponding to the hypothesis of decreased productivity) and found that it increased model performance in terms of AIC, log-likelihood, and variance explained. The top model including this term was otherwise identical to our final model. As these physiological time series become available, it will be prudent to include such terms in future models.

Finally, we used the parameterized FC α model to estimate the effect of changes in temperature during incubation, as well as flow during outmigration, on model-predicted escapement. As flow was the stronger covariate in the model, it is no surprise that variations in flow showed a greater effect, with increases in flow during

outmigration relating positively to increased adult escapement. Interestingly, for the recent years characterized by low freshwater flow and high incubation temperatures, the models representing increased temperature and decreased flow beyond what was observed provided a more accurate prediction than our final parameterized model (Fig. 6). This indicates compounding effects beyond what is presently captured in our model. Freshwater conditions have carryover effects on the survival of salmon at sea as they relate to the size, condition, timing, and abundance of outmigrants. Each of these dynamics can affect survival at sea through size-selective mortality (Woodson et al. 2013), match–mismatch of salmon with their preferred prey (Satterthwaite et al. 2014), and competition (Miller et al. 2013). This points to a need to consider the interactions between freshwater and marine dynamics when considering the tradeoffs associated with different managerial scenarios. As well, this makes clear the need to consider a full life-cycle model to accommodate the implications of environmental variability and managerial action at any given life stage on the fisheries and spawning populations.

Life-cycle models such as the one presented here provide a tool that enables integration of data series and mechanistic models across life stages and habitats to describe the composite effects of processes contributing to population dynamics and can be used for strategic ecosystem-based management of migratory species such as anadromous fish. Our results support the hypothesis that escapement variability in CVFC is largely described by composite effects of freshwater and marine processes during the smolt to juvenile period. These results align with and reconcile previous research demonstrating the importance of these phases for recruitment to the population (Beamish and Mahnken 2001, Kilduff et al. 2014, Woodson and Litvin 2015, Wells et al. 2016, Michel 2018). Our results also point to key management levers related to the most influential processes found to affect the CVFC population (freshwater temperature, flow, and marine predation). In particular for CVFC, freshwater temperatures may be managed, as is presently done for Central Valley winter-run Chinook, through modification of dam operations to optimize the temperature of spawning areas. Similarly, pulse flow

releases during juvenile outmigration will likely increase survival rates through the freshwater system. However, this operation will be most effective if considered relative to the potential for survival at sea, which relates both to predation risk (Wells et al. 2017) and the development of suitable forage (Friedman et al. 2018) upon which outmigrating juvenile Chinook rely. With increasingly variable marine conditions (Sydeman et al. 2013), in addition to increasing and dynamic predator populations (Chasco et al. 2017, Wells et al. 2017), the impact of prey-switching in years of low productivity will likely increase. Continued study of marine ecosystem dynamics can be pursued simultaneously with, and complement efforts to increase survival in the freshwater phase. Overall, management actions that promote diversity in the natural population will increase resilience in the population through strengthened portfolio effects (Mantua and Francis 2004, Carlson and Satterthwaite 2011, Satterthwaite and Carlson 2015, Herbold et al. 2018). The results of our work can be used to develop long-term strategies to sustain populations such as CVFC and thereby reduce variability in harvest and escapement. Finally, the methodology developed in this study can be used to improve conservation and management of other anadromous fishes and migratory species.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online at: <http://onlinelibrary.wiley.com/doi/10.1002/ecs2.2743/full>

From: Williams, Nicole [Nicole.Williams@icf.com]
Sent: 9/21/2020 8:20:04 PM
To: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Berryman, Ellen [Ellen.Berryman@icf.com]; Briard, Monique [Monique.Briard@icf.com]
CC: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; John Spranza [John.Spranza@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites HC: Stone Corral Creek TRR Alt Figure

Hello Jelica – Ellen is out of the office this week. Our team received the information that was provided last Thursday about the second part of the area to be evaluated (the alignment area). Monique is checking in with the team and will let you know the status. Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
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From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Monday, September 21, 2020 5:51 PM
To: Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; John Spranza <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites HC: Stone Corral Creek TRR Alt Figure
Importance: High

Ellen/Nicole

Wanting to know what the ETA is for getting biological/cultural constraints information for both the TRR and Stone Corral Creek.

Any way that the HC team can get information from you by COB Thursday this week. There is a strong desire to incorporate the information into the technical memorandum that is due September 28th.

Also, are we expecting information to come through for the existing/current TRR area?

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6697

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 3:46 PM
To: Berryman, Ellen <Ellen.Berryman@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>
Cc: 'Laurie Warner Herson' <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: Sites HC: Stone Corral Creek TRR Alt Figure

Hey there

See attached file from Pete. No GIS/kmz is available – only line-work on the PDF.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



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Sacramento, CA 95833
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Jelica.Arsenijevic@hdrinc.com

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From: Rude, Pete/RDD [<mailto:Pete.Rude@jacobs.com>]
Sent: Tuesday, September 15, 2020 4:24 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Subject: Sites HC: Stone Corral Creek TRR Alt Figure

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Henry and Jelica,

As we discussed with ICF on Friday afternoon, attached is a revised figure that shows the Pipeline alignment that we will be using. It runs from the northwest corner of the Stone Corral Creek TRR to the west side of Funks Reservoir – where it would follow the same path up to the Inlet/outlet tunnels.

Now ICF has what they need for their cultural resources and biological analysis for this alternative. If we could get their input by September 23 that would be best. Let me know if anyone has questions.

Thanks

Peter H. Rude, PE (CA, HI, CO) /jacobs/ Civil Engineer & Principal Project Manager
1-530-229-3396 (office)/ 1-530-917-4164 (mobile)/ 2525 Airpark Drive, Redding, CA 96001
pete.rude@jacobs.com / www.jacobs.com

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viewing, copying or distribution of, or reliance on this message by unintended recipients is strictly prohibited. If you have received this message in error, please notify us immediately by replying to the message and deleting it from your computer.

From: Havelaar, Christiaan [Christiaan.Havelaar@icf.com]
Sent: 9/22/2020 8:22:30 AM
To: Carper, Mark A [mcarper@usbr.gov]
CC: Lassell, Susan [Susan.Lassell@icf.com]; Briard, Monique [Monique.Briard@icf.com]; Risse, Danielle [Danielle.Risse@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Lloyd, John [John.Lloyd@hdrinc.com]
Subject: RE: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Hi Mark,

Thanks for your quick review. I'll address these comments and send you a final by COB today. For #3, I will clarify that any additional locations would be within the current defined APE.

Christiaan

From: Carper, Mark A <mcarper@usbr.gov>
Sent: Monday, September 21, 2020 11:18 AM
To: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org; Lloyd, John <John.Lloyd@hdrinc.com>
Subject: Re: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Hey Christiaan- I have a couple comments. They are minimal so not worthy of an attached matrix. I've embedded them below. Of the three, #3 specifically needs to be addressed before I can initiate SHPO consultation with a no historic properties affected determination.

1- Typo - Pages 7&10 " Geotecnical"

2- Cut-n-paste gone awry – Page 10 "Maxwell The western end of this area is located at the eastern base of the Antelope Valley foothills East of Funks Creek with the eastern the Tehama Colusa Canal."

3- Needs explicit clarification – Page 12 "if additional locations are needed. If identified locations must be adjusted or additional locations are needed, the determination of new locations would be coordinated with resource experts" This needs clarification that additional or alternate locations would still need to be situated within the defined APE boundary as presented in Figure 3. The current language doesn't express that. If they propose to go outside of the defined APE this would be more than coordination to avoid resources. I would need to reconsult with Tribes and SHPO.

Cheers!
Mark

From: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Sent: Thursday, September 17, 2020 11:51 AM
To: Carper, Mark A <mcarper@usbr.gov>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org

<aforsythe@sitesproject.org>; Lloyd, John <John.Lloyd@hdrinc.com>

Subject: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon Mark,

Attached is the cultural resources report for the proposed 2020-2021 Sites geotechnical studies as well as a finding of effect table. The 2020 report is an addendum to the 2019 geotechnical report and the 2020 FOE table is formatted in a similar fashion to the 2019 table for consistency. Please let us know if you have any questions. We look forward to your review.

Thank you,

Christiaan

Christiaan Havelaar | Senior Archaeologist/Manager | +1.916.231.9748 direct | christiaan.havelaar@icf.com | icf.com

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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/22/2020 10:25:22 AM
To: Spranza, John [John.Spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Subject: FW: data needs meetings

Regarding tomorrow's PD team meeting. We may have the style guide but not the construction appendix (or any appendix) template – we will need to address as an upcoming item. However, can we change the agenda to address the following from Nicole's email, below:

- Authority/HR &HC – what has been removed or substantially modified – if we could get the list now, that would really help so we know that we are not describing or analyzing a facility that no longer exists in Chapter 2 (e.g., connector tunnel to the I/O Works). Trying to avoid analyzing facilities that didn't need analysis to being with.

From: Williams, Nicole [mailto:Nicole.Williams@icf.com]
Sent: Monday, September 21, 2020 8:43 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Cc: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Subject: RE: data needs meetings

Hello Laurie –

Thanks much for the initial list.

I've added additional thoughts below regarding the meetings in green highlight.

I also uploaded ICF's responses and tracked changes to comments in Chapter 2. They might help with organizing/framing the meetings. Yellow highlighted comments are where we need additional input or clarification or are pointing out an example where it would be helpful if a reviewer just modified text rather than incorporated a comment bubble (which I understand you discussed with Monique today). Kind of like the yellow highlighted comments I did in Chapter 1. Let me know if that is not working for you.

- The Chapter 2 document is here: <https://sitesreservoirproject.sharepoint.com/EnvPlanning/Shared%20Documents/Forms/AllItems.aspx?viewid=8f364129%2D488b%2D483d%2Dbd96%2Db022e5337c7e&id=%2FEnvPlanning%2FShared%20Documents%2FRDEIR%5FSEI%20Ch%202%20PPD>

- As: Ch2_AltDescription_compiled w_Rec (note it was saved as a new version of the existing document; not as an entirely new document).

We will continue to look through the TMs and pull out as much information as we can before our internal kick off which is scheduled for this Friday.

Question: when you say later in October (looking for after October 1 but before October 12), those meetings would be focused on Alt 2?

Cheers, Nicole

NICOLE L. WILLIAMS
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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>

Sent: Monday, September 21, 2020 3:33 PM

To: Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>

Cc: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>

Subject: data needs meetings

Hi Nicole and Monique,

I am coordinating with Jelica to identify meetings needed to address additional data needs for the EIS/EIR (she will also follow up on the BA). After reviewing the initial input from HR and HC, I have developed the following list of topics/data needs that I think will require follow-up meetings in the near term:

- Authority/Integration/HR/HC – Any information identified in Chapter 2 seemed contradictory within a TM or that we requested clarification based on TM information. An example of this is on page 2-47. Clarification of this is the text below, seems like there are two different things going on here:

- Authority/HC – can you help clarify the gray highlights – seems like there are two options here and need to know what should actually be described.) Funks Reservoir has a spillway that could accommodate a flow of 22,000 cfs or more than the total emergency drawdown flow of 16,000 cfs. The TRR would be lower in the system and was not anticipated to have a spillway that could accommodate the 7,000 cfs emergency drawdown flow that the system is capable of conveying. Although a high capacity spillway could be added at the TRR, there is concern that excessive flow from the TRR could pose a flooding threat to residents downstream. In the event the TRR is found to not be able to accommodate the emergency drawdown flows, one option is to install additional energy dissipation valves at Funks Reservoir and connect to the TRR pipelines which would increase the flow into Funks where it could possible accommodate it.

- If the Authority adhered to the Reclamation criteria of a maximum of 20 feet per second in the pipelines, the maximum drawdown flow that could be sent through the pipelines would be 4,500 cfs for each system, or a total of 9,000 cfs. The additional 7,000 cfs would need to be discharged by other facilities such as 1) an energy dissipation structure at the tunnel outlet that discharges to Funks Creek or 2) the addition of more pipelines from the outlet to Funks Reservoir with additional energy dissipation to Funks Reservoir

Note: an example where clarification was successfully achieved is on page 2-18 based on the information provided by HR.

- Authority/HR & HC – what has been removed or substantially modified – if we could get the list now, that would really help so we know that we are not describing or analyzing a facility that no longer exists in Chapter 2 (e.g., connector tunnel to the I/O Works). Trying to avoid analyzing facilities that didn't need analysis to being with.

- HR & HC – Construction Appendix (means and methods)

- Authority/HC – confirmation of pipeline from transition manifold to Funks Creek to release flow

- Authority/Integration (?) – Integrating facilities/information from HR & HC – I see this need for the roads and the transition manifold. There may be other facilities/areas of overlap. The HR and HC pieces for these types of facilities need to be pulled together through both text but also figures. For example, ideally the roads figure would have ALL the roads on them (those associated with Funks and TRR) and the transition manifold figure would have all pieces of the manifold.

- HR – I/O tower and fish screens and clarification of headgates, tunnel – I don't think this clarification is needed any more if the connector tunnel has been removed. I also don't think the fish screens need to be discussed unless HR/Authority need more from the environmental team about why the screens they have already identified are okay. I do think the number and level of portals needs to be resolved and I raised this to my fish folks today, they are going to

bring it up at a meeting later this week because the number and location of portals has potential effects on temperature.

- HR- borrow areas and quarries
- HR/Roadways – clarifications of items such as “locally there will be no shoulders”
- HR/Roadways – input on Table PD2-6 – Sites Project Roads & Purposes
- HR/Roadways & Authority – confirm maintenance: “AECOM recommends that during construction, the construction contractor will be responsible for maintaining maintenance and construction roads. After construction, we anticipate responsibility will shift to the County for permanent roads and to the Authority for maintenance roads.”
- HC/Authority – GCID Maintenance and Improvements
- HC/Authority – building locations
- Authority – Reservoir Management Plan (what is included; e.g., will HABs be addressed)
- Authority – Reservoir Operations Plan
- Authority – water for construction (comment from Reclamation was a reminder that CVP water can’t be used outside of CVP place of use)
- Authority – building location please identify what building location we should be analyzing – page 2-17
- Authority – Comm Roads – page 2-34 HR says Kevin S. needs to decide
- Authority – Ecosystem account – page 2-38;
- Authority – Maxwell intertie – HC suggested the authority write it on page 2-39

Please let me know if you have any additions. Please note that we will also need meetings later in October once the Alternative 2 design work is done and HC progresses with conveyance details (including power transmission).

Thanks,

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

Supplier Clearinghouse Women Business Enterprise (#16000323)

<http://phenixenv.com/>

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/22/2020 11:34:45 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [John.Spranza@hdrinc.com]
Subject: FW: data needs meetings

FYI

From: Briard, Monique [mailto:Monique.Briard@icf.com]
Sent: Tuesday, September 22, 2020 8:35 AM
To: Williams, Nicole <Nicole.Williams@icf.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Subject: RE: data needs meetings

Thank you, Laurie for pulling together the proposed meetings for us and Nicole for adding the detail so that the meetings focus on the information that is needed. As we discussed yesterday, please move forward with the meetings without ICF staff to resolve the information that is needed in the text.

Thanks,
Monique

From: Williams, Nicole <Nicole.Williams@icf.com>
Sent: Monday, September 21, 2020 8:43 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Briard, Monique <Monique.Briard@icf.com>
Cc: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Subject: RE: data needs meetings

Hello Laurie –

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Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
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Sent: Monday, September 21, 2020 3:33 PM
To: Williams, Nicole <Nicole.Williams@icf.com>; Briard, Monique <Monique.Briard@icf.com>
Cc: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
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- Authority – Reservoir Management Plan (what is included; e.g., will HABs be addressed)
- Authority – Reservoir Operations Plan
- Authority – water for construction (comment from Reclamation was a reminder that CVP water can't be used outside of CVP place of use)
- Authority – building location please identify what building location we should be analyzing – page 2-17
- Authority – Comm Roads – page 2-34 HR says Kevin S. needs to decide
- Authority – Ecosystem account – page 2-38;
- Authority – Maxwell intertie – HC suggested the authority write it on page 2-39

Please let me know if you have any additions. Please note that we will also need meetings later in October once the Alternative 2 design work is done and HC progresses with conveyance details (including power transmission).

Thanks,

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

Supplier Clearinghouse Women Business Enterprise (#16000323)

<http://phenixenv.com/>

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/22/2020 1:46:50 PM
To: Kevin Spesert [kspesert@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: AB 52

Good afternoon –

Since we have a meeting scheduled with the Yocha Dehe next week, is it time to send out the letters reinitiating AB 52 consultation with all tribes? If so, we will need to provide a description of the project with the letters. We could provide a link to the Board materials from last week but I know there were some suggested edits to the project description summary. Another option would be to update the project description summary, make appropriate edits and eliminate non-essential information.

Janis left a message for me last week so I talked to her this morning. She is available to support the Yocha Dehe call and will check in with ICF before she does so Monique is aware of her activities. She also wanted to confirm whether she should reach out to Doc Bill at CICC again since she now has a working phone number for him. I told her that I would confirm with Kevin.

Let me know if you would like to have a call to discuss the approach to the meeting next week with Laverne and/or the overall AB 52 process.

Thank you,

Laurie

Laurie Warner Herson
Principal/Owner



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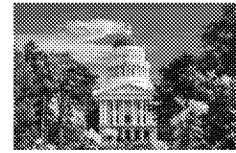
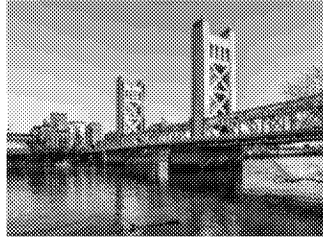
<http://phenixenv.com/>

Sites Reservoir



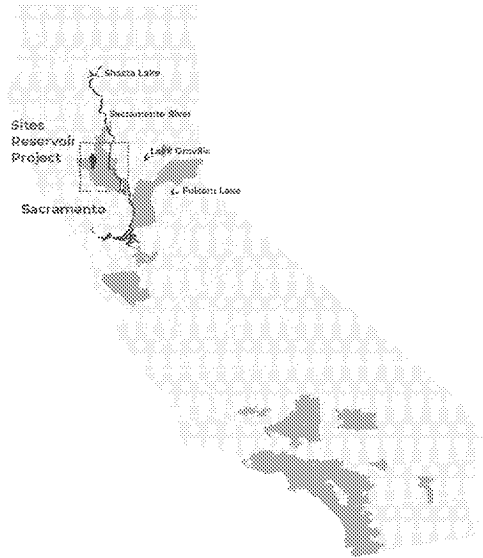
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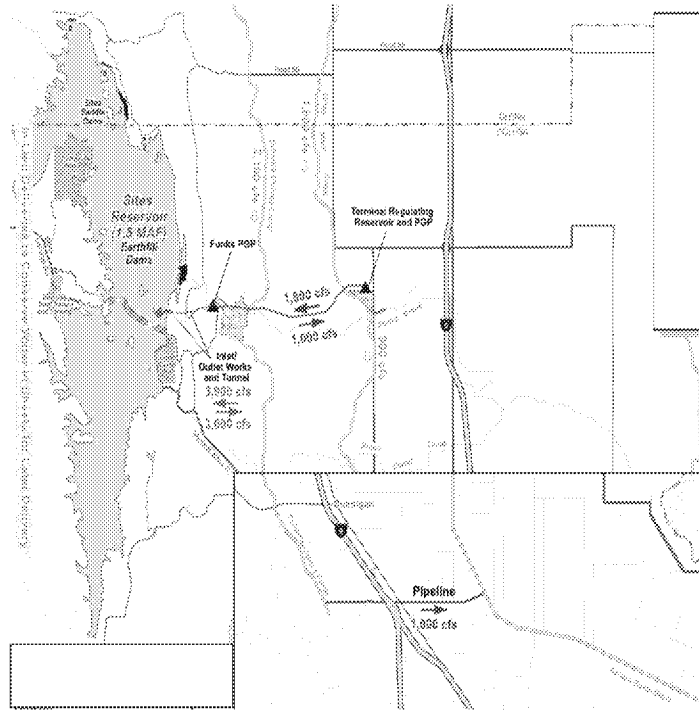


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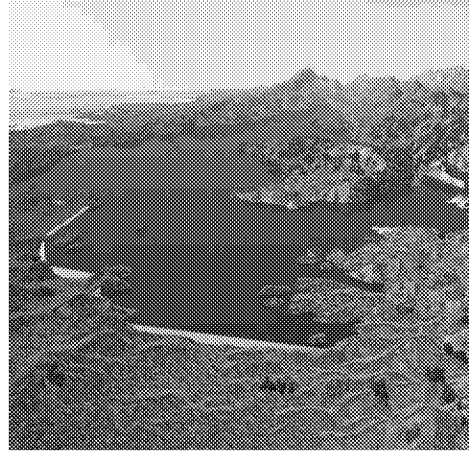
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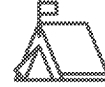
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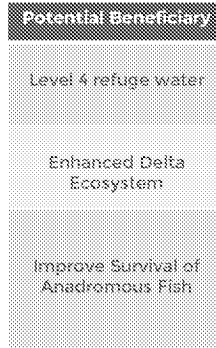
Provide water dedicated to help improve conditions for the Delta Smelt

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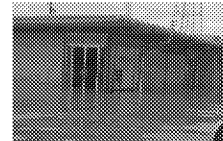
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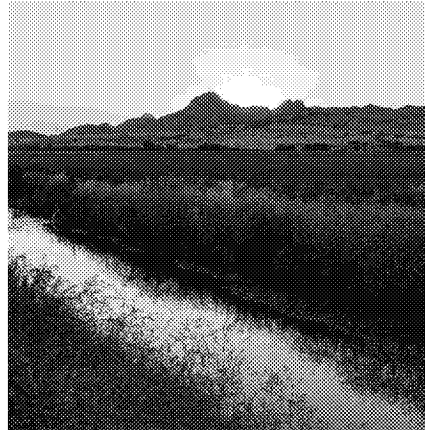
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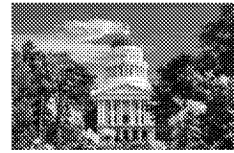
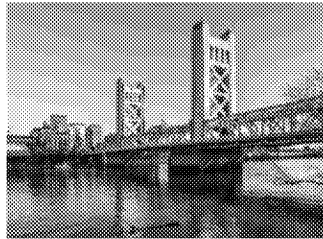
 **Sites**

Sites Reservoir



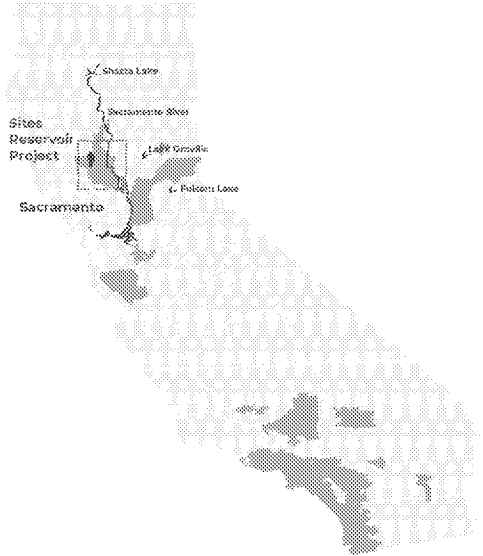
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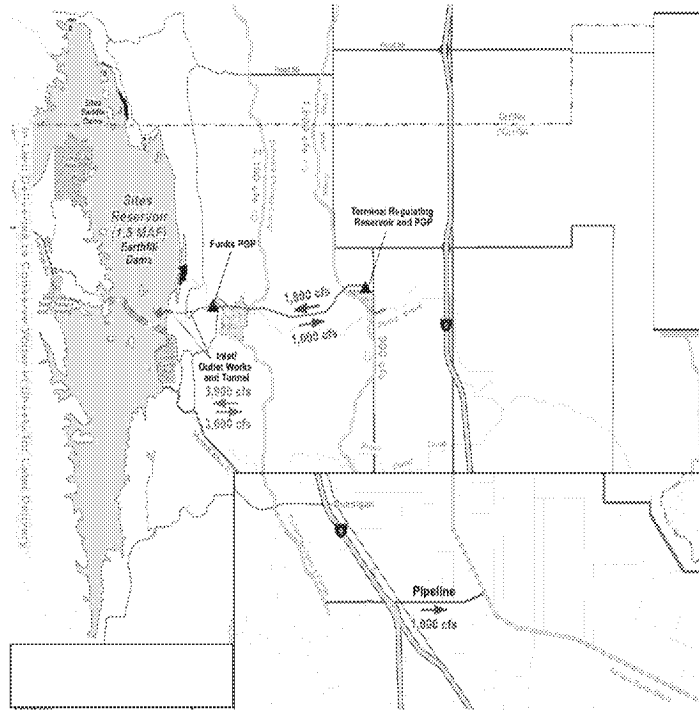


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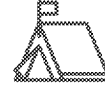
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Potential Beneficiary
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Enhanced Delta Ecosystem
Improve Survival of Anadromous Fish

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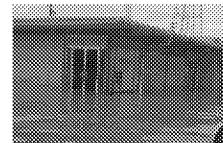
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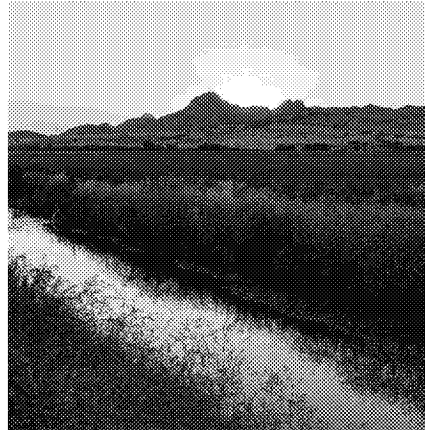
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Questions

 **Sites**

From: Havelaar, Christiaan [Christiaan.Havelaar@icf.com]
Sent: 9/23/2020 11:58:03 AM
To: Carper, Mark A [mcarper@usbr.gov]
CC: Lassell, Susan [Susan.Lassell@icf.com]; Briard, Monique [Monique.Briard@icf.com]; Risse, Danielle [Danielle.Risse@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Lloyd, John [John.Lloyd@hdrinc.com]; Tannourji, Danielle [Danielle.Tannourji@icf.com]
Subject: RE: [EXTERNAL] Sites 2020 Geotechnical Addendum Report
Attachments: SitesGeotech_Rpt_ADDENDUM_09232020.pdf

Hi Mark,
Here is the revised report. We should be good to go now. Let me know if you need anything else.
Thanks!

Christiaan

From: Carper, Mark A <mcarper@usbr.gov>
Sent: Monday, September 21, 2020 11:18 AM
To: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org; Lloyd, John <John.Lloyd@hdrinc.com>
Subject: Re: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Hey Christiaan- I have a couple comments. They are minimal so not worthy of an attached matrix. I've embedded them below. Of the three, #3 specifically needs to be addressed before I can initiate SHPO consultation with a no historic properties affected determination.

1- Typo - Pages 7&10 " Geotecnical"

2- Cut-n-paste gone awry – Page 10 "Maxwell The western end of this area is located at the eastern base of the Antelope Valley foothills East of Funks Creek with the eastern the Tehama Colusa Canal."

3- Needs explicit clarification – Page 12 "if additional locations are needed. If identified locations must be adjusted or additional locations are needed, the determination of new locations would be coordinated with resource experts" This needs clarification that additional or alternate locations would still need to be situated within the defined APE boundary as presented in Figure 3. The current language doesn't express that. If they propose to go outside of the defined APE this would be more than coordination to avoid resources. I would need to reconsult with Tribes and SHPO.

Cheers!
Mark

From: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Sent: Thursday, September 17, 2020 11:51 AM
To: Carper, Mark A <mcarper@usbr.gov>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle

<Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org
<aforsythe@sitesproject.org>; Lloyd, John <John.Lloyd@hdrinc.com>

Subject: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon Mark,

Attached is the cultural resources report for the proposed 2020-2021 Sites geotechnical studies as well as a finding of effect table. The 2020 report is an addendum to the 2019 geotechnical report and the 2020 FOE table is formatted in a similar fashion to the 2019 table for consistency. Please let us know if you have any questions. We look forward to your review.

Thank you,

Christiaan

Christiaan Havelaar | Senior Archaeologist/Manager | +1.916.231.9748 direct | christiaan.havelaar@icf.com | icf.com

ICF | 980 9th St, Suite 1200, Sacramento, CA 95814 | +1.916.752.0943 mobile



From: Carper, Mark A [mcarper@usbr.gov]
Sent: 9/23/2020 12:07:16 PM
To: Havelaar, Christiaan [Christiaan.Havelaar@icf.com]
CC: Lassell, Susan [Susan.Lassell@icf.com]; Briard, Monique [Monique.Briard@icf.com]; Risse, Danielle [Danielle.Risse@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Lloyd, John [John.Lloyd@hdrinc.com]; Tannourji, Danielle [Danielle.Tannourji@icf.com]
Subject: Re: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Thanks Christiaan

From: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Sent: Wednesday, September 23, 2020 11:58 AM
To: Carper, Mark A <mcarper@usbr.gov>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org <aforsythe@sitesproject.org>; Lloyd, John <John.Lloyd@hdrinc.com>; Tannourji, Danielle <Danielle.Tannourji@icf.com>
Subject: RE: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Hi Mark,
Here is the revised report. We should be good to go now. Let me know if you need anything else.
Thanks!

Christiaan

From: Carper, Mark A <mcarper@usbr.gov>
Sent: Monday, September 21, 2020 11:18 AM
To: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org; Lloyd, John <John.Lloyd@hdrinc.com>
Subject: Re: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

Hey Christiaan- I have a couple comments. They are minimal so not worthy of an attached matrix. I've embedded them below. Of the three, #3 specifically needs to be addressed before I can initiate SHPO consultation with a no historic properties affected determination.

1- Typo - Pages 7&10 " Geotecnical"

2- Cut-n-paste gone awry – Page 10 "Maxwell The western end of this area is located at the eastern base of the Antelope Valley foothills East of Funks Creek with the eastern the Tehama Colusa Canal."

3- Needs explicit clarification – Page 12 "if additional locations are needed. If identified locations must be adjusted or additional locations are needed, the determination of new locations would be coordinated with resource experts" This needs clarification that additional or alternate locations would still need to be situated within the defined APE boundary as presented in Figure 3. The current language doesn't express that. If they

propose to go outside of the defined APE this would be more than coordination to avoid resources. I would need to reconsult with Tribes and SHPO.

Cheers!
Mark

From: Havelaar, Christiaan <Christiaan.Havelaar@icf.com>
Sent: Thursday, September 17, 2020 11:51 AM
To: Carper, Mark A <mcarper@usbr.gov>
Cc: Lassell, Susan <Susan.Lassell@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Risse, Danielle <Danielle.Risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; aforsythe@sitesproject.org <aforsythe@sitesproject.org>; Lloyd, John <John.Lloyd@hdrinc.com>
Subject: [EXTERNAL] Sites 2020 Geotechnical Addendum Report

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon Mark,

Attached is the cultural resources report for the proposed 2020-2021 Sites geotechnical studies as well as a finding of effect table. The 2020 report is an addendum to the 2019 geotechnical report and the 2020 FOE table is formatted in a similar fashion to the 2019 table for consistency. Please let us know if you have any questions. We look forward to your review.

Thank you,

Christiaan

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From: JP Robinette [JRobinette@BrwnCald.com]
Sent: 9/23/2020 2:22:42 PM
To: Jerry Brown [jbrown@sitesproject.org]; Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Draft Affordability Ops TM
Attachments: Draft Affordability Operations Modeling TM_101019.pdf; Draft Affordability Operations Modeling TM_101019.docx; MasterGrid_101019_static.xlsx

Email 2 of 2.

Here are some of the final results before the value planning was started. This included some assumptions on state O&M coverage. Purely FYI. Still assumed federal investment, so very outdated.

JP Robinette, PE*

Brown and Caldwell

JRobinette@brwncald.com

T 916.853.5312 | C 801.819.4306

*Professional Registration in Specific States

From: Tull, Robert/SAC <Robert.Tull@jacobs.com>
Sent: Thursday, October 10, 2019 2:57 PM
To: Frederiksen, Lee E. <Lee.Frederiksen@hdrinc.com>; Jim Watson <jwatson@sitesproject.org>
Cc: JP Robinette <JRobinette@BrwnCald.com>; Joe Trapasso <jtrapasso@sitesproject.org>; Kevin Spesert (kspesert@sitesproject.org) <kspesert@sitesproject.org>; Rob Thomson <rthomson@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>; Herrin, Jeff <jeff.herrin@aecom.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>
Subject: Draft Affordability Ops TM

Lee,

Attached is the draft Affordability TM for the operations modeling support. I included a complete pdf along with the word and excel files for the text and master table.

Please review and let us know if you have any questions.

Thanks,
Rob

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Operations Affordability Analysis Technical Memorandum



To: Jim Watson
CC: Rob Thomson
JP Robinette
Date: October 10, 2019
From: Rob Tull
Quality Review by: Rob Leaf
Authority Agent Review by: Rob Thomson
Subject: Facility Affordability Analysis – Operations Modeling

1.0 Purpose and Background

This memorandum documents the preliminary evaluation of various facility configurations, sizes, and regulatory criteria to support the financial affordability analysis. Jacobs conducted screening level modeling analyses of 29 different Sites Project scenarios, including a range of reservoir sizes, variants with 1 or 2 Delevan pipelines, with or without a Delevan pumping plant/intake, and potential future diversion criteria. Jacobs provided estimated Sites Project water deliveries to Holthouse Reservoir in support of the affordability analysis. These results are intended only for preliminary screening level evaluation purposes.

2.0 Assumptions and Methodology

The different scenarios were simulated with the CalSim II model by adjusting reservoir size, level of member participation, conveyance facilities, and regulatory criteria.

2.1 Modeling Assumptions

All model simulations were conducted with the DCR 2015 “merged model” developed for the Sites Project. The scenarios evaluated in this study were based on modifications to the Sites Alternative D, which includes a 1.81 MAF reservoir with intakes at Red Bluff, Hamilton City, and Delevan and a two-pipe Delevan Pipeline. Public Water Agency participation is consistent with Phase 2 levels and the project provides public benefits for anadromous fisheries, Level 4 refuge deliveries, and Yolo Bypass augmentation flows.

In Alternative D, diversions are allowed when operational criteria are met including bypass flows of 3,250 cfs at Red Bluff, 4,000 cfs at Hamilton City, and 5,000 cfs at Wilkins Slough. Additionally, there is a bypass flow requirement at Freeport that varies throughout the year to maintain Delta water quality.

Seven groups of scenarios were analyzed. Each group includes a combination of facilities and diversion criteria. Within each group, different reservoir sizes were evaluated.

2.2 Public Benefit Reservoir Storage Accounts

Public benefits are funded by the State of California (State) and the U.S. Bureau of Reclamation (Reclamation). The State is responsible for Yolo Bypass augmentation flows and refuge deliveries while

Reclamation is responsible for anadromous fish benefits. Reservoir storage account sizes for public benefits are based on the ratio of the financial investment of the participating party to the total cost of the project.

The cost for recreation and flood control benefits is shared between the State and Reclamation. As these benefits do not involve water storage, their dollar value is deducted from the investment amount in calculating account sizes. Based on information provided by AECOM, it is assumed that recreation cost is divided evenly between State and Reclamation, while the State is responsible for 35 percent of the flood control benefit and Reclamation is responsible for the remaining 65 percent. Flood control costs are fixed while recreation costs are proportional to the size of Sites Reservoir.

State investment is assumed to be fixed at \$816 million, the amount currently proposed to be awarded by the Water Storage Investment Program (WSIP). Reclamation participation under the WIIN Act is assumed to be 25 percent of the total project cost.

The State Public Benefit Account is divided between Refuge Level 4 deliveries and Yolo Bypass augmentation flows. In all scenarios, except for the 0.8 MAF scenarios, the Yolo Bypass reservoir storage account is 120 TAF. The remaining capacity is assigned to Refuge Level 4 deliveries. The estimated average annual State operations and maintenance (O&M) cost is based on estimated cost per acre-foot for State portion of total reservoir fill, pumping, and wheeling provided by AECOM. The transfer sales value is assumed to be \$1000/AF for State water sold to offset the O&M cost.

2.3 Public Water Agency (PWA) Reservoir Storage Accounts

PWA reservoir storage account sizes are based on provided estimates or the ratio of the water requested to the active storage capacity of the reservoir.

The PWA reservoir accounts are defined for the following participants (assumed account capacities are presented in the attached summary tables).

- Tehama-Colusa Canal Authority (TCCA)
- Glenn-Colusa Irrigation District (GCID)
- Reclamation District 108 (RD108)
- Other Sacramento Valley (Colusa County)
- South-of-Delta

The reservoir storage account sizes for TCCA, GCID, RD108, and "Other Sacramento Valley" participants were estimated based on Phase 2 participation levels. The South-of-Delta reservoir account was sized based on Phase 2 participation or remaining active storage capacity available after accounting for public benefit accounts and Sacramento Valley PWAs.

2.4 Delevan Pipeline Facilities

The Delevan Pipeline is assumed to have a diversion capacity of 2,000 cfs with two pipes and 1,000 cfs with one pipe. It is assumed to have a release capacity of 1,500 cfs with two pipes and 750 cfs with one pipe.

3.0 Scenarios and Results

The different scenarios that were evaluated are described in the following sections. Results from some scenarios are repeated in multiple tables for comparison purposes. Tables with full results, including Holthouse deliveries and account capacities, are attached. Full Phase 2 PWA participation is assumed to 193 TAF at Holthouse. The ability to improve Sacramento River water temperature management to support anadromous fish benefits was not evaluated in this study.

Group 1 - Alternative D Conditions

These scenarios established a baseline for the analysis, evaluating 5 possible reservoir sizes under Alternative D operating criteria. The Delevan intake was only considered for the 1.8 MAF reservoir, since it was assumed

that the smaller projects do not require the same fill capacity. North of Delta participation is satisfied in all scenarios while South of Delta participation was satisfied in only the 1.8 and 1.5 MAF scenarios. The ability to provide water for public benefits also decreases with reduction in reservoir size and reduced conveyance facilities.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0	1.8 MAF	2	Intake/Outlet	Alt D	237	218
A1	1.5 MAF	2	Outlet Only	Alt D	200	188
A2	1.3 MAF	2	Outlet Only	Alt D	185	185
A4	1.0 MAF	2	Outlet Only	Alt D	158	169
A3	0.8 MAF	2	Outlet Only	Alt D	138	146

Group 2 - Alternative D conditions with 1-pipe Delevan Pipeline

A cost saving measure would involve reducing the Delevan pipeline to one pipe. A one-pipe scenario was not evaluated for the 1.8 MAF project since it is assumed that two pipelines will be needed to fill and release water from a reservoir of that size. While all scenarios were able to meet North of Delta participation, none satisfied South of Delta participation due to restrictive outlet capacity. At this point, the 0.8 MAF project was eliminated from consideration since it did not meet the demand by a significant margin.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
B1	1.5 MAF	1	Outlet Only	Alt D	153	204
B2	1.3 MAF	1	Outlet Only	Alt D	149	199
B4	1.0 MAF	1	Outlet Only	Alt D	137	182
B3	0.8 MAF	1	Outlet Only	Alt D	126	154

Group 3 - Alternative D conditions with Delevan Intake/Outlet

Alternative D conditions were evaluated with a Delevan intake included with the smaller reservoir sizes to allow for additional reservoir fill capacity. While the intake increased the project cost, it also allowed the 1.3 MAF project to satisfy both North of Delta and South of Delta participation.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0	1.8 MAF	2	Intake/Outlet	Alt D	237	218
A1.1	1.5 MAF	2	Intake/Outlet	Alt D	219	216
A2.1	1.3 MAF	2	Intake/Outlet	Alt D	205	206
A4.1	1.0 MAF	2	Intake/Outlet	Alt D	176	184

Group 4 - Alternative D Conditions plus Wilkins Slough and Fremont Weir notch

This group included Alternative D conditions plus a Wilkins Slough bypass flow of 8,000 cfs and the Fremont Weir notch with protection of the first 6,000 cfs spill before any diversions may occur. This represents a potential future more restrictive diversion scenario. This change in diversion criteria led to a significant decrease in project delivery capability with only the 1.8 MAF project meeting all participant demands. The ability to provide water for public benefits also decreases.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
C1	1.8 MAF	2	Intake/Outlet	Alt D + Wilkins/ Fremont	197	156
C2	1.5 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	162	120
C3	1.3 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	147	124
C4	1.0 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	128	116

Group 5 - Alternative D Conditions plus Wilkins Slough and Fremont Weir notch with Delevan Intake

This group included the same diversion criteria as Group 4 with the addition of the Delevan intake to allow for additional fill capability under the more constraining diversion criteria. Participants' demands were still only met by the 1.8 MAF project with the intake.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
C1	1.8 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	197	156
C2.1	1.5 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	180	153
C3.1	1.3 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	168	150
C4.1	1.0 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	143	138

Group 6 - CDFW Operations Scenario

The California Department of Fish and Wildlife (CDFW) provided a set of diversion criteria as part of the 60-Day process. Under this criteria, no diversions were permitted at Red Bluff and Hamilton City between September and December, the Wilkins Slough bypass flow was increased to 10,000 cfs, the Fremont Weir notch was included with the first 6,000 cfs of spill preserved, the Freeport bypass criteria was increased to 35,000 cfs between January and May, and a Delta outflow requirement of 44,500 cfs was implemented between March and May. Scenarios were analyzed both with and without Delevan intakes. In all cases, deliveries were far below the participants' Phase 2 demand and showed reduced water for public benefits.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0c	1.8 MAF	2	Intake/Outlet	CDFW	159	124
A1c	1.5 MAF	2	Outlet Only	CDFW	113	76
A2c	1.3 MAF	2	Outlet Only	CDFW	109	72
A1.1c	1.5 MAF	2	Intake/Outlet	CDFW	143	124
A2.1c	1.3 MAF	2	Intake/Outlet	CDFW	133	118

Group 7 – Scaled diversions and Authority Operations Scenario

Several additional scenarios were considered that employed a scaled upstream diversion approach. Diversions at each intake were permitted to increase as the flow in the Sacramento River increased above each intake. The S1 scenario applied this approach to the Red Bluff, Hamilton City, and Delevan intakes while S5 scenario did not include a Delevan intake. These scenarios all included the Fremont Weir notch with the first 6,000 cfs of spill protected. All other Alternative D criteria applied. The results show that the scaled diversion criteria alone had a minimal effect on diversions and deliveries.

An additional SPA scenario included the S5 scaling approach as well as an increased Wilkins Slough bypass flow of 8,000 cfs in April and May.

The participants' demand was met in all S1 and S5 scenarios. Under the SPA Operations scenario, Holthouse deliveries fell 11 TAF short of participant demand.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0.S1	1.8 MAF	2	Intake/Outlet	S1	224	192
A0.S5	1.8 MAF	2	Outlet Only	S5	203	140
A1.1.S1	1.5 MAF	2	Intake/Outlet	S1	210	198
A1.S5	1.5 MAF	2	Outlet Only	S5	191	160
A1.SPA	1.5 MAF	2	Outlet Only	SPA	182	150

4.0 Attachment

The attached table provides full results for all the scenarios evaluated in this study.

Sites Project Afordability Analysis - DRAFT

Scenario			Scn A0		Scn A1		Scn A2		Scn A4		Scn A3		
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions		1.5 MAF Reservoir w/o Delevan intake, Alt D Conditions		1.3 MAF w/o Delevan intake, Alt D Conditions		1.0 MAF w/o Delevan intake, Alt D Conditions		0.8 MAF w/o Delevan intake, Alt D Conditions		
Reservoir Capacity			1.81 MAF		1.5 MAF		1.27 MAF		1.0 MAF		0.8 MAF		
Delevan Configuration			2 pipes, intake/outlet		2 pipes, outlet only		2 pipes, outlet only		2 pipes, outlet only		2 pipes, outlet only		
Diversion Criteria			Alt D		Alt D		Alt D		Alt D		Alt D		
		Participation (Phase 2)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	43 64	140	42 60	140	47 74	140	48 77	140
	GCID	Long-Term Dry & Critical	5	3 5	20	3 5	20	3 5	20	3 5	20	3 5	20
	RD108	Long-Term Dry & Critical	4	3 4	20	3 4	20	3 4	20	3 4	20	3 4	20
	Colusa County	Long-Term Dry & Critical	10	8 10	50	7 9	50	8 10	50	8 10	50	7 8	15
	SOD	Long-Term Dry & Critical	140	178 368	814	144 283	591	129 250	438	97 173	273	77 134	184
	Total	Long-Term Dry & Critical	193	237 459	1064	200 366	821	185 329	668	158 265	503	138 228	379
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	110 151	315	107 147	264	96 128	204	83 114
Federal Total		Long-Term Dry & Critical		132 187	390	110 151	315	107 147	264	96 128	204	83 114	158
Refuge L4		Long-Term Dry & Critical		26 20	116	24 16	124	20 12	98	9 6	53	21 14	83
Yolo Bypass		Long-Term Dry & Critical		52 28	120	47 26	120	50 28	120	57 32	120	36 18	60
O&M		Long-Term		8		8		8		8		7	
Transfer Sale		Dry & Critical		9		9		9		7		7	
State Total		Long-Term Dry & Critical		86 56	236	78 51	244	78 49	218	73 46	173	63 39	143
Total		Long-Term Dry & Critical		218 243	626	188 202	559	185 196	482	169 174	377	146 152	301
Total	Long-Term Dry & Critical		455 702	1810	389 567	1500	370 525	1270	327 439	1000	285 380	800	

Sites Project Afordability Analysis - DRAFT

Scenario			Scn A0		Scn B1		Scn B2		Scn B4		Scn B3		
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions		1.5 MAF Reservoir w/o Delevan intake, 1 pipe, Alt D Conditions		1.3 MAF w/o Delevan intake, 1 pipe, Alt D Conditions		1.0 MAF w/o Delevan intake, 1 pipe, Alt D Conditions		0.8 MAF w/o Delevan intake, 1 pipe, Alt D Conditions		
Reservoir Capacity			1.81 MAF		1.5 MAF		1.27 MAF		1.0 MAF		0.8 MAF		
Delevan Configuration			2 pipes, intake/outlet		1 pipe, outlet only		1 pipe, outlet only		1 pipe, outlet only		1 pipe, outlet only		
Diversion Criteria			Alt D		Alt D		Alt D		Alt D		Alt D		
		Participation {Phase 2}	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	42 64	140	45 69	140	48 77	140	48 77	140
	GCID	Long-Term Dry & Critical	5	3 5	20	3 5	20	3 5	20	3 5	20	3 5	20
	RD108	Long-Term Dry & Critical	4	3 4	20	3 4	20	3 4	20	3 4	20	3 4	20
	Colusa County	Long-Term Dry & Critical	10	8 10	50	8 10	50	8 10	50	8 10	50	7 8	15
	SOD	Long-Term Dry & Critical	140	178 368	814	98 201	570	91 184	418	75 147	240	64 120	166
	Total	Long-Term Dry & Critical	193	237 459	1064	153 284	800	149 272	648	137 243	470	126 215	361
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	113 151	312	113 149	261	98 132	203	82 113
Federal Total		Long-Term Dry & Critical		132 187	390	113 151	312	113 149	261	98 132	203	82 113	156
Refuge L4		Long-Term Dry & Critical		26 20	116	32 25	147	25 18	121	18 13	88	28 20	103
Yolo Bypass		Long-Term Dry & Critical		52 28	120	50 28	120	52 31	120	56 32	120	36 20	60
O&M		Long-Term		8		9		9		9		8	
Transfer Sale		Dry & Critical		9		9		9		9		7	
State Total		Long-Term Dry & Critical		86 56	236	92 62	267	86 58	241	84 54	208	72 48	163
Total		Long-Term Dry & Critical		218 243	626	204 213	580	199 207	502	182 186	410	154 161	319
Total	Long-Term Dry & Critical		455 702	1810	357 497	1500	348 480	1270	319 429	1000	280 376	800	

Sites Project Afordability Analysis - DRAFT

Scenario			Scn A0		Scn A1.1		Scn A2.1		Scn A4.1		
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions		1.5 MAF Reservoir with Delevan intake, Alt D Conditions		1.3 MAF with Delevan intake, Alt D Conditions		1.0 MAF with Delevan intake, Alt D Conditions		
Reservoir Capacity			1.81 MAF		1.5 MAF		1.27 MAF		1.0 MAF		
Delevan Configuration			2 pipes, intake/outlet		2 pipes, intake/outlet		2 pipes, intake/outlet		2 pipes, intake/outlet		
Diversion Criteria			Alt D		Alt D		Alt D		Alt D		
		Participation (Phase 2)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	49 78	140	50 81	140	51 84	140
	GCID	Long-Term Dry & Critical	5	3 5	20	3 5	20	3 5	20	3 5	20
	RD108	Long-Term Dry & Critical	4	3 4	20	3 4	20	3 4	20	3 4	20
	Colusa County	Long-Term Dry & Critical	10	8 10	50	8 10	50	8 10	50	8 10	50
	SOD	Long-Term Dry & Critical	140	178 368	814	156 312	612	141 272	460	111 204	291
	Total	Long-Term Dry & Critical	193	237 459	1064	219 409	842	205 373	690	176 307	521
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	128 180	318	124 169	266	113 157
Federal Total		Long-Term Dry & Critical		132 187	390	128 180	318	124 169	266	113 157	206
Refuge L4		Long-Term Dry & Critical		26 20	116	23 16	99	17 11	74	5 2	34
Yolo Bypass		Long-Term Dry & Critical		52 28	120	56 32	120	58 32	120	59 35	120
O&M		Long-Term		8		8		8		7	
Transfer Sale		Dry & Critical		9		9		8		7	
State Total		Long-Term Dry & Critical		86 56	236	88 57	219	83 51	194	71 44	154
Total		Long-Term Dry & Critical		218 243	626	216 236	538	206 220	460	184 201	359
Total		Long-Term Dry & Critical		455 702	1810	435 646	1500	412 593	1270	359 508	1000

Sites Project Afordability Analysis - DRAFT

Scenario			Scn A0		Scn C1		Scn C2		Scn C3		Scn C4	
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions		1.8 MAF Reservoir with Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		1.5 MAF Reservoir w/o Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		1.3 MAF Reservoir w/o Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		1.0 MAF Reservoir w/o Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch	
Reservoir Capacity			1.81 MAF		1.81 MAF		1.5 MAF		1.27 MAF		1.0 MAF	
Delevan Configuration			2 pipes, intake/outlet		2 pipes, intake/outlet		2 pipes, outlet only		2 pipes, outlet only		2 pipes, outlet only	
Diversion Criteria			Alt D		Alt D + Wilkins/Fremont		Alt D + Wilkins/Fremont		Alt D + Wilkins/Fremont		Alt D + Wilkins/Fremont	
		Participation (Phase 2)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)
Water Agencies	TCCA	33	45	160	39	160	35	140	32	140	35	140
			73		61		48		44		51	
	GCID	5	3	20	3	20	3	20	3	20	3	20
			5		4		4		4		5	
	RD108	4	3	20	3	20	3	20	3	20	3	20
			4		4		4		4		4	
	Colusa County	10	8	50	7	50	7	50	7	50	7	50
		10		8		8		8		9		
SOD	140	178	814	145	814	114	591	102	438	80	273	
		368		288		224		195		136		
Total	193	237	1064	197	1064	162	821	147	668	128	503	
			459			366		289		254	503	
Public Benefits	Anadromous Fish		132	390	94	390	69	315	68	264	62	204
			187		125		82		88		79	
	Federal Total		132	390	94	390	69	315	68	264	62	204
			187		125		82		88		79	
	Refuge L4		26	116	18	116	15	124	13	98	5	53
			20		13		10		8		4	
	Yolo Bypass		52	120	37	120	31	120	36	120	42	120
			28		15		13		15		19	
	O&M		8		6		6		7		6	
	Transfer Sale		9		7		6		7		5	
State Total		86	236	62	236	52	244	56	218	54	173	
		56		35		30		29		28		
Total		218	626	156	626	120	559	124	482	116	377	
		243		160		112		117		107		
Total		455	1810	353	1810	282	1500	271	1270	244	1000	
		702		526		401		372		312		

Sites Project Afordability Analysis - DRAFT

Scenario			Scn A0		Scn C2.1		Scn C3.1		Scn C4.1		
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions		1.5 MAF Reservoir with Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		1.3 MAF with Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		1.0 MAF with Delevan intake, Alt D Conditions + Wilkins/Fremont Weir Notch		
Reservoir Capacity			1.81 MAF		1.5 MAF		1.27 MAF		1.0 MAF		
Delevan Configuration			2 pipes, intake/outlet		2 pipes, intake/outlet		2 pipes, intake/outlet		2 pipes, intake/outlet		
Diversion Criteria			Alt D		Alt D + Wilkins/Fremont		Alt D + Wilkins/Fremont		Alt D + Wilkins/Fremont		
		Participation (Phase 2)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	39 60	140	41 62	140	41 61	140
	GCID	Long-Term Dry & Critical	5	3 5	20	3 5	20	3 5	20	3 5	20
	RD108	Long-Term Dry & Critical	4	3 4	20	3 4	20	3 4	20	3 4	20
	Colusa County	Long-Term Dry & Critical	10	8 10	50	8 9	50	8 9	50	8 9	50
	SOD	Long-Term Dry & Critical	140	178 368	814	128 247	612	113 214	460	88 154	291
	Total	Long-Term Dry & Critical	193	237 459	1064	180 324	842	168 293	690	143 233	521
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	89 113	318	87 108	266	79 96
Federal Total		Long-Term Dry & Critical		132 187	390	89 113	318	87 108	266	79 96	206
Refuge L4		Long-Term Dry & Critical		26 20	116	16 12	99	12 8	74	3 2	34
Yolo Bypass		Long-Term Dry & Critical		52 28	120	41 20	120	45 23	120	50 24	120
O&M		Long-Term		8		7		7		6	
Transfer Sale		Dry & Critical		9		7		7		6	
State Total		Long-Term Dry & Critical		86 56	236	64 38	219	63 38	194	59 32	154
Total		Long-Term Dry & Critical		218 243	626	153 152	538	150 146	460	138 128	359
Total		Long-Term Dry & Critical		455 702	1810	333 475	1500	318 439	1270	281 360	1000

Sites Project Affordability Analysis - DRAFT

Scenario			Scn A0	Scn A0c	Scn A1c	Scn A2c	Scn A1.1c	Scn A2.1c							
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions	1.8 MAF Reservoir with Delevan intake, CDFW Operations	1.5 MAF Reservoir w/o Delevan intake, CDFW Operations	1.3 MAF Reservoir w/o Delevan intake, CDFW Operations	1.5 MAF Reservoir with Delevan intake, CDFW Operations	1.3 MAF Reservoir with Delevan intake, CDFW Operations							
Reservoir Capacity			1.81 MAF	1.81 MAF	1.5 MAF	1.27 MAF	1.5 MAF	1.27 MAF							
Delevan Configuration			2 pipes, intake/outlet	2 pipes, intake/outlet	2 pipes, outlet only	2 pipes, outlet only	2 pipes, intake/outlet	2 pipes, intake/outlet							
Diversion Criteria			Alt D	CDFW Operations Scenario	CDFW Operations Scenario	CDFW Operations Scenario	CDFW Operations Scenario	CDFW Operations Scenario							
		Participation {Phase 2}	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)			
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	32 46	160	22 32	140	24 32	140	31 41	140	31 43	140
	GCID	Long-Term Dry & Critical	5	3 5	20	3 4	20	2 3	20	3 3	20	3 4	20	3 4	20
	RD108	Long-Term Dry & Critical	4	3 4	20	2 3	20	2 3	20	2 3	20	3 4	20	2 3	20
	Colusa County	Long-Term Dry & Critical	30	8 10	50	7 7	50	5 5	50	5 5	50	7 8	50	7 7	50
	SOD	Long-Term Dry & Critical	140	178 368	814	115 224	814	81 150	612	75 132	460	100 192	612	90 166	460
	Total	Long-Term Dry & Critical	193	237 459	1064	159 283	1064	113 193	842	109 175	690	143 248	842	133 224	690
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	76 94	390	44 52	318	40 45	266	73 84	318	70 79
Federal Total		Long-Term Dry & Critical		132 187	390	76 94	390	44 52	318	40 45	266	73 84	318	70 79	266
Refuge L4		Long-Term Dry & Critical		26 20	116	12 8	116	7 7	99	6 6	74	12 7	99	8 4	74
Yolo Bypass		Long-Term Dry & Critical		52 28	120	30 10	120	20 6	120	21 6	120	33 10	120	35 11	120
O&M		Long-Term		8		6		5		5		6		6	
Transfer Sale		Long-Term Dry & Critical		9		5		2		2		5		4	
State Total		Long-Term Dry & Critical		86 56	236	48 24	236	32 15	219	31 13	194	51 22	219	48 19	194
Total		Long-Term Dry & Critical		218 243	626	124 117	626	76 67	538	72 58	460	124 106	538	118 98	460
Total	Long-Term Dry & Critical		455 702	1810	283 400	1810	190 259	1500	180 233	1270	267 354	1500	251 322	1270	

Sites Project Affordability Analysis - DRAFT

Scenario			Scn A0	Scn A0.S1	Scn A0.S5	Scn A1.1.S1	Scn A1.S5	Scn A1.SPA							
Scenario Description			1.8 MAF Reservoir with Delevan intake, Alt D Conditions	1.8 MAF Reservoir with Delevan intake, S1	1.8 MAF Reservoir w/o Delevan intake, S5	1.5 MAF Reservoir with Delevan intake, S1	1.5 MAF Reservoir w/o Delevan intake, S5	1.5 MAF Reservoir w/o Delevan intake, SPA Operations							
Reservoir Capacity			1.81 MAF	1.81 MAF	1.81 MAF	1.5 MAF	1.5 MAF	1.5 MAF							
Delevan Configuration			2 pipes, intake/outlet	2 pipes, intake/outlet	2 pipes, outlet only	2 pipes, intake/outlet	2 pipes, outlet only	2 pipes, outlet only							
Diversion Criteria			Alt D	S1	S5	S1	S5	SPA Operations Scenario							
	Participation {Phase 2}		Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)	Deliveries at Holthouse (TAF)	Storage Capacity (TAF)			
Water Agencies	TCCA	Long-Term Dry & Critical	33	45 73	160	44 71	160	38 53	160	45 73	140	42 64	140	33 42	100
	GCID	Long-Term Dry & Critical	5	3 5	20	3 5	20	3 5	20	3 5	20	3 5	20	3 5	20
	RD108	Long-Term Dry & Critical	4	3 4	20	3 4	20	3 4	20	3 4	20	3 4	20	3 4	20
	Colusa County	Long-Term Dry & Critical	10	8 10	50	8 9	50	7 9	50	8 10	50	7 10	50	7 9	50
	SOD	Long-Term Dry & Critical	140	178 368	814	166 335	814	151 305	814	150 296	612	135 261	592	136 262	631
	Total	Long-Term Dry & Critical	193	237 459	1064	224 424	1064	203 376	1064	210 387	842	191 344	822	182 321	821
	Public Benefits	Anadromous Fish	Long-Term Dry & Critical		132 187	390	117 163	390	85 116	390	119 168	318	95 130	315	88 120
Federal Total		Long-Term Dry & Critical		132 187	390	117 163	390	85 116	390	119 168	318	95 130	315	88 120	315
Refuge L4		Long-Term Dry & Critical		26 20	116	23 18	116	16 11	116	22 16	99	20 14	123	19 13	124
Yolo Bypass		Long-Term Dry & Critical		52 28	120	45 23	120	33 18	120	49 26	120	39 20	120	36 16	120
O&M Transfer Sale		Long-Term Dry & Critical		8 9		7 8		5 6		7 8		6 6		7 6	
State Total		Long-Term Dry & Critical		86 56	236	75 49	236	55 35	236	79 50	219	66 40	243	62 36	244
Total		Long-Term Dry & Critical		218 243	626	192 212	626	140 151	626	198 218	538	160 170	558	150 156	559
Total	Long-Term Dry & Critical		455 702	1810	415 636	1810	343 527	1810	407 605	1500	351 514	1500	332 477	1500	

Operations Affordability Analysis Technical Memorandum



To: Jim Watson
CC: Rob Thomson
JP Robinette
Date: October 10, 2019
From: Rob Tull
Quality Review by: Rob Leaf
Authority Agent Review by: Rob Thomson
Subject: Facility Affordability Analysis – Operations Modeling

1.0 Purpose and Background

This memorandum documents the preliminary evaluation of various facility configurations, sizes, and regulatory criteria to support the financial affordability analysis. Jacobs conducted screening level modeling analyses of 29 different Sites Project scenarios, including a range of reservoir sizes, variants with 1 or 2 Delevan pipelines, with or without a Delevan pumping plant/intake, and potential future diversion criteria. Jacobs provided estimated Sites Project water deliveries to Holthouse Reservoir in support of the affordability analysis. These results are intended only for preliminary screening level evaluation purposes.

2.0 Assumptions and Methodology

The different scenarios were simulated with the CalSim II model by adjusting reservoir size, level of member participation, conveyance facilities, and regulatory criteria.

2.1 Modeling Assumptions

All model simulations were conducted with the DCR 2015 “merged model” developed for the Sites Project. The scenarios evaluated in this study were based on modifications to the Sites Alternative D, which includes a 1.81 MAF reservoir with intakes at Red Bluff, Hamilton City, and Delevan and a two-pipe Delevan Pipeline. Public Water Agency participation is consistent with Phase 2 levels and the project provides public benefits for anadromous fisheries, Level 4 refuge deliveries, and Yolo Bypass augmentation flows.

In Alternative D, diversions are allowed when operational criteria are met including bypass flows of 3,250 cfs at Red Bluff, 4,000 cfs at Hamilton City, and 5,000 cfs at Wilkins Slough. Additionally, there is a bypass flow requirement at Freeport that varies throughout the year to maintain Delta water quality.

Seven groups of scenarios were analyzed. Each group includes a combination of facilities and diversion criteria. Within each group, different reservoir sizes were evaluated.

2.2 Public Benefit Reservoir Storage Accounts

Public benefits are funded by the State of California (State) and the U.S. Bureau of Reclamation (Reclamation). The State is responsible for Yolo Bypass augmentation flows and refuge deliveries while

Reclamation is responsible for anadromous fish benefits. Reservoir storage account sizes for public benefits are based on the ratio of the financial investment of the participating party to the total cost of the project.

The cost for recreation and flood control benefits is shared between the State and Reclamation. As these benefits do not involve water storage, their dollar value is deducted from the investment amount in calculating account sizes. Based on information provided by AECOM, it is assumed that recreation cost is divided evenly between State and Reclamation, while the State is responsible for 35 percent of the flood control benefit and Reclamation is responsible for the remaining 65 percent. Flood control costs are fixed while recreation costs are proportional to the size of Sites Reservoir.

State investment is assumed to be fixed at \$816 million, the amount currently proposed to be awarded by the Water Storage Investment Program (WSIP). Reclamation participation under the WIIN Act is assumed to be 25 percent of the total project cost.

The State Public Benefit Account is divided between Refuge Level 4 deliveries and Yolo Bypass augmentation flows. In all scenarios, except for the 0.8 MAF scenarios, the Yolo Bypass reservoir storage account is 120 TAF. The remaining capacity is assigned to Refuge Level 4 deliveries. The estimated average annual State operations and maintenance (O&M) cost is based on estimated cost per acre-foot for State portion of total reservoir fill, pumping, and wheeling provided by AECOM. The transfer sales value is assumed to be \$1000/AF for State water sold to offset the O&M cost.

2.3 Public Water Agency (PWA) Reservoir Storage Accounts

PWA reservoir storage account sizes are based on provided estimates or the ratio of the water requested to the active storage capacity of the reservoir.

The PWA reservoir accounts are defined for the following participants (assumed account capacities are presented in the attached summary tables).

- Tehama-Colusa Canal Authority (TCCA)
- Glenn-Colusa Irrigation District (GCID)
- Reclamation District 108 (RD108)
- Other Sacramento Valley (Colusa County)
- South-of-Delta

The reservoir storage account sizes for TCCA, GCID, RD108, and "Other Sacramento Valley" participants were estimated based on Phase 2 participation levels. The South-of-Delta reservoir account was sized based on Phase 2 participation or remaining active storage capacity available after accounting for public benefit accounts and Sacramento Valley PWAs.

2.4 Delevan Pipeline Facilities

The Delevan Pipeline is assumed to have a diversion capacity of 2,000 cfs with two pipes and 1,000 cfs with one pipe. It is assumed to have a release capacity of 1,500 cfs with two pipes and 750 cfs with one pipe.

3.0 Scenarios and Results

The different scenarios that were evaluated are described in the following sections. Results from some scenarios are repeated in multiple tables for comparison purposes. Tables with full results, including Holthouse deliveries and account capacities, are attached. Full Phase 2 PWA participation is assumed to 193 TAF at Holthouse. The ability to improve Sacramento River water temperature management to support anadromous fish benefits was not evaluated in this study.

Group 1 - Alternative D Conditions

These scenarios established a baseline for the analysis, evaluating 5 possible reservoir sizes under Alternative D operating criteria. The Delevan intake was only considered for the 1.8 MAF reservoir, since it was assumed

that the smaller projects do not require the same fill capacity. North of Delta participation is satisfied in all scenarios while South of Delta participation was satisfied in only the 1.8 and 1.5 MAF scenarios. The ability to provide water for public benefits also decreases with reduction in reservoir size and reduced conveyance facilities.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0	1.8 MAF	2	Intake/Outlet	Alt D	237	218
A1	1.5 MAF	2	Outlet Only	Alt D	200	188
A2	1.3 MAF	2	Outlet Only	Alt D	185	185
A4	1.0 MAF	2	Outlet Only	Alt D	158	169
A3	0.8 MAF	2	Outlet Only	Alt D	138	146

Group 2 - Alternative D conditions with 1-pipe Delevan Pipeline

A cost saving measure would involve reducing the Delevan pipeline to one pipe. A one-pipe scenario was not evaluated for the 1.8 MAF project since it is assumed that two pipelines will be needed to fill and release water from a reservoir of that size. While all scenarios were able to meet North of Delta participation, none satisfied South of Delta participation due to restrictive outlet capacity. At this point, the 0.8 MAF project was eliminated from consideration since it did not meet the demand by a significant margin.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
B1	1.5 MAF	1	Outlet Only	Alt D	153	204
B2	1.3 MAF	1	Outlet Only	Alt D	149	199
B4	1.0 MAF	1	Outlet Only	Alt D	137	182
B3	0.8 MAF	1	Outlet Only	Alt D	126	154

Group 3 - Alternative D conditions with Delevan Intake/Outlet

Alternative D conditions were evaluated with a Delevan intake included with the smaller reservoir sizes to allow for additional reservoir fill capacity. While the intake increased the project cost, it also allowed the 1.3 MAF project to satisfy both North of Delta and South of Delta participation.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0	1.8 MAF	2	Intake/Outlet	Alt D	237	218
A1.1	1.5 MAF	2	Intake/Outlet	Alt D	219	216
A2.1	1.3 MAF	2	Intake/Outlet	Alt D	205	206
A4.1	1.0 MAF	2	Intake/Outlet	Alt D	176	184

Group 4 - Alternative D Conditions plus Wilkins Slough and Fremont Weir notch

This group included Alternative D conditions plus a Wilkins Slough bypass flow of 8,000 cfs and the Fremont Weir notch with protection of the first 6,000 cfs spill before any diversions may occur. This represents a potential future more restrictive diversion scenario. This change in diversion criteria led to a significant decrease in project delivery capability with only the 1.8 MAF project meeting all participant demands. The ability to provide water for public benefits also decreases.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
C1	1.8 MAF	2	Intake/Outlet	Alt D + Wilkins/ Fremont	197	156
C2	1.5 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	162	120
C3	1.3 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	147	124
C4	1.0 MAF	2	Outlet Only	Alt D + Wilkins/Fremont	128	116

Group 5 - Alternative D Conditions plus Wilkins Slough and Fremont Weir notch with Delevan Intake

This group included the same diversion criteria as Group 4 with the addition of the Delevan intake to allow for additional fill capability under the more constraining diversion criteria. Participants' demands were still only met by the 1.8 MAF project with the intake.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
C1	1.8 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	197	156
C2.1	1.5 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	180	153
C3.1	1.3 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	168	150
C4.1	1.0 MAF	2	Intake/Outlet	Alt D + Wilkins/Fremont	143	138

Group 6 - CDFW Operations Scenario

The California Department of Fish and Wildlife (CDFW) provided a set of diversion criteria as part of the 60-Day process. Under this criteria, no diversions were permitted at Red Bluff and Hamilton City between September and December, the Wilkins Slough bypass flow was increased to 10,000 cfs, the Fremont Weir notch was included with the first 6,000 cfs of spill preserved, the Freeport bypass criteria was increased to 35,000 cfs between January and May, and a Delta outflow requirement of 44,500 cfs was implemented between March and May. Scenarios were analyzed both with and without Delevan intakes. In all cases, deliveries were far below the participants' Phase 2 demand and showed reduced water for public benefits.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0c	1.8 MAF	2	Intake/Outlet	CDFW	159	124
A1c	1.5 MAF	2	Outlet Only	CDFW	113	76
A2c	1.3 MAF	2	Outlet Only	CDFW	109	72
A1.1c	1.5 MAF	2	Intake/Outlet	CDFW	143	124
A2.1c	1.3 MAF	2	Intake/Outlet	CDFW	133	118

Group 7 – Scaled diversions and Authority Operations Scenario

Several additional scenarios were considered that employed a scaled upstream diversion approach. Diversions at each intake were permitted to increase as the flow in the Sacramento River increased above each intake. The S1 scenario applied this approach to the Red Bluff, Hamilton City, and Delevan intakes while S5 scenario did not include a Delevan intake. These scenarios all included the Fremont Weir notch with the first 6,000 cfs of spill protected. All other Alternative D criteria applied. The results show that the scaled diversion criteria alone had a minimal effect on diversions and deliveries.

An additional SPA scenario included the S5 scaling approach as well as an increased Wilkins Slough bypass flow of 8,000 cfs in April and May.

The participants' demand was met in all S1 and S5 scenarios. Under the SPA Operations scenario, Holthouse deliveries fell 11 TAF short of participant demand.

Scenario	Reservoir Size	Delevan Pipelines	Delevan Intake	Diversion Criteria	Holthouse PWA Deliveries	Holthouse Public Benefit Deliveries
A0.S1	1.8 MAF	2	Intake/Outlet	S1	224	192
A0.S5	1.8 MAF	2	Outlet Only	S5	203	140
A1.1.S1	1.5 MAF	2	Intake/Outlet	S1	210	198
A1.S5	1.5 MAF	2	Outlet Only	S5	191	160
A1.SPA	1.5 MAF	2	Outlet Only	SPA	182	150

4.0 Attachment

The attached table provides full results for all the scenarios evaluated in this study.

File Provided Natively

Sites Reservoir Feasibility Study Technical Memorandum

Mitigation Measure Evaluation and Cost Estimate

February 2020

Prepared for

U.S. Bureau of Reclamation

Prepared by

AECOM

2020 L Street, Suite 400
Sacramento, CA 95811

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Attachments

- Attachment 1 Sites Reservoir Mitigation Cost Summary
- Attachment 2 High Cost Mitigation Measure Measures
- Attachment 3 Detailed Cost Assumptions by Resource
- Attachment 4 Anticipated Land Use Impacts (Alternative C)
- Attachment 5 Vegetation Community and Habitat Impacts (Alternative C)
- Attachment 6 Air Quality Impacts (Alternative C)

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1.0 ABSTRACT

For the Sites Project Authority (Authority), AECOM has developed a planning-level cost estimate for implementing measures necessary to mitigate anticipated environmental impacts resulting from the construction, operation, and maintenance of the Sites Reservoir Alternative C.

The cost estimate includes a summary of costs for relevant mitigation measures followed by detailed cost estimate worksheets with assumptions. To support the preparation of the I cost estimate, AECOM held a series of mitigation cost development workshops. In addition to cost development, AECOM evaluated mitigation-related schedule constraints and recommendations for modifying mitigation measures. This technical memorandum is comprised of the following:

- Study Objective
- Background
- Mitigation Costs
- Key Cost Assumptions
- Recommended Mitigation Measure Modifications
- Mitigation Related Schedule Constraints
- Recommendations and Next Steps

2.0 STUDY OBJECTIVE

The purpose of this assignment was to develop feasibility-level costs for mitigation measure implementation, identify any project schedule constraints related to implementing the mitigation measures, provide recommendations for changes to the mitigation measures, and identify next steps for mitigation planning. This assignment is intended to inform ongoing project planning and requests for grant funding.

3.0 BACKGROUND

In 2013, a planning-level cost estimate for implementation of the North-of-the-Delta-Offstream Storage (NODOS) Mitigation Monitoring Plan was prepared (DWR and Reclamation 2013). At the time these costs were developed, details regarding mitigation measures were limited. The purpose of this memorandum is to present a more detailed update to previous mitigation cost estimates to inform ongoing project planning and requests for grant funding. In May 2016, AECOM held a series of mitigation-related workshops with the Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) Team comprised of California Department of Water Resources (DWR), U.S. Bureau of Reclamation (Reclamation), and CH2M HILL staff.

During the workshops, a total of 155 mitigation measures from the NODOS Preliminary Administrative Draft EIR were reviewed (DWR 2013: Appendix 1A). Cost assumptions, potential

schedule impacts associated with implementing the mitigation measures, and recommended modifications to the measures that could potentially reduce project costs were discussed. The 2013 mitigation cost estimate was also reviewed. Assumptions developed during the workshops were used to update the mitigation costs.

4.0 MITIGATION COSTS

Mitigation costs for Alternative C are based on the environmental impact analysis and implementing the mitigation measures from the NODOS Preliminary Administrative Draft Environmental Impact Report (DWR 2013). These costs can be readily scaled to Alternative A or B and will inform the development of costs for Alternative D currently under development by the Authority. Alternative C is comprised of a 1.81 million acre-feet reservoir formed by two large dams and nine saddle dams. It includes two hydropower pumping and generating facilities, a forebay/afterbay reservoir adjacent to the existing Tehama-Colusa Canal, a terminal regulating reservoir adjacent to the Glenn-Colusa Canal, large diameter pipelines (TRR and Delevan), power transmission lines, a fish-screened intake/discharge facility on the Sacramento River and three designated recreation areas. The project components associated with Alternative C are the most comparable to the Authority-preferred alternative (Alternative D) that is currently being developed.

Wherever possible, AECOM followed the estimating instructions contained in Reclamation's Cost Estimating Handbook (Reclamation, 1989) and Reclamation's Manual, Directives and Standards, FAC 09-01, FAC 09-02, and FAC 09-03.

The allowances and contingencies by component applied to mitigation cost estimates are presented in Table 1. The mobilization/demobilization allowance and design and construction contingencies were applied to develop the field cost. The non-contract cost allowance was then applied to the field cost to arrive at the construction cost.

Escalation of construction costs to a Notice to Proceed date has not been included in the estimate. This was done to avoid confusion and double counting, because escalation is a factor included in the benefit-cost feasibility analysis of the project following several possible design and construction scheduling options.

This analysis is limited to implementing mitigation measures not already included in the costs associated with the design, construction, and operations and maintenance (O&M) activities for Alternative C.

Table 1. Cost Estimate Allowances and Contingencies for Mitigation Costs

Component	Value	Basis for Assigned Allowance or Contingency
Mobilization/Demo bilization	2%	Approximately 65% of the mitigation costs are associated with real estate actions, 19% of the costs with environmental and cultural resources monitoring, and the remaining 16% for restoration. Mobilization/demobilization for monitoring largely consists of the mobilization and demobilization of environmental monitoring staff with pickup trucks and infrequent short-term monitoring by watercraft. In this case mobilization/demobilization costs are likely to be in the range of 1% to 2%.
Design Contingency	12%	Covers minor unlisted items, minor design and scope changes, and cost estimating refinements. This is the area of greatest uncertainty prior to the negotiation of permits. We recommend increasing the design contingency from 10% to 12%.
Procurement Strategy	1%	The most significant effort will be associated with procuring mitigation credits. The construction contractors selected for facility construction will perform the bulk of the restoration and construction related tasks. There will be a real estate contractor and one or two environmental monitoring contracts. There may be some small landscaping contracts. Most of the oversight throughout will likely be performed by the environmental contractor who will work for the Authority.
Escalation to Notice to Proceed	—	This will be addressed in the Basis of Estimate Report consistent with the overall project cost estimate.
Construction Contingency	2%	Only 16% of the total mitigation is anticipated to include construction costs related to restoration. The construction contingency for real estate and monitoring should be very low.
Non-Contract Costs	4%	Approximately \$52 million in monitoring costs is already included in the mitigation estimates. We do not anticipate another layer of construction management. There will be some design, but the design will be highly constrained by the permits.

Source: Data compiled by AECOM in 2016

Table 2 presents a summary of estimated construction phase mitigation costs by category. A detailed cost breakdown by mitigation category and measure is presented Attachment 1.

Table 2. Construction Phase Mitigation Costs for Alternative C

Mitigation Category	Estimated Cost
Vegetation Communities/Botanical Resources	\$70,066,000
Wetlands/Surface Waters	\$68,050,000
Aquatic Resources	\$46,488,000
Wildlife Habitat	\$43,754,000
Cultural/Historic/Paleontological Resources	\$39,100,000
Land and Agriculture	\$20,689,000
Air Quality	\$200,000
Mobilization, Design Contingency, Construction Contingency, Non Contract Cost	\$54,811,000
Total	\$343,957,000

Notes:

Source: Data compiled by AECOM in 2016

Table 3 presents a summary of O&M phase mitigation costs.

Table 3. O&M Phase Mitigation Costs for Alternative C

Mitigation Category	Estimated Annual Cost ¹
Vegetation Communities/Botanical Resources	\$85,000
Wetlands/Surface Waters/Groundwater	\$275,000 ²
Aquatic Resources	\$775,000 ³
Wildlife Habitat	12,400 ⁴
Cultural/Historic/Paleontological Resources	\$9,000
Land and Agriculture	----- ⁵
Air Quality	\$5,000 ⁶
Flood Control and Management	\$4,320,000 ⁷
Total	\$5,481,400

Notes:

1. Costs include mobilization, contingency and escalation
2. Costs include for *Mitigation Measure GWRES-2* (\$25,000) and *Mitigation Measure SWQual-1a* (\$250,000).
3. Costs include an annual contingency for *Mitigation Measure Fish-1b* (\$500,000 per year) and annual on-site restoration land management for *Mitigation Measure Fish-1e* (\$275,000 per year).
4. Estimated costs are associated with on-site restoration land management for *Mitigation Measure Wild-3c* and *Bot-1a* (10 acres); and *Wet-1a* (21 acres) for a total of 31 acres of on-site restoration monitoring.
5. No ongoing costs are assumed for agricultural and conservation easements
6. Estimated annual cost is associated with stationary source permitting fees anticipated for using the emergency back-up generators at the pumping plants
7. Estimated annual cost associated with maintaining stream flow of 10 cfs between Oct-May in Funks and Stone Corral creeks as specified in *Mitigation Measure Flood-1*; Cost assumes average of 30 days per month; \$450 per acre-foot of water (AF); 1 cfs provides 2 AF/day

Source: Data compiled by AECOM in 2016

Attachment 2 presents a summary of the mitigation measures that have the highest cost. Detailed assumptions for mitigation categories presented in Table 1 are included in Attachment 3. Quantities for estimating project costs are derived from the impact analysis in the NODOS Preliminary Administrative Draft Environmental Impact Report for Alternative C (DWR 2013). To simplify documentation, quantity tables used in the analysis are presented as Attachments 4 and 5.

The total estimated costs associated with impacts on vegetation communities, wetlands and special-status species habitat were developed by first calculating the land mitigation requirements using applicable mitigation ratios and estimated land impacts presented on a per-acre basis.

The range of mitigation ratios used for cost estimating were derived from mitigation ratios used in previously implemented projects, including the CALFED Programmatic EIR/EIS, Shasta Lake Water Resources Investigation EIR/EIS, and Los Vaqueros Expansion Investigation EIR/EIS.

On-site mitigation through land acquisition and restoration was assumed for all temporary and permanent impacts to streams, aquatic habitat as prescribed in Mitigation Measures *Fish 1-e*, *Wild-3c*, *Bot-1a*; and *Wet-1a*. All other permanent impacts to natural community and terrestrial special-status species habitat are assumed to be mitigated off-site through the purchase of credits from a mitigation bank.

To estimate costs for off-site mitigation, the mitigation land acreages were then multiplied by a mitigation bank cost range to obtain cost ranges for mitigation of effects on natural communities and special-status species habitat. A detailed breakdown of the mitigation land needs and associated costs for each natural community and focus special-status species is provided in Attachment 5.

On-site mitigation costs for restoration prescribed in Mitigation Measures *Fish 1-e*, *Wild-3c*, *Bot-1a*; and *Wet-1a*, it was assumed that assumed that two acres of land for every mitigation acre would be needed for restoration. This conservative approach does not take into account the existing habitat function acquired land. If land acquired is of high habitat value, then less acres of land may be needed for on-site restoration. Annual mitigation land management and monitoring costs for on-site restoration were assumed to be \$400 per acre.

5.0 AIR QUALITY MITIGATION

Air quality in California is regulated at the Federal, state, and local levels. The pollutants of greatest concern in the project area of Glenn and Colusa counties are:

- Ozone
- Ozone precursors (Nitrogen oxides (NO_x) and Reactive Organic Gases (ROG))
- Particulate matter (PM₁₀) from vehicle and equipment exhaust
- Particulate matter (PM₁₀) from soil disturbance and wind erosion (fugitive dust)
- PM₁₀ precursors (NO_x, ROG, and Sulphur oxides (SO_x)).

Table 4 compares the proposed Sites Reservoir project with the Folsom Dam Safety Improvement project. Both projects are located in the Sacramento Valley Air Basin but are regulated by different air pollution control districts. Unlike the Folsom Dam project, the proposed Sites Reservoir project would be located in federally-designated attainment zones for ozone and PM₁₀. Therefore, no federal General Conformity de minimis standards would be applicable since all National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA) would be met. However, the project would be located in a state-designated nonattainment zone for PM₁₀ similar to the Folsom Dam project.

Table 4. Comparison with Folsom Dam Safety Improvements Project

	Folsom Dam Safety Improvements	Sites Reservoir1
Project Location	Sacramento, Placer, and El Dorado counties	Glenn and Colusa counties
Air Basin	Lower Sacramento Valley	Upper Sacramento Valley
Air District	Sacramento Metro AQMD	Glenn County APCD and Colusa County APCD
Federal Attainment Status (NAAQS) ²		
Ozone	Non-attainment, serious for 8-hour average	Unclassified/Attainment
NOx	Attainment	Unclassified/Attainment
ROG	Not applicable	Not applicable
PM ₁₀	Non-attainment, moderate	Unclassified
PM _{2.5}	Attainment	Unclassified/Attainment
CO	Attainment/Maintenance	Unclassified/Attainment
SOx	Attainment	Unclassified
State Attainment Status (CAAQS) ²		
Ozone	Non-attainment	Attainment
NOx	Attainment	Attainment
ROG	Not applicable	Not applicable
PM ₁₀	Non-attainment	Non-attainment
PM _{2.5}	Attainment	Attainment
CO	Attainment	Unclassified
SOx	Attainment	Attainment
Local AQMD/APCD Construction-Related Significance Threshold ²		
PM ₁₀	50 µg per cubic meter	Level B > 25 lbs per day Level C > 137 lbs per day ³
NOx	85 lbs per day	Level B > 80 lbs per day Level C > 137 lbs per day ³
ROG	Sacramento County - none; El Dorado and Placer counties – 82 lbs. per day	Level B > 25 lbs per day Level C > 137 lbs per day ³
Local Fees for Exceeding Threshold	If mitigated NOx emissions still exceed 85 lbs per day, SMAQMD's policy is to charge a mitigation fee of \$14,300 per ton excess (at time of construction) (\$18,260 per ton excess as of July 2016)	See Table 5 for stationary emission sources only Glenn and Colusa counties currently do not have a program or mechanism to collect mitigation fees for CEQA project-related emissions beyond the New Source Review permitting programs for stationary sources

Notes for Table 4

¹ Status is as of December 2015

² PM_{2.5} – Particulate matter less than or equal to a 2.5 microns

PM₁₀ – Particulate matter less than or equal to a nominal 10 microns

NO_x – Nitrogen oxides (ozone and PM₁₀ precursor)

SO_x – Sulphur oxides (PM₁₀ precursor)

CO – Carbon monoxide

ROG – Reactive Organic Gases (ozone and PM₁₀ precursor)

³ Level C – If emissions from a project would exceed the Level C thresholds, mitigation measures (BAMMs and SMMs⁴), including off-site mitigation measures following the guidelines, may be required to reduce the overall air quality impacts of the project to a level of insignificance. (from Tehama County Air Pollution Control District; Glenn and Colusa counties expected to have similar requirements)

⁴ BAMMS – Best Available Mitigation Measures

SMMs – Standard Mitigation Measures

Source: Folsom Dam Safety and Flood Damage Reduction Draft EIS/EIR Chapter 3 (Reclamation 2006) and Sites Reservoir - Preliminary Administrative Draft EIR Chapter 24 (DWR 2013)

New pollutant sources that meet the definition of a Stationary Source, such as on-site concrete and asphalt batch plants and operational aggregate quarries, will need to be permitted by the local air pollution control districts in Glenn and Colusa counties. Permit fees to allow construction of stationary sources (Authority to Construct permits) and annual permit fees to allow ongoing operation of stationary sources (Permits to Operate) are discussed in the Districts' air quality rules and regulations. These New Source Review (NSR) requirements in Glenn and Colusa counties only apply to sources that meet the definition of a stationary source. Table 5 summarizes the NSR permitting fee schedule for stationary sources. Glenn County has a similar fee schedule.

Table 5. Colusa County Fee Schedule for Permitting Stationary Sources¹

Permit	Fee Schedule
Authority to Construct Permit	\$228.00 (fee covers the review of the project emissions, air quality impacts, and the preparation of an air quality summary analysis report)
Annual Operating Permit	\$110 plus the following:
For sources up to 1 ton per year	\$238
For sources 1 to 5 tons per year	\$279
For sources 5 to 10 tons per year	\$380
For sources 10 to 15 tons per year	\$465
For sources 15 to 20 tons per year	\$549
For sources 20 to 25 tons per year	\$744 plus \$39 for every ton or fraction of ton over 25 tons

Source: Email communication from Casey Ryan, Air Pollution Standards Officer II, Colusa County APCD (March 22, 2016)

For CEQA, construction-related emissions for all project-related sources (i.e., mobile, area, fugitive, and stationary sources) must be estimated. Table 6 defines the Levels of Significance for the pollutants of concern. Attachment 6 includes tables extracted from the Preliminary Administrative Draft EIR that summarize the preliminary CEQA analysis. These tables are further summarized in Table 7.

Table 6. Thresholds of Significance for Pollutants of Concern

Pollutant	Level A	Level B	Level C
NOx	Less than or equal to 25 lbs/day	Greater than 25 lbs per day	Greater than 137 lbs per day
ROG	Less than or equal to 25 lbs/day	Greater than 25 lbs per day	Greater than 137 lbs per day
PM ₁₀	Less than or equal to 25 lbs/day	Greater than 80 lbs per day	Greater than 137 lbs per day
Level of Significance	Potentially Significant Impacts	Potentially Significant Impacts	Significant Impacts
Required CEQA Document	Mitigated Negative Declaration (MND) or Negative Declaration	MND or Environmental Impact Report (EIR)	EIR
Mitigation		Mitigation measures, Best Available Mitigation Measures (BAMMs) and Standard Mitigation Measures (SMMs), including off-site mitigation measures following the guidelines, may be required to reduce the overall air quality impacts of the project to a level of insignificance.	

Source: Tehama County Air Pollution Control District Air Quality Planning & Permitting Handbook (April 2015)

Based on a preliminary impact analysis of the construction, operation, and maintenance of project facilities, the project will have significant impacts to air quality before mitigation. Glenn and Colusa counties currently do not have a program or mechanism to collect mitigation fees for CEQA project-related emissions beyond the NSR permitting programs for stationary sources.

Table 7. Summary of Preliminary CEQA Impact Analysis (from Attachment 6 tables)

Pollutant	Level A Significance Threshold Exceeded	Level B Significance Threshold Exceeded	Level C Significance Threshold Exceeded
NOx	Construction – Yes O&M – Yes	Construction – Yes O&M – Yes	Construction – Yes O&M – No
ROG	Construction – Yes O&M – Yes	Construction – Yes O&M – Yes	Construction – Yes O&M – No
PM ₁₀	Construction – Yes O&M – No	Construction – Yes O&M – No	Construction – Yes O&M – No

The following mitigation measures are proposed to be implemented:

- Air Qual-1a: Develop a Fugitive Dust Control Plan
- Air Qual-1b: Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions.

Descriptions of the mitigation measures and cost estimate cost assumptions are described in Appendix 4I. The mitigation implementation costs are included in Tables 2 and 3.

Because engineering studies indicate that anticipated construction materials can be sourced within the same air basin as the project, additional mitigation costs associated with the transport of materials through areas with more stringent air emissions regulations would be avoided.

The concrete batch plants and quarry operations activities during construction are considered stationary emission sources and would require a permit to construct/operate from the local air district.

Table 8. Summary of Air Quality Mitigation Measures

Impact	Project Facilities	Level of Significance before Mitigation	Mitigation Measure	Level of Significance After Mitigation
Air Qual-1 Conflict with an applicable Air Quality Plan, contribute substantially to an Air Quality Violation, and/or Result in a Cumulative Considerably Net Increase of Nonattainment Pollutants	All Primary Area Project Facilities (construction)	Significant	Air Qual-1a Develop a Fugitive Duct Control Plan	Significant and unavoidable for emissions of PM ₁₀
			Air Qual-1b Implement measures to reduce equipment and vehicle exhaust emissions	Significant and unavoidable for emissions of NO _x , PM ₁₀ , and ROG Less than Significant for emissions of SO _x , CO, and PM _{2.5}
	All Primary Area Project Facilities (O&M)	Significant	Air Qual-1a Develop a Fugitive Duct Control Plan	Less than Significant
			Air Qual-1b Implement measures to reduce equipment and vehicle exhaust emissions	Less than Significant
GHG-1: Generation of Cumulative GHG Emissions	CVP Operational Emissions	Potentially Significant	No Feasible Mitigation	Potentially Significant and Unavoidable

Source: Preliminary Administrative Draft EIR Chapter 24 Air Quality Table 24-14 and Chapter 25 Climate Change and Greenhouse Gas Emissions Table 25-15 (DWR, 2013)

6.0 KEY COST ASSUMPTIONS

The following presents a summary of the key assumptions for developing costs presented in Tables 2 and 3. Detailed assumptions specific to each mitigation measure can be found in Attachment 3.

- Natural community and special-status species habitat impacts identified for Alternative C are assumed to be of high quality and suitable to support special-status species. A detailed evaluation of existing habitat may identify some land of degraded habitat value or highly disturbed. For that reason, the mitigation requirements and associated costs may be less for some areas and lower than estimated in Table 1.
- No overlap in land needed for mitigation for natural communities and special-status species except for agricultural land types and ponds is assumed for this cost estimate. A more detailed habitat assessment and land evaluation will eventually be needed to identify more precise impacts from the selected alternative on natural communities and special-status species habitats. Agency coordination would also be required to determine land types necessary to meet mitigation requirements.
- With the exception of Bald and Golden Eagle, giant garter snake, California red-legged frog, western pond turtle and burrowing owl, this cost estimate assumes that habitat requirements for other special-status species that may be affected by the project are met by compensation for the different natural community type effects. Mitigation requirements for valley elderberry longhorn beetle are assumed to be met as part of on-site restoration prescribed in Mitigation Measure *Fish-1e*.
- Specialized pre-construction surveys (e.g., for rare plants) were assumed to be performed at the same pace as protocol-level surveys for consistency; however, specialized preconstruction surveys would likely be performed much faster than protocol-level surveys. For that reason, the survey costs may be less than estimated.
- The majority of costs estimated for cultural and paleontological resources are contingency-related in the event of discovery of unidentified resources and/or human remains during construction activities. These estimates are based on known site conditions and experience on similar projects.
- Except for permitting and associated fees related to air quality, the mitigation costs do not include costs associated with any other permits needed for the project including preparation of permit applications or coordination with regulatory agencies for approvals.

7.0 RECOMMENDED MITIGATION MEASURE MODIFICATIONS

During review of the proposed mitigation measures, it was noted that several mitigation measures may require further evaluation or modification. Such modifications would also assist with refining the estimated range of costs associated with mitigation measure implementation. These measures include the following:

- **Mitigation Measure *Fish-1a*:** Increase stocking frequency of coldwater fish species. Further evaluation is needed to confirm potential effects to coldwater fish species and how stocking frequency would reduce these effects.
- **Mitigation Measure *Fish 1b*:** Mitigation monitoring and reporting plan for potential reduced flows into Yolo Bypass. Further evaluation of anticipated project operations and associated changes in Yolo Bypass flows is needed. Future analyses may indicate that this is a benefit and not an impact.
- **Mitigation Measure *Fish-1e*:** Implement Habitat Restoration Actions. This mitigation measure specifies on-site restoration requirements associated with Stone Corral and Funks creeks. It is recommended that these requirements be further developed and incorporated into the project description so that secondary (indirect) impacts associated with proposed restoration are evaluated as part of the EIR/EIS.
- **Mitigation Measure *Flood-1*:** Maintain permanent low flow releases into Stone Corral and Funks Creeks Downstream of Sites and Golden Gate Dams. This mitigation measure specifies a downstream flow performance standard of 10 cubic feet per second (cfs). Confirmation of the 10 cfs flow performance standard should be performed prior to finalization of project operations costs.
- **Mitigation Measure *Rec-4a*:** Extend the Existing Dinosaur Point Boat Ramp at San Luis Reservoir. The need for this mitigation measure to address changes in San Luis Reservoir from project operations and feasibility of implementation needs to be further evaluated.
- **Mitigation Measure *Rec-4b*:** Extend the Basalt Campground Water Intake at San Luis Reservoir. The need for this mitigation measure to address changes in San Luis Reservoir from project operations and feasibility of implementation needs to be further evaluated.

8.0 MITIGATION RELATED SCHEDULE CONSTRAINTS

Schedule constraints as a result of implementing mitigation measures include the following:

- Mitigation Measure *Wild-2d* requires the development of various planning documents and performance of Golden Eagle telemetry studies for 3 to 5 years prior to construction and then 3 to 5 years post construction. This mitigation measure impacts when construction of the project can begin.
- Several watershed hydrological studies are required as mitigation to inform or provide guidance regarding how to avoid and/or minimize impacts to natural springs, swales and wetland areas. These studies are to be performed prior to the finalization of project designs.
- Various mitigation measures specify construction work window constraints, including the following:

- All in-water work activities will be limited to July through September (Mitigation Measure *Fish-1f*).
- Demolition and structure removal work activities are to be avoided during bat maternity season from mid-April through August 31, and outside of the winter months when bats could be hibernating (Mitigation Measure *Wild-1b*).
- Construction activities within 0.5 mile of nesting Golden Eagles must be avoided between March 1 and August 15 (Mitigation Measure *Wild-2d*).
- Construction activities for the Delevan Pipeline Intake/Discharge Facility in vicinity of giant garter snake habitat will be limited from May 1 through October 1 (Mitigation Measure *Wild-2e*).
- Construction activity in the vicinity of burrows occupied by nesting burrowing owls must be avoided from February 1 through August 31; the peak nesting season occurs from April 15 through July 15 (Mitigation Measure *Wild-2g*).
- Construction activity for the Delevan Pipeline Intake/Discharge Facility in vicinity of riparian and orchard vegetation must be avoided between mid-June through August (Mitigation Measure *Wild-2i*).

9.0 RECOMMENDATIONS AND NEXT STEPS

The recommended next steps to address mitigation requirements are as follows:

- Several mitigation measures require the avoidance and/or minimization of impacts to sensitive habitats. It is recommended that during finalization of project designs further evaluation of possible avoidance or minimization be performed to reduce mitigation requirements and costs, and impacts to project schedule. These avoidance measures may include adjusting facility footprints, determining alternative routes, or modifications to construction methods.
- Mitigation requirements for Golden Eagle include up to five years of telemetry surveys prior to construction. These studies would assist with identifying nesting and foraging locations of Golden Eagle in the project area as well as suitable areas to implement habitat mitigation for Golden Eagle. It is recommended that preparation of these monitoring plans be initiated in consultation with regulatory agencies in the near-term in order to minimize impact to the construction schedule.
- Mitigation requirements for implementation of Habitat Restoration Actions (Mitigation Measure *Fish-1e*) specify on-site restoration requirements associated with Stone Corral and Funks creeks. It is recommended that these requirements be further developed and incorporated into the project description of the EIR/EIS. Restoration strategies that target habitats for multiple species could significantly reduce the overall area of land needed for off-site mitigation by simultaneously meeting the requirements of natural communities and of one or more special-status species on the same area of land. The final approach

for onsite restoration should also consider the feasibility of meeting off-site mitigation requirements.

- The feasibility of using mitigation banks for meeting off-site mitigation requirements for the loss of habitat and agriculture should be further evaluated. It is recommended that anticipated mitigation requirements be further discussed with mitigation banks within the project area (e.g., Westervelt) and county staff. In the event that off-site mitigation requirements cannot be fully achieved, additional on-site mitigation may need to be considered.
- Further discussion with the Glenn and Colusa County Air Pollution Control Districts is planned by the EIS/EIR team (CH2M Hill) to confirm if additional air quality mitigation would be required for constructing and operating the proposed project.

10.0 REFERENCES

DWR and Reclamation 2013. *Mitigation Monitoring Plan Costs for North-of-the-Delta Off stream Storage*. Prepared for the California Department of Water Resource and United States Department of Interior, Bureau of Reclamation. Sacramento, CA. November.

DWR 2013. *NODOS Preliminary Administrative Draft Environmental Impact Report*. Sacramento, CA. December. Available online:
http://www.water.ca.gov/storage/northdelta/prelim_admin_draft_eir_index.cfm

Reclamation 2006. *Folsom Dam Safety and Flood Damage Reduction Draft Environmental Impact Statement/Environmental Impact Report*. Folsom, CA. December. Available online. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=1808

Sites Reservoir Mitigation Cost Summary

PLANT ACCOUNT		PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
			Surface Water Quality					\$1,510,108.10
			Aquatic Resources					\$46,487,500.00
			Botanical Resources					\$70,066,000.00
			Wildlife Habitat					\$43,753,900.00
			Wetlands Habitat					\$66,540,000.00
			Cultural Resources					\$37,890,000.00
			Land Use					\$20,689,375.00
			Paleontology					\$1,210,000.00
			Subtotal					\$288,146,883.10
			Mobilization	2%	+/-			\$5,762,937.66
			Subtotal with Mobilization					\$293,909,820.76
			Contract Cost Allowances (Sum of):	10%	+/-			\$29,390,982.08
			Design Contingencies, 10 % (+/-)					
			APS, 0 % (+/-). Type of procurement: Full and open sealed bid competition					
			CONTRACT COST					\$323,300,802.84
			Construction Contingencies	2%	+/-			\$6,466,016.06
			FIELD COST					\$329,766,818.89
			Non-Contract Costs	4%	+/-			\$13,190,672.76
			CONSTRUCTION COST (Unit Price Level May 2016)					\$342,957,491.65
			Escalation to Notice to Proceed (NTP) (separate calculation not included here)					\$342,957,491.65
			at		per year for	years		
			CONSTRUCTION COST (with Escalation to NTP)					\$342,957,491.65
Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.								

FEATURE:		PROJECT:					
NODOS Project		NODOS Alternative C					
Project Mitigation and Monitoring Plan							
Resource Category Cost Estimates		WOID:		ESTIMATE LEVEL:			
Wildlife Habitat		REGION:		UNIT PRICE LEVEL:			
		FILE: #N/A					

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<i>Wild-1[x]; Wild-2[x]</i>					
	1	Blue oak woodland (GE; SH; WSF)(4:1)	Wild-2	3550.0	acre	\$3,000.00	\$10,650,000.00
	2	Deciduous orchard (GGS)	Wild-2c	46.2	acre	\$4,500.00	\$207,900.00
	3	Dryland grain and seed crops (SH)(0.5:1)	Wild-1a	166.6	acre	\$2,000.00	\$333,200.00
	4	Irrigated row and field crops (SH)(0.5:1)	Wild-1a	77.8	acre	\$2,500.00	\$194,500.00
	5	Pasture (GSC; FH; BO; WTK)(1:1)		72.7	acre	\$4,500.00	\$327,150.00
	6	Rice (GGS)(3:1 perm ac./ 1:1 temp ac.)	Wild-2c	1752.7	acre	\$4,500.00	\$7,887,150.00
	7	Valley foothill riparian (3:1) (GGS; VELB CTS; BE; SH; WYBC; VRI; WPT; RT)		334.6	acre	\$3,000.00	\$1,003,800.00
	8	Blue Oak woodland/mixed (<i>Bot-x</i>)	Bot-2a	52.0	acre	\$3,000.00	\$156,000.00
		<i>Wild-1b</i>					
	9	Implement bat exclusion measures	Wild-1b	18.0	days	\$1,600.00	\$28,800.00
		<i>Wild-2b</i>					
	9	Bald eagle nest removal	Wild-2b	3.0	Nest	\$11,960.00	\$35,880.00
		<i>Wild-2d</i>					
	10	Golden eagle pre-/post-construction satellite telemetry studies	Wild-2d	7.0	Years	\$290,000.00	\$2,030,000.00
	11	Golden Eagle Monitoring Plan	Wild-2d	1.0	LS	\$150,000.00	\$150,000.00
	12	Golden eagle Protection Plan	Wild-2d	1.0	LS	\$150,000.00	\$150,000.00
	13	Independent Expert (Pete Bloom)	Wild-2d	1.0	LS	\$120,000.00	\$120,000.00
	14	Helicopter survey - nesting population	Wild-2d	4.0	Survey	\$10,800.00	\$43,200.00
	15	Helicopter detraction actions	Wild-2d	3.0	Nest	\$17,940.00	\$53,820.00
		<i>Wild-2g</i>					
	16	Pre-constr survey western burrowing owls	Wild-2g	16500.0	acre	\$200.00	\$3,300,000.00
		<i>Wild-2h</i>					
	17	Pre-constr survey western pond turtle	Wild-2h	1712.5	acre	\$200.00	\$342,500.00
		<i>Wild-4</i>					
	18	Awareness training (human disturbance)	Wild-4	1.0	LS	\$100,000.00	\$100,000.00
	19	Pre-constr surveys /monitoring during construction	Wild-4	10.0	Year	\$1,664,000.00	\$16,640,000.00
SUBTOTAL THIS SHEET							\$43,753,900.00

FEATURE:				PROJECT:			
NODOS Project Project Mitigation and Monitoring Plan				NODOS Alternative C			
Resource Category Cost Estimates Paleontology				WOID:		ESTIMATE LEVEL:	
				REGION:		UNIT PRICE LEVEL:	
				FILE: G:\US Bureau of Rec\GSA Sites\Working\Task 13 Cost Estimate\Environmental Mitigation\[Attachment 1- Mitigation Cost Summary_2020.xlsx\Mitigation & Monitoring Plan			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Paleontology					
		Paleo-1b					
	1	Paleontological Resource Specialist pre-construction consultation		1.0	LS	\$350,000.00	\$350,000.00
		Paleo-1c					
	2	Implement Paleontological Resources Monitoring/Mitigation Plan		1.0	LS	\$200,000.00	\$200,000.00
		Paleo-1d					
	3	Paleontological Resources Awareness Training		1.0	LS	\$100,000.00	\$100,000.00
		Paleo-1e					
	4	Monitoring during Construction and monthly reporting		8.0	Year	\$50,000.00	\$400,000.00
		Paleo-1f					
	5	Ensure Monitoring & Mitigation implementation plan		8.0	Year	\$20,000.00	\$160,000.00
SUBTOTAL THIS SHEET							\$1,210,000.00

High Cost Mitigation Measures

Attachment 3. High Cost Mitigation Components

Mitigation Measure	High Cost Component/Activity	Estimated Costs¹ (\$million)
<i>Bot-1a; Bot-2e Wild 1a; Wild 2b</i>	Mitigation for loss of annual grasslands	68.5
<i>Bot-1a; Wet-2a; Wild 1a</i>	Mitigation for loss of seasonal wetlands	54.7
<i>Bot-1a; Wet-1a; Fish-1e; Wild-3c</i>	Riparian/Stream restoration	44.3
<i>Bot-1a; Wet-2b</i>	Mitigation for loss of alkaline wetlands	11.1
<i>Bot-1a; Wild 1a</i>	Mitigation for loss of Blue Oak woodland	10.7
<i>Cul-4a</i>	Native American (Midden) grave repatriation	20.0
<i>Cul-1b</i>	Archeological resources recovery	7.9
<i>Bot-1a; Wild 1a; Wild 2c; Land-4a</i>	Mitigation for loss of rice fields, giant garter snake habitat and prime farmland	7.9
<i>Land 4a</i>	Ag lands conservation easements for loss of prime farmland	12.5
<i>Land 5c</i>	Williamson Act contract cancellation fees	5.0

Notes:

¹ Estimated costs include mobilization, contingency, and escalation

Source: Data compiled by AECOM in 2016

ATTACHMENT 3

Detailed Cost Assumptions by Resource

Botanical Resources

Wetland and other Waters of the U.S.

Terrestrial Biological Resources

Aquatic Resources

Surface Water Quality

Cultural Resources

Paleontological Resources

Land Use

Air Quality

Attachment 4A. Botanical Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Bot-1a:</i> Implement Vegetation Community Mitigation Measures Recommended by USFWS	A Habitat Evaluation Procedures (HEP) assessment of the Primary Study Area was conducted under the lead of USFWS. A determination of appropriate mitigation measures for the habitat types that would be adversely affected within the Primary Study Area shall be made using the results of the HEP assessment, as well as through consultation with USFWS pursuant to the Fish and Wildlife Coordination Act. Mitigation measures could include but not be limited to protection, enhancement, restoration, or conservation easement.	Refer to vegetation community impacts spreadsheet – Attachment 6.
<i>Bot-1b:</i> Conduct Watershed Hydrological Studies	DWR and Reclamation shall conduct hydrological studies to determine how much of the grassy upland acts as a watershed for the alkaline wetland swale that feeds the downstream alkaline marsh. The studies shall provide guidance regarding how to avoid impacts to the grasslands that direct water to the marsh.	Costs to be included in project construction and O&M costs. Cost to include study only. \$300,000 to \$700,000 (studies) O&M monitoring and reporting for wetlands. \$20,000 per year
<i>Bot-1c:</i> Avoid/Minimize Loss or Disturbance of Vegetation by Refining the Siting of Facilities and Implementing BMPs	DWR and Reclamation shall implement BMPs, protective measures such as fencing and erosion, sedimentation, and dust control, and where possible refine the siting of facilities to minimize construction disturbance to sensitive vegetation communities.	Costs for protective measures to be included in project construction and O&M costs.
<i>Bot-1d:</i> Conduct Groundwater Hydrological Studies	DWR and Reclamation shall conduct hydrological studies to determine the effects of groundwater pressure on the alkaline habitat quality of the swale and the marsh. Measures may include protection of nearby similar vegetation communities, or USFWS may determine the effects are unavoidable and there may be no means of mitigation if there are no equivalent nearby vegetation communities that are feasible to protect or enhance.	Cost to include groundwater hydrology studies focused on impacts to alkaline habitat only. \$300,000 to \$700,000 (studies) O&M for groundwater and alkaline habitat monitoring. \$25,000 per year

Attachment 4A. Botanical Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Bot-1e:</i> Minimize Impacts by Siting Facilities Away from Drainage Swales and Implementing BMPs	DWR and Reclamation shall implement measures that mitigate impacts within the Holthouse Reservoir Complex to alkaline wetland vegetation in the on-site swale to avoid sedimentation of the swale during Project construction, according to recommendations received during consultation with USFWS.	Costs to be included in project construction and O&M costs.
<i>Bot-1f:</i> Implement BMPs to Avoid Disturbance of Marsh Vegetation in Adjacent Delevan National Wildlife Refuge	DWR and Reclamation shall set back all construction activities and equipment at least 20 feet away from the strip of marshy vegetation along the south end of the Delevan Pipeline construction disturbance area bordering the north edge of Delevan NWR. In addition, construction workers shall be prohibited from entering the NWR. BMPs, including signage on existing fencing, shall also be used to minimize erosion, sedimentation, and dust.	Costs to be included in project construction and O&M costs. Avoidance will be included into designs. No additional costs associated. Engineers to evaluate tunneling construction methods to avoid impacts.
<i>Bot-2a:</i> Conduct Pre-Construction Surveys for <i>Sidalcea keckii</i> and <i>Amsinckia lunaris</i> ; if Found, Compensate According to USFWS Guidelines	If either plant species is found during the Project pre-construction surveys, DWR and Reclamation shall immediately report the location and size of occurrences to CDFG and USFWS. If found, DWR and Reclamation shall compensate for the loss or temporary disturbance of either species according to USFWS guidelines, which could include protection of known occurrences in nearby habitat.	Assume total acreage to be surveyed is 4,000 to 5,000 acres. Assume survey 6 acres per day for protocol level studies at \$100 per hour. Assume 2 staff and 3 surveys. \$3,200,000 to \$4,000,000 (surveys)
<i>Bot-2b:</i> Avoid Occurrences of CNPS List 1B and State- or Federally-Listed Plant Species	DWR and Reclamation shall avoid occurrences of <i>Sidalcea keckii</i> , <i>Amsinckia lunaris</i> , and <i>Lotus rubriflorus</i> by refining the siting of facilities where feasible, and minimizing construction impacts with protection measures and BMPs, such as fencing and erosion, dust, and sedimentation control.	Costs to be included in project construction and O&M costs. Avoidance will be included into designs. No additional costs associated. Engineers to evaluate tunneling construction methods to avoid impacts.

Attachment 4A. Botanical Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Bot-2c:</i> Conduct Pre-Construction Surveys for Rare Alkaline Wetland Species in the Managed Alkaline Wetland Parcel of the Delevan Pipeline	DWR and Reclamation shall conduct pre-construction surveys to determine if rare alkaline wetland species are present. If determined to be present during the pre-construction surveys, DWR and Reclamation shall compensate for the loss and temporary disturbance of alkaline wetland species according to USFWS guidelines, which could include protection of known occurrences in nearby habitat.	Assume 14 acres to be surveyed. Assume 2 staff and 3 surveys. Assume 6 acres per day for protocol level studies at \$100 per hour. \$11,200 (surveys)
<i>Bot-2d:</i> Conduct Pre-Construction Surveys for Special-Status Plant Species	DWR and Reclamation shall conduct pre-construction surveys to determine if habitats that support special-status species are present.	Assume mitigation applies to unsurveyed grassland areas associated with the Delevan project components(13 miles long and 1,000 feet wide = 1,575 acres). Assume two staff and three surveys per year for 8 years. Assume: 10 acres per day for protocol level studies at \$100 per hour. \$756,000 (surveys)
<i>Bot-2e:</i> Compensate for Loss or Disturbance of CNPS List 4 Species According to CDFG Guidelines	DWR and Reclamation shall compensate for the loss of 13 occurrences CNPS List 4 species pursuant to consultation with DFG, which could include protection of known occurrences in nearby habitat. DWR and Reclamation shall also compensate for the temporary disturbance of four CNPS List 4 species pursuant to consultation with DFG, which could include preserving habitat available for recolonization by three of the four species by revegetating with local natives and using weed-free mulch to prevent post-construction takeover by weeds.	Refer to vegetation community impacts spreadsheet – Attachment 6.

Attachment 4A. Botanical Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Bot-3a:</i> Implement Preventive Actions by Following Weed Control BMPs; Minimize Exposed Ground; Reduce Weed Seed by Removal of On-Site and Off-Site Weeds	DWR and Reclamation shall minimize the introduction of new weed seeds into the construction disturbance area or transport weed seeds between construction disturbance areas by following weed control BMPs (e.g., equipment washing). DWR and Reclamation shall minimize the exposed ground within the construction disturbance area that is available for weed colonization or spread by mulching with weed-free materials or planting the exposed ground with native cover crops local to the Project area. In addition, DWR and Reclamation shall reduce the weed seed that is available for invasion into the Project construction disturbance area by appropriate removal of on-site weeds and by implementing selective adjacent off-site weed removal.	Costs to be included in project construction and O&M costs. O&M for weed management. \$10,000/year
<i>Bot-3b:</i> Implement Avoidance Measures in Areas Adjacent to the Delevan National Wildlife Refuge	During construction of the Delevan Pipeline and Power Transmission Line, DWR and Reclamation shall avoid the placement of large staging areas within the portion of the construction disturbance area that borders the Delevan NWR.	Costs to be included in project construction and O&M costs. Avoidance will be included into designs. No additional costs associated with mitigation measure. Engineers to evaluate jack and bore and/or tunneling construction methods to avoid impacts.
<i>Bot-4:</i> Implement Vegetation Monitoring in Coordination with USFWS	DWR and Reclamation, in coordination with USFWS, shall monitor the effects of human activities on the health of sensitive areas adjacent to Project facilities.	Timing after construction/during operation of recreation facilities. Assume monitoring at Stone Corral and Peninsula Hills Recreation Areas and assume costs will be rolled up into O&M costs for recreation facilities. O&M for vegetation monitoring \$25,000 per year

Attachment 4B. Wetlands and Other Waters of the U.S.

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Wet-1a:</i> Implement Compensatory Mitigation Measures for Streams pursuant to USACE Determination within the Watershed in which the Impacts	<p>Compensatory mitigation for streams shall be provided for each significant impact identified by the USACE determination according to ratios determined by the USACE for the appropriate category and degree of severity of loss or impact. Mitigation shall occur within the watershed in which the impacts occur:</p> <ul style="list-style-type: none"> • Sites Reservoir & Dams, Recreation Areas— Funks/Hunter/Antelope/Grapevine/Stone Corral Creek watersheds. • Delevan Pipeline Intake Facilities, Delevan Pipeline Discharge Facility— Sacramento River adjacent to facility location. • Road Relocations, Funks Reservoir, Holthouse Reservoir Complex, Sites Inlet/Outlet Structure and associated facilities, Field Office Maintenance Yard, Electrical Switchyard—Funks Creek watershed. 	Refer to wetland impacts spreadsheet – Attachment 6.
<i>Wet-1b:</i> Reroute Canals to Ensure Continued Hydrological Connection, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination	For impacts to canals, mitigation shall include re-routing the canals to ensure continued hydrological connection to traditional waters of the U.S. Loss of emergent wetland habitat from within canals shall be mitigated for in other ways, as recommended by the USACE.	Costs associated with avoidance measures, BMPs and to be included in project construction and O&M costs.
<i>Wet-1c:</i> Restore Ponds to Original Condition, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination within the Same Hydrologic Unit in which the Ponds Occur	The pond located 3.5 miles west of the Sacramento River within the Delevan Pipeline construction disturbance area should be restored after construction is completed to its current condition as an agricultural pond. If restoration is not possible, compensatory mitigation measures, pursuant to USACE determination, shall be implemented within the Hunters Creek-Logan Creek watershed downstream of their confluence.	Refer to wetland impacts spreadsheet – Attachment 6.

Attachment 4B. Wetlands and Other Waters of the U.S.

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Wet-2a:</i> Conserve, Enhance, Restore, or Create Seasonal Wetlands, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination within the Watershed in which the Impacts Occur</p>	<p>For the seasonal wetlands located along the edge of Funks Reservoir, alter the extent of dredging so that the slope of the reservoir bottom is more tapered at this point</p>	<p>Refer to wetland impacts spreadsheet – Attachment 6.</p>
<p><i>Wet-2b:</i> Conserve, Enhance, Restore, or Create Alkaline Wetlands, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination within the Watershed in which the Impacts Occur</p>	<p>The local saline spring areas further upslope in same geological formation as the springs that feed Salt Lake shall be enhanced. These springs are located outside of the Sites Reservoir footprint but in the creases of the foothills due north of Salt Lake. Some of them may be able to be expanded, and could possibly be partially protected from grazing impacts with the installation of protective fencing.</p> <p>A conservation agreement shall be entered into with Reclamation to manage and protect the entire alkaline wetland area southeast of Holthouse Reservoir. Management shall include burning and grazing regimes similar to those used effectively on the Sacramento NWR.</p> <p>A purchase or conservation agreement shall be entered into with the utilities or other landowners to protect and manage other saline/alkaline wetland habitats in parcels east of the Tehama-Colusa (T-C) Canal, north of the Primary Study Area. Protected areas might include a potential alkaline wetland area southeast of the Colusa Generating Station located along the T-C Canal.</p> <p>For the Holthouse Reservoir alkaline wetlands, a hydrogeological study shall be conducted to determine the direction and sources of water supplying the seeps, swales, and main wetland area, to better inform evaluation of potential effects of placing the dam and reservoir in proximity of the wetland's west edge. The study shall include testing of the wetland area's water and soils, and may allow for development of minimization measures.</p>	<p>Refer to wetland impacts spreadsheet – Attachment 6.</p>

Attachment 4B. Wetlands and Other Waters of the U.S.

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Wet-2c:</i> Conserve, Enhance, Restore, or Create Vernal Pools Equivalent to the Type of Vernal Pools Adversely Impacted, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination</p>	<p>For vernal pools, the type of vernal pools conserved elsewhere shall be equivalent to the type lost from the Primary Study Area – most likely, clay pan and alkaline vernal pools. Consultation with vernal pool experts shall occur to ensure ecological equivalence.</p>	<p>Refer to wetland impacts spreadsheet – Attachment 6.</p>
<p><i>Wet-2d:</i> Conserve, Enhance, Restore, or Create Emergent Wetlands, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination within the Watershed in which the Impacts Occur</p>	<p>[Text not included in previous draft of EIS/R]</p>	<p>Refer to wetland impacts spreadsheet – Attachment 6.</p>
<p><i>Wet-2e:</i> Conserve, Enhance, Restore, or Create Comparable Riparian Wetlands in the Inner Coast Range Foothills, or Implement other Compensatory Mitigation Measures pursuant to USACE Determination</p>	<p>For the two-acre riparian wetland and waters of Funks Creek lost to Holthouse Reservoir, a comparable area in the inner coast range foothills shall be selected for restoration and conservation.</p>	<p>Refer to wetland impacts spreadsheet – Attachment 6.</p>

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Wild-1a:</i> Implement a Combination of Habitat Protection, Enhancement, Restoration, or Conservation Easement Measures, in Consultation with USFWS	For all three action alternatives, the acreage of permanent habitat loss within the Recreation Areas and the Road Relocations, as well as the temporary habitat disturbance within the construction disturbance areas for most facilities, was estimated. Because these acres are estimated, it may be possible to avoid impacts to certain habitat types. A Habitat Evaluation Procedures assessment of the Primary Study Area was conducted under the lead of USFWS. A determination of appropriate mitigation measures for the habitat types that would be adversely affected within the Primary Study Area shall be made using the results of the HEP assessment, as well as through consultation with USFWS pursuant to the Fish and Wildlife Coordination Act. Mitigation measures could include but not be limited to protection, enhancement, restoration, or conservation easement.	Refer to habitat impacts spreadsheet – Attachment 6.
<i>Wild-1b:</i> Implement Bat Exclusion Measures Prior to Demolition of Existing Structures	Prior to structure demolition, structures shall be inspected by a qualified biologist to determine if bats are present and if present, to determine if the structure is being used as a day, night, or maternity roost. If a roost is present, appropriate bat exclusion measures shall be implemented at least five to seven days prior to structure demolition outside of the maternity season, which can range from mid-April through August 31, and outside of the winter months when bats could be hibernating. Bat exclusion measures could include one-way devices such as polypropylene netting, plastic sheeting, or tube-type excluders that would be placed at all active entry points. If a roost is present in a structure located outside of a reservoir inundation area, possible avoidance measures could include retaining the structure.	<p>Costs for bat exclusion measures to be included in project construction and O&M costs.</p> <p>Assume 89 structures to be surveyed. Trees that provide bat roosting habitat to be surveyed with other species surveys.</p> <p>Assume one-time survey. Assume five structures per day (18 days total) and two staff at \$100 per hour.</p> <p>\$28,800 (surveys)</p>
<i>Wild-2a:</i> Obtain Permit for Bald Eagle Nest Tree Removal, Remove Nest Tree Outside of Breeding Season, and Create Suitable Habitat	A permit to remove or relocate an eagle nest shall be obtained from USFWS. The bald eagle nest tree shall be removed outside of the breeding season, which ranges from January through July, to avoid direct impacts. Dam construction activities shall not occur during the breeding season until the nest tree is removed. After construction is complete, the filling of Sites Reservoir and Holthouse Reservoir would create new fish-bearing lacustrine habitat in an area that is surrounded by suitable bald eagle nest trees. Following inundation, releases downstream of Golden Gate Dam would restore flows to Funks Creek to maintain fisheries and bald eagle habitat.	Costs to prepare a plan to remove nest included in Mitigation Measure <i>Wild-2d</i> .

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Wild-2b:</i> Implement Protective Actions to Prevent Bank Swallows from Nesting in the Cut Banks of Project Construction Trenches	Construction of the pipelines shall begin in May due to giant garter snake restrictions. May falls within the bank swallow breeding season (ranging from mid-March through July). Protective action shall be taken to prevent bank swallows from attempting to nest within the cut banks of the pipeline trenches. Actions shall include the placement of a mesh net on all cut banks during the bank swallow nesting season, and implementation of Mitigation Measure Wild-3a to ensure that trenches are backfilled within 72 hours of pipeline installation.	Costs to be included in project construction and O&M costs.
<i>Wild-2c:</i> Conduct Pre-Construction Surveys for Giant Garter Snakes and Implement Protective Actions; Conduct Project Construction Activity Between May 1 and October 1 in Giant Garter Snake Habitat; Compensate for Temporary Disturbance of Habitat According to USFWS Guidelines	Protective actions shall be taken to avoid or minimize impacts to the giant garter snake. Protective actions and mitigation measures shall comply with the USFWS's Programmatic Biological Opinion (USFWS, 1997).	Costs associated with avoidance measures, BMPs and to be included in project construction and O&M costs. Assume GGS preconstruction survey and monitoring costs included in Mitigation Measure <i>Wild-4</i> .
<i>Wild-2d:</i> Implement Avoidance and Minimization Measures at Historic or Active Golden Eagle Nest Sites; Conduct Satellite Telemetry Studies Pre- and Post-Construction to Determine Territory Size; Prepare a Golden Eagle Protection Plan and a Golden Eagle Monitoring Plan; Mitigate for Loss of Annual Grassland Foraging Habitat	Construction activities shall be modified to ensure that nesting Golden Eagles are protected. To avoid impacts to nesting Golden Eagles at Peninsula Hills, construction of the recreation area would be deferred. To avoid or minimize possible impacts to nesting Golden Eagles in other construction areas, some or all of the following measures shall be implemented: <ul style="list-style-type: none">• A bird detraction program shall be implemented near historic Golden Eagle nest sites to discourage eagles from returning to those sites.• Construction near recently active nest sites shall start outside the active nesting season. The nesting period for Golden Eagles is between March 1 and August 15.• If groundbreaking activities begin during the nesting period, a qualified biologist shall perform a pre-construction survey 14 to 30 days before the start of each new construction phase to search for Golden Eagle nest sites in appropriate habitat within 0.5 mile of proposed activities. If active nests	Nests located at three of the restoration areas and downstream of Site Dam. Located in Stone Corral and Peninsula Hills, Lurline Headwaters. Assume general pre-construction survey/clearance costs included in Mitigation Measure <i>Wild-4</i> . Telemetry Studies (assume 3 to 5 years prior to construction and then 3 to 5 years post construction). Assume \$175 per hour for two staff. Assume 400 hours per year. \$840,000 to \$1,400,000 (\$140,000 per year)

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
	<p>are not identified, no further action is required and construction may proceed.</p> <ul style="list-style-type: none"> If active nests are identified, a minimum 0.5 mile buffer zone around active Golden Eagle nests shall be implemented. Buffer zones shall remain until young have fledged. For activities conducted with agency approval within this buffer zone, a qualified biologist shall monitor construction activities and the eagle nest(s) to monitor eagle reactions to activities. If activities are deemed to have a negative effect on nesting eagles, the biologist shall immediately inform the construction manager that work should be halted, and CDFG and USFWS will be consulted. For Golden Eagles that begin nesting within the buffer zone after start of construction, the same avoidance and minimization measures as described for active eagle nests found before start of construction (0.5 mile buffer) shall be implemented. A buffer of less than 0.5 mile may be used if there is a visual barrier, such as a hill or dense trees, between the construction activity and the nest. <p>To assess the impact of this loss of foraging habitat, the following measures shall be implemented prior to the start of Project construction:</p> <ul style="list-style-type: none"> A Golden Eagle Monitoring Plan shall be prepared. Satellite telemetry studies shall be conducted for three to five years prior to the start of construction to establish the number of Golden Eagles and the size of their territories. Surveys shall be conducted by permitted biologists. A Golden Eagle Protection Plan shall be prepared. 	<p>Assume 10 sites for telemetry studies and equipment \$15,000 per site.</p> <p>\$150,000</p> <p>Helicopter Surveys – Four surveys for nesting population study (timing when vegetation is not on trees), helicopter costs – \$950 per hour for 7 hours.</p> <p>\$26,600 (\$6,600 per survey)</p> <p>Expert assistance.</p> <p>\$120,000</p> <p>Preparation of a Golden Eagle Protection Plan.</p> <p>\$150,000</p> <p>Preparation of a Golden Eagle Monitoring Plan.</p> <p>\$150,000</p> <p>Bird Detraction Program.</p> <p>\$300,000</p> <p>Helicopter assist with implementation \$2,750 per hour for 6 hours and two staff at \$120 per hour for three nests.</p> <p>\$53,820</p> <p>Avoidance and minimization measures (including 0.5 mile work exclusion around active nests) to be included in the construction and</p>

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
		O&M costs. Mitigation Measure <i>Wild-2d</i> total costs — \$1,790,420 to \$2,350,420
<i>Wild-2e</i> : Implement Protective Actions to Minimize Impacts to the Ringtail, and Restore Connectivity of Riparian Corridor	The fully-protected ringtail was observed within the riparian habitat that would be removed during construction of the Delevan Pipeline Intake/Discharge Facilities. The removal of riparian habitat within the footprint of the facilities would further reduce connectivity of the riparian corridor at that location. Implementation of Mitigation Measure <i>Wild-3c</i> would restore that connectivity. To minimize potential direct impacts to the ringtail, riparian vegetation removal shall not occur during the early pup-rearing season, which ranges from May 1 through June 15. Efforts to restore riparian corridor connectivity could include other habitat enhancements, such as providing ringtail nesting cavities and planting food sources.	Assume mitigation costs to restore connectivity included in <i>Wild-3c</i> .

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Wild-2f.</i> Implement Protective Actions to Avoid or Minimize Impacts to Elderberry Plants; Where Avoidance is not Possible, Transplant or Replace Plants, According to USFWS Guidelines</p>	<p>There are two elderberry shrubs located within the potential construction disturbance area for Sites Reservoir and Dams that could be completely avoided by establishing and maintaining a 100-foot-wide or wider buffer around them. Construction crews shall be briefed regarding the need to avoid these plants, and signs shall be posted during construction to avoid the buffer area. After Project construction is complete, this area would not be affected by Project operation or maintenance.</p> <p>The elderberry shrub immediately adjacent to the footprint of the Delevan Pipeline Intake/Discharge Facility is located on the edge of an irrigation canal that is situated along an existing access road. Because of its proximity to the road, it would not be possible to establish a 100-foot-wide buffer. It would also not be possible to establish a 100-foot-wide buffer for the shrubs located immediately adjacent to the existing Maxwell Sites Road. Consultation with USFWS would be initiated for possible approval to encroach on the buffer. Otherwise, appropriate mitigation measures shall be implemented.</p> <p>The elderberry shrubs within the footprint of Sites Reservoir, Sites Dam, and Golden Gate Dam, as well as the one shrub within the footprint of the Delevan Pipeline Intake/Discharge Facility, would not be avoided by Project construction, and therefore, shall be transplanted or replaced, depending on the likelihood of survival post-transplantation. Transplantation procedures shall comply with USFWS's 1999 Conservation Guidelines for the Elderberry Longhorn Beetle (USFWS, 1999). If transplantation is not feasible, USFWS general guidelines require replacement of elderberry plants in designated mitigation areas. Elderberry plants are typically replaced at a ratio of 2:1 for stems greater than one inch in diameter at ground level with no adult emergence holes, 3:1 for stems where emergence holes are documented in less than 50 percent of the shrubs, and 5:1 for stems greater than one inch in diameter with emergence holes.</p> <p>Mitigation measures already required for the loss of riparian habitat pursuant to the mitigation for loss of wildlife habitat types described above could potentially compensate for the native planting requirement for elderberry plant mitigation.</p>	

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Wild-2g</i>: Conduct Pre-Construction Surveys for Western Burrowing Owls; If Owls are Found, Implement Protective Actions</p>	<p>Pre-construction surveys shall be conducted in annual grasslands within the footprint of Sites Reservoir and within the construction disturbance area of the Road Relocations to determine if burrowing owls are present. These surveys shall be conducted within 30 days of ground-disturbing construction activities or the start of the filling of reservoir. Surveys shall be conducted by a qualified biologist in compliance with the Burrowing Owl Survey Protocol and Mitigation Guidelines (CBOC, 1993). If burrowing owl burrows are found, protective measures shall be implemented.</p> <p>Protective measures may include avoidance of occupied burrows during the nesting season, which is from February 1 through August 31, with the peak of the season occurring from April 15 through July 15. Any unoccupied burrows located within the immediate construction area shall be excavated using hand tools, and then filled to prevent reoccupation.</p> <p>If destruction of occupied burrows is unavoidable, such as within the footprint of Sites Reservoir, burrow entrances shall be altered, outside of the nesting season, to allow resident owls to exit but not re-enter the burrow. Owls shall be excluded from burrows by installing one-way doors in burrow entrances. One-way doors shall be left in place for at least 48 hours to ensure owls have left the burrow before the start of construction. Other possible mitigation could include the creation of artificial burrows in adjacent suitable habitat.</p> <p>Loss of annual grassland habitat shall be compensated for with implementation of the mitigation for loss of wildlife habitat types described above.</p>	<p>Assume 16,500 acres – one time survey</p> <p>1 acre per hour two staff at \$100 per hour.</p> <p>\$3,300,000 (surveys)</p>

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Wild-2h:</i> Conduct Pre-Construction Surveys and Provide a Biological Monitor During Project Construction for the Western Pond Turtle; If Found, Turtles shall be Captured and Relocated by a Qualified Biologist</p>	<p>Before construction activities begin, a qualified biologist shall conduct western pond turtle surveys along creeks and other ponded areas within the footprint of Sites Reservoir, Sites Dam, and Holthouse Reservoir, as well as along the irrigation canals within the construction disturbance area of the Delevan Pipeline. Adjacent upland areas shall also be examined for evidence of nests or individual turtles. A Project biologist shall be responsible for conducting the survey and relocating any turtles found within footprints or construction disturbance areas. If a nest is observed, a biologist with appropriate permits and prior approval from CDFG shall move eggs to a suitable location or facility for incubation. However, some individuals may be undetected or enter sites after surveys are conducted, and could be subject to mortality. A biological monitor shall, therefore, be present during Project construction to minimize take.</p>	<p>Include Delevan pipeline area (1,575 acres) and canal (23.2 acres) and valley foothill riparian (VFR) habitat (114.3 acres) Assume one acre per hour, two staff, one time survey. \$342,500 (surveys)</p>
<p><i>Wild-2i:</i> Conduct Pre-Construction Surveys for the Western Yellow-Billed Cuckoo and Schedule Construction Activities to Avoid Impacts to Nest Sites</p>	<p>The yellow-billed cuckoo breeding season ranges from mid-June through August. To minimize direct impacts to this species, riparian and orchard vegetation removal within the footprint of the Delevan Pipeline Intake/Discharge Facility shall occur outside of these dates. If construction activities are scheduled to occur during the breeding season, preconstruction surveys shall be conducted in riparian and orchard habitat within the construction disturbance area of the Delevan Pipeline Intake/Discharge Facility to confirm that cuckoos are not actively nesting in or near the area. If active nests are identified, a minimum 500-foot construction buffer shall be established around any nest sites. All construction shall be avoided where active nests are discovered until the cuckoos have finished nesting. Loss of valley foothill riparian and deciduous orchard habitat shall be compensated for with implementation of the mitigation for loss of wildlife habitat types described above.</p>	<p>ACREAGE VFR at Intakes only – 13 acres. Assume one time survey, two staff, four acres per hour \$650 (survey)</p>
<p><i>Wild-3a:</i> During Project Construction, Backfill Trenches within 72 hours of Pipeline Installation and Provide an Escape Ramp for Trapped Wildlife</p>	<p>Pipeline trenches shall be backfilled within 72 hours of pipeline installation to prevent potential impacts to trapped wildlife. The trench shall be inspected for wildlife before it is filled. At the end of each day, a ramp shall be placed at the end of the trench at an approximate 45 degree slope to allow trapped wildlife to escape. In addition to a ramp, the trench shall be covered to prevent wildlife from falling in.</p>	

Attachment 4C. Terrestrial Biological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Wild-3b:</i> Construct Transmission Lines and Associated Equipment Following Suggested Practices for Avian Protection on Power Lines	Transmission lines, poles, and associated equipment shall be properly fitted with wildlife protective devices to isolate and insulate structures to prevent injury or mortality to wildlife, especially avian species. Protective measures shall follow the guidelines provided in Suggested Practices for Avian Protection on Power Lines (APLIC, 2006), and shall include insulating hardware or conductors against simultaneous contact, using poles that minimize impacts to birds, and increasing the visibility of conductors or wires to prevent or minimize bird collisions	Costs to be included in project construction and O&M costs.
<i>Wild-3c:</i> Restore Riparian Habitat Connectivity	After the Delevan Pipeline Intake/Discharge Facilities are constructed, riparian habitat connectivity shall be restored to provide a travel corridor for terrestrial wildlife. The entire length of the land side of the new levee associated with the facilities shall be planted with riparian vegetation. Where the levee approaches SR 45, fencing shall be installed to protect wildlife from vehicles. Vegetation shall be monitored, and irrigated if necessary, to ensure survival.	Lands acquired for the Intake/Discharge facilities will be adequate to also accommodate incorporation of riparian connectivity mitigation.
<i>Wild-4:</i> Implement Avoidance and Minimization Measures	Measures to avoid or minimize human disturbance impacts associated with Project construction and maintenance activities.	<p>Awareness Training. \$50,000 to \$200,000</p> <p>Preconstruction surveys/monitoring assume 8 full-time staff (FTE) for 10 years.</p> <p>Surveys + Monitoring \$1,660,000 per year (\$16,600,000 surveys)</p> <p>Project design avoidance measure costs to be included in project construction and O&M costs.</p>

Attachment 4D. Aquatic Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Fish-1a:</i> Increase stocking frequency of coldwater fish species	Text to be developed	No cost associated with this measure.
<i>Fish-1b:</i> Prepare and Implement a Mitigation Monitoring and Reporting Plan	<p>DWR and Reclamation shall prepare and implement a Mitigation Monitoring and Reporting Plan to mitigate for expected significant reduced flows through the Yolo Bypass (all alternatives), which could include the following mitigation measure:</p> <ul style="list-style-type: none"> • Modifications to the Fremont Weir to allow additional flow for inundation of the Yolo Bypass has been identified as a fisheries habitat improvement action by other projects or programs and may be implemented before the NODOS Project is authorized. If modifications occur before implementation of the NODOS Project, this impact would be reduced to less than significant and would not require mitigation. If the modifications are not yet implemented, mitigation measures for the NODOS Project could include modification of the weir to offset potentially reduced flows through the Yolo Bypass and associated habitat availability for splittail and other fish species of primary management concern. 	<p>Details related to mitigation need to be further evaluated as part of EIR/EIS revisions – measure may also include benefits.*</p> <p>O&M costs</p> <p>\$500,000/annually(contingency)</p>
<i>Fish-1c:</i> Prepare and Implement a Stormwater Pollution Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan (ESCP) Prior to the Initiation of Construction Activities	DWR and Reclamation shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan (ESCP) prior to the initiation of construction activities.	Costs to be included in project construction and O&M costs.
<i>Fish-1d:</i> Prepare and Implement a Spill Prevention and Hazardous Materials Management Plan Prior to the Initiation of Construction Activities	DWR and Reclamation shall prepare a Spill Prevention and Hazardous Materials Management Plan (developed as part of the SWPPP) that would be designed to minimize the potential for chemical spills and seepage during construction, operation, and maintenance activities.	Costs to be included in project construction and O&M costs.

Attachment 4D. Aquatic Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Fish-1e</i>: Implement Habitat Restoration Actions</p>	<p>To minimize disturbance to aquatic habitat, construction personnel shall participate in an environmental awareness training program provided by a qualified biologist. Construction personnel shall be informed about any sensitive biological resources associated with the proposed Project and that disturbance of sensitive habitat or special-status species would be a violation of the Endangered Species Act and the Clean Water Act.</p>	<p>Costs to include restoration at a ratio of 2:1 for linear stream miles inundated with the following project components:</p> <ul style="list-style-type: none"> • Sites Reservoir Inundation Area and Sites Dams • Holthouse Reservoir Complex, the Sites Reservoir Inlet/Outlet Structure, and the Sites Pumping/Generating Plant • Delevan Pipeline <p>Delevan Pipeline Intake Facilities and Delevan Pipeline Discharge Facility.</p> <p>Assume acquisition of 681 acres at \$2,500 per acre.</p> <p>O&M cost for restoration land management —681 acres at \$400 per acre.</p> <p>\$275,000</p>

Attachment 4D. Aquatic Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Fish-1f</i> : Perform In-Water Pile Driving July Through September During Daylight Hours	In-water pile driving shall only occur during July through September during daylight hours. This time period takes into consideration the migratory patterns of salmonids; pile driving shall occur after the cessation of the outmigration of juvenile salmon and before the initiation of the upstream migration of adults returning to spawn. To avoid impacts to the majority of fish species of primary management concern, sheet pile installation and in-stream heavy equipment activity shall be coordinated with USFWS, USBR, CDFG, and NMFS to avoid and or minimize potential impacts. If feasible, a vibratory hammer shall be used, and pile driving shall commence at low energy levels and slowly build to impact force. In addition, underwater sound levels shall be monitored to ensure that pile driving activities do not create underwater sound levels that exceed NMFS' noise thresholds (i.e., accumulated sound exposure level of 183 dB and a peak pressure of 206 dB).	Costs to be included in project construction and O&M costs.
<i>Fish-1g</i> : Design Fish Screen in Compliance with NMFS and CDFG Criteria	Fish screen at the Delevan Pipeline Intake Facilities shall be designed to comply with NMFS and CDFG fish screening criteria. The Delevan Pipeline Intake Facilities or Discharge Facility shall be designed to minimize hydraulic and physical habitat that is suitable for non-native predatory fish species. The facility shall be designed in coordination with NMFS and CDFG to ensure incorporation of the best available scientific and engineering knowledge of fish screen design to minimize predation potential on fish species of primary management concern. These design criteria shall minimize or avoid increased habitat suitability for non-native predatory fish species. However, a monitoring and adaptive management program shall be implemented to ensure that losses resulting from predatory fish are minimized.	Costs to be included in project construction and O&M costs.

Attachment 4D. Aquatic Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Fish-1h</i>: Prepare and Implement a Fish Salvage and Rescue Plan</p>	<p>The fish screen at the Delevan Pipeline Intake Facilities shall be designed to comply with NMFS and CDFG fish screening criteria. In addition, a Fish Salvage and Rescue Plan shall be developed and approved by NMFS and CDFG prior to initiation of construction activities, and could include the following measure:</p> <ul style="list-style-type: none"> • A qualified biologist shall provide construction monitoring throughout all phases of the project. If spawning activities for sensitive fish species are encountered during construction activities, the monitoring biologist shall be authorized to stop construction activities until appropriate corrective measures are completed or it is determined that the fish would not be harmed. If possible, all fish species shall be allowed to independently move away from the area. Fish that become entrapped in any side channel where construction work is taking place shall be netted, transported to the river, and released according to the Fish Salvage and Release Plan. 	<p>Costs include preparation of a Fish Salvage and Rescue Plan and anticipated level of effort for fish salvage operations (contingency costs)</p> <p>\$520,000 (contingency)</p>

Attachment 4E. Surface Water Quality

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>SW Qual -1(a):</i> Implement a Water Quality Monitoring, Modeling, and Operations Coordination Program to Protect Beneficial Uses</p>	<p>A comprehensive water monitoring program, including analysis of water quality conditions at the Project intake/discharge locations on the Sacramento River, as well as major Project conveyance and impoundment features, shall be implemented. This monitoring program shall include a network of automated real-time water monitoring locations at these locations, with data available to operators on the SCADA control system to allow real-time adaptive alteration in diversion amounts based on these conditions. This would allow operators to select the best quality waters to fill Sites Reservoir and potentially avoid importation of poor quality water that may affect the quality of Project water deliveries. This strategy could require additional modeling of Project water quality conditions to better understand the complex chemical interactions and physical and biological processes that affect contaminant levels. In addition, fish in Sites Reservoir shall be sampled and analyzed for mercury and other potential contaminants that may have deleterious effects to human and wildlife consumers. Results from these analyses shall be submitted to the Office of Environmental Health Hazard Assessment (OEHHA) for determination of the threats to consumers of fish in Sites Reservoir. Determination of adverse health effects to consumers would lead to educational postings at access points and public media to reduce exposure to contaminated fish.</p>	<p>Cost for infrastructure (monitoring devices, SCADA, etc.) and O&M of would be included in project construction and O&M costs.</p> <p>Water quality sampling necessary to determine how facilities should be operated is included in O&M costs.</p> <p>Supplemental mitigation cost</p> <p>\$1,500,000</p> <p>O&M annual cost</p> <p>\$250,000</p>
<p><i>SW Qual-1(b):</i> Excavate and Remove, or Consolidate and Cap, Salt Lake</p>	<p>The Salt Lake site within the footprint of Sites Reservoir would be either excavated and removed or consolidated and capped by an impermeable cover to avoid dissolution of the salt deposit into the reservoir waters. Salt Lake is fed by upslope salt springs, is many decades old, and the salt pan has accumulated to an unknown thickness over this time by evaporation. After removal/capping of the salt pan, the salt spring inputs to a completed Sites Reservoir would be diluted by high quality Sacramento River imports to a level that would be less than significant to water quality.</p>	<p>Mitigation cost would include removal (clearing and grubbing) and removal of surface materials, jet grouting of concrete and capping of Salt Lake and site grading.</p> <p>\$10,000 to \$15,000</p>
<p><i>SW Qual-1(c) to SW-Qual-1(l)</i></p>	<p>Mitigation measures associated with implementation of SWPPP, BMPs and other related construction practices.</p>	<p>Mitigation costs would be included in project construction and O&M costs.</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-1a</i>: Avoid Impacts to Historical Resources/Historic Properties</p>	<p>If feasible, impacts to identified historical resources/historic properties, including prehistoric and historic-era archaeological sites, buildings and structures, TCPs, and human remains shall be avoided. Methods of avoidance may include, but are not limited to, Project re-design, or, when appropriate, deeding the site into a permanent conservation easement; incorporation of sites into parks, greenspace, or other open space; and protection measures, such as fencing.</p>	<p>Assumption \$40 per acre for remaining surveys and field documentation.</p> <p>\$32,500 to \$50,000 (surveys)</p> <p>Approximately 790 acres not yet surveyed. Additional areas to be defined – transmission line footprint and confirm pipeline alignments and Leesburg road.</p> <p>Costs should also include geo-archeology studies to determine the potential for buried resources. Timing of studies could be performed during construction.</p> <p>Assume \$100,000 prior to construction (timing of desktop evaluations – during EIR/EIS).</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-1b</i>: Conduct Archaeological Data Recovery</p>	<p>If it is infeasible to avoid impacts to archaeological sites that have been determined to be eligible for listing on the CRHR or the NRHP, additional research including, but not necessarily limited to, archaeological excavation shall be conducted. This work shall be directed by a qualified archaeologist who meets the U.S. Secretary of Interior's professional standards, and shall include preparation of a research design; additional archival and historical research to supplement the research design, when appropriate; archaeological excavation; analysis of artifacts, features, and other attributes of the resource; and preparation of a technical report documenting the methods and results of the investigation in accordance with the California Office of Historic Preservation Guidelines for Archaeological Research Design (1991). The purpose of this work is to recover a sufficient quantity of data to compensate for damage to or destruction of a resource that is eligible for the CRHR pursuant to criterion 4 of CCR 4852(b) or the NRHP pursuant to 36 CFR 60.4(d). The procedures to be used in this data recovery program shall be determined in consultation with responsible agencies and interested parties such as Native American tribes, as appropriate, within the parameters of the PA.</p>	<p>Ethnographic Studies and Inventory with Evaluation. \$200,000 to \$1,500,000 (Could be performed in phases – initial outreach (\$200,000 to \$500,000) should occur during EIR/EIS). Costs for determining eligibility for sites in areas not yet surveyed and/or buried (Assume another 10 sites could be discovered.) \$2,500,000 to \$5,000,000 Documentation costs. \$100,000 Curation costs – Assume \$5,000 a box and 1,000 boxes. \$5,000,000 to \$10,000,000 <i>Cul-1b</i> total—\$7,800,000 to \$16,600,000</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-1c:</i> Immediately Halt Construction if Cultural Resources are Discovered and Implement an Accidental Discovery Plan</p>	<p>Not all cultural resources are visible on the ground surface. Protocols for addressing the accidental discovery of archaeological resources that are not visible on the ground surface during Project construction will be outlined in an Accidental Discovery Plan, as directed by the PA. If any cultural resources, such as structural features, unusual amounts of bone or shell, flaked or ground stone artifacts, historic-era artifacts, human remains, or architectural remains are encountered during any Project construction activities, work shall be suspended immediately at the location of the find and within an appropriate radius, with a minimum of 50 feet. A qualified archaeologist shall conduct a field investigation of the specific site and recommend mitigation deemed necessary for the protection or recovery of any cultural resource concluded by the archaeologist to represent a historical resource or unique archaeological resource. Mitigation measures shall be developed in consultation with responsible agencies and, as appropriate, interested parties such as Native American tribes. Implementation of the approved mitigation would be required before resuming construction activities at the archaeological site. All of the activities identified above shall be detailed in an Accidental Discovery Plan developed prior to construction so that all parties are aware of the actions required if buried archaeological resources are uncovered during Project construction. Discoveries of human remains shall be treated as described below for Mitigation Measure Cul-4b.</p>	<p>Assume contingency costs to address stop work to be included in project construction and O&M costs.</p> <p>Preparation of Accidental Discovery Plan.</p> <p>\$250,000 to \$400,000</p> <p>Field assessments after accidental discoveries are encountered during construction. Assume 10 to 20 accidental discoveries.</p> <p>\$4,000,000 to \$8,000,000 (contingency)</p>
<p><i>Cul-1d:</i> Protection of Archaeological Sites by Capping</p>	<p>Capping archaeological sites that are considered historical resources with soil, gravels, rock, or specific kinds of vegetation can be a viable way to protect the deposits under some circumstances. For example, sites subject to inundation and water level fluctuations may be protected from erosion by applying a layer of gravel/rock (rip-rap), soil, cloth, or some combination of treatments. In such circumstances, regular monitoring would be required to evaluate the efficacy of the mitigation, and to identify if and when it is necessary to refresh the protection. A layer of soil, i.e., sterile fill, might also be placed over a site where construction of a building was planned, such that all construction disturbance would occur in the fill</p>	<p>Capping costs to be included in project construction and O&M costs.</p> <p>Assume monitoring to be included in construction and O&M costs.</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-1e:</i> Develop Agreement Documents to Address Potential Future Operational Impacts to Cultural Resources</p>	<p>Protocols for addressing potential future operations impacts at Sites Reservoir and at existing facilities within the Extended Study Area shall be addressed in the PA. This may include preparation of Memoranda of Agreement for specific facilities and/or development of a Cultural Resources Management Plan, depending on the lead agency in charge of the facility. Management of historical resources/historic properties under such agreement documents might include standard measures for identification of historical resources/historic properties where needed, assessment of project impacts, and application of specific mitigation measures, as well as protocols for resource monitoring or stabilization techniques. Such agreement documents shall be developed in consultation with responsible agencies and interested parties, such as Native American tribes, as appropriate, within the parameters of the PA.</p>	<p>Preparation of MOA and PA and/or Cultural Resources Management Plan in consultation with responsible agencies and interested parties, such as Native American tribes, as appropriate. \$200,000 to \$500,000</p>
<p><i>Cul-2a:</i> Follow the Secretary of the Interior's Standards for the Treatment of Historical Resources/Historic Properties</p>	<p>Because construction of Project facilities has the potential to modify buildings or structures that are considered historical resources/historic properties, any alterations, including relocation, to historic buildings or structures shall conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (1995).</p>	<p>Assume no built environment resources have been determined to be eligible; however, a railroad and quarry may be eligible. \$1,000,000 to \$2,000,000</p>
<p><i>Cul-2b:</i> Record Built Environment Resources to Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) Standards</p>	<p>If avoidance or relocation of a building or structure that is considered eligible for the CRHR or NRHP is not feasible, and the resource must be demolished, a qualified architectural historian who meets the U.S. Secretary of Interior's professional standards shall be retained to document the impacted historical architectural resource to Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) specifications. HABS and HAER documentation packages shall be entered into the Library of Congress as well as the NWIC or NEIC of the CHRIS.</p>	<p>Assume costs to include preparation of HABS and HAER documentation. \$1,000,000 to \$2,000,000</p>
<p><i>Cul-3:</i> Consult with Native American Communities regarding How to Mitigate for Impacts to TCPs</p>	<p>TCPs are often locations on the landscape that have sacred or other special meaning to Native American communities. Associated characteristics, such as an archaeological deposit, are not always present. Early and meaningful consultation with Native American communities shall occur to identify ways to mitigate impacts to TCPs. Interpretive programs, establishing or enhancing locations for traditional plants, or a visitor's center, are examples of ways to address these important issues. Consultation with Native American communities shall occur.</p>	<p>Cost components are related to <i>Cult-1 (e)</i>. Assume costs for ongoing consultation with tribes. Assume 4+ tribes and costs to include AB52 compliance. \$2,000,000 to \$4,000,000</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-4a</i>: Relocation of Known Cemeteries</p>	<p>Consultation shall occur with the entity (County, City, private) that has jurisdiction over the cemetery, and interested parties as appropriate, to identify a satisfactory place that is protected from future disturbance for the relocation of human remains. Similarly, if Native American burials are known to exist in an archaeological site, the Project proponent shall work with the appropriate tribe to identify a satisfactory location for re-interment of burials in a protected location.</p>	<p>Assume two cemeteries: Town of Sites Cemetery – Assume 150 individuals and \$3,000 for each individual grave site. \$450,000 Native American Cemetery – 100 individuals and \$5,000 for each individual grave site. \$500,000 Midden Grave Sites – Assume \$10,000,000 to \$20,000,000 Total - \$10,950,000 to \$20,950,000</p>

Attachment 4F. Cultural Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Cul-4b:</i> Immediately Halt Construction if Human Remains are Discovered and Implement a Burial Treatment Plan</p>	<p>Project construction activities have the potential to have unanticipated significant impacts to buried human remains where there is no surface indication of their presence. In these circumstances, the requirements of California Health and Human Safety Code 7050.5 must be followed. In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the potentially damaging excavation must halt in the area of the remains and the local County Coroner must be notified. The Coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code Section 7050.5[b]). If the Coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). Pursuant to the provisions of California Public Resources Code Section 5097.98, the NAHC shall identify a Most Likely Descendent (MLD). The MLD designated by the NAHC shall have at least 48 hours to inspect the site and propose treatment and disposition of the remains and any associated grave goods. All of the activities identified above shall be detailed in a Burial Treatment Plan, as directed by the PA, and developed in consultation with local Native American tribes prior to Project construction so that all parties are aware of the actions required if buried human remains are uncovered during Project construction.</p>	<p>Preparation and implementation of a Burial Treatment Plan. \$500,000 to \$800,000 Contingency costs to be included in project construction and O&M costs. Assume accidental discoveries - \$500,000 to \$1,000,000 (contingency)</p>

Attachment 4G. Paleontological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Paleo-1a:</i> Retain a Qualified Paleontological Resource Specialist Prior to the Start of Construction	DWR and Reclamation shall retain a qualified Paleontological Resource Specialist at least 90 days prior to the start of construction.	No anticipated costs
<i>Paleo-1b:</i> Consultation with the Paleontological Resource Specialist Prior to and During Project Construction	At least 30 days prior to the start of Project construction, DWR and Reclamation shall provide maps or drawings to the Paleontological Resource Specialist that shows the planned construction footprint. Maps shall identify all areas of the Project where ground disturbance is anticipated. (Site grading plan and plan and profile drawings for the utility lines are appropriate for this purpose). The plan drawings shall show the location, depth, and extent of all ground disturbances affecting paleontologically sensitive sediment. If Project construction proceeds in phases, maps and drawings may be submitted prior to the start of each phase. In addition, the proposed schedule of each Project phase shall be provided to the Paleontological Resource Specialist. Before work commences on affected phases, DWR and Reclamation shall notify the Paleontological Resource Specialist of any construction phase scheduling changes. If paleontological resources monitoring is ongoing, DWR and Reclamation shall ensure that the Paleontological Resource Specialist or Paleontological Resource Monitor consults weekly with the Project superintendent or construction field manager to confirm area(s) to be worked the following week and until ground disturbance is completed.	Paleontological resource specialist staffing for plans and drawing reviews. \$250,000 to \$500,000

Attachment 4G. Paleontological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Paleo-1c:</i> Prepare and Implement a Paleontological Resources Monitoring and Mitigation Plan</p>	<p>DWR and Reclamation shall ensure that the Paleontological Resource Specialist prepares a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources.</p> <p>The PRMMP shall also provide guidance for preparation of a Paleontological Resources Report by the designated Paleontological Resource Specialist at the conclusion of ground-disturbing activities that may affect paleontological resources. The Paleontological Resources Report shall include an analysis of the collected fossil materials and related information, including a description and inventory of recovered fossil materials, a map showing the location of paleontological resources encountered, determinations of sensitivity and significance, and a statement by the Paleontological Resource Specialist that Project impacts to paleontological resources have been mitigated below the level of significance.</p>	<p>Preparation of Paleontological Resources Monitoring and Mitigation Plan and Paleontological Resources Report.</p> <p>\$200,000 to \$300,000</p>
<p><i>Paleo-1d:</i> Conduct Paleontological Resources Awareness Training</p>	<p>Prior to ground disturbance and for the duration of Project construction activities involving ground disturbance, the Paleontological Resource Specialist shall prepare, and DWR and Reclamation shall conduct, weekly paleontological resources awareness training.</p>	<p>Paleontological resource specialist staffing for weekly construction meetings.</p> <p>\$50,000 to \$200,000</p>

Attachment 4G. Paleontological Resources

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Paleo-1e:</i> Conduct Monitoring During Project Construction and Prepare Monthly Reports</p>	<p>DWR and Reclamation shall ensure that the Paleontological Resource Specialist and Paleontological Resource Monitor(s) monitor construction excavations consistent with the PRMMP in areas where potential fossil-bearing materials have been identified, both at reservoir sites and along any constructed linear facilities associated with the Project. In the event that the Paleontological Resource Specialist determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the Paleontological Resource Specialist shall notify DWR and Reclamation.</p> <p>DWR and Reclamation shall ensure that the Paleontological Resource Specialist and Paleontological Resource Monitor(s) have the authority to halt or redirect construction if paleontological resources are encountered. DWR and Reclamation shall ensure that there is no interference with monitoring activities, as directed by the Paleontological Resource Specialist.</p> <p>DWR and Reclamation shall ensure that the Paleontological Resource Specialist prepares and submits monthly summaries of monitoring and other paleontological resources management activities. The summary shall include the name(s) of the Paleontological Resource Specialist or Paleontological Resource Monitor(s) active during the month, general descriptions of training and monitored construction activities; and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered descriptions of samplings, if any, and a list of identified fossils. A final section of the report shall address any issues or concerns about the Project relating to paleontological resources mitigation activities, including any incidents of non-compliance or any changes to the monitoring plan by the Paleontological Resource Specialist. If no monitoring took place during the month, the report shall include an explanation as to why monitoring was not conducted.</p>	<p>Paleontological resource specialist staffing for construction monitoring. \$250,000 to \$2,000,000</p>
<p><i>Paleo-1f:</i> Ensure Implementation of the Paleontological Resources Monitoring and Mitigation Plan</p>	<p>DWR and Reclamation, through the designated Paleontological Resource Specialist, shall ensure that all components of the PRMMP are adequately performed during construction.</p>	<p>Paleontological resource specialist project staffing for oversight of plan implementation \$100,000 to \$250,000</p>

Attachment 4H. Land Use

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Land-2a:</i> To the Extent Possible, Work with Glenn County to Encourage the County to Modify or Amend the Glenn County General Plan to Bring it into Consistency with the Proposed Project Land Uses</p>	<p>Prior to the start of Project construction, DWR and Reclamation shall, to the extent possible, work with Glenn County to modify or amend its General Plan for consistency with proposed Project land uses, or to implement other appropriate measures to minimize conflicts between the Project and County policies.</p>	<p>Assume coordination only \$50,000 to \$100,000</p>
<p><i>Land-2b:</i> Execute an Agreement with NRCS to Amend WRP Easement Contract and Conduct Post-Construction Wetland Restoration</p>	<p>Prior to the start of Project construction, DWR and Reclamation shall execute an agreement with NRCS to amend the existing WRP easement contract to allow the construction and operation of the Delevan Transmission Line and Delevan Pipeline. Project Engineers shall design the transmission line and the construction contractor shall install the transmission line tower footings to span the parcel of land that has the WRP easement (a distance of approximately 680 feet). Project Engineers shall design the pipeline and the construction contractor shall install the pipeline to avoid the wetlands in the subject parcel of land, to the extent feasible. The pipeline length across the subject parcel is approximately 650 feet. Upon completion of pipeline installation, the area that was disturbed by Project construction shall be restored to a functional wetland condition.</p>	<p>Estimate costs for agreement/amendments. Cost of Post construction restoration. Costs for additional monitoring or management of the additional restored area. Assume 3:1 mitigation ratio—see Attachment 5. Refer to wetland mitigation.</p>
<p><i>Land-3a:</i> To the Extent Possible, Work with Glenn and Colusa Counties to Encourage the Counties to Modify or Amend the Glenn County and Colusa County General Plans' Land Use Designations to Bring them into Consistency with the Proposed Project Land Uses</p>	<p>Prior to the start of Project construction, DWR and Reclamation shall, to the extent possible, work with Glenn and Colusa counties to modify or amend the counties' General Plan land use designations, or to implement other appropriate measures to eliminate the Project's conflicts with those designations</p>	<p>Estimate costs for coordination only—costs included in <i>Land-2a</i>.</p>

Attachment 4H. Land Use

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Land-3b:</i> Execute an Agreement with Maxwell Irrigation District to Minimize and Avoid Short-term and Long-Term Impacts to Existing Facilities and Operations	Prior to the start of Project construction, DWR and Reclamation shall execute an agreement with the Maxwell Irrigation District to ensure that Project construction and operation of the Delevan Pipeline Intake Facilities or the Delevan Pipeline Discharge Facility will not adversely affect the operation of the existing adjacent Maxwell Irrigation District facility.	Costs associated with implementing the agreement would be included under project construction and operation costs. \$50,000 to \$100,000
<i>Land-4a:</i> Enter into Agricultural Conservation Easements with Glenn and Colusa Counties	Establish agricultural conservation easements with Glenn and Colusa counties for lands used for agricultural production to ensure agriculture remains viable in perpetuity and to prevent incompatible development on the selected parcels.	Estimate costs to establish agricultural easements and ongoing reporting/monitoring requirements. Assume 1:1 mitigation ratio—see Attachment 4. \$5,000,000 (land easements)
<i>Land-5a:</i> To the Extent Possible, Work with Glenn and Colusa Counties to Encourage the Counties to Modify or Amend the Glenn County and Colusa County General Plans' Zoning Designations to Bring them into Consistency with the Proposed Project Land Uses	Prior to the start of Project construction, DWR and Reclamation shall, to the extent possible, work with Glenn and Colusa counties to modify or amend the counties' zoning designations, or to implement other appropriate measures to eliminate the Project's conflicts with those designations.	Estimate costs for coordination only—costs included in <i>Land-2a</i> .
<i>Land-5b:</i> Acquire Lands through Eminent Domain	During the Project land acquisition process, DWR and Reclamation shall acquire parcels through eminent domain.	Estimate costs for mitigation measure to be included as part of real estate evaluation.

Attachment 4H. Land Use

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<p><i>Land-5c:</i> For Land Permanently Acquired other than by Eminent Domain, Seek County Approvals to Rescind Williamson Act Contracts and Enter into Open Space Contracts or Open Space Easements</p>	<p>Prior to permanently acquiring lands other than by eminent domain during the land acquisition process, DWR and Reclamation shall seek County approvals to rescind Williamson Act Contracts and enter into Open Space Use Agreements or Open Space Easements with the counties.</p>	<p>Costs include fee for cancelling Williamson Act contract and establishing open space easements and ongoing reporting/monitoring requirements.</p> <p>Assume approximately \$2,500 per acre—see Attachment 4.</p> <p>Williamson Act Contract cancellation fees (12.5%) approximately.</p> <p>\$5,040,000 (fees)</p>

Attachment 4I. Air Quality

Mitigation Measure	Mitigation Measure Description	Cost Estimate Assumptions
<i>Air Qual -1a:</i> Develop a Fugitive Dust Control Plan	The Fugitive Dust Control Plan shall include avoidance and minimization measures and BMPs to reduce fugitive PM10 and PM2.5 emissions.	Preparation of Fugitive Dust Control Plan. \$100,000 Costs associated with plan implementation to be included in project construction costs.
<i>Air Qual -1b:</i> Implement Measures to Reduce Equipment and Vehicle Exhaust Emissions	<ul style="list-style-type: none"> • All construction equipment shall be maintained according to manufacturer's specifications. • Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). • During all construction activities, diesel -fueled portable equipment with maximum power greater than 25 horsepower shall be registered under the ARB's Statewide Portable Equipment Registration Program. • All fleets of diesel -fueled off -road vehicles shall comply with the emissions standards pursuant to CCR Title 13, Section 2449. To the extent feasible, operate off -road vehicles with engines certified to the Tier 2 or newer emissions standards. • All on -road trucks shall be operated in compliance with the emission standards per CCR Title 13, Section 2025. To the extent feasible, operate on -road trucks with engines certified to the 2007 model year or newer heavy -duty diesel engine emissions standards. • To the extent feasible, electric equipment shall be operated. • Alternatively fueled construction equipment shall be used, to the extent feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel. • Electricity used to power facilities and equipment shall be generated by renewable energy sources with state -of -the -art emissions control systems, to the extent feasible. 	<p>Costs associated with emissions controls to be included in project construction costs.</p> <p>See Attachment 7 for emissions estimates for construction and O&M.</p> <p>Assume permit will be required for stationary emission sources (i.e., concrete batch plant and quarry operations) during 10-year construction period.</p> <p>\$5,000 per year (permit fees)</p> <p>—</p> <p>Assume permit will be required for stationary emission sources (i.e., back-up emergency generators at the pumping plants) during O&M phase of the project.</p> <p>\$5,000 per year (permit fees)</p>

ATTACHMENT 4

Anticipated Land Use Impacts (Alternative C)

Attachment 5: Designated Land Uses Subject to Impacts (Alternative C)

Descriptor	Acreage		Mitigation Approach	Anticipated Mitigation Ratio (as applicable)			Estimated Cost
	Permanent Loss ^b	Temporary Disturbance		Permanent Loss ^b	Temporary Disturbance	Mitigation Acreage	
Number of Potentially Affected Parcels	278	209	NA	NA	NA	NA	NA
Acreage of Potentially Affected Parcels	19,636	26,425	NA	NA	NA	NA	NA
Zoning Designation of Potentially Affected Parcels (Acres)							
Agricultural Preserve	2,100	24,753	NA	NA	NA	NA	NA
Exclusive Agriculture	2,055	1,030	NA	NA	NA	NA	NA
Foothill Agriculture/Forestry	0	450	NA	NA	NA	NA	NA
Floodway	0	14	NA	NA	NA	NA	NA
Intensive Agriculture	0	0	NA	NA	NA	NA	NA
Light or Heavy Industrial	19	0	NA	NA	NA	NA	NA
N/A	43	174	NA	NA	NA	NA	NA
No Information Available	0	1	NA	NA	NA	NA	NA
Designation Undetermined	15,419	3	NA	NA	NA	NA	NA
Total	19,636	26,425	NA	NA	NA	NA	NA
FMMP Designation of Potentially Affected Parcels (Acres)							
Urban and Built-up Land	1	0 ^c	NA	NA	NA	NA	NA
Grazing Land	369	2,601	NA	NA	NA	NA	NA
Farmland of Local Importance	1,624	21,514 ^b	*May or may not need to mitigate for this particular FMMP category (Low range of costs excludes this FMMP designation).	1:1*	NA	1,624	
Local Potential Farmland	144	1,414		NA	NA	NA	NA

Descriptor	Acreage		Mitigation Approach	Anticipated Mitigation Ratio (as applicable)		Mitigation Acreage	Estimated Cost
	Permanent Loss ^b	Temporary Disturbance		Permanent Loss ^b	Temporary Disturbance		
Prime Farmland	960	606 ^b	Protection of land in same county with same FMMP designation with conservation easement (Mitigation costs presented in Land-4a)	1:1	NA	960	
Farmland of Statewide Importance	0 ^c	0 ^c	Protection of land in same county with same FMMP designation with conservation easement (Mitigation costs presented in Land-4a)	1:1	NA	0 ^c	
Unique Farmland	1,001	7	Protection of land in same county with same FMMP designation with conservation easement (Mitigation costs presented in Land-4a)	1:1	NA	1,001	
Water	0	3	NA	NA	NA	NA	NA
Other Land	123	287	NA	NA	NA	NA	NA
Designation Undetermined	15,414	3 ^b	NA	NA	NA	NA	NA
Total	19,636	26,425	--	--	--	1,961 to 3,585	--
Number of Potentially Affected Parcels with Williamson Act Contracts	136	113	--	--	--	--	--
Acreage of Potentially Affected Parcels with Williamson Act Contracts	16,126	22,689	--	--	--	--	--

Descriptor	Acreage		Mitigation Approach	Anticipated Mitigation Ratio (as applicable)		Mitigation Acreage	Estimated Cost
	Permanent Loss ^b	Temporary Disturbance		Permanent Loss ^b	Temporary Disturbance		
	Number of Potentially Affected Parcels with WRP Easements	1		0	--		
Number of Potentially Affected Acres with WRP Easements	7	0	--	--	21	Assume cost comparable to obtaining mitigation credits.	

Notes:

- ¹ Acreages for land use impacts for Alternative C are from Tables 20-27 in NODOS Preliminary Administrative Draft Environmental Impact Report (December 2013).
- ^a Totals may not match due to the rounding of individual acreages that comprise the totals.
- ^b A total of 2.5 acres would under Alternative A and C would be permanently disturbed from transmission line poles, but due to pole locations being currently unknown, the affected FMMP category cannot currently be determined. Therefore, 2.5 acres under Alternative A and C of land more than the total listed in Long-Term Impacts would be permanently affected.
- ^c There is less than one acre in these categories, but more than zero.

FMMP = Farmland Mapping and Monitoring Program

WRP = Wetland Reserve Program

ATTACHMENT 5

Vegetation Community and Habitat Impacts (Alternative C)

Attachment 6. Acres of Habitat/Wetlands Subject to Alternative C Impacts^{1,a}

Vegetation/Habitat Type	State-Federally-Listed Species Associations within Primary Study Area ^{1,2,3,4,5,6,7,8,9}	Acreage		Assumptions for Mitigation Approach (On-site/Off-site)	Anticipated Mitigation Ratio		Estimated Mitigation Acreage	Estimated Cost/Acre	Mitigation Cost	
		Permanent Loss ^b	Temporary Disturbance	Restoration/Mitigation Banking	Permanent Loss ^b	Temporary Disturbance			Low	High
Botanical Resource/Vegetation Community										
Annual grassland	Sidalcea keckii and Amsinckia lunaris	13,694.7	2,091.5	Assume 4,000 to 5,000 acres support CNPS recommends 1:1 for species Mitigation for permanent loss would be off-site mitigation.	1:1 to 3:1	1:1		\$2,000 to \$2,500 per acre Temporary mitigation included in construction costs	\$35,389,400	\$115,210,250
Alkaline wetland		0.5	14.0	*May affect an additional 14 acres of wetland (per MM Bot-1a) See wetlands impacts below	2:1 to 3:1	--			below	below
Blue oak woodland	Sidalcea keckii and Amsinckia lunaris and Lotus rubriflorus	478.6	353.5	*All known occurrences of <i>Lotus rubriflorus</i> are on private land or utility corridors (assume 5 to 10% of the acreage would include plant species) CNPS recommends 1:1 for species	1:1			\$2,500 to \$3,000 per acre	\$59,825	\$143,580
Blue oak savanna		375.5	269.7		see below			\$2,500 to \$3,000 per acre	below	below
Blue oak /mixed chaparral	Lotus rubriflorus	33.4	21.1	Assume 5-10% acreage to include plant species) CNPS recommends 1:1 for species	1:1			\$2,500 to \$3,000 per acre	\$4,175	\$10,020
Canal		9.1	14.1	Impacts mostly associated with Holthouse Reservoir 7.1 acres is the existing TC canal (no GGS) 0.9 acre for regulating reservoir (TRR) GCID improvements associated with temporary disturbance.	1:1 to 3:1		Assume 1 acre permanent loss for GGS Assume no suitable habitat would be temp disturbed.	\$20,000 per acre	\$20,000	\$60,000
Chamise		0.6	2.1	Assume no mitigation needed; can be avoided					--	--
Crops/agriculture		700.0	2,307.7	No additional mitigation required beyond agricultural impacts					--	--
Fremont cottonwood riparian		1.1	0.0	See VFR					below	below
Fresh emergent wetland		0.0	4.5	See VFR					below	below
Mixed chaparral		0.8	1.8	See VFR					below	below
Pond		22.4	226.6	See VFR					below	below
Open water		1.6	0.0	See VFR					below	below
Urban/disturbed		90.8	46.9	See VFR					below	below
Valley foothill riparian		82.6	4.0	See VFR					below	below
Valley oak riparian		26.5	0.1	See VFR					below	below
Valley oak woodland		3.5	0.0		1:1 to 3:1			\$2,500 to \$3,000 per acre	\$8,750	\$31,500
Botanical Resources TOTAL		15,521.7	5,357.6						\$35,482,150	\$115,455,350

Vegetation/Habitat Type	State-Federally-Listed Species Associations within Primary Study Area ^{1,2,3,4,5,6,7,8,9}	Acreage		Assumptions for Mitigation Approach (On-site/Off-site)	Anticipated Mitigation Ratio		Estimated Mitigation Acreage	Estimated Cost/Acre	Mitigation Cost	
		Permanent Loss ^b	Temporary Disturbance	Restoration/Mitigation Banking	Permanent Loss ^b	Temporary Disturbance			Low	High
Wildlife Habitats										
Barren		0.2	21.4	Assume no mitigation needed					--	--
Blue oak woodland	CRLF (also associated with blue oak foothill pine), GE; SH; WSF	887.5	644.3		2:1 to 5:1	1:1		\$2,500 to \$3,000 per acre	\$6,048,250	\$15,245,400
Canal	GGS, WPT	9.1	14.1	Assume no mitigation needed	3:1 for GGS*	1:1 for GGS*			above	above
Chamise-redshank chaparral		0.6	2.1	Assume no mitigation needed; can be avoided					--	--
Deciduous orchard	*confirm whether associated with GGS (pg. 14-6)	15.4	175.1	Include for GGS for any Orchard east of I-5	3:1 for GGS*	1:1 for GGS*	Assume 15.4 permanent only	\$4,000 to 5,000 per acre	\$184,800	\$231,000
Dryland grain and seed crops	SH - Swainson's hawk	333.2	214.5	Assume 25%-50% acreage would be suitable foraging habitat.	0.5:1	--		\$2,000 per acre	\$83,300	\$166,600
Eucalyptus		0	46.2	Assume no mitigation requirement	--	--			--	--
Fresh emergent wetland	GGS; CRLF; GSC4, GE	0.5	18.5		3:1 for GGS*	1:1 for GGS*	20.0		below	below
Irrigated row and field crops	SH - Swainson's hawk	155.6	225.7	Assume 25%-50% acreage would be suitable foraging habitat.	0.5:1			\$2,500 per acre	\$48,625	\$97,250
Lacustrine	BE	22.4	226.6	Assume no mitigation needed; reservoir will be expanded					--	--
Mixed chaparral		0.8	1.8						above	above
Pasture	GSC, FH; BO; WTK	72.7	241.2		1:1	--		\$4,000 to \$5,000 per acre	\$290,800	\$363,500
Rice	GGS	122.9	1,383.6	Assume all rice suitable GGS habitat	3:1 for GGS*	1:1 for GGS*	1,752.3	\$4,000 to \$5,000 per acre	\$7,009,200	\$8,761,500
Riverine	BE, BS	1.6	0	Associated with fish screen Assume on-site restoration	2:1 to 3:1	--		Costs to be estimated as part of project design and construction	NA	NA
Urban/disturbed		90.8	46.9						--	--
Valley foothill riparian	GGS; VELB; CTS; BE; SH, WYBC; VRI; WPT; RT	110.2	4.1	The mitigation for loss of other wildlife habitat types could potentially compensate for the native planting requirement for elderberry plant mitigation. Elderberry plants are typically replaced at a ratio of 2:1 for stems greater than one inch in diameter; 3:1 for stems where emergence holes are documented in less than 50 percent of the shrubs, and 5:1 for stems greater than one inch in diameter with emergence holes 672 elderberry stems surveyed within the proposed Sites Reservoir footprint; emergence holes were found on 18 stems. [ASSUME 3:1 for VELB mitigation]	3:1 for GGS* 4:1	1:1 for GGS*		\$2,500 to \$3,000 per acre	\$836,750	\$1,004,100
Valley oak woodland	SH	3.5	0	See botanical above				\$2,500 to \$3,000 per acre	above	above

Vegetation/Habitat Type	State-Federally-Listed Species Associations within Primary Study Area ^{1,2,3,4,5,6,7,8,9}	Acreage		Assumptions for Mitigation Approach (On-site/Off-site)	Anticipated Mitigation Ratio		Estimated Mitigation Acreage	Estimated Cost/Acre	Mitigation Cost	
		Permanent Loss ^b	Temporary Disturbance	Restoration/Mitigation Banking	Permanent Loss ^b	Temporary Disturbance			Low	High
Wildlife Habitats TOTAL	--	15,521.7	5,357.6		--	--			\$14,501,725	\$25,869,350
Wetland Type										
Alkaline		37.0	--	Includes an additional 19.5 acres adjacent to Assume a total of 27 acres requiring mitigation. Assume off-site mitigation	2:1 to 3:1		150k to 200k/acre		\$8,100,000	\$27,000,000
Emergent		2.4	--	Assume off-site mitigation	1:1 to 5:1		100k to 150k/acre		\$240,000	\$1,800,000
Riparian		25.0	--	Riparian wetland mitigation assumed to be covered under VFR.					above	above
Seasonal		182.4	--		1:1 to 5:1		100k to 150k/acre		\$18,240,000	\$136,800,000
Vernal Pool		5.5	--	Vernal pool mitigation assumed to be covered under annual grassland					above	above
Wetlands TOTAL		252.3	--						\$26,580,000	\$165,600,000
Total Pond Acres ^b		35.8	--	Assume no mitigation needed. It is assumed that ponds within pipeline alignment can be avoided. Other "pond" impacts would be mitigated as part of vegetation community mitigation likely to include pond features like grassland or riparian.					--	--
Total Streams		227.7		Assume on-site restoration	2:1	455.4			NA	NA
Streams 0-5 Feet Wide		6.0	--	Assume on-site restoration	2:1	12			NA	NA
Streams 5-10 Feet Wide		15.1	--	Assume on-site restoration	2:1	30.2			NA	NA
Streams 10-15 Feet Wide		13.3	--	Assume on-site restoration	2:1	26.6			NA	NA
Streams <15 Feet Wide		77.0	--	Assume on-site restoration	2:1	144			NA	NA
Streams >15 Feet Wide		116.3	--	Assume on-site restoration	2:1	232.6			NA	NA
Other Waters of the US TOTAL			--						NA	NA

Notes:

¹Acreages for Botanical Resource/Vegetation Community impacts for Alternative C are from Table 13-29; Acreages for Wildlife Habitats impacts for Alternative C are from Table 14-24; Acreages for Wetland Type impacts for Alternative C are from Table 15-20 in NODOS Preliminary Administrative Draft Environmental Impact Report (December 2013)

State-Federally-Listed Species Associations within Primary Study Area Vegetation Communities

- 1 – Vegetation and Habitat associations are taken from Table 14-3 (Golden Eagle, Western Pond Turtle) and Table 14-5 for Foothill Yellow Legged Frog in DWR 2013.
- 2 – Mitigation ratio for GGS is up to 6:1, if construction is performed during active season (May 1 to October 1).
- 3 – Wildlife habitat for Northern spotted owl - Douglas Fir, redwood, mixed hardwood conifer (MHC)
- 4 – Wildlife habitat for Greater Sandhill crane - Freshwater emergent marsh, Wet Meadow and PAS (Table 14-3) - Wintering habitat in Primary Study Area
- 5 – Wildlife habitat for Ringtail (Riparian habitats)
- 6 – Wildlife habitat for Willow flycatcher (MRI, WTM)
- 7 – Wildlife habitat for Pacific fisher (MHC, SMC)
- 8– Wildlife habitats for bat species (structures, woodland habitats, and orchards near intake)
- 9 – Wildlife habitats for Burrowing owl (Annual grassland and edge of blue oak woodland)

BE - Bald eagle	PF - Pacific fisher
BS - Bank swallow	NSO - Northern spotted owl
BO - Burrowing Owl	RT - Ringtail
CRLF - California red-legged frog	SH - Swainson's hawk
CTS - California tiger salamander	VP Invertebrates - Conservancy fairy shrimp, Vernal pool fairy shrimp, Vernal pool tadpole shrimp
FYLF - Foothill Yellow Legged Frog	VELB - Valley elderberry longhorn beetle
FH - Ferruginous hawk	WF - Willow flycatcher
GE - Golden Eagle	WPT - Western Pond Turtle
GGS - Giant garter snake	WYBC - Western yellow-billed cuckoo
GSC - Greater Sandhill crane	WSF - Western Spadefoot

Botanical Resources/Vegetation Communities

- ^a Total permanent vegetation loss acreage includes the footprint of Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, Holthouse Reservoir Electrical Switchyard, GCID Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, TRR Pipeline Road, Delevan Pipeline Electrical Switchyard, and the Delevan Pipeline Intake Facilities. Total permanent loss acreage also includes the estimated permanent loss from construction within the footprint of the Recreation Areas, within the construction disturbance area for the Road Relocations, and from construction of the transmission tower footings associated with the Delevan Transmission Line.
- ^b Total temporary disturbance acreage includes the footprint of the Recreation Areas (minus the acreage of estimated permanent loss) and footprint of the existing Funks Reservoir, as well as the defined construction disturbance areas for the Road Relocations (minus the acreage of estimated permanent loss), Delevan and TRR pipelines, Holthouse to T-C Canal Pipeline, TRR to Funks Creek Pipeline, Delevan Transmission Line, and GCID Canal Facilities Modifications. Total temporary disturbance acreage also includes the estimated construction disturbance areas (outside of the footprints) for Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, Holthouse Reservoir Electrical Switchyard, GCID Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and Delevan Pipeline Intake Facilities.
- ^c Total acreage does not include acreage associated with the Project Buffer.

Wildlife Habitats

- ^a Calculated acreage does not include acres associated with the Project Buffer because the location and extent of disturbance is not yet specified.
- ^b Total permanent habitat loss acreage includes the footprint of Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, Holthouse Reservoir Electrical Switchyard, GCID Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, TRR Pipeline Road, Delevan Pipeline Electrical Switchyard, and the Delevan Pipeline Intake Facilities. Total permanent loss acreage also includes the estimated permanent loss from construction within the footprint of the Recreation Areas, within the construction disturbance area for the Road Relocations, and from construction of the transmission tower footings associated with the Delevan Transmission Line.
- ^c Total temporary disturbance acreage includes the footprint of the Recreation Areas (minus the acreage of estimated permanent loss) and the footprint of the existing Funks Reservoir, as well as the defined construction disturbance areas for the Road Relocations (minus the acreage of estimated permanent loss), Delevan Pipeline, TRR Pipeline, Holthouse to T-C Canal Pipeline, TRR to Funks Creek Pipeline, Delevan Transmission Line, and GCID Canal Facilities Modifications. Total temporary disturbance acreage also includes the estimated construction disturbance areas for Sites Reservoir and Dams, Sites Reservoir Inlet/Outlet Structure, Sites Pumping/Generating Plant, Tunnel from Sites Pumping Generating Plant to Sites Inlet/Outlet Structure, Sites Electrical Switchyard, Field Office Maintenance Yard, Holthouse Reservoir Complex, Holthouse Reservoir Electrical Switchyard, GCID Canal Connection to the TRR, TRR, TRR Pumping/Generating Plant, TRR Electrical Switchyard, and Delevan Pipeline Intake Facilities.

Wetlands and Waters of the US

- ^a The northwest 0.5 acre of swale feeding marsh is within proposed footprint, but hydrologically connected to a 20-acre (estimated minimum area) marsh/swale/vernal pool complex. Wetlands themselves equal 13 acres; entire complex with connecting upland watersheds equal 20 to 40 acres.
- ^b Ponds counted separately from streams.
- ^c Includes 6.1 acres for Salt Lake. All other pond acreages are stock ponds.
- ^d Acres of wetlands and other waters of the U.S. types are unknown because the Project Buffer was added after surveys were conducted; consequently, wetland/WUS features were not mapped.
- ^e Total acreage does not include acreage associated with the Project Buffer, which has not been surveyed or mapped.
- ^f Primary Study Area is defined as the Project facility footprints except for the Delevan Pipeline, which also includes a wider construction disturbance area corridor, and for Holthouse Reservoir complex, where Alkaline wetlands potentially affected include acres adjacent to dam footprint as well as overlapping with the footprint.

ATTACHMENT 6

Air Quality Impacts (Alternative C)

Attachment 7A. Average Daily Emission Rates for Criteria Pollutants by Year for Construction of Alternatives C¹

Construction Year	Emissions (pounds per day)					
	NOx	PM10	PM2.5	ROG	CO	SOx
2013	2,171	344	124	247	833	3
2014	4,487	860	274	508	1,749	6
2015	4,012	765	246	455	1,565	5
2016	4,061	770	250	460	1,593	5
2017	2,286	528	153	257	920	3
2018	990	319	83	109	412	1
2019	990	319	83	109	412	1
2020	892	298	76	98	360	1
2021	98	21	8	11	52	0
Significance Threshold (lb/day)	137	137	n/a	137	n/a	n/a

Notes:

- ¹ Emissions estimates are from Appendix 24 Table 24A.B-1 for construction emissions for Alternatives B and C in NODOS Preliminary Administrative Draft Environmental Impact Report (December 2013)
- ² The average daily construction emission rates in lb/day for each construction year are the sum of the average daily emission rates estimated for each of the project features that would be constructed in the indicated construction year.
- ³ Bolded values indicate an exceedance of the significance threshold.
- ⁴ Significance Threshold is from Tehama County APCD Level C: Greater than 137 pounds per day of emissions. If emissions from a project would exceed the Level C thresholds, mitigation measures (BAMMs and SMMs), including off-site mitigation measures following the guidelines, may be required to reduce the overall air quality impacts of the project to a level of insignificance (TCAPCD 2009).

Attachment 7B. Construction On-Site Concrete Batch Plant PM10 Emissions¹

Project Feature	Total Concrete Mass (tons)	Number of Days	Daily Rate (tons/day)	PM10 Emissions (lb/day)
Tunnel - Inlet and Outlet Including Sites Pump Plant	77,515	194	400	10.14
Pipelines - Delevan and TRR	11,100	28	396	10.07
Dams & Sites Inundation	85,951	215	400	10.14
TRR Pump Plant	55,500	139	399	10.13
Funks Reservoir Modification	23,773	59	403	10.22
Sacramento River Intake & P/G Plant	55,500	139	399	10.13
Paved Roads & Bridges	186,110	310	600	14.81
GCID Canal & Headworks	21,090	35	603	14.86
Transmission Lines	16,095	40	402	10.20
Recreation	8,780	44	200	5.49

Batch Plants Controlled Emission Factors ^a		
Sand Transfer ^b	0.000297	lb PM10/ton cement
Aggregate Transfer ^b	0.00099	lb PM10/ton cement
Cement Unloading to Storage Silo	0.00034	lb PM10/ton cement
Cement Supplement Unloading to Storage Silo	0.0049	lb PM10/ton cement
Weigh Hopper Loading ^b	0.00072	lb PM10/ton cement
Truck Loading ^c	0.016	lb PM10/ton cement
Total	0.023	lb PM10/ton cement

Notes:

- ¹ Emissions estimates are from Appendix 24 Table 24A.B-11 for concrete batch plant PM10 emissions for Alternatives B and C in NODOS Preliminary Administrative Draft Environmental Impact Report (December 2013)
- ^a Emission factors from AP-42, Section 11.12, June 2006
- ^b The batch plants will have dust control equipment and was assumed to control dust emissions with an efficiency of 70% during sand and aggregate transfer. Source for control efficiency: BAAQMD Permit Handbook, Section 11.5 Concrete Batch Plants, March 2009
- ^c It was assumed the truck loading process would also include dust controls. Therefore, the controlled truck loading emission factor was used.

Attachment 7C. Summary of Criteria Pollutant Emissions for Operations and Maintenance of Alternatives¹

Summary O&M Emissions (lb/day)						
	NOx	PM10	PM2.5	ROG	CO	SOx
Total Average Daily Emissions (lb/day)	33	7	7	38	1308	0.1
TCAPCD Threshold (lb/day), Level A	< 25	< 25		< 25		
Threshold Exceeded?	Yes, subject to standard mitigation measures	No		Yes, subject to standard mitigation measures		
TCAPCD Threshold (lb/day), Level B	> 25	> 25		> 25		
Threshold Exceeded?	Yes, incorporate Best Available Mitigation Measures	No		Yes, incorporate Best Available Mitigation Measures		
TCAPCD Threshold (lb/day), Level C	> 137	> 137		> 137		
Threshold Exceeded?	No	No		No		

Notes:

- ¹ Emissions estimates are from Appendix 24 Table 24A.D-1 in NODOS Preliminary Administrative Draft Environmental Impact Report (December 2013)
- ² It was assumed that sedans/pickups would travel at a speed of 15 mph which equates to 3 roundtrips per hour at a distance of 5 miles per roundtrip.
- ³ There would be a total of 60 employees supporting work at all sites so the employee commute emissions are represented under the "Reservoirs, Recreation Facilities, Dams, Roads, Bridges" category but this covers all O&M employees.

File Provided Natively

From: Thayer, Reed/SAC [Reed.Thayer@jacobs.com]
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To: Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Mike.Hendrick@icf.com; Jim Lecky (jim.Lecky@icf.com) [jim.Lecky@icf.com]
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Subject: Sites Alt A2 - Preliminary Effects Analysis

Fisheries Team,

We have completed CalSim II modeling for the Sites Alternative A2 – Preliminary Effects Analysis (PEA) scenario. An FR Metrics report and a Trend Reporting Spreadsheet are available at the link below. All files in this transmittal are preliminary and are not for distribution.

https://jacobsengineering-my.sharepoint.com/:f:/g/personal/reed_thayer_jacobs_com/EsdGZ-f3GIZOvdTwou_dM-oBZ3eGRhuvy9QnO14cnew5Mg?e=nhBoda

Scenarios Included

Scenarios provided in this deliverable are tabulated below.

Model Name	Label Name (as seen in spreadsheet)	Description
No Action Alternative	NAA 091720	Baseline simulation (ROC on LTO model assumptions)
ALT A2 092220 rev03 (91 TAF CVP OpFlex) Scn B	ALTA2	Alternative A2 with Value Planning Scenario B criteria
ALT A2 092220 rev03 (91 TAF CVP OpFlex) PEA	ALTA2 PEA	Alternative A2 with relaxed diversion criteria for the preliminary effects analysis

Detailed model assumptions (facility and regulatory criteria) for the scenarios are in the “AssumptionMatrix” tab in Trend Reporting spreadsheet.

FR Metrics

The FR Metrics report, FRmetrics_rev16__ALTA2_CVP91_092220_rev03_PEA_vs_ALTA2_CVP91_092220_rev03.pdf, contains four tables that present results for two scenarios.

- Deliveries Table: Reports deliveries to the point of use, accounting for carriage water, losses, etc.
- Sites Releases Table: Reports the releases from Sites Reservoir by account
- Sites Fills Table: Reports fills to Sites Reservoir by account
- Sites Storage Allocation Table: Reports the size of accounts in Sites Reservoir

Trend Reporting Spreadsheet

The Trend Reporting Spreadsheet, NODOS_Trend_Reporting_rev26dpcy_DV5_HistClim_CALSIM__ALTA2_092220_PrelimEffects.xlsm, is designed to provide easy viewing of multiple scenarios. Please focus on the “Report - ALL (DASHBOARD)” tab. At this tab, you can select the parameter that you wish to evaluate, the type of statistic that you would like to view (e.g. averages, water-year type averages, dry periods), and the seasonal period (e.g. individual months, water year, CVP contract year, selected seasons). There is also an option to convert flow data in CFS to volume in TAF/month.

This tab presents data in the following formats:

- Results Table
- Bar chart of results
- Timeseries of selected statistic
- Exceedance plot (displays all data for the selected seasonal period; is not affected by “select statistic”)
- Monthly Pattern (displays the selected statistic for each month; is not affected by “select seasonal period”)
- Water-year type averages bar chart (not affected by “select statistic”)
- Overall timeseries (includes entire timeseries, not affected by “select statistic” or “select seasonal period”).

Not all statistics or seasonal periods should be used for all parameters. For example, seasonal averages or annual averages of reservoir storage do not provide value.

If reviewing results by water year type, please note that water year type averages are calculated based on calendar year, not water year.

Additionally, extra attention should be paid to the scales on the y-axis of each plot.

Reed Thayer, PE | [Jacobs](#) | Water Resources Engineer
O: 916.286.0228 | M: 831.233.2141 | reed.thayer@jacobs.com
2485 Natomas Park Dr, Ste 600 | Sacramento, CA 95833 | USA

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 9/25/2020 6:32:31 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Laurie Warner Herson (laurie.warner.herson@phenixenv.com) [laurie.warner.herson@phenixenv.com]
Subject: RE: Documentation of 2035 Central Tendency

Ali,

I put CH's memo on SharePoint here:

https://sitesreservoirproject.sharepoint.com/:w:/r/Operations/Shared%20Documents/Operations%20Criteria%20Development%20and%20Baseline/Baseline/Climate%20Change/Sites_2035CT_Description_20200924.docx?d=w5e7a1277bf31402e83999a17df31b300&csf=1&web=1&e=6ZW91i

I reviewed it and don't have any comments. I think it's helpful.

Laurie – FYI, this is the climate change baseline CH is recommending for the CEQA and NEPA analysis. We may also try to work with the water commission to see if they will accept this baseline. I need to check the regs to see if that is allowable.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Thursday, September 24, 2020 9:34 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Cc: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: Documentation of 2035 Central Tendency

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Ali and Erin,

A brief document describing 2035 CT climate conditions is attached.

Please let me know if you have any questions.

Best,
Steve

Steve Micko, PE | Jacobs | Associate Water Resources Engineer
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/28/2020 10:49:49 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Linda Fisher (linda.fisher@hdrinc.com) [linda.fisher@hdrinc.com]
Subject: RE: Sites - Shasta Supplemental EIS and San Luis Dam Raise (B.F. Sisk Raise) Supplemental EIS

Hi Ali,

With Linda's help, I accessed and then searched both documents. The only mention of the Sites Reservoir was in the Shasta Supplemental EIS:

p. 1-1

The CALFED Programmatic Environmental Impact Statement/Report (PEIS/R), completed in July of 2000, considered more than 50 surface water storage sites throughout California and recommended more detailed study of the five sites identified in the CALFED Programmatic ROD. These studies included Shasta Lake Enlargement, Los Vaqueros Reservoir Enlargement, Sites Reservoir, in Sacramento-San Joaquin Delta (In-Delta) storage, and development of storage in the upper San Joaquin River Basin. The SLWRI FEIS relied on evaluations, alternatives development, and screening included in the CALFED PEIS/R, focusing on the subsequent action of evaluating the enlargement of Shasta Dam and Lake. Accordingly, Reclamation tiered its analysis of the SLWRI FEIS to the CALFED PEIS/R.

The BF Sisk Supplemental EIS did not mention Sites at all – I checked the cumulative project list in Appendix O of the EIS as well to be sure Sites wasn't addressed since the referenced that appendix in the SEIS.

As you know, the 2014 FEIS for Shasta does mention Sites in the cumulative discussion (p. 3-24):

Based on this review, the effects of the actions described below were considered qualitatively in the assessment of cumulative effects of action alternatives. This list is organized into four categories of actions: water resources, resource management and restoration, levee, and development actions. Some unknown subset of the following projects, though not strictly meeting the criteria above, would likely be implemented, such as the Bay Delta Conservation Plan (BDCP), the North-of-Delta Offstream Storage Facility (Sites Reservoir), and the Upper San Joaquin River Basin Storage Investigation (Temperance Flat Reservoir).

Also in p. 3-34:

North-of-Delta Offstream Storage Investigation The North-of-Delta Offstream Storage Investigation is a feasibility study being performed by Reclamation and DWR, in partnership with local interests. Pursuant to the CALFED solution principles, storage locations that would not add a new dam on a major stream were considered and evaluated. As its name indicates, the North-of-Delta Offstream Storage Investigation focuses on offstream storage north of the Delta – specifically, potential projects for offstream storage of surface water at Sites Reservoir in the Sacramento River basin.

Offstream storage located north-of-the-Delta would require conveying water from the Sacramento River or one of its major tributaries to the new storage location. An offstream storage conveyance system could use either existing diversions and canals or new diversions and conveyance. Water would be diverted during periods of relatively higher flow through the conveyance system, into the new offstream storage reservoir, and stored until it is needed to meet the planning objectives.

Such storage could increase water supply reliability for all beneficial uses (agricultural, urban, and environmental). The Sites Reservoir Project could contribute to cumulative effects on water supplies and associated resources. The project could increase water supplies available for export in years when export supplies otherwise would be limited. This project also could modify the timing and magnitude of upstream reservoir releases in wet years.

A notice of intent/notice of preparation for this project was issued in November 2001 and public scoping for the environmental document occurred in January 2002. The complete plan formulation report was published in September 2008 and the Final EIS/R and Feasibility Report are anticipated for release in 2014.

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Monday, September 28, 2020 9:34 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Linda Fisher (linda.fisher@hdrinc.com) <linda.fisher@hdrinc.com>
Subject: RE: Sites - Shasta Supplemental EIS and San Luis Dam Raise (B.F. Sisk Raise) Supplemental EIS

Hi Laurie and Linda – Just wanted to check in on this. Jerry asked this on our leadership team meeting this morning.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, September 21, 2020 7:07 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Linda Fisher (linda.fisher@hdrinc.com) <linda.fisher@hdrinc.com>
Subject: Sites - Shasta Supplemental EIS and San Luis Dam Raise (B.F. Sisk Raise) Supplemental EIS

Laurie and Linda – Can one of you or a junior staff member take a look thru the above 2 documents to see what they say about Sites. I am thinking of something as simple as searching for Site, copying all text related to sites into a Word file and adding a note on the page number / section it came from so we can go back and find it again if we have questions. These are both out for public review now and we don't intend to comment, but want to make sure that they are accurately reflecting the Sites Project.

We want to make sure that we are looking at the BF Sisk Raise Supplemental EIS – not the dam safety fix project.

Any way we can have this by end of week?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Sent: 9/28/2020 11:53:34 AM
To: Berryman, Ellen [Ellen.Berryman@icf.com]
CC: Spranza, John [John.Spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Luu, Henry [Henry.Luu@hdrinc.com]; Briard, Monique [Monique.Briard@icf.com]
Subject: FW: Sites Reservoir BA Data Needs Addressed
Attachments: BA Data Needs HC and HR Combined Responses.docx

Hello Ellen

We took out the data needs identified in the BA project description and followed up with both HR/HC. Integration also provided some guidance. Let us know if you have any questions – hope this helps.

BTW – you’ll see that there are some items we are going to be following up on with the Authority.

Thanks

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Friday, September 25, 2020 6:57 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Edits/responses are attached.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

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From: Arsenijevic, Jelica
Sent: Thursday, September 24, 2020 6:02 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

I've combined HR/HC responses and responded to the recreation question by looking at the WSIP application. Please confirm that it looks good to you before we share this information with ICF. You'll see a couple of comments for additional information – perhaps you know the answers.

Laurie – take a look too.

Thanks

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



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Sacramento, CA 95833
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M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

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From: Luu, Henry
Sent: Thursday, September 24, 2020 9:27 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Attached are HR's responses.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Luu, Henry
Sent: Wednesday, September 23, 2020 10:32 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

See attached for HC responses. I anticipate HR's comments tomorrow.

I have a couple of additional comments to HC responses:

- GCID is working on refining the initial list of improvements...updates hopefully within the next couple of weeks.
- I think reservoir facilities will require more than 4 years to construction (including roads & bridges). I recommend we assume 6 years of construction with concurrent construction of reservoir and conveyance facilities.

Henry H. Luu, PE

D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 5:30 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

See revised data needs from BA. It shows areas that overlap with the EIR/S. other areas need clarification. Can we get input from HR/HC?

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 4:19 PM
To: 'Laurie Warner Herson' <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Laurie

See attached BA needs. I went ahead and revised it slightly by highlighting areas that were identified as "highlights/notes from previous requests by EIR/S team"

Hope this helps consolidate and identify meeting topics.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Laurie Warner Herson [mailto:laurie.warner.herson@phenixenv.com]
Sent: Thursday, September 17, 2020 3:31 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: Fwd: Sites Reservoir REIR/SEIS - Construction Appendix

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FYI - this was the email exchange that Monique referenced. I offered to help Nicole keep things moving because her husband may have COVID.

I am going to pull together the list of topics, based on the EIR/EIS Ch 2 consolidated comments I sent to ICF yesterday. I will send the list to you two to incorporate permitting needs (I'm assuming they will be very similar, if not the same). Then Jelica can run with the meetings as she has in the past.

If you already have started a list, let me know and I'll add to it.

Begin forwarded message:

From: "Williams, Nicole" <Nicole.Williams@icf.com>
Date: September 17, 2020 at 2:19:21 PM PDT
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: "Briard, Monique" <Monique.Briard@icf.com>, "Unsworth, Ellen" <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie –

Thanks we're waiting on test results, but we know it is not the flu. And of course mandatory quarantine is always fun.

Will do regarding the location for the appendix.

Regarding helping out – would it be possible for you to pull together an initial list of meeting topics and participants (assuming HR/HC participation) you think are needed based on your review/consolidation of the chapter 2 comments and any conversations you've had about the BA description with John/Jelica? For example, you indicated yesterday in your email there might be some issues with Roads so that might be one meeting that is needed if we weren't provided the information flagged in chapter 2 or if HR had questions about the information we were asking for.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 1:39 PM
To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Nicole –

I am so sorry to hear that COVID has hit your family. Please let me know what we can do to help out so you can focus on your family.

I think we should put the construction appendix in the working draft folder in the environmental planning library since it is an attachment to the EIR/EIS:

<https://sitesreservoirproject.sharepoint.com/:f:/r/EnvPlanning/Shared%20Documents/Construction%20Appendix?csf=1&web=1&e=be4fub>

Wishing you the best,

Laurie

From: Williams, Nicole [<mailto:Nicole.Williams@icf.com>]

Sent: Thursday, September 17, 2020 1:08 PM

To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>

Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>

Subject: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie – we've made progress on the construction appendix, but unfortunately my husband came down with COVID-related symptoms yesterday, and this has impacted my week. We'll upload it early next week. Can you let me know where you want it on sharepoint?

Cheers, Nicole

NICOLE L. WILLIAMS | Senior Environmental Planner | (o) 916.231.9614 | (m) 530.867.0470 | nicole.williams@icf.com | icf.com
ICF | 980 9th Street Suite 1200 Sacramento CA 95814 |

—



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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/28/2020 12:54:05 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Heydinger, Erin (Erin.Heydinger@hdrinc.com) [Erin.Heydinger@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Subject: FW: Data/Info Needs that require Authority Input
Attachments: Table PD 2-1 Participants.docx; Table PD2-25, Best Management Practices and Environmental Commitments.pdf
Flag: Follow up

Ali and Kevin –

Jelica, Henry and I met on Thursday to go over some of the remaining information needs and/or direction that ICF has requested for the EIR/EIS project description. I would like to set up a meeting with you to go over the items outlined below, all of which need input/direction from the Authority:

- Table PD2-1 Member Participant Summary Table (confirm member participants) – **need direction on what level of detail is appropriate for the EIR/EIS**
- GCID Improvements required by project (not wish list) – **confirm what assumptions to use now with GCID discussions/agreements pending**
- Building locations – HC indicated that they need the Authority to decide where these are going – **need assumptions for EIR/EIS**
- Confirm Recreation Assumptions – **confirm “up to” those described in CWC Prop 1 application or if there is additional local input to consider**
- Maintenance approach for roads – **need to clarify what will be maintained by County vs. Authority**, per AECOM: “AECOM recommends that during construction, the construction contractor will be responsible for maintaining maintenance and construction roads. After construction, we anticipate responsibility will shift to the County for permanent roads and to the Authority for maintenance roads.”
- Comm Road location – **Do we have a preferred route that we can analyze?**
- Confirm WISP allocation – “It is expected, because of the 2017 WSIP process, approximately 40 thousand acre-feet (TAF) and 50 TAF would be allocated to support State involvement.” – **do we need to be specific, can we confirm now?**
- Confirm Reclamation participation – ICF note: “confirm, still uncertain volume of water Reclamation is being assigned” - **do we need to be specific, can we confirm now?**
- Operations to insert table that shows amount of water going to IL4 refuges NOD and SOD in different year types. Also insert table specifying volume of water going to Yolo Bypass. – Note from ICF: “Does Ali need to agree? If so, please get her agreement and provide the table.” – **confirm table appropriate to include in RDEIR/SEIS (will work with Erin and Ops to obtain)**
- Maxwell Intertie – HC has suggested that the Authority provide write-up for ICF – **should Integration take lead with HC input?**
- Authority/HR : our understanding is the WSIP information about flood control would be updated. Is that information that would make sense to insert here? – Per HR: “We understand that the HC Contractor has been asked to evaluate the floodplain for Funks and Stone Corral Creeks. Is this included in their analysis? It seems like we should only have one model to evaluate flood control” – **need to confirm approach**
- Would HABs be part of the reservoir management plan or the operations plan? – **need to confirm who is taking lead on these plans and confirm outline/contents for each**
- Off-site quarries – ICF note: “at one of the focused meetings it was mentioned there was a list of potential mining locations within the Orland Quarry Area that might be suitable and the quantities, was this list provided to us?” – **need to confirm to what level we address this, I think Kevin may have wanted to minimize reference to specific areas?**
- Best Management Practices/Environmental Commitments (BMPs/ECs) – **Need Kevin and Ali to review and confirm that these are appropriate since these will be assumed to be part of the project when the impact analysis is conducted in the next few weeks**

Also, there were a couple of comments/questions from Reclamation that I wanted to note:

- Is there a water master on the Colusa Basin Drain? (Reclamation question)
- Water for construction – Reclamation comment: “Will this water be from the Sites water right? or is it expected to come from GCID? Or Reclamation? Reclamation cannot provide CVP water outside the CVP Place of Use.”

I have attached both Table PD2-1, Participants and Table PD2-25, Best Management Practices and Environmental Commitments for your reference. It would probably be most efficient to have one meeting with both of you; however, I can break out issues/topics that specifically need Kevin’s input and set up two meetings if needed.

Let me know how you would like to proceed in resolving these items.

Thank you,

Laurie

From: Laurie Warner Herson

Sent: Thursday, September 24, 2020 12:08 PM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>

Cc: Heydinger, Erin (Erin.Heydinger@hdrinc.com) <Erin.Heydinger@hdrinc.com>

Subject: Data/Info Needs that require Authority Input

Hi Jelica and Henry -

I’ve gone through the most recent version of the EIR/EIS draft Chapter 2, Alternatives, to capture items that will require Authority input. These can be expanded on (or possibly eliminated) before we meet with Ali and Kevin. I’ve copied Erin as a couple of these deal with operations.

- Table PD2-1 Member Participant Summary Table (confirm member participants)
- GCID Improvements required by project (not wish list)
- Building locations – HC indicated that they need the Authority to decide where these are going
- Confirm Recreation Assumptions
- Maintenance approach for roads – need to clarify what will be maintained by County vs. Authority, per AECOM: “AECOM recommends that during construction, the construction contractor will be responsible for maintaining maintenance and construction roads. After construction, we anticipate responsibility will shift to the County for permanent roads and to the Authority for maintenance roads.”
- Comm Road location – I believe that Kevin was coordinating this
- Confirm WISP allocation – “It is expected, because of the 2017 WSIP process, approximately 40 thousand acre-foot (TAF) and 50 TAF would be allocated to support State involvement.”
- Confirm Reclamation participation – ICF note: “confirm, still uncertain volume of water Reclamation is being assigned”
- Operations to insert table that shows amount of water going to IL4 refuges NOD and SOD in different year types. Also insert table specifying volume of water going to Yolo Bypass. – Note from ICF: “Does Ali need to agree? If so, please get her agreement and provide the table.”
- Is there a water master on the Colusa Basin Drain? (Reclamation question)
- Maxwell Intertie – HC has suggested that the Authority provide write-up for ICF
- Authority/HR : our understanding is the WSIP information about flood control would be updated. Is that information that would make sense to insert here? – Per HR: “We understand that the HC Contractor has been asked to evaluate the floodplain for Funks and Stone Corral Creeks. Is this included in their analysis? It seems like we should only have one model to evaluate flood control” – need to confirm approach

- Would HABs be part of the reservoir management plan or the operations plan?
- Off-site quarries – ICF note: “at one of the focused meetings it was mentioned there was a list of potential mining locations within the Orland Quarry Area that might be suitable and the quantities, was this list provided to us?” – need to confirm to what level we address this, I think Kevin may have wanted to minimize reference to specific areas?
- Water for construction – Reclamation comment: “Will this water be from the Sites water right? or is it expected to come from GCID? Or Reclamation? Reclamation cannot provide CVP water outside the CVP Place of Use.”
- BMPs/ECs – Need Kevin to review (I think Ali has already but should confirm)

ICF has also noted that: “if anything come in at the end of the December it likely will not be included in the REIR/SEIS or the description of the alternatives.”

Looking forward to the discussion at 1 pm.

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

Supplier Clearinghouse Women Business Enterprise (#16000323)

<http://phenixenv.com/>

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/28/2020 1:00:33 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Heydinger, Erin (Erin.Heydinger@hdrinc.com) [Erin.Heydinger@hdrinc.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Subject: RE: Data/Info Needs that require Authority Input

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From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Monday, September 28, 2020 1:00 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Kevin Spesert <kspesert@sitesproject.org>
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Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Sent: Monday, September 28, 2020 12:54 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
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Thank you,

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From: Laurie Warner Herson

Sent: Thursday, September 24, 2020 12:08 PM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Luu, Henry <Henry.Luu@hdrinc.com>

Cc: Heydinger, Erin (Erin.Heydinger@hdrinc.com) <Erin.Heydinger@hdrinc.com>

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Laurie Warner Herson
Principal/Owner


Phenix
Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

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From: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
Sent: 9/28/2020 1:22:40 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Luu, Henry [Henry.Luu@hdrinc.com]
CC: Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Marcia Kivett [MKivett@sitesproject.org]
Subject: RE: Data/Info Needs that require Authority Input

Hey there

Took a look at calendars

Henry, myself, you, and Ali are available for these times. Need input from Marcia for Kevin's availability (cc'd)

- 9/30 – 3 to 4pm
- 10/1 – 3 to 5pm
- 10/2 –
 - 10 to 11am
 - 12 to 1:30
 - after 230
- 10/5 – 3 to 4pm
- 10/6 – 9 to 11am

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
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Ecosystem Benefit Possibilities

The purpose of this document is to provide general considerations/information needed by CDFW for assessing the viability of the following ecosystem benefits that the Sites Project could potentially provide, in order to develop a contract to administer public benefits under the Water Storage Investment Program.

1. Refuge Water Supply

Goal: To provide Incremental Level 4 (IL4) refuge water to CVPIA refuges or water to other State or private wildlife refuges.

a. South-of-Delta (SOD) refuge water

- Provide long-term average and monthly range of volume of water to be provided by water year type at point of delivery (San Luis Reservoir or refuge boundary).
- Agreement with Bureau of Reclamation on participation in the CVPIA Refuge Water Supply Program.
- Modeling that demonstrates ability to convey water to SOD. Modeling should consider capacity in CA Aqueduct and Delta export facilities. If water is conveyed under Bureau of Reclamation's water right, priority for IL4 at CVP export facility must be considered. If San Luis Reservoir is the point of delivery, reservoir capacity to store water until it is delivered to refuges must be considered.
- Agreements to exchange reservoir water for CVP or SWP contractor water in order to deliver water SOD.

b. North-of-Delta (NOD) refuge water (in addition to considerations above)

- Identify NOD refuges that need IL4 refuge water and could potentially receive refuge water directly from Sites (e.g., Delevan wildlife refuge).
- Demonstrate that Sites can convey water to private and state NOD wildlife refuges, particularly those refuges on the east side of the valley, where the need for water is the greatest.
- Obtain exchange and conveyance agreements with local water districts to provide water.
- Obtain an exchange agreement with a SWP contractor to exchange water out of Oroville Reservoir and obtain approval from DWR for the exchange.

2. Yolo Bypass Pulse Flow

Goal: Stimulate the growth of and/or transport phytoplankton/zooplankton from the upper Yolo Bypass region to the lower Sacramento River, to provide food to Delta Smelt.

a. Direct delivery of water from Sites Reservoir to the Yolo Bypass via Sites' Dunnigan pipeline into the Colusa Basin Drain.

- Provide long-term average and monthly (July through September) range of volume of water to be delivered by water year type.

- Obtain agreements to utilize conveyance facilities needed to move water through the Colusa Basin Drain and Yolo Bypass, during the late summer-fall period.
 - Modeling that demonstrates volume of water to be conveyed through the Colusa Basin Drain and Yolo Bypass, during July – September, and considers capacity of conveyance facilities during those months.
 - Evaluation of potential negative impacts from the pulsed water, including but not limited to increased straying of salmonids, reduced water quality, and temperature impacts.
 - Demonstrate ability to provide net ecosystem benefit, considering mitigation and avoidance requirements for all impacts.
- b. Delivery of water to the Sacramento River via exchanges (in addition to considerations above).
- Demonstrate ability to obtain exchange agreements and deliver water through the Sacramento River and through the Yolo Bypass.
 - Assess and demonstrate the ability to move water into and through the Yolo Bypass. This includes any necessary agreements and considerations of pump capacity and priority of use.
 - Modeling that demonstrates volume and timing of water conveyed through the Yolo Bypass.
 - Assess potential impacts to redd dewatering in the Sacramento River.
3. Delta Smelt Habitat Improvements
- Goal: Suisun Marsh Salinity Control Gate (SMSCG) operations for Delta Smelt habitat improvement in critically dry years.
- a. Delivery of water using Sites facilities through Dunnigan pipeline to the Colusa Basin Drain and then out to the Sacramento River.
- Provide long-term average and monthly (June through October) range of volume of water to be provided in critically dry years.
 - Modeling that demonstrates the number of days that the salinity control gates can be operated based on the water to be provided.
 - Obtain agreements with Bureau of Reclamation and DWR to operate the SMSCG in critically dry years to provide an ecosystem benefit above existing regulatory requirements.
 - Assess potential negative impacts from the delivery of water from the Colusa Basin Drain, including but not limited to reduced water quality and temperature impacts to the Sacramento River.
 - Demonstrate ability to provide net ecosystem benefit, considering mitigation and avoidance requirements for all impacts.
- b. Delivery of water to the Sacramento River via exchanges (in addition to considerations above).

- Obtain agreements to exchange water in order to provide the ecosystem benefit.
 - Assess potential impacts to redd dewatering in the Sacramento River.
4. Yolo Bypass Floodplain Inundation
- Goal: Provide water in the spring to the lower Yolo Bypass, following floodplain inundation from a natural storm event, to extend the period of floodplain inundation, and provide rearing habitat for juvenile salmonids.
- a. Direct delivery of water from Sites Reservoir to the Yolo Bypass via Sites' pipeline into the Colusa Basin Drain.
 - Provide long-term average and monthly range of volume of water to be delivered by water year type.
 - Modeling that demonstrates volume of water to be conveyed through the Colusa Basin Drain and Yolo Bypass, during the spring, and considers potential conveyance limitations and conflict with agricultural drainage in the Yolo Bypass.
 - Assess the length of time that floodplain inundation can be increased.
 - Assess potential negative impacts from the extended floodplain inundation, including but not limited to increased straying of salmonids, reduced water quality, and temperature impacts.
 - Demonstrate ability to provide net ecosystem benefit, considering mitigation and avoidance requirements for all impacts.
 - b. Delivery of water to the Sacramento River via exchanges (in addition to considerations above).
 - Obtain agreements to exchange water in order to provide the ecosystem benefit.
 - Assess and demonstrate the ability to move water into and through the Yolo Bypass. This includes any necessary agreements and considerations of pump capacity and priority of use.
 - Modeling that demonstrates volume and timing of water conveyed through the Yolo Bypass.
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Activity ID	Activity Name	Remaining Duration	Start	Finish	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
SITES PROJECT					2414	02-Jan-20 A	01-Nov-29							
MILESTONES					2393	13-Apr-20 A	01-Nov-29							
MS-005-VP	Approve Preferred Project	0		13-Apr-20 A										
MS-007-PD	Preliminary Project Description Complete	0		31-Aug-20										
MS-011-DE	Release Revised Draft EIR/EIS for Public Review	0		06-Jul-21										
MS-020-CS	WIIN Construction Start Date	0		16-Dec-21*										
MS-250-FE	Final EIR/EIS	0		13-May-22										
MS-450-RD	ROD Signed	0		13-Jun-22										
MS-500-CS	Construction Starts	0		17-Jul-23										
MS-510-CC	Construction Complete	0		27-Nov-28										◆ Construction
MS-600-PB	Public Benefits	0		01-Nov-29										◆
VALUE PLANNING					0	02-Jan-20 A	13-Apr-20 A							
Value Planning Analysis					0	02-Jan-20 A	03-Mar-20 A							
Value Planning Report					0	14-Feb-20 A	13-Apr-20 A							
Preferred Project					0	13-Apr-20 A	13-Apr-20 A							
PROJECT DESCRIPTION					21	11-Feb-20 A	31-Aug-20							
Determine Needs					0	11-Feb-20 A	28-Apr-20 A							
Components					21	01-Apr-20 A	31-Aug-20							
Develop Project Description					21	29-Apr-20 A	31-Aug-20							
Preliminary Project Description Complete					0	31-Aug-20	31-Aug-20							
OPERATIONS MODELING					2198	02-Jan-20 A	03-Jan-29							OPERATI
Value Planning Operations					21	02-Jan-20 A	31-Aug-20							
Refine Operational Parameters					0	10-Feb-20 A	12-Jun-20 A							
Full Operations Analysis					145	15-Jun-20 A	19-Feb-21							
EIR/EIS AND BA/ITP Documentation					55	09-Nov-20	22-Jan-21							
Operations Plan, Ver 1					232	02-Jan-20 A	23-Nov-21							
Operational Agreements					232	04-Jan-21	23-Nov-21							
Bridging Analysis for Baseline					91	04-Jan-21	10-May-21							
Bridging Analysis for CWC/WSIP Benefits					105	01-Feb-21	25-Jun-21							
Final Sites-Reclamation Operating Agreement					328	07-Jul-21	07-Oct-22							
Final Sites-DWR Operating Agreement					328	07-Jul-21	07-Oct-22							
Final TCCA Facility Use Agreement					328	07-Jul-21	07-Oct-22							
Final GCID Facility Use Agreement					328	07-Jul-21	07-Oct-22							
Final CBDA Facility Use Agreement					328	07-Jul-21	07-Oct-22							
Operations Plan, Version 2					370	07-Jul-21	06-Dec-22							
Annual Operating Plan Process and Procedures					519	11-Oct-21	06-Oct-23							
Provide Operations Input on Response to Comments and Final EIR/EIS					20	11-Oct-21	08-Nov-21							
Member Portal/Accounting System					0	03-Jan-29	03-Jan-29							◆ Member P
Operations Support					819	21-Jun-21	09-Aug-24							
EIR/EIS					1056	11-Feb-20 A	19-Aug-24							
Work Plan & Outline					21	11-Feb-20 A	31-Aug-20							
Project Description Chapter					81	01-Sep-20	22-Dec-20							
Draft EIR/EIS					221	01-Sep-20	06-Jul-21							
Public Review					60	07-Jul-21	05-Sep-21							
Begin Preparation of the Admin Final EIR/EIS					40	23-Aug-21	18-Oct-21							
Summary Report FOR CWC					26	18-Oct-21	23-Nov-21							
Final EIR/EIS					149	18-Oct-21	13-May-22							

Actual Work
 Critical Remaining Work
 Remaining Work
 Summary
 Milestone



Sites Reservoir Project

Date: 23-Sep-20

Activity ID	Activity Name	Remaining Duration	Start	Finish	2020					2021					2022					2023					2024					2025					2026					2027					2028					2029				
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q													
					Gantt Chart Timeline																																																	
	NOD, Findings of Fact, Statement of Overriding Considerations, Mitigation Monitoring Program	32	22-Apr-22	07-Jun-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> NOD, Findings of Fact, Statement of Overriding Considerations, Mitigation Monitoring Program </div> </div>																																																	
	Authority Certifies EIR and Approves Project and File NOD	1	07-Jun-22	08-Jun-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Authority Certifies EIR and Approves Project and File NOD </div> </div>																																																	
	ROD	22	13-May-22	13-Jun-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> ROD </div> </div>																																																	
	Additional NEPA/CEQA Review, if needed	570	14-Jun-22	19-Aug-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Additional NEPA/CEQA Review, if needed </div> </div>																																																	
	PERMITTING	1056	30-Oct-20	15-Nov-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> PERMITTING </div> </div>																																																	
	CWC Feasibility Report	277	30-Oct-20	23-Nov-21	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> CWC Feasibility Report </div> </div>																																																	
	Geotechnical Field Monitoring	1056	30-Oct-20	15-Nov-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Geotechnical Field Monitoring </div> </div>																																																	
	FEDERAL PERMITS	1133	14-Apr-20 A	04-Dec-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> FEDERAL PERMITS </div> </div>																																																	
	Phase 1 Environmental Site Assessments	763	03-Jan-22	04-Dec-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Phase 1 Environmental Site Assessments </div> </div>																																																	
	U.S. Army Corps of Engineers CWA 404, Rivers and Harbors Act Section 10	612	14-Apr-20 A	06-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> U.S. Army Corps of Engineers CWA 404, Rivers and Harbors Act Section 10 </div> </div>																																																	
	U.S. Army Corps of Engineers Rivers and Harbors Act Section 14, Section 408	591	01-Sep-20	06-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> U.S. Army Corps of Engineers Rivers and Harbors Act Section 14, Section 408 </div> </div>																																																	
	U.S. EPA and U.S. Army Corps of Engineers LEDPA Review	591	01-Sep-20	06-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> U.S. EPA and U.S. Army Corps of Engineers LEDPA Review </div> </div>																																																	
	Advisory Council on Historic Preservation NHPA Section 106	338	01-Sep-20	16-Dec-21	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Advisory Council on Historic Preservation NHPA Section 106 </div> </div>																																																	
	USFWS and NMFS ESA Section 7	359	14-Apr-20 A	16-Dec-21	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> USFWS and NMFS ESA Section 7 </div> </div>																																																	
	USFWS Bald Eagle Protection Act	685	01-Sep-20	17-Apr-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> USFWS Bald Eagle Protection Act </div> </div>																																																	
	U.S. Coast Guard Navigability Determination	253	03-Jan-22	21-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> U.S. Coast Guard Navigability Determination </div> </div>																																																	
	USBR Warren Act	371	11-Jan-21	13-Jun-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> USBR Warren Act </div> </div>																																																	
	USBR - Land Agreement	506	03-Jan-22	11-Dec-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> USBR - Land Agreement </div> </div>																																																	
	STATE PERMITS and AGREEMENTS	2131	01-Sep-20	31-Oct-28	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> STATE PERMITS and AGREEMENTS </div> </div>																																																	
	Caltrans Encroachment & Transportation	761	03-Jan-22	02-Dec-24	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Caltrans Encroachment & Transportation </div> </div>																																																	
	State Lands Commission/State Lands Lease, if needed	253	03-Jan-22	21-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> State Lands Commission/State Lands Lease, if needed </div> </div>																																																	
	Central Valley Flood Protection Board Levee Encroachment	591	01-Sep-20	06-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Central Valley Flood Protection Board Levee Encroachment </div> </div>																																																	
	SWRCB Water Rights Permit	684	01-Sep-20	17-Apr-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> SWRCB Water Rights Permit </div> </div>																																																	
	SWRCB NPDES and CWA Section 402 (Multiple permits based on construction packages and/or ROW access)	1234	12-Dec-23	01-Sep-28	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> SWRCB NPDES and CWA Section 402 (Multiple permits based on construction packages and/or ROW access) </div> </div>																																																	
	SWRCB Waste Discharge Requirements Multiple permits based on construction packages and/or ROW acces	1234	12-Dec-23	01-Sep-28	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> SWRCB Waste Discharge Requirements Multiple permits based on construction packages and/or ROW acces </div> </div>																																																	
	RWQCB CWA Section 401 Water Quality Certification	445	24-Nov-25	06-Aug-27	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> RWQCB CWA Section 401 Water Quality Certification </div> </div>																																																	
	DWR DSOD (Multiple permits based on construction packages and/or ROW access)	509	17-Sep-24	28-Aug-26	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> DWR DSOD (Multiple permits based on construction packages and/or ROW access) </div> </div>																																																	
	Cal OSHA Permits (Multiple permits based on construction packages and/or ROW access)	1276	12-Dec-23	31-Oct-28	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Cal OSHA Permits (Multiple permits based on construction packages and/or ROW access) </div> </div>																																																	
	CDFW Streambed Alteration	591	01-Sep-20	06-Dec-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> CDFW Streambed Alteration </div> </div>																																																	
	CDFW Section 2081	463	30-Sep-20	08-Jul-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> CDFW Section 2081 </div> </div>																																																	
	NAHC/Local Tribes AB 52 Consultation	338	01-Sep-20	16-Dec-21	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> NAHC/Local Tribes AB 52 Consultation </div> </div>																																																	
	SMARA	140	18-Oct-21	29-Apr-22	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> SMARA </div> </div>																																																	
	LOCAL AGENCY PERMITS AND APPROVALS	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> LOCAL AGENCY PERMITS AND APPROVALS </div> </div>																																																	
	Colusa County	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County </div> </div>																																																	
	Colusa County Air Pollution Control Districts	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County Air Pollution Control Districts </div> </div>																																																	
	Colusa County Public Works - Encroachments	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County Public Works - Encroachments </div> </div>																																																	
	Colusa County Transportation	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County Transportation </div> </div>																																																	
	Colusa County Public Works Building, Street Improvement, Grading Permits	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County Public Works Building, Street Improvement, Grading Permits </div> </div>																																																	
	Colusa County General Plan and Zoning	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Colusa County General Plan and Zoning </div> </div>																																																	
	Glenn County	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County </div> </div>																																																	
	Glenn County Air Pollution Control	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County Air Pollution Control </div> </div>																																																	
	Glenn County Public Works - Encroachments	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County Public Works - Encroachments </div> </div>																																																	
	Glenn County Transportation	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County Transportation </div> </div>																																																	
	Glenn County Public Works Building, Street Improvement, Grading Permits	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County Public Works Building, Street Improvement, Grading Permits </div> </div>																																																	
	Glenn County General Plan and Zoning	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Glenn County General Plan and Zoning </div> </div>																																																	
	Yolo County	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Yolo County </div> </div>																																																	
	Yolo County Air Pollution Control	400	03-Jan-22	14-Jul-23	<div style="display: flex; align-items: center;"> <div style="width: 40px; height: 10px; background-color: black; margin-right: 5px;"></div> <div> Yolo County Air Pollution Control </div> </div>																																																	

Actual Work
 Critical Remaining Work
 Summary
 Remaining Work
 Milestone



Activity ID	Activity Name	Remaining Duration	Start	Finish	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
					Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	Yolo County Public Works - Encroachments	400	03-Jan-22	14-Jul-23			█							
	Yolo County Transportation	400	03-Jan-22	14-Jul-23			█							
	Yolo County Public Works Building, Street Improvement, Grading Permits	400	03-Jan-22	14-Jul-23			█							
	Yolo County General Plan and Zoning	400	03-Jan-22	14-Jul-23			█							
	MITIGATION	2391	01-Sep-20	30-Oct-29			█							
	FEASIBILITY LEVEL GEOTECH	359	25-Mar-20 A	16-Dec-21			█							
	Geotechnical Permitting & Planning	84	25-Mar-20 A	26-Nov-20			█							
	Field Investigation	103	30-Oct-20	23-Mar-21			█							
	Data Evaluation and Reporting	295	30-Oct-20	16-Dec-21			█							
	FEASIBILITY ENGINEERING	456	02-Jan-20 A	02-May-22			█							
	PROP 1	1491	22-Oct-20	10-Jul-26			█							
	CWC Feasibility Review	180	25-Mar-21	03-Dec-21			█							
	Revised Public Benefits	0	22-Oct-20	22-Oct-20			◆							
	CWC Review of Public Draft EIR/EIS	30	07-Jul-21	17-Aug-21				█						
	CWC Determination of Feasibility	0	03-Dec-21	03-Dec-21										
	CWC All Permits Acquired for Construction Funding	0	10-Jul-26	10-Jul-26										
	RIGHT OF WAY (ROW)	1981	01-Sep-20	04-Apr-28			█							
	Rights of Entry	508	01-Sep-20	11-Aug-22			█							
	Acquisitions (Phased)	1542	03-Jan-22	30-Nov-27			█							
	Relocation Assistance, as needed	1119	04-Oct-23	17-Jan-28				█						
	Acquisition Closeout and Transfer of Jurisdiction as needed	90	01-Dec-27	04-Apr-28										
	DESIGN LEVEL GEOTECH & SURVEY	253	03-Jan-22	21-Dec-22			█							
	Design Level Survey	147	03-Jan-22	26-Jul-22			█							
	Design Level Geotech	253	03-Jan-22	21-Dec-22			█							
	PRELIMINARY AND FINAL ENGINEERING	1776	11-Jan-21	01-Nov-27			█							
	Project Delivery Method (assumes mixed contracting)	253	11-Jan-21	29-Dec-21			█							
	DB-100 Design Packages and Project Delivery Method Determinations (Assumes Mixed Contracting)	253	11-Jan-21	29-Dec-21			█							
	Preliminary Engineering	506	03-Jan-22	11-Dec-23			█							
	Final Engineering	509	12-Dec-23	21-Nov-25										
	Recreation Facilities Design/Engineering	506	24-Nov-25	01-Nov-27										
	CONSTRUCTION	1643	17-Jul-23	31-Oct-29										
	Conveyance Features	1276	12-Dec-23	31-Oct-28										
	Reservoir Features	1401	17-Jul-23	27-Nov-28										
	Recreational Features	520	04-Nov-27	31-Oct-29										
	OPERATIONS	371	01-Jun-28	01-Nov-29										
	Early Operations (Commissioning)	370	01-Jun-28	31-Oct-29										
	Full Operations Begins	0	01-Nov-29	01-Nov-29										

Actual Work
 Critical Remaining Work
 Remaining Work
 ◆ Milestone
 Summary



From: Janis Offermann [janis@horizonh2o.com]
Sent: 9/28/2020 3:05:41 PM
To: Laverne Bill [LBill@yochadehe-nsn.gov]; Isaac Bojorquez [IBojorquez@yochadehe-nsn.gov]
CC: Kevin Spesert [kspesert@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: September 30, 2020 meeting information
Attachments: INTERNAL_Sites_Alternative1_Pipeline_V3_11x17.pdf; INTERNAL_Sites_Alternative2_Pipeline_V3_11x17.pdf; 02-03 EIR_EIS Selection of Preferred Project for Purposes of CEQA (1).pdf; 20200930_Sites-Yocha Dehe Mtg-AGN.docx

Hi, Laverne and Isaac

We are all looking forward to our next meeting coming up on Wednesday afternoon. In preparation for the meeting, I have attached a suggested agenda, and information about the recently approved project description. You will note that there are some minor alterations since we last met and discussed the project description, which we will go over with you. These documents are also available at the following link:

https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/02-03-EIR_EIS-Selection-of-Preferred-Project-for-Purposes-of-CEQA.pdf

I hope all is well and that it isn't too smoky up in Capay Valley, though I imagine the new fire in Napa is not helping matters.

Take care
Janis

Janis Offermann

Cultural Resources Practice Leader
Horizon Water and Environment
400 Capitol Mall, Suite 2500
Sacramento, CA 95814
916.465.8076 – office
530.220.4918 – mobile



Topic: **Joint Authority Board and Reservoir Committee Meeting Agenda Item 2.3** 2020 September 17

Subject: **Preferred Project for the Purposes of the CEQA Analysis and Federal/State ESA Analysis**

Requested Action:

Designate Alternative 1, based on VP-7 of the Sites Project Value Planning Alternatives Appraisal Report (Value Planning Report), as the Authority's preferred project for the purposes of the Revised Draft Environmental Impact Report (EIR) analysis and for the purposes of the Biological Assessment and State Incidental Take Permit applications.

Detailed Description/Background:

In April 2020, the Authority accepted the Value Planning Report and its findings and directed staff to analyze the environmental effects of the new alternatives in the Value Planning Report, including VP7. The Authority also directed that a revised and recirculated Draft EIR be prepared for public review¹. Staff began development of the revised Draft EIR and is at the point where the Board needs to identify a preferred alternative based on a more complete project description (see attachment A).

During the Reservoir Committee and Board meetings in June, staff provided an overview of the alternatives under consideration as well as revised draft objectives for the project, requesting review and input in order to focus efforts in developing a more complete project description. At that time, staff presented Alternatives 1 and 2 which combined components of VP5, VP6, and VP7 from the Value Planning Report. Staff recommended these two alternatives as they define the reasonable range of alternatives given the previous analyses of the project and potential alternatives.

Staff is returning to the Reservoir Committee and Authority Board with a Preliminary Project Description (Attachment A), and revised objectives (Attachment B). Changes have been made to both the alternatives and objectives in response to Reservoir Committee and Authority Board input and in further development of project details and information by the project team. The key changes to the alternatives are as follows:

- Transportation/circulation components have been clarified. Both alternatives provide access to residents at the south end of the reservoir via a realigned Huffmaster Road. To provide access to the west side of the reservoir, Alternative 1 crosses the reservoir with a bridge on Sites Lodoga

¹ Staff has worked cooperatively with the Bureau of Reclamation to identify the appropriate approach to proceed with the Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act, and a Supplemental EIS will be prepared as part of the joint California Environmental Quality Act/National Environmental Policy Act documentation.

Road. Alternative 2 includes a south road continuing from Huffmaster Road around the west side of the reservoir to Ladoga, with no bridge.

- The Dunnigan pipeline alignment and proposal to release into the Colusa Basin Drain has been further assessed and confirmed as the proposed component for conveyance release under Alternative 1.

Key changes to the objectives are as follows:

- All objectives have been revised to focus on the statewide benefits of the Project and the needs of all Participants.
- Objective 1 addresses the amount of water supply required to meet participants' water demands and the need for an affordable, cost-effective Project.
- Objective 2 addresses the Water Storage and Investment Program public benefits.
- Objective 3 addresses federal participation and clarifies the intent of the Project to provide operational flexibility to the Central Valley Project.
- Objective 4 addresses intended benefits to the Delta ecosystem beyond the requirements of the Water Storage and Investment Program public benefits.
- Minor changes have also been made to Objective 5 regarding roadway connectivity.

Due to the project schedule, staff is preparing the Revised EIR at the same time as the engineering team is conducting preliminary design activities. The following assumptions represent the variations being taken from the project described in VP7 of the Value Planning Report and have been incorporated in the development of Alternative 1 to allow the EIR/EIS and engineering activities to move forward simultaneously and achieve the project schedule:

- Bridge – The EIR/EIS will move forward with Bridge Option 1B, Shorter Bridge with Fill Prisms, including the Cast-in-Place Prestressed Concrete Box Girder bridge type. This option was identified as a lowest cost bridge alternative in the Value Planning Report while meeting the functional requirements for efficient traffic flow.
- Dam Fill materials – The EIR/EIS will move forward with Dam Fill Option 1A, Earth and Rockfill, which is anticipated to be preferred by California Division of Safety of Dams and will assist in meeting the schedule and affordability goals; it also provides maximum coverage for potential environmental effects as the rockfill involves blasting associated with rock quarrying.
- Terminal Regulating Reservoir – The EIR/EIS will continue to analyze the original proposed location for this reservoir and carries forward additional potential locations as more is learned in the coming months regarding soils conditions.

- Glenn-Colusa Irrigation District and Colusa Basin Drain Facility Improvements – The EIR/EIS will address the type and magnitude of improvements needed to convey Sites water through existing facilities, pending future agreements on any specific improvements that may be warranted by the Project.
- Emergency Releases – In the rare and unanticipated condition that the Sites Reservoir has to conduct emergency releases, these releases are currently planned to be made into Funks Creek, Stone Corral Creek, and into the Hunters Creek watershed via Saddle Dam 3, 5, and 8b. Emergency release locations and the extent of potential impacts will be evaluated in further detail as part of the on-going feasibility study.
- Dunnigan Release – Based on preliminary hydraulic study, the EIR/EIS will assume release to the Colusa Basin Drain under Alternative 1 and will carry forward an extension to the Sacramento River under Alternative 2.
- Hydropower Generation – Based on the current Project information, the EIR/EIS will address incidental in-line conduit hydropower generation at a level that is below the threshold for Federal Energy Regulatory Commission license.
- Temporary Water Supply for Construction – Based on the current Project information, the EIR/EIS will evaluate obtaining water temporarily for construction supply on site via existing groundwater or surface water facilities or existing or new groundwater wells, including any onsite treatment that may be warranted depending on water quality.

It is important to note that the engineering team will continue to consider and analyze options for various facility components in order to optimize design and reduce costs, including potentially considering alternatives to account for reduced participation levels to maintain affordability. In the event that the final project facilities are different than the assumptions above, staff will consider appropriate modifications to the process and documents consistent with the California Environmental Quality Act, National Environmental Policy Act, and the Federal and State Endangered Species Acts. The goal is to make any modifications on a timeline that does not impact the ability to deliver the EIR/EIS documents for public review any later than July 2021.

The California Environmental Quality Act Guidelines require that an EIR analyze a reasonable range of alternatives to the project which would feasibly attain most of the basic objectives of the project while avoiding or substantially lessening significant effects of the project. While an EIR must analyze reasonable alternatives, it also needs to identify a proposed project, which is also referred to as the preferred alternative. At this time, staff is recommending the designation of Alternative 1 as the Authority's proposed project based on its meeting the intent and the goals of the Value Planning effort, its close alignment with VP-7, and its ability to meet the project objectives. The EIR/EIS will also analyze Alternative 2 and the No Project/No Action Alternative.

If designated by the Reservoir Committee and Authority Board, Alternative 1 would also be used as the proposed project for the purposes of the Biological Assessment under the Federal Endangered Species Act and State Incidental Take Permit applications under the California Endangered Species Act.

Prior Action:

April 22, 2020: The Authority directed staff to revise and recirculate a Draft Environmental Impact Report (EIR) to analyze the environmental effects of the options identified in the Final Sites Project Value Planning Alternatives Appraisal Report dated April 2020, including VP7.

April 22, 2020: The Authority accepted: the final report titled "Sites Project Value Planning Alternatives Appraisal Report, dated April 13, 2020" and the recommendations presented within, and; a recommendation to the Sites Project Authority to approve the final report titled "Sites Project Value Planning Alternatives Appraisal Report, April 13, 2020" and the recommendations presented within.

February 26, 2020: The Authority approved a recommendation to re-start efforts on the EIR for the Sites Reservoir Project and assess the most appropriate approach for completing the EIR pursuant to the California Environmental Quality Act.

July 20, 2017: The Reservoir Committee approved a recommendation to forward the Draft EIR/EIS to the Authority Board for its consideration to formally receive and adopt the document for inclusion in the Authority's Water Storage Investment Project application.

July 31, 2017: The Authority approved the release of the Draft EIR for public and agency review, in connection with the Authority's application to the California Water Commission by August 14, 2017. The document was published as joint Draft EIR/EIS by the Authority under the California Environmental Quality Act and Reclamation under the National Environmental Policy Act.

December 19, 2016: The Authority approved release of a Supplemental Notice of Preparation (released February 2, 2017) to transfer the California Environmental Quality Act lead agency status from the Department of Water Resources to the Sites Project Authority. Public scoping meetings were conducted on February 14 and 15, 2017.

Fiscal Impact/Funding Source:

Actual costs to prepare the project description and the supporting evaluations were within the amounts budgeted in the Phase 1B Work Plan which was approved by the Sites Project Authority at its January 22, 2020 Board meeting.

Sufficient funds to complete the recirculated Draft EIR/EIS and begin preparation of the Final EIR/EIS are included in the Amendment 2 Work Plan (Budget), which was approved by the Authority at its August 26, 2020 Board meeting.

Costs to complete and circulate the Final EIR/EIS will be considered in a future Work Plan.

Staff Contact:

Ali Forsythe

Attachments:

Attachment A – Sites Reservoir Project, Preliminary Project Description –
September 8, 2020.

Attachment B – Revised Recommended EIR Objectives.

Sites Reservoir Project Preliminary Project Description September 2020

On April 22, 2020, the Sites Project Authority (Authority) directed staff to revise and recirculate a Draft Environmental Impact Report (EIR) consistent with the California Environmental Quality Act (CEQA) to analyze the environmental effects of the facility options identified in the Sites Project Value Planning Report (Value Planning Report), dated April 2020. Since that time, Authority staff and environmental, engineering and modeling consultants have been developing and refining alternatives. In June, staff recommended that the Draft Revised EIR¹/Supplemental Environmental Impact Statement (EIS)² (Revised EIR/Supplemental EIS) evaluate two action alternatives, Alternative 1 and Alternative 2, and provided an initial overview of the two alternatives.

This preliminary project description summarizes the alternatives presented in the preliminary Revised EIR/Supplemental EIS Chapter 2, Alternatives Description, which was completed on August 31, 2020. That preliminary draft Chapter 2 reflects preliminary design efforts, including the preparation of technical memos and preliminary drawings, and coordination between the service providers and staff. Modeling and engineering efforts are ongoing, and additional information related to operations and construction means and methods will likely supplement the preliminary Draft Chapter 2 in the coming weeks.

1.0 Overview of Alternatives

The following table compares facilities and operational considerations under Alternatives 1 and 2. This table is an updated version of a table provided at the June 24 Authority Board meeting (Agenda Item 3.3 Attachment B) and identifies existing as well as new facilities that will be constructed to implement each alternative.

Table 1. Revised Alternatives Summary Table

Facilities/Operations	Alternative 1	Alternative 2
Diversion/Reservoir Infrastructure Details		
Reservoir Size	1.5 million acre feet (MAF)	1.3 MAF
Dams [Scaled to the size of the reservoir]	2 main dams, Golden Gate Dam and Sites Dam 7 saddle dams 2 saddle dikes	2 main dams, Golden Gate and Sites Dam 6 saddle dams 2 saddle dikes
Spillway	One spillway on Saddle Dam 8b	Similar to Alternative 1
Funks Reservoir and Funks Pumping Generating Plant	Funks Reservoir excavated to original capacity; same footprint as existing Funks Reservoir. New Funks Pump Generating Plant (PGP). New Funks pipeline alignment with 2 pipelines.	Similar to Alternative 1

¹ The Revised EIR/Supplemental EIS will also address the No Project/No Action Alternative.

² A Supplemental EIS will be prepared to comply with the National Environmental Policy Act (NEPA).

Table 1. Revised Alternatives Summary Table

Facilities/Operations	Alternative 1	Alternative 2
Terminal Regulating Reservoir (TRR); TRR Pumping Generating Plant; TRR Pipeline	New TRR facilities (TRR and TRR PGP) adjacent to the Glenn Colusa Irrigation District (GCID) Main Canal. New TRR pipeline alignment with 2 pipelines.	Same as Alternative 1
Hydropower	Power generation incidental upon release.	Same as Alternative 1
Diversion(s)	Diversion from Sacramento River into existing Tehama-Colusa Canal at Red Bluff and the existing GCID Main Canal at Hamilton City. Adding 2 pumps in existing bays at the plant at the Red Bluff Pumping Plant.	Same as Alternative 1
Emergency Release Flow	Releases into Funks Creek via Inlet/Outlet Works. Releases into Stone Corral Creek via Site Dam permanent discharge outlet. Emergency outflow pipeline and structures in Saddle Dam 3 and 5 to release north to Hunters Creek Watershed. Release from spillway on Saddle Dam 8b.	Similar to Alternative 1
Flood Control	Flood damage reduction benefit for local watersheds from reservoir storage.	Same as Alternative 1
Reservoir Management	Reservoir Management Plan and Reservoir Operations Plan.	Same as Alternative 1
Electrical Facilities	Transmission Lines, substations, switchyards; interconnection with Western Area Power Administration or Pacific Gas and Electric.	Same as Alternative 1
Recreation		
Multiple Facilities Consistent with WSIP Application	Two primary areas with infrastructure (with phased construction): 1. Peninsula Hills Area 2. Stone Corral Creek One day-use boat ramp w/parking located on the west side of the reservoir and south of the bridge.	Same as Alternative 1
Transportation/Circulation		
Provide Route to West Side of Reservoir	Bridge crossing the reservoir as a result of the relocation of existing Sites Lodoga Road. Relocation of Huffmaster Road with gravel road to residents at the south end of the reservoir terminating at the south end of the reservoir.	No bridge. Relocation of Sites Lodoga Road to residents at south end of the reservoir continues to Lodoga. Huffmaster Road is integrated into Sites Lodoga Road and is paved the entire way.
Multiple Maintenance and Local Access Roads	Approximately 46 miles of new paved and unpaved roads would provide construction and maintenance access to the proposed facilities, as well as provide public access to the proposed recreation areas.	Similar to Alternative 1

Table 1. Revised Alternatives Summary Table

Facilities/Operations	Alternative 1	Alternative 2
	Approximate number of roads related to the reservoir: 5 local/construction roads 2 construction/maintenance roads 7 local roads 4 maintenance roads Approximate number of access roads related to conveyance facilities: 1 to the TRR 1 to Funks complex Multiple within pipeline easements	
Operations		
Operational Criteria	Option based on Value Planning Report, Table 3.1 Scenario B, anticipated to be modified by future modeling efforts.	Same as Alternative 1
Reclamation Involvement	Two Options: 1. Funding Partner 2. Operational Exchanges a. Within Year Exchanges b. Real-time Exchanges	Same as Alternative 1
State Water Project (SWP) Involvement	Operational Exchanges with Oroville and storage in SWP facilities South-of-Delta.	Same as Alternative 1
Bypass Releases into Funks Creek and Stone Corral Creek	Develop specific bypass criteria to protect downstream water right holders and ecological function.	Same as Alternative 1
Conveyance Dunnigan Release	Release 1,000 cubic feet per second (cfs) into new pipeline to Colusa Basin Drain to meet member participant demands and Proposition 1 needs.	Release into new pipeline to Sacramento River to meet member participant demands. Partial release into the Colusa Basin Drain to fulfill the Proposition 1 needs.

2.0 Facilities

The project will utilize both existing and proposed new facilities, all of which will be located within northern California in Glenn, Colusa, Tehama and Yolo Counties (see Figures 1 and 2 at the end of this document). As summarized in the Table 1 above, most facilities are the same or similar under Alternatives 1 and 2 although features may differ in scale or location due to the size of the reservoir. Facilities that have substantial differences between alternatives, such as the proposed dams, Dunnigan Pipeline and the Sites Lodoga Road realignment/relocation, are described in more detail below.

2.1 Existing Facilities

The project will utilize certain existing water supply infrastructure, including:

- Existing Bureau of Reclamation infrastructure operated by the Tehama-Colusa Canal Authority (TCCA):
 - Red Bluff Pumping Plant
 - Tehama-Colusa Canal

- Funks Reservoir located approximately 65 miles south of the Red Bluff Pumping Plant
- Existing GCID Hamilton City Diversion and the GCID Main Canal
- Colusa Basin Drain (CBD)

Both action alternatives would require pumping capacity that exceeds the existing total installed capacity of 2,000 cfs of the Red Bluff Pumping Plant to convey flow to Funks Reservoir and ultimately Sites Reservoir. Both action alternatives would require installation of two additional 250-cfs vertical axial-flow pumps into existing concrete pump bays at the pumping plant.

Both action alternatives would also require a new 3,000-cfs GCID Main Canal headgate structure about 0.25 mile downstream of Hamilton City Pump Station. The existing headgate structure would be inadequate for proposed winter operation during high river flows. To streamline maintenance during the winter shutdown period (i.e., reduce it from the current shutdown window of 6 weeks to 2 weeks), smaller improvements would be required to integrate Sites Reservoir into the GCID system.

Use of the existing Funks Reservoir would require excavation of sediment to return it to its original capacity. The bottom of Funks Reservoir would be reshaped to allow large, unimpeded flows to and from the new Funks PGP.

Proposed access during construction will avoid the town of Maxwell, utilizing County Roads 68 and 69, McDermott Road, Maxwell Sites Road and Sites Lodoga Road. Several of these existing roads would require improvement to support construction activities. Other local roads would need to be relocated or developed to accommodate access due to the construction of reservoir facilities. These include portions of Sites Lodoga Road, Huffmaster Road, and Communication Road.

2.2 Proposed Conveyance Facilities

Implementation of either Alternative 1 or 2 would require various facilities to control the conveyance of water between Sites Reservoir and the Tehama-Colusa Canal and GCID Main Canal. These facilities would include regulating reservoirs, pipelines, PGPs, electrical substations, and administration and maintenance buildings.

The two regulating reservoirs would be the existing Funks Reservoir and the new Terminal Regulating Reservoir (TRR). Both regulating reservoirs would have two 12-foot-diameter pipelines extending to and from Sites Reservoir just below Golden Gate Dam. At each regulating reservoir, the pipelines would be connected to a pumping generating plant that pumps water from the regulating reservoir to Sites Reservoir, as well as turbines that would generate power when flows were released from Sites Reservoir. There would also be energy dissipation equipment adjacent to each PGP (e.g., fixed cone valve[s]) to throttle the flow of water into each regulating reservoir when the turbines are not being used.

A transition manifold would be constructed at the base of Golden Gate Dam to connect pipelines from Sites Reservoir to Funks Reservoir and the TRR pipelines. In

addition, a point of interconnection to a high-voltage electric transmission line would be required to power the facilities at the proposed TRR and Funks electrical substations.

Water released from Sites Reservoir would be conveyed south of Sites Reservoir using the existing Tehama-Colusa Canal and a new Dunnigan pipeline. The water would flow south about 40 miles to the end of the Tehama-Colusa Canal, where it would be diverted into the proposed Dunnigan Pipeline. Under Alternative 1, the flows would subsequently be conveyed to the CBD and released through the proposed CBD Outlet Structure, eventually reaching the Sacramento River at Knights Landing or to the Yolo Bypass/Cache Slough complex through the Knights Landing Ridge Cut. Under Alternative 2 water would flow south to the end of the Tehama-Colusa Canal but would be diverted into an extended Dunnigan Pipeline, with release directly to the Sacramento River with some flows released to the CBD to flow into the Yolo Bypass/Cache Slough complex through the Knights Landing Ridge Cut for environmental benefits under Proposition 1.

2.3 Proposed Reservoir Facilities

Under either alternative, water would be impounded by the Golden Gate Dam on Funks Creek and the Sites Dam on Stone Corral Creek; a series of saddle dams along the eastern and northern rims of reservoir would close off topographic saddles in the surrounding ridges to form Sites Reservoir. Two saddle dikes are also needed at topographic saddle low points along the northern end of the reservoir. These components of the reservoir would be scaled according to the alternative.

Under Alternative 1, the proposed 1.5-MAF reservoir would have a Normal Maximum Water Surface (NMWS) elevation of 498 feet. Under Alternative 2, the proposed 1.3-MAF reservoir would have an NMWS elevation of 482 feet. Nominal crest would be at elevation 517 feet for all dams for 1.5-MAF capacity, and at elevation 500 feet for 1.3-MAF capacity. Table 2 presents a summary of dam heights required to impound Sites Reservoir for the 1.5-MAF capacity and 1.3-MAF capacity.

Table 2. Dam Heights for 1.5-MAF and 1.3-MAF Sites Reservoir Alternatives

Dam/Dike	1.5-MAF Reservoir Maximum Height Above Streambed (feet)	1.3-MAF Reservoir Maximum Height Above Streambed (feet)
Golden Gate Dam	287	270
Sites Dam	267	250
Saddle Dam 1	27	None
Saddle Dam 2	57	40
Saddle Dam 3	107	90
Saddle Dam 5	77	60
Saddle Dam 6	47	None
Saddle Dam 8A	82	65
Saddle Dam 8B	37	5
Saddle Dike 1	12	10 (near Saddle Dam 1)
Saddle Dike 2	12	10 (near Saddle Dam 6)
Saddle Dam 10 ^a	Not required for 1.5-MAF Reservoir	30

^a For the 1.3-MAF Reservoir, Golden Gate Dam would be reconfigured and Saddle Dam 10 added to close off a topographic saddle in the ridge that is closed in the 1.5-MAF Golden Gate Dam configuration.

The engineering team is continuing to evaluate different options for dam fill that would be utilized under either Alternative 1 or Alternative 2. One option is an earth- and rockfill dam and another option is an earthfill dam. The proposed inlet/outlet works for an earthfill dam would be located to the south of Golden Gate Dam and would be used both to fill the reservoir through conveyance facilities located to the East and to make releases from Sites Reservoir. The inlet/outlet works include:

1. A multi-level intake tower including a low-level intake.
2. Two 23 foot inside diameter inlet/outlet tunnels through the ridge on the right abutment of Golden Gate Dam.

2.4 Proposed Recreational Facilities

As specified in the Sites Water Storage Investment Program application, either alternative would include two primary recreation areas and a day-use boat ramp which are to be phased in over a period of time. Located on the northwest shore of the proposed Sites Reservoir, to the north of the existing Sites Lodoga Road, the Peninsula Hills Recreation Area would include approximately:

- 200 campsites (car and recreational vehicle)
- one group camp area
- 10 picnic sites (with parking at each site)
- hiking trails
- electricity
- potable water
- one kiosk
- 19 vault toilets

Located on the eastern shore of the Sites Reservoir, north of the existing Maxwell Sites Road and proposed Sites Dam, the Stone Corral Creek Recreational Area would include:

- 50 campsites (car and recreational vehicle)
- electricity

- 10 picnic sites (with parking at each site)
- six-lane boat launch site
- hiking trails
- potable water
- one kiosk
- 10 vault toilets

Each alternative would also include a Day-Use Boat Ramp/Parking Recreation Area, located on the western side of the reservoir where the existing Sites Lodoga Road intersects with the proposed inundation area for the reservoir. Facilities would include:

- one kiosk
- one vault toilet
- potable water
- parking area

2.5 Proposed Roads and South Bridge

In addition to modifying existing roads for construction access, the project will require up to 46 miles of new paved and unpaved roads to provide construction and maintenance access to the proposed facilities, as well as public access to the proposed recreation areas. Sites Lodoga Road provides access to and from the town of Maxwell, which is adjacent to Interstate 5. Sites Lodoga Road becomes Maxwell Sites Road east of the rural community of Sites that is within the inundation area. The reservoir would eliminate east-west access to Interstate 5 (east of the reservoir) from the rural communities of Stonyford and Lodoga (west of the reservoir) because it would inundate the current route of Sites Lodoga Road. The current Sites Lodoga Road is an east-west, two-lane rural collector road and provides an emergency and evacuation route to and from these rural communities. Because construction of the Sites Dam would eliminate access on the Sites Lodoga Road, this collector road would need to be relocated/realigned prior to project construction.

Under Alternative 1, the realigned Sites Lodoga Road would include the construction of a bridge across the reservoir. Various bridge types and options have been evaluated. One option for a bridge is a full-length bridge that would offer navigational passage along the entire width of the reservoir. Another option for a bridge is a causeway with partial fill, which would limit the navigational passage within the reaches of the shorter bridges; however, the approach to implementing fill prism in the reservoir would significantly reduce construction cost. Alternative 1 would also include the realignment of the existing Huffmaster Road to provide access to properties otherwise inaccessible due to reservoir construction.

Under Alternative 2, the realignment of Sites Lodoga Road would result in a road that ultimately extends from Maxwell to the community of Lodoga around the southern end and western side of the proposed Sites Reservoir. This road, referred to as the Maxwell Lodoga Road, would include the realignment and repavement of the existing Huffmaster Road.

2.6 Project Buffer

The proposed project buffer would consist of the total amount of land that would be acquired beyond the facility footprints for each alternative. The preliminary approach to the buffer is outlined below.

- The buffer would include 100 feet around all buildings and most ground facilities (e.g., substations, any aboveground pipelines) along with 100 feet around the Sites Reservoir Complex and recreation areas.
- The buffer may be less than 100 feet if the facility is near a property boundary and the proposed uses do not conflict with the adjacent land uses.
- No project buffers are anticipated for underground or buried facilities (i.e., Dunnigan Pipeline), overhead power lines, or roads (both public and project maintenance access roads).
- The Authority would evaluate the need for the buffer (and if implemented, an appropriate width) on a case-by-case basis in coordination with adjacent landowners. The buffer would likely be acquired in fee title by the Authority; however, acquisition of buffer areas in an easement may be feasible under certain circumstances.
- The lands within the buffer would generally remain undeveloped. Limited features may be installed to reduce future maintenance activities and fire hazards. These features may include limited fencing, regrading to construct fire breaks or fire trails, or similar actions.
- The lands within the buffer would be maintained by the Authority. Maintenance activities that are proposed to be undertaken within the project buffer include vegetation maintenance and periodic fire break maintenance. Such activities may include grazing, periodic tilling or disking, and performing limited controlled/prescribed burns. Where appropriate, the buffer may be managed as wildlife habitat. Fence maintenance would occur within the buffer.

3.0 Operations

The operation of the project under each alternative will be defined in upcoming months as the modeling and development of diversion criteria are further advanced. The member participants of the Authority have a collective demand of approximately 240,000 acre-feet, of which 192,892 acre-feet is needed by participating public water agencies³. Reclamation is also a participant through funding and/or operational exchanges with Shasta Lake. The State would also be involved through operational exchanges with Oroville Reservoir and storage in State Water Project facilities south-of-Delta.

Sites Reservoir would be filled by diverting unregulated/unappropriated flow in the Sacramento River. This water originates during winter storm events, which increase flows in the tributaries to the Sacramento River below Keswick Dam and avoiding any effects on the Trinity River. Water would be available for diversion after senior water rights are met, in-river aquatic species protection requirements are met, and delta water quality requirements have been met. Diversions would occur at the fish screened Red Bluff Pumping Plant and the GCID Hamilton City location when applicable regulatory requirements are met and existing pumping and conveyance capacity is available to convey water through the canals to the reservoir. TRR and Funks Reservoir, PGPs, and pipelines connect directly to the inlet/outlet works and would be operated in parallel to

³ April 2020 Sites Project Value Planning Alternatives Appraisal Report.

pump water into and out of Sites Reservoir. Water would enter (and be released from) the reservoir through the inlet/outlet works.

Reservoir releases include releases to meet participant demands and to deliver water for a range of environmental benefits that will be finalized during project development and permitting.

- Sites Reservoir would be operated in cooperation with Central Valley Project (CVP) and SWP operations to coordinate with releases made with the CVP and SWP from Shasta Lake, Lake Oroville, and Folsom Lake. Sites Reservoir releases could supplement and/or allow reduced releases from other reservoirs while maintaining minimum instream flow objectives, Sacramento River temperature requirements, and Delta salinity control requirements assigned to CVP and SWP.
- Releases would be made mostly in dry and critical water years. Water users north of the Delta would mostly receive deliveries from the TCCA canal and GCID canal. Water users south of the Delta would receive water primarily via SWP pumping facilities.
- Using the CBD for conveyance of Sites Reservoir water would include coordination with the local landowners regarding the project operation and timing of the additional flows.

Releases would also be made to Funks and Stone Corral Creeks for downstream water right holders and to maintain ecological function in the sections of these creeks affected by the project. A proposed Reservoir Operations Plan would describe the management of water operations, including releases to Funks and Stone Corral Creeks.

Operation of either alternative would require power to run facilities and pump water. The identification of a power source and the location of transmission facilities is pending coordination with Western Area Power Administration and/or Pacific Gas and Electric. Each of the alternatives would also generate incidental power when water is released from Sites Reservoir at the Funks PGP and TRR PGP. The capacity of the project power generation facilities is anticipated to be below the threshold such that no license would be required from the Federal Energy Regulatory Commission and the facilities would satisfy the criteria for a "Qualifying Conduit Hydropower Facility" under the Hydropower Regulatory Efficiency Act of 2013, as amended by America's Water Infrastructure Act of 2018.

4.0 Maintenance and Management

Under either alternative, maintenance activities for the project facilities would include debris removal, dredging, vegetation control, rodent control, erosion control and protection, routine inspections (dams, tunnels, pipelines, PGPs, inlet/outlet works, fencing, signs, and gates), painting, cleaning, repairs, and other routine tasks to maintain facilities in accordance with design standards after construction and commissioning. Routine visual inspection of the facilities would be conducted to monitor performance and prevent mechanical and structural failures of project elements. Maintenance activities associated with proposed river intakes could include

cleaning, removal of sediment, debris, and biofouling materials. These maintenance actions could require dewatering; suction dredging or mechanical excavation around intake structures; or the use of underwater diving crews, boom trucks, rubber-wheel cranes, and raft- or barge-mounted equipment. Proposed maintenance activities could occur on a daily, annually, periodically (as needed), and long-term basis.

The Authority would also develop and implement a Reservoir Management Plan to define the land uses of project lands controlled by the Authority, fish stocking and vector control practices, and the resources associated with project lands. The Reservoir Management Plan would include the following types of information:

- **Fisheries Management.** This would target species composition for Sites Reservoir, including stocking strategies, habitat enhancement measures, and monitoring efforts.
- **Land Use Management and Recreation.** This would outline how decisions regarding future amenities would be made and what land use considerations would be factored into Authority operations and activities.
- **Easement Management:** Right-of-ways and/or permanent easements would be required for long-term operation and maintenance of all the large-diameter pipelines. This would outline management and maintenance activities for easement areas.
- **Emergency Management.** This would establish protocol on how the Authority would be involved in controlling and resolving emergency situations, including those arising as a result of recreationists.
- **Vector Management.** This would establish protocols and practices for communicating and coordinating with vector control authorities in determining how vector control would be managed at the project facilities.
- **Sediment Management and Removal.** This would consolidate information on the frequency and locations of dredging, testing of sediment before disposal, disposal locations, and procedures to follow if sediment contaminant levels exceed regulatory standards for constituents of concern (e.g., pesticides).

5.0 Best Management Practices

A number of Best Management Practices and environmental commitments are proposed to be included in Project design, construction and operation/maintenance. The following proposed list of Best Management Practices and environmental commitments would be considered part of the Project.

- Conform with Applicable Design Standards and Building Codes
- Perform Geotechnical Evaluations and Prepare Geotechnical Data Reports
- Utility and Infrastructure Verification and/or Relocation
- Natural Gas Well Decommissioning
- Water Wells Decommissioning
- Road Abandonment
- Environmental Site Assessment(s)

- Salvage, Stockpile, and Replace Topsoil and Prepare a Topsoil Storage and Handling Plan
- Stormwater Pollution Prevention Plan(s) and Best Management Practices (storm water and non-storm water)
- Stormwater Pollution Prevention Plan for Operation and Maintenance
- Spill Prevention and Hazardous Materials Management / Accidental Spill Prevention, Containment, and Countermeasure Plans and Response Measures
- Minimize Soil Disturbance
- Comply with Requirements of RWQCB Order 5-00-175
- Groundwater/ Dewatering Water Supply
- Construction Equipment, Truck, and Traffic Management Plan
- Visual/Aesthetic Design, Construction, and Operation Practices
- Fire Safety and Suppression / Fire Prevention and Control Plan
- Worker Health and Safety Plan
- Blasting Standard Requirements
- Mosquito and Vector Control During Construction
- Construction Noise Management
- Operation and Maintenance Noise Management
- Construction Emergency Action Plan
- Emergency Action Plan for Reservoir Operations
- Electrical Power Guidelines and EMF Field Management Plan
- Construction Equipment Exhaust Reduction Plan
- Fugitive Dust Control Plans
- Construction Best Management Practices to Reduce Greenhouse Gas Emissions
- Hazardous Materials Management Plans
- Construction Site Security
- Notification of Maintenance Activities in Waterways
- Worker Environmental Awareness Program
- Fish Rescue and Salvage Plans for Funks Reservoir, Stone Corral Creek, and Funks Creek for Alternative 1; for Sacramento River for Alternative 2
- Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities
- Control of Invasive Plant Species during Construction and Operation

6.0 Pre-Construction Activities

In addition to items/activities addressed in the above list of proposed BMPs and ECs, there are other activities that would be required prior to the initiation of construction of the different physical components of either Alternative 1 or Alternative 2. These activities include: finalizing criteria and standards used for final design, including emergency management/release requirements; preparing a Dam Monitoring Program; conducting additional geotechnical and related field investigations to support design; relocation of two private cemeteries (Sites Cemetery and a Rancheria Cemetery); and the development and implementation of a Resident Relocation Program.

7.0 Timing of Environmental Review and Feasibility Report

The current schedule contemplates release of the Revised EIR/Supplemental EIS in July 2021. This is roughly the same timing for the engineering team's finalization of the Feasibility Report for the California Water Commission. As such, preparation of the Revised EIR/Supplemental EIS and Feasibility Report are proceeding simultaneously. To accommodate the project schedule and the simultaneous preparation of the Revised EIR/Supplemental EIS and Feasibility Report, the following project components will be utilized for the analysis:

- Sites Lodoga Road and Bridge – Under Alternative 1, the Revised EIR/Supplemental EIS will include the option of the shorter bridge with fill prisms, including the cast-in-place prestressed concrete box girder bridge type. This option was identified as a lowest cost bridge alternative in the Value Planning Report while meeting the functional requirements for efficient traffic flow.
- Dam Fill Materials – Under Alternative 1 and 2, the Revised EIR/Supplemental EIS will include the option of using earth and rockfill. This option is anticipated to be preferred by the Division of Safety of Dams and will assist in meeting the schedule and affordability goals; it also provides maximum coverage for potential environmental effects as the rockfill involves blasting associated with rock quarrying.
- Terminal Regulating Reservoir (TRR) – Under Alternative 1 and 2, it is anticipated that the Revised EIR/Supplemental EIS will include the current TRR location. Other locations currently are under review due to the extent and costs associated with ground preparation needed for construction at the current site.
- GCID and Colusa Basin Drain Facility Improvements – Under Alternative 1 and 2, the Revised EIR/Supplemental EIS will describe the types of improvements needed to convey water through existing facilities and reduce GCID's current maintenance winter shutdown period from 6 weeks to 2 weeks, pending agreement between GCID and the Authority on any specific improvements that may be warranted due to implementation of the project. Improvements may also be needed to the Colusa Basin Drain to convey Sites water.
- Emergency Releases – In the rare and unanticipated condition that the Sites Reservoir has to conduct emergency releases, these releases are currently planned to be made into Funks Creek, Stone Corral Creek, and into the Hunters Creek watershed via Saddle Dam 3, 5, and 8b. Emergency release locations and the extent of potential impacts will be evaluated in further detail as part of the on-going feasibility study.
- Dunnigan Release – Under Alternative 1, the Revised EIR/Supplemental EIS will evaluate a release to the CBD based on a preliminary hydraulic analysis. Alternatives 2 will carry forward an extension of the Dunnigan pipeline to the Sacramento River.
- Hydropower Generation – Under Alternative 1 and 2, the Revised EIR/Supplemental EIS will evaluate incidental in-line conduit hydropower generation below the threshold for a Federal Energy Regulatory Commission license.
- Temporary Water Supply for Construction – Under Alternative 1 and 2, the Revised EIR/Supplemental EIS will evaluate options for obtaining temporary water supply for construction, such as obtaining water on site via existing groundwater

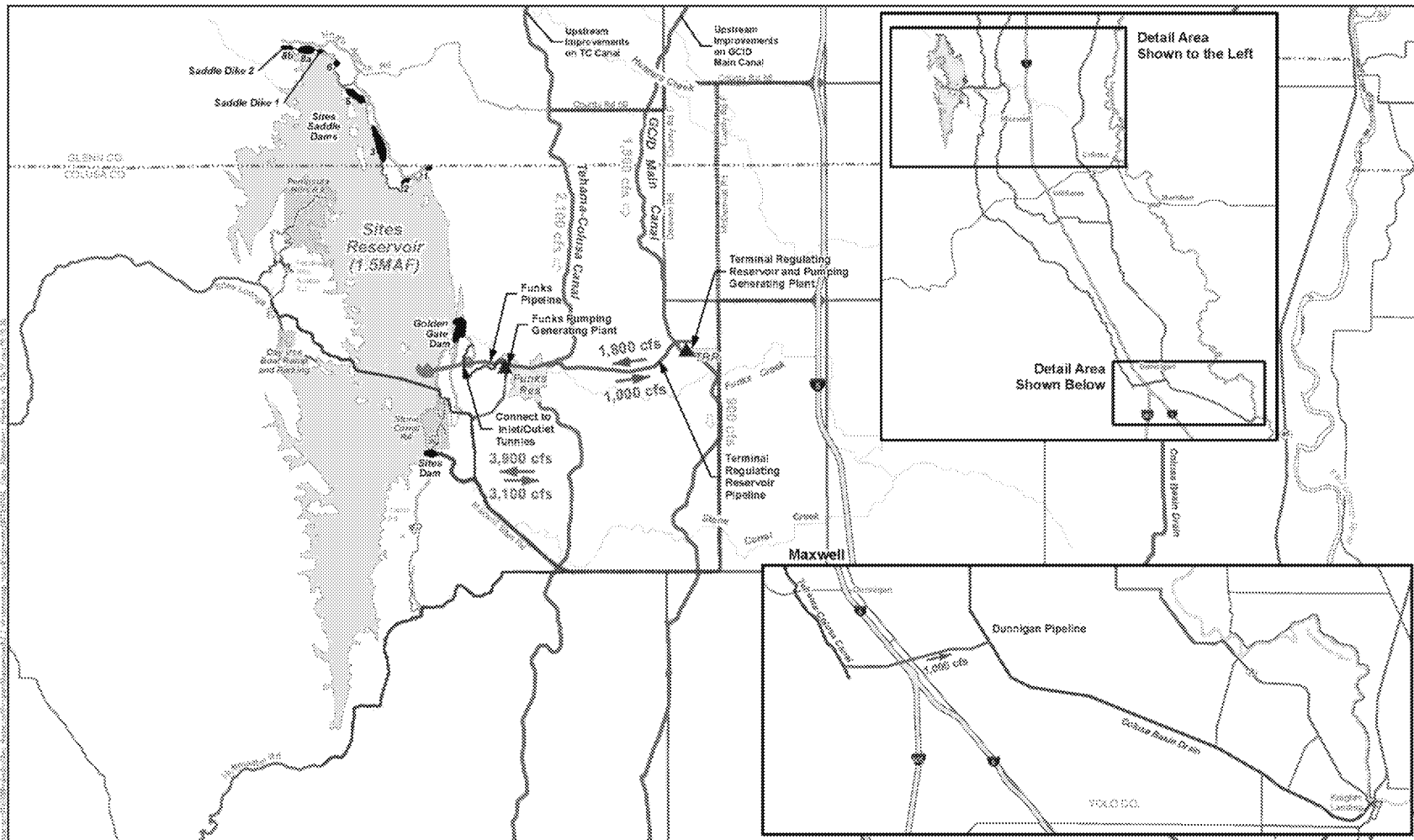
or surface water facilities and/or utilizing existing or drilling new wells, including any necessary treatment depending on the water quality.

The engineering team will continue to consider and analyze options for various facility components, consistent with CEQA and NEPA requirements, in order to optimize design considerations and reduce costs.

It should also be noted that in the upcoming weeks, there will be further definition of project operations through modeling, clarification of water rights, and consultation with resource agencies. This information and any resulting changes to the alternatives described in the preliminary draft will be incorporated into the complete Chapter 2, Alternatives Description, to be completed by December 2020.

8.0 Identification of the Preferred Alternative for the Revised EIR/Supplemental EIS Analysis

The CEQA Guidelines require that an EIR analyze a reasonable range of alternatives to the project which would feasibly attain most of the basic objectives of the project and avoid or substantially lessen the significant effects of the project. An EIR also needs to identify a proposed project, i.e., a preferred alternative. At this time, Authority staff is recommending the designation of Alternative 1 as the Authority's proposed project based on it meeting the objectives identified in the Value Planning Report and being most closely aligned with Alternative VP-7, and its ability to meet the revised draft CEQA project objectives. The Revised EIR/Supplemental EIS will also evaluate Alternative 2 and the No Project/No Action Alternative.

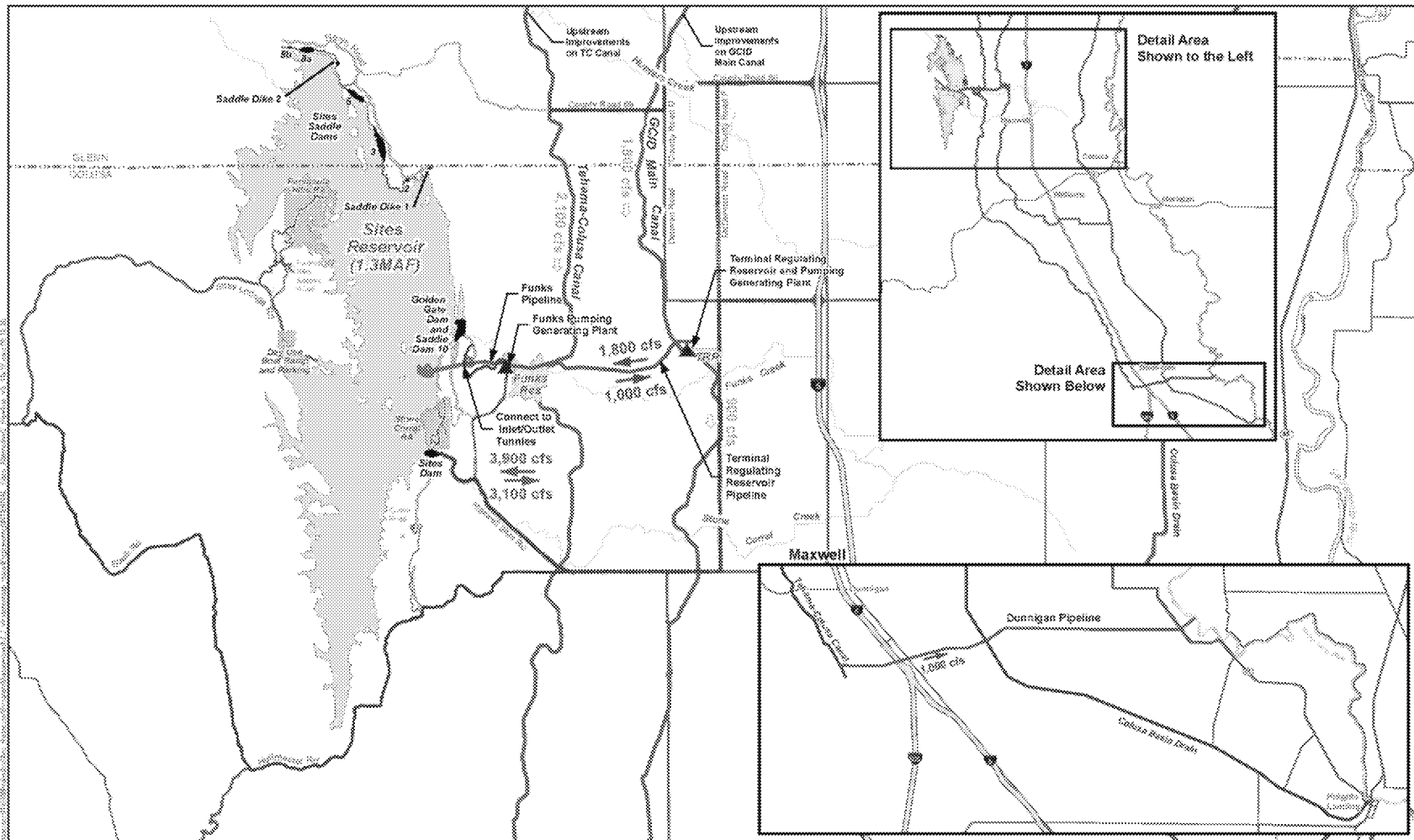


ALTERNATIVE 1

Legend

- Canal
- Pipeline
- Maintenance Access Road
- Construction/Maintenance Route
- New/Realigned Permanent Road
- Construction Route (Existing Road)
- Existing Roads
- Waterways

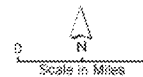




ALTERNATIVE 2

Legend

- | | | | |
|------------|----------------------------------|--------------------------------------|------------------|
| — Canal | — Maintenance Access Road | — New/Realigned Permanent Road | — Existing Roads |
| — Pipeline | — Construction/Maintenance Route | — Construction Route (Existing Road) | — Waterways |



Sites Reservoir Project Revised Recommended EIR Objectives September 8, 2020

- OBJ-1: Improve water supply reliability and resiliency to meet member participants' agricultural and municipal long-term average annual water demand in a cost-effective manner for all member participants', including those that are the most cost-sensitive.
- OBJ-2: Provide public benefits consistent with Proposition 1 of 2014 and use Water Storage Investment Program (WSIP) funds to improve statewide surface water supply reliability and flexibility to enhance opportunities for fisheries and habitat management for the public benefit through a designated long-term average annual water supply.
- OBJ-3: Provide public benefits consistent with the Water Infrastructure Improvements for the Nation Act (WIIN Act) of 2016 by using federal funds, if available, provided by Reclamation to improve Central Valley Project (CVP) operational flexibility in meeting CVP environmental and contractual water supply needs and improving cold pool management in Shasta Reservoir to benefit anadromous fish
- OBJ-4: Provide surface water to convey biomass from the floodplain to the Delta to enhance the Delta ecosystem for the benefit of pelagic fishes¹ in the north Delta (e.g., Cache Slough).
- OBJ-5: Provide local and regional amenities, such as developing recreational facilities, reducing local flood damage, and maintaining roadway connectivity through modifications.

¹ Pelagic fish are species that spend most of their life swimming in the water column, having little contact or dependency with the bottom.

Sites Reservoir Project - Yocha Dehe Meeting Agenda



Date: September 30, 2020

Location: Link Provide in Outlook Invitation

Time: 2:00 PM to 3:00 PM

Leader: Sites Authority

Recorder: Sites Integration

Purpose: Quarterly Project Update Meeting with Representatives of the Yocha Dehe Wintun Nation

Attendees:

Laverne Bill, Yocha Dehe	Kevin Spesert, Sites Authority	Ali Forsythe, Sites Authority
Isaac Bojorquez, Yocha Dehe	Janis Offermann, Horizon	Laurie Warner Herson, Sites Integration

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Introductions/Purpose of the Meeting	Kevin	10 min
2. Project Update <ul style="list-style-type: none"> a. Development of Alternatives b. Designation of Preferred Alternative 	Ali	10 min
3. CEQA Schedule <ul style="list-style-type: none"> a. Revised EIR Analysis b. Re-initiation of AB 52 Letters 	Laurie/Janis	10 min
4. Reclamation Coordination <ul style="list-style-type: none"> a. Yocha Dehe Treatment Protocol 	Janis	5 min
5. Yocha Dehe Questions and Concerns	Laverne/Isaac	20 min
6. Next Steps	All	5 min

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 9/29/2020 8:11:25 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

I have not seen anything that is more recent. I also think that it is a wise move given our recent discussions with Scott.

Based on calls yesterday and last Wednesday the aquatics team is also looking to move the meetings with CDFW up, the first being targeted for 10/19. I will be sending out a separate email discussing this but the team feels that we need to engage the CDFW right after the OBAN/IOS run under the "relaxed" criteria Jacobs has been running to allow the CDFW staff to understand the changes to the model, and have the opportunity to discuss and provide meaningful input before the entire modeling run is complete. I am waiting for a schedule from ICF that I will then forward to this group with the request.

John Spranza

D 916.679.8858 M 818.640.2487

From: Alicia Forsythe [mailto:aforsythe@sitesproject.org]
Sent: Monday, September 28, 2020 4:48 PM
To: Spranza, John <John.Spranza@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: FW: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi all – After a number of discussions in our various Monday meetings today, I am thinking that it might be better to chat with NRDC and company on their diversion criteria sooner rather than later. I am thinking of reaching out to the same group as below with a doodle poll to get something schedule in early October. This would be separate from our other NGO meetings we are planning in October. Any concerns with moving forward with discussions with NRDC and company?

Also, I assume they would want to see something similar to the attached modelled. And I realize this is a question for them (and the whole purpose of the discussion), but anyone seen anything more recent than the attached from NRDC?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, September 21, 2020 6:32 PM
To: 'Obegi, Doug' <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>

Draft_0003968

Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org

Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Thanks for your email and for watching our agendas / keeping up to date with the project.

I want to assure you that we have not changed our position from my June email. We will have Jacobs evaluate at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. Jacobs is working on a number of revisions to the Sites Calsim model, including modifications to the baseline, which we expect to be completed in the coming weeks. We will reach out to you soon for a meeting in October to discuss where we are on operational criteria along with confirming the criteria that you would like to see modelled.

Once we have the modifications to the Calsim model completed, we will run a series of analyses using the results of Calsim to test the operational criteria and resulting effects to juvenile salmon. These include follow on modeling (that uses the output of the Calsim modeling), such as DSM2 and OBAN, along with spreadsheet analyses based on recent scientific papers – many of which you cite below.

We truly appreciate your input and I will be reaching out in a few weeks to schedule some time to chat in October.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>

Sent: Wednesday, September 16, 2020 9:28 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>

Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org

Subject: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Dear Ali and Jerry,

I hope you're both hanging in there these days, and that you and your families are all safe and sound between fires, hazardous air quality, COVID, and everything else that is making 2020 suck.

I'm writing about the proposal to select a preferred alternative for the Sites Project at tomorrow's meeting of the Authority's Board of Directors (https://3hm5en24txyp2e4cxvxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/02-03-EIR_EIS-Selection-of-Preferred-Project-for-Purposes-of-CEQA.pdf). It appears from the memo to the Board of Directors that the CEQA document will only consider 2 alternatives, with identical operational parameters for those alternatives (meaning that there are no operational alternatives being considered). The memo further states that the preferred alternative will be the basis for the application for a biological opinion and a CESA incidental take permit. I strongly urge the Board and staff at the Authority to take a different approach.

First, considering only a single operational scenario would violate CEQA's mandate to consider a reasonable range of alternatives, a point that state agencies have also made previously with respect to the environmental review for this project. So I hope that I'm misunderstanding the memo to the Board in concluding that this is the only operational alternative that is being considered. In addition, that approach is inconsistent with our last email exchange in June, where you stated that:

"We will have Jacobs conduct an analysis of at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. However, based on analyses we completed last summer / fall, we expect these criteria to result in a project that's not affordable and provides very little water to accomplish the project objectives. Thus, we don't anticipate that this will result in an alternative that we would carry forward for detailed analysis in the Revised EIR as we don't anticipate it to result in a feasible project."

I'm unaware of any such discussions to refine one or more operational alternatives since our email exchange in June. Has the Authority decided not to model any such alternatives? In addition, is the Authority not planning to model an alternative that is consistent with the SWRCB's 55% of unimpaired flow proposal from the July 2018 Framework (https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf)? In addition to violating CEQA, the failure to include analysis of these or similar alternatives should preclude state agencies from relying on the CEQA document for a water rights proceedings and for CESA permitting.

Second, as we have previously emphasized, the proposed operations being considered would significantly harm juvenile salmon migrating down the Sacramento River in the winter and spring months, as the best available science demonstrates a very strong flow: survival relationship for juvenile fall-run, spring-run, and winter-run Chinook salmon in the upper, middle, and lower Sacramento River and in the Delta (see citations below), and it would harm Longfin Smelt and other species downstream as a result of reducing Delta outflow during these months.

I strongly urge the Board to consider a reasonable range of alternatives that includes more protective operational parameters, including an alternative that is consistent with the SWRCB's 55% of unimpaired flow framework for the Sacramento River and an alternative similar to the operations that we have previously proposed. We remain willing to work with you to refine such an alternative.

Thank you for consideration of our views.

Sincerely,
Doug

Citations:

- Stuart Munch et al 2020. *Science for integrative management of a diadromous fish stock: interdependencies of fisheries, flow and habitat restoration*, Can. J. Fish. Aquat. Sci. 77: 1487–1504 (2020) [dx.doi.org/10.1139/cjfas-2020-0075](https://doi.org/10.1139/cjfas-2020-0075);
- Michel, Cyril 2019. *Decoupling outmigration from marine survival indicates outsized influence of streamflow on cohort success for California's Chinook salmon populations*, Can. J. Fish. Aquat. Sci. 76: 1398–1410 (2019) [dx.doi.org/10.1139/cjfas-2018-0140](https://doi.org/10.1139/cjfas-2018-0140);
- Friedman, W. R. et al. 2019. *Modeling composite effects of marine and freshwater processes on migratory species*. Ecosphere 10(7):e02743. [10.1002/ecs2.2743](https://doi.org/10.1002/ecs2.2743);
- Mark Henderson et al, 2018. *Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat and predation related covariates*. Can. J. Fish. Aquat. Sci. 76(9): 1549-1561, <https://doi.org/10.1139/cjfas-2018-0212>;
- Notch, Jeremy et al 2020. *Outmigration survival of wild Chinook salmon smolts through the Sacramento River during historic drought and high water conditions*. Environ Biol Fish, <https://doi.org/10.1007/s10641-020-00952-1>

- Russell Perry et al 2018. Flow-mediated effects on travel time, routing, and survival of juvenile Chinook salmon in a spatially complex, tidally forced river delta. Can. J. Fish. Aquat. Sci. 75(11): 1886-1901, <https://doi.org/10.1139/cjfas-2017-0310>.

DOUG OBEGI
*Senior Attorney**
Water Program

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DOBEGI@NRDC.ORG
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Please save paper.
Think before printing.

** Admitted to practice in California*

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 9/29/2020 9:00:21 AM
To: Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Heydinger, Erin [Erin.Heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Mike.Hendrick@icf.com; Jim Lecky (jim.Lecky@icf.com) [jim.Lecky@icf.com]
CC: Leaf, Rob/SAC [Rob.Leff@jacobs.com]; Micko, Steve/SAC [Steve.Micko@jacobs.com]; Hassrick, Jason [Jason.Hassrick@icf.com]; Chris Fitzer (CFitzer@esassoc.com) [CFitzer@esassoc.com]
Subject: RE: Sites Alt A2 - Preliminary Effects Analysis-Doodle Poll

Hi Reed,

I'm going to send out an email soon with a Doodle pool so we can discuss a few of the results. Current questions are on the Feather and American river flows and Delta Outflow. ICF may have a few more to add to the agenda.

John Spranza

D 916.679.8858 M 818.640.2487

From: Thayer, Reed/SAC [mailto:Reed.Thayer@jacobs.com]
Sent: Wednesday, September 23, 2020 7:17 PM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Mike.Hendrick@icf.com; Jim Lecky (jim.Lecky@icf.com) <jim.Lecky@icf.com>
Cc: Leaf, Rob/SAC <Rob.Leff@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Spranza, John <John.Spranza@hdrinc.com>; Hassrick, Jason <Jason.Hassrick@icf.com>
Subject: Sites Alt A2 - Preliminary Effects Analysis

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Fisheries Team,

We have completed CalSim II modeling for the Sites Alternative A2 – Preliminary Effects Analysis (PEA) scenario. An FR Metrics report and a Trend Reporting Spreadsheet are available at the link below. All files in this transmittal are preliminary and are not for distribution.

https://jacobsengineering-my.sharepoint.com/:f/g/personal/reed_thayer_jacobs_com/EsdGZ-f3GJZOvdTwou_dM-oBZ3eGRhuyv9QnOI4cnew5Mg?e=nhBoda

Scenarios Included

Scenarios provided in this deliverable are tabulated below.

Model Name	Label Name (as seen in spreadsheet)	Description
No Action Alternative	NAA 091720	Baseline simulation (ROC on LTO model assumptions)
ALT A2 092220 rev03 (91 TAF CVP OpFlex) Scn B	ALTA2	Alternative A2 with Value Planning Scenario B criteria
ALT A2 092220 rev03 (91 TAF CVP OpFlex) PEA	ALTA2 PEA	Alternative A2 with relaxed diversion criteria for the preliminary effects analysis

Detailed model assumptions (facility and regulatory criteria) for the scenarios are in the "AssumptionMatrix" tab in Trend Reporting spreadsheet.

FR Metrics

The FR Metrics report, FRmetrics_rev16__ALTA2_CVP91_092220_rev03_PEA_vs_ALTA2_CVP91_092220_rev03.pdf, contains four tables that present results for two scenarios.

- Deliveries Table: Reports deliveries to the point of use, accounting for carriage water, losses, etc.
- Sites Releases Table: Reports the releases from Sites Reservoir by account
- Sites Fills Table: Reports fills to Sites Reservoir by account
- Sites Storage Allocation Table: Reports the size of accounts in Sites Reservoir

Trend Reporting Spreadsheet

The Trend Reporting Spreadsheet, NODOS_Trend_Reporting_rev26dpcy_DV5_HistClim_CALSIM__ALTA2_092220_PrelimEffects.xlsm, is designed to provide easy viewing of multiple scenarios. Please focus on the "Report - ALL (DASHBOARD)" tab. At this tab, you can select the parameter that you wish to evaluate, the type of statistic that you would like to view (e.g. averages, water-year type averages, dry periods), and the seasonal period (e.g. individual months, water year, CVP contract year, selected seasons). There is also an option to convert flow data in CFS to volume in TAF/month.

This tab presents data in the following formats:

- Results Table
- Bar chart of results
- Timeseries of selected statistic
- Exceedance plot (displays all data for the selected seasonal period; is not affected by "select statistic")
- Monthly Pattern (displays the selected statistic for each month; is not affected by "select seasonal period")
- Water-year type averages bar chart (not affected by "select statistic")
- Overall timeseries (includes entire timeseries, not affected by "select statistic" or "select seasonal period").

Not all statistics or seasonal periods should be used for all parameters. For example, seasonal averages or annual averages of reservoir storage do not provide value.

If reviewing results by water year type, please note that water year type averages are calculated based on calendar year, not water year.

Additionally, extra attention should be paid to the scales on the y-axis of each plot.

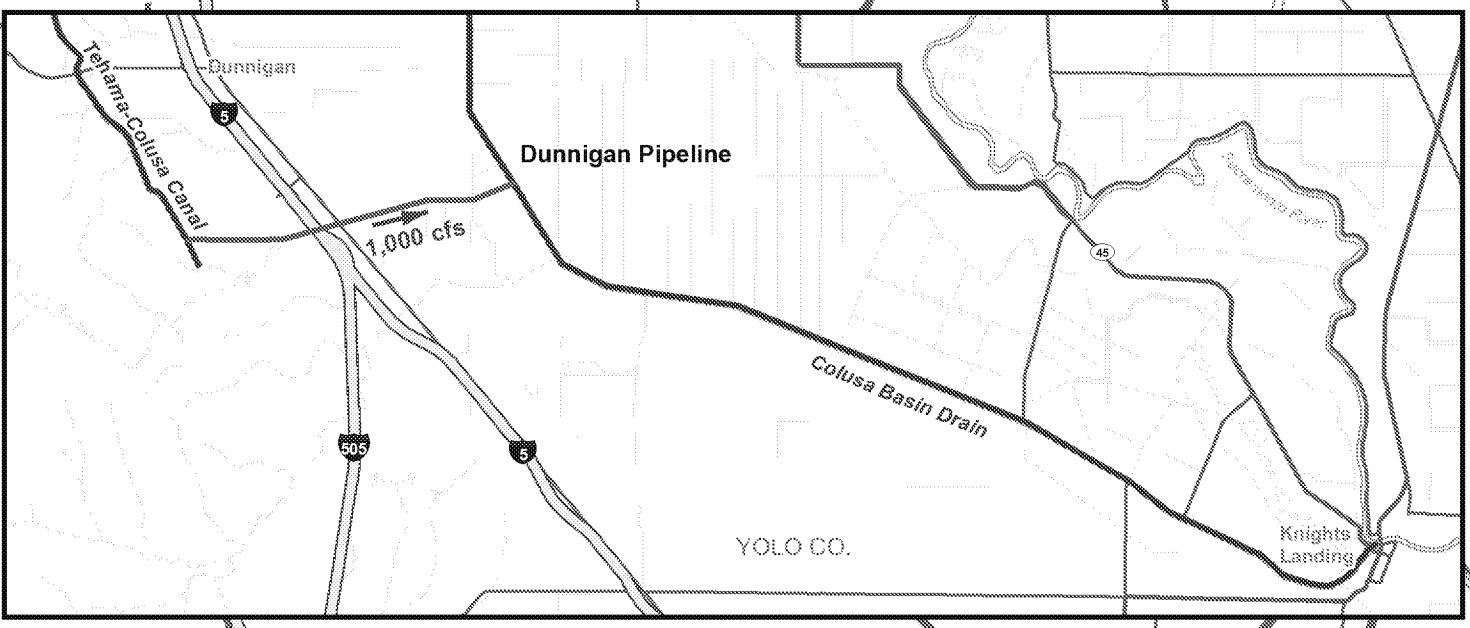
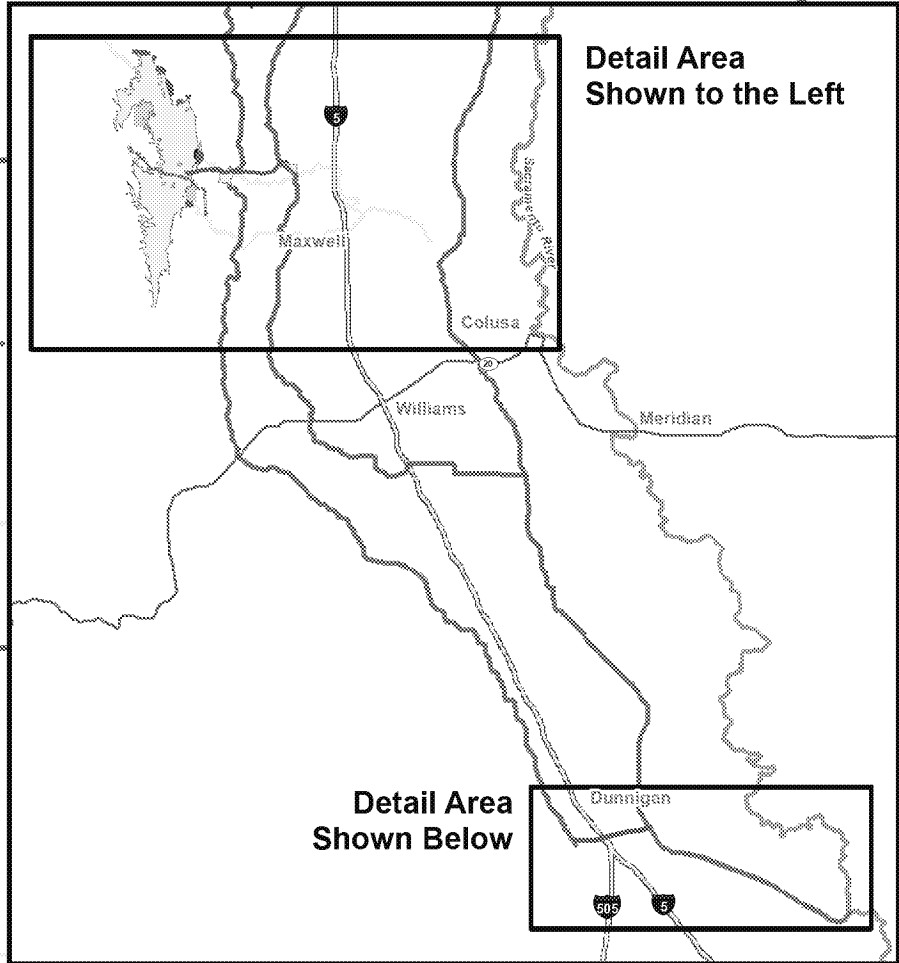
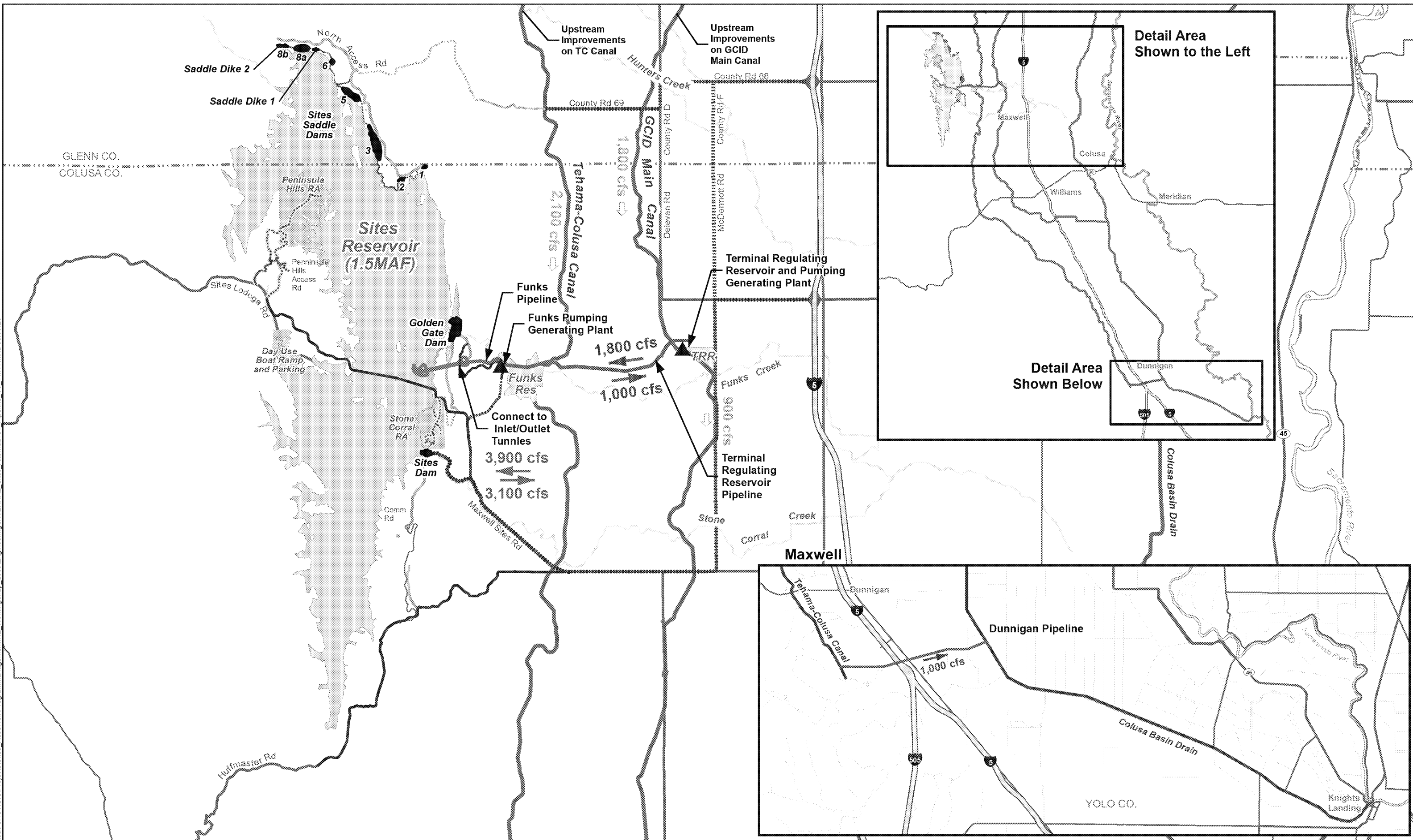
Reed Thayer, PE | [Jacobs](#) | Water Resources Engineer

O: 916.286.0228 | M: 831.233.2141 | reed.thayer@jacobs.com

2485 Natomas Park Dr, Ste 600 | Sacramento, CA 95833 | USA

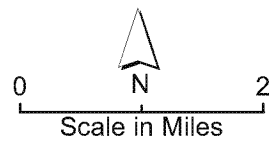
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Legend

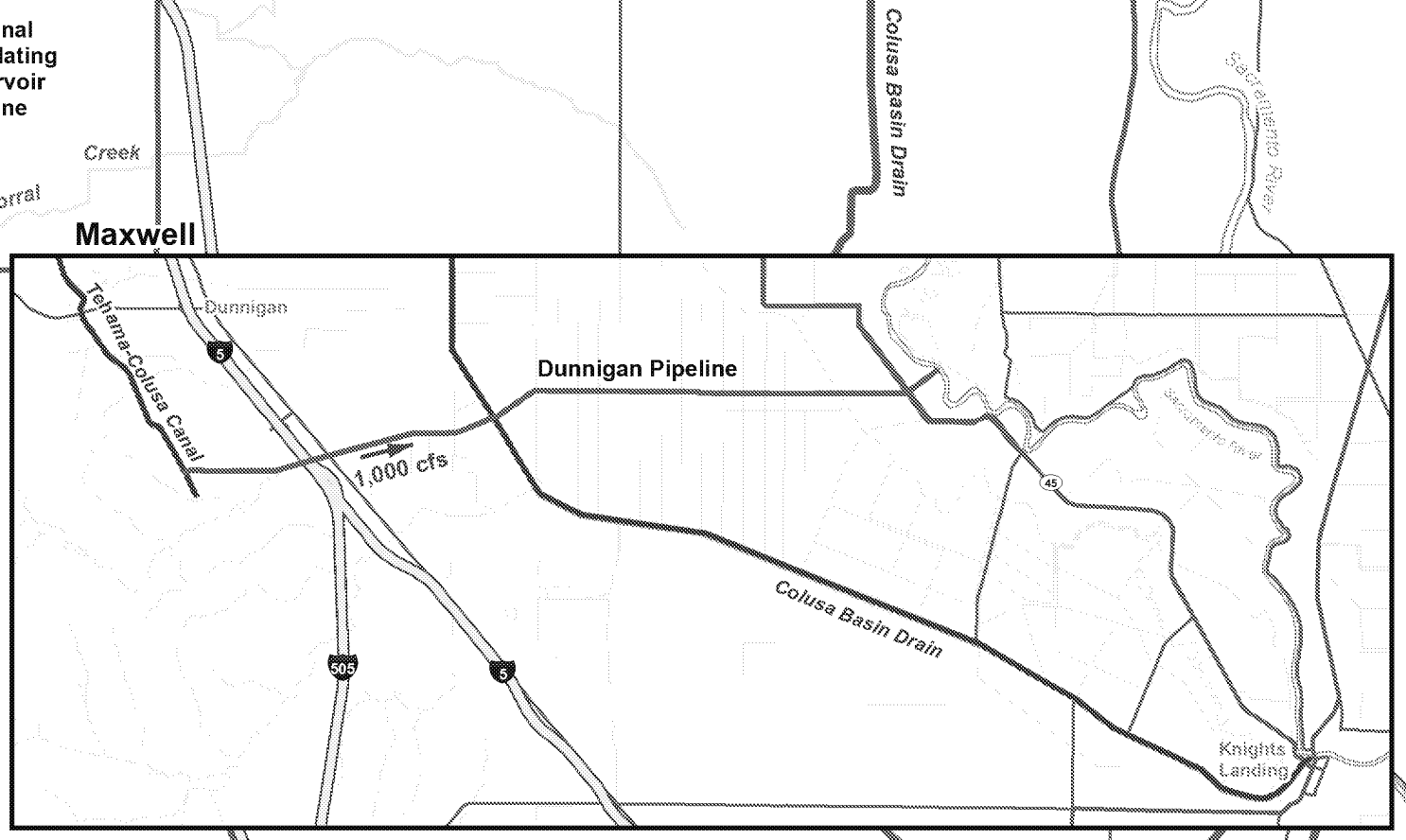
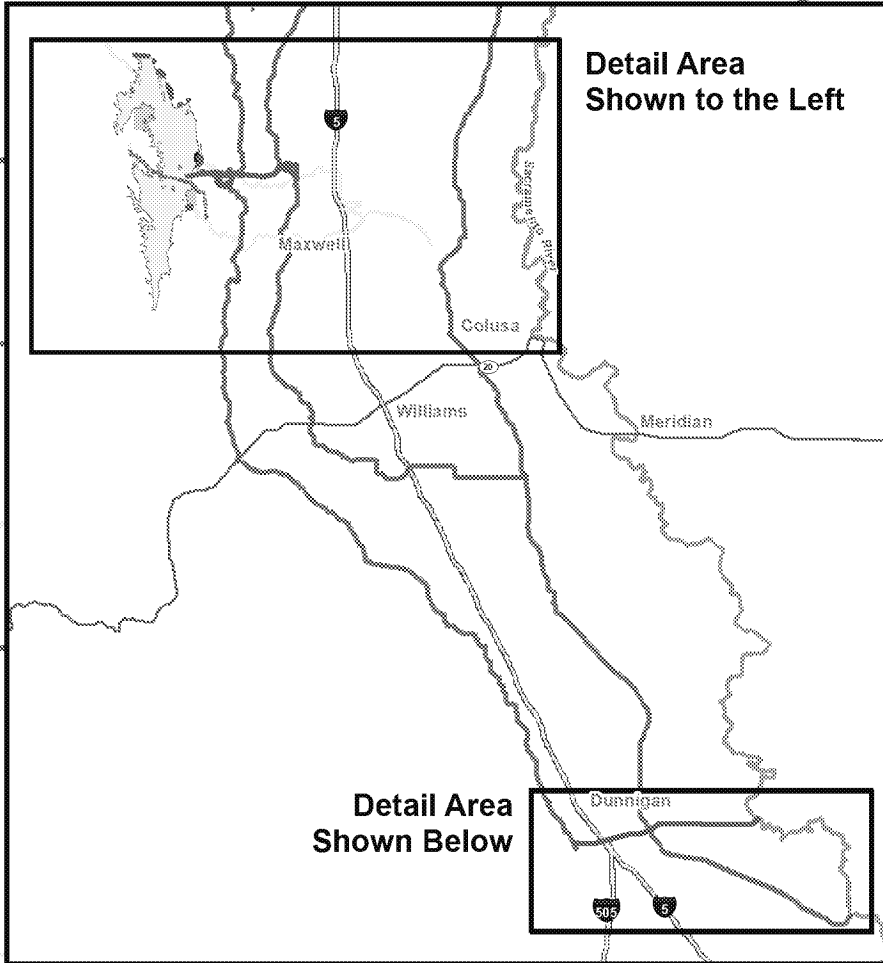
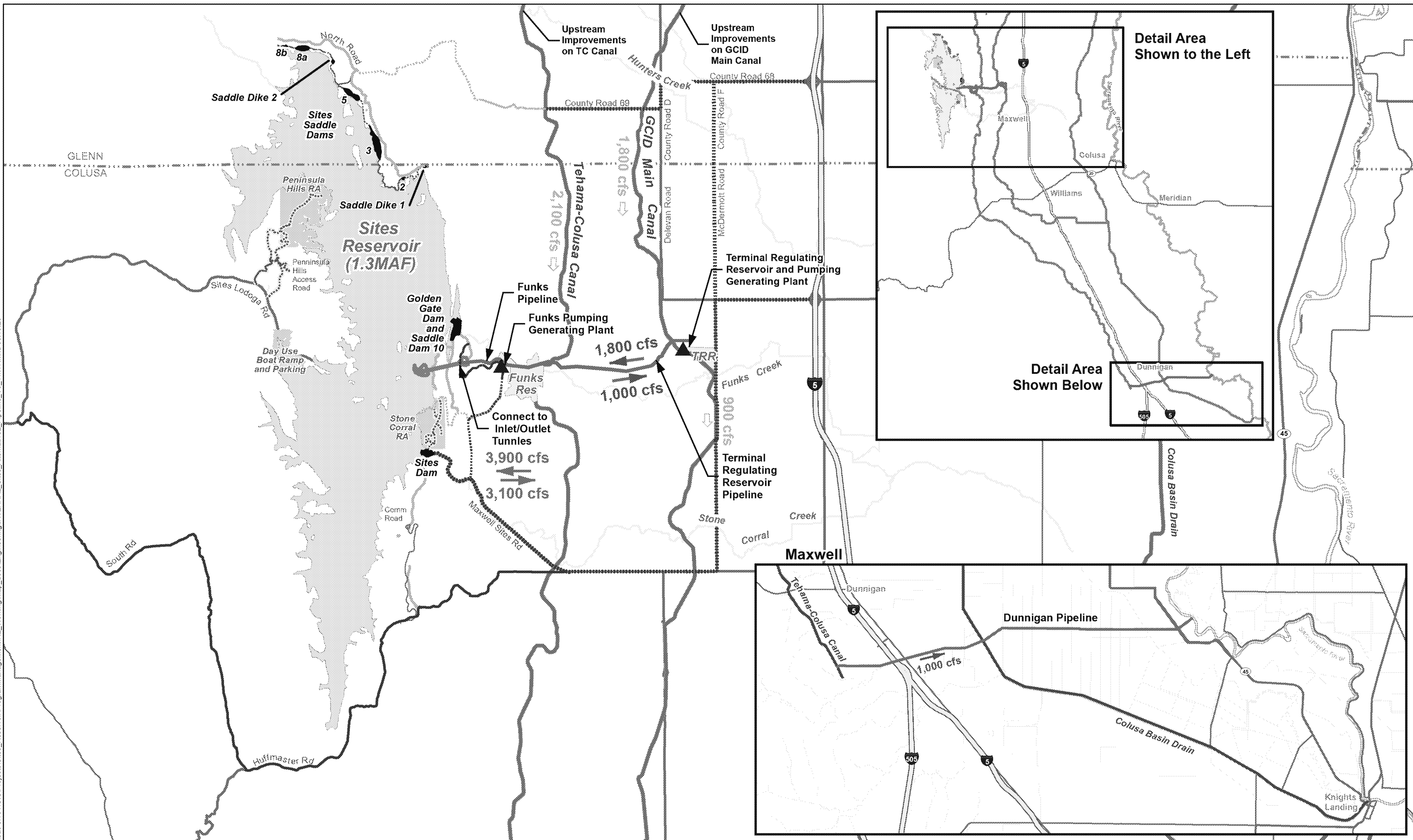
- Canal
- Maintenance Access Road
- New/Realigned Permanent Road
- Existing Roads
- Pipeline
- Construction/Maintenance Route
- Construction Route (Existing Road)
- Waterways



ALTERNATIVE 1

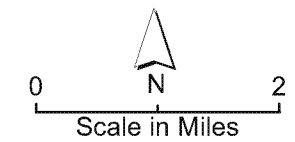
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Legend

- Canal
- Pipeline
- Maintenance Access Road
- Construction/Maintenance Route
- New/Realigned Permanent Road
- Construction Route (Existing Road)
- Existing Roads
- Waterways



ALTERNATIVE 2

Draft_0003975

From: Herrin, Jeff [jjeff.herrin@aecom.com]
Sent: 9/30/2020 8:44:35 AM
To: Marcia Kivett [MKivett@sitesproject.org]; Joe Trapasso [jtrapasso@sitesproject.org]; Erin Heydinger [Erin.Heydinger@hdrinc.com]; Henry Luu [Henry.Luu@hdrinc.com]
Subject: Action Item - Outline/CWC Feasibility Meeting
Attachments: Detailed Sites Reservoir Feasibility Report Outline.docx; Sites Reservoir Feasibility Report Outline.docx

All,

Per discussions in our last call, I have attached two working draft outline versions for the Feasibility Report. The outline complies with the requirements in Section 3.5 of the CWC Technical Reference (November, 2016). One outline is less detailed and appropriate to share with the Commission. The second contains additional detail and a conceptual schedule.

One item we should focus on soon is confirming the proposed schedule for collecting information from the entire project team.

Also, Erin and I were on a call yesterday to discuss Reclamation's alternative analysis for both the Reclamation and Authority alternatives. That might be a topic for follow-up by either this group or the Operations Team. I'm not sure where that lands, but feel free to add it to the agenda for our next meeting if appropriate.

Jeff Herrin

Water Resources Planner, Water Business Unit, Sacramento, CA
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-----Original Appointment-----

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Tuesday, September 29, 2020 10:38 AM
To: Marcia Kivett; Joe Trapasso; Erin Heydinger; Henry Luu; Herrin, Jeff
Subject: CWC Feasibility Meeting
When: Tuesday, October 06, 2020 1:00 PM-2:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

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+1 213-379-5743 United States, Los Angeles (Toll)
(888) 404-2493 United States (Toll-free)

Conference ID: 100 777 467#

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A Brown and Caldwell Teams meeting has been created for this event.

[Help](#)

Sites Reservoir Feasibility Report

Detailed Outline and Schedule

- 1.0 Project Objectives – prepare Tech Memo to confirm/propose benefit distribution
- 2.0 Project Description – short summary for the **preferred alternative** with reference to Appendix A
- 3.0 Project Costs – summary tables for construction and O&M costs with reference to Appendix B
- 4.0 Project Benefits – calculated using CWC Technical Reference methodology based on operations modeling results as modified during the application review process
- 5.0 Cost Allocation and Cost Assignment – based on project benefits and costs using separable benefits/remaining costs (SCRB) method
- 6.0 Technical Feasibility – presentation of proposed operation plan and expected deliveries in different hydrologic year types – reference to Appendix C. Emphasis is on convincing them that we can deliver the water we are committed to delivering, but also address flood and recreation
- 7.0 Environmental Feasibility – need to include a mitigation plan for impacts and indicate if we will file a Statement of Overriding Considerations
- 8.0 Economic Feasibility – BCR analysis based on project benefits and costs
- 9.0 Financial Feasibility – summary (OPTIONAL inclusion of Appendix D)
- 10.0 Constructability – summary with reference to Appendix E

Appendices

- A Project Description (from Draft EIR/S) – include full description from the EIR/S (would prefer to include only the preferred alternative, but not sure that is possible)
- B Cost Estimate Backup
- C Operations Model Details - description of data and analytical methods, the hydrologic period, development conditions, hydrologic time step, and water balance analysis showing, for the with- and without-project condition, all flows and water supplies relevant to the benefits analysis
- D Financial Approach (Optional) – details of financial approach proposed by MDA
- E Constructability Appendix from Draft EIR/S

Overview Schedule

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Project Objectives	█	█								
Project Description					█					
Project Costs					█	█				
Project Benefits			█	█	█	█				
Cost Allocation					█	█				
Technical Feasibility				█	█					
Environmental Feasibility						█				
Economic Feasibility					█	█				
Financial Feasibility						█	█			
Constructability				█	█					
Appendix A – Project Description from EIR/S Team				█						
Appendix B – Cost Estimate from Engineering Team					█					
HR and HC Estimates				█						
Consolidated Estimate for Appendix					█					
Appendix C - Operations Model Appendix from Operations Team				█						
Appendix D - Financial Approach Details/Backup from MDA – pros and cons to including, not required						█				
Appendix E – Consolidated Construction and O&M Appendix from Engineering Team (also included in EIR/S)					█					
Internal Review of Full Report							█			
Work Group Review								█		
Board Review									█	
Submittal to CWC										█

Sites Reservoir Feasibility Report Outline

- 1.0 Project Objectives
- 2.0 Project Description – short summary with reference to Appendix A
- 3.0 Project Costs – summary with reference to Appendix B
- 4.0 Project Benefits
- 5.0 Cost Allocation and Cost Assignment
- 6.0 Technical Feasibility – presentation of proposed operation plan and expected deliveries in different hydrologic year types – reference to Appendix C
- 7.0 Environmental Feasibility
- 8.0 Economic Feasibility
- 9.0 Financial Feasibility – summary with reference to Appendix D
- 10.0 Constructability – summary with reference to Appendix E

Appendices

- A Project Description (from Draft EIR/S)
- B Cost Estimate Backup
- C Operations Model Details - description of data and analytical methods, the hydrologic period, development conditions, hydrologic time step, and water balance analysis showing, for the with- and without-project condition, all flows and water supplies relevant to the benefits analysis
- D Financial Approach (Optional) – details of financial approach proposed by MDA
- E Constructability Appendix from Draft EIR/S

Table 4-4, Summary of Applicable Permits and Approvals

Note: Table 1-1 in the 2017 Document explains what each agency's role on the project is; whereas Table 4-1 in the 2017 document was designed to describe review periods for specific permits. All of this information is important and useful to the reader; so we'll work to combine the two purposes into a single table, since we have eliminated Table 1-1 from the revised introduction. We will also update the list of permits needed for the new project alternatives, and any other changes/updates applicable with the agencies.

To add at a later date, include the responsibilities of the following agencies as described in Table 1-1 of the 2017 Draft EIR/EIS:

-Bureau of Indian Affairs

- Reclamation

-Dept of Agriculture

-WAPA

-CARB

-California Department of Boating and Waterways

-CA Dept of Toxic Substances Control

-Delta Stewardship Council

We will use "see above" for the responsibility column for agencies that are listed multiple times (they are currently grouped by agency).

Agency	Agency Role & Responsibility	Type of Permit or Approval	Regulated Activity	Review Period	Authority
U.S. Army Corps of Engineers		Department of the Army permit (Section 404)	Discharge of dredged or fill material into waters of the United States (including wetlands)	10 to 18 months after application submittal	Section 404 Clean Water Act (33 U.S.C. 1344)
U.S. Army Corps of Engineers		Department of the Army permit (Section 10)	Construction of any structure in or over navigable waters of the United States, the excavation/dredging or deposition of material in these waters, or any obstruction or alteration in navigable waters	10 to 18 months after application submittal	Section 10 of the Rivers and Harbor Act (33 U.S.C. 403)
U.S. Army Corps of Engineers		Department of the Army permission (Section 408)	Any proposed project that may affect any existing USACE (and/or State Plan of Flood Control levee in the Central Valley and Delta)	10 to 18 months after application submittal	Section 408 of the Rivers and Harbor Act (33 U.S.C. 408)
U.S. Environmental Protection Agency/U.S. Army Corps of Engineers		LEDPA review	Review of LEDPA for issuance of an Individual Permit (Section 404) if required. Project could be relieved of LEDPA analysis if water-dependent determination is upheld.	Up to 1 year (approximately) depending on NEPA status	Section 404(b)(1)

Agency	Agency Role & Responsibility	Type of Permit or Approval	Regulated Activity	Review Period	Authority
Advisory Council on Historic Preservation/ State Office of Historic Preservation/Reclamation		Section 106 review and compliance	Federal undertaking (Reclamation) and as part of consideration of a Section 404 permit by USACE	6 to 18 months after Section 106 study result submittal	NHPA (36 CFR 800)
U.S. Fish and Wildlife Service/National Marine Fisheries Service/Reclamation		Section 7 Consultation	Federal undertaking (Reclamation) and as part of consideration of a Section 404 permit by USACE	6 to 18 months after biological assessment (BA) permit application and BA submittal	16 U.S.C. 1531 et seq; 50 CFR 17, Sections 17.94-17.96 ESA
U.S. Fish and Wildlife Service		Bald and Golden Eagle Protection Act (typically addressed through Section 7 consultation)	Federal undertaking that may result in "take" (as defined under this Act) of bald or golden eagles	(typically included as part of Section 7 consultation)	16 U.S.C. 668-668d, 54 Stat. 250
U.S. Coast Guard		Navigability determination	Determination if proposed activities potentially affect river navigation	6 months	33 CFR 2.40
Reclamation		Warren Act Contract	Storage and transportation of non-CVP water facilities	1 year	42 CFR 523
California Department of Transportation		Encroachment permits	Use of California rights-of-way for installation of pipelines along State freeways and roads	2 months after application submittal	21 CCR 14.11.1-14.11.6
California Department of Transportation		Transportation permit	Transport of heavy or oversized loads on State roads during construction	Same day as applied for	California Vehicle Code Section 35780; California Streets and Highway Code 117, 660-711
California State Lands Commission		Land use lease	Placement of fill or structures in navigable waterways or Section 16 or 36 lands (water intake structures are typically exempt from this process)	6 to 12 months after application submittal	California Public Resources Code Section 6000 et. Seq.
Central Valley Flood Protection Board		encroachment permit	Encroachment onto/through state flood control facilities. CVFPB encroachment application requires CEQA and NEPA review completion or exemption (exclusion), environmental review, hydraulic/hydrologic review, and 408 coordination with USACE.	6 to 18 months after application submittal	23 CCR encroachment permit

Agency	Agency Role & Responsibility	Type of Permit or Approval	Regulated Activity	Review Period	Authority
State Water Resources Control Board		Water rights permit	Diversion of water from existing streamflow	3-5 years	California Water Code §5101
State Water Resources Control Board and Regional Water Quality Control Boards		General Construction Stormwater National Pollution Discharge Elimination System permit	All stormwater discharges when clearing, grading, and excavation result in a land disturbance of 5 or more acres	Prior to construction	CWA
State Water Resources Control Board and Regional Water Quality Control Boards		Waste discharge requirements	Discharge of reclaimed water on land and to groundwater	6 to 18 months after application submittal	Porter-Cologne Water Quality Act
State Water Resources Control Board and Regional Water Quality Control Boards		Section 401 Water Quality Certification	Discharge of fill materials to waters of the U.S.	6 to 18 months after application submittal	CWA
California Department of Water Resources, Division of Safety of Dams		Approval of plans and specifications for the construction or enlargement of a dam or reservoir	Dam or reservoir construction or enlargement	6 to 18 months after application submittal	California Water Code Division 3, Dams and Reservoirs Parts 1 and 2
California Occupational Safety and Health Administration		Permits for buildings, structures, scaffolding/falsework, construction, trenches/excavations, and demolition	Construction of trenches or excavations 5 feet or deeper and into which a person is required to descend. Construction or demolition of any building, structure, scaffolding, or falsework more than 3 stories high. The underground use of diesel engines in working mines and tunnels.	6 months after application submittal	California Labor Code Section 6500
California Department of Fish and Wildlife		Streambed Alteration Agreement	Crossing of streams, rivers, or lakes (also for reservoirs, which interrupt streams)	6 to 18 months after application submittal based on 50 percent design	Sections 1601-1603 of the California Fish and Game Code
California Department of Fish and Wildlife		Section 2081 Management Agreement	Potential adverse effects on State-listed endangered or threatened species or species proposed for State listing. Incidental take of State-	6 to 18 months after application submittal based on 50 percent design	Section 2081 California Fish and Game Code

Agency	Agency Role & Responsibility	Type of Permit or Approval	Regulated Activity	Review Period	Authority
			protected species by a non-state entity.		
Native American Heritage Commission/Local Tribes		AB 52 Consultation	Effects on tribal cultural resources	1 to 3 years	California Public Resources Code 21080.3.1
State Office of Historic Preservation		See Advisory Council on Historic Preservation under USACE	Potential adverse effects on State unique archaeological sites and historic resources	6 to 18 months after application submittal	Consultation under Section 106 of the NHPA; state law
Colusa and Glenn County Air Pollution Control Districts		Authority to construct and permit to operate	Construction or operation of any non-exempt source of air contaminants; typically limited to stationary sources	6 months after application submittal	New Source Review regulations; Clean Air Act; New Source Review regulations; Clean Air Act; Glenn County Air Pollution Control District Article III, Sections 50 to 57; Colusa County Air Pollution Control District Regulation III, Rules 3.1 to 3.18.
Colusa and Glenn County Public Works Departments		Encroachment permit	Use of local jurisdictions right-of-way to install pipeline across roadways	2 months	County ordinances
Colusa and Glenn County Public Works Departments		Transportation permit	Transport of heavy or oversized loads on county roads	2 months	County ordinances
Colusa and Glenn County Public Works Departments		Building permit, street improvement permit, grading permit	Construction activities within the county	Approximately 1 month after final design	Uniform Building Codes, as adopted
Colusa County Planning Department		Zoning/General Plan amendment	Changes to zoning or General Plan designations	6 months	County Zoning Code and General Plan

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 9/30/2020 11:39:44 AM
To: Briard, Monique [Monique.Briard@icf.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
CC: John Spranza [John.Spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Berryman, Ellen [Ellen.Berryman@icf.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Williams, Nicole [Nicole.Williams@icf.com]; Unsworth, Ellen [Ellen.Unsworth@icf.com]
Subject: RE: Sites Reservoir BA Data Needs Addressed

Hi Monique,

While I intend to continue to work with Nicole to fill data gaps in the EIR/EIS project description as discussed on Monday (including an upcoming discussion with the Authority agents tomorrow to obtain direction on a list of items) I think that consistency between the BA and EIR/EIS is an ICF function and can more easily be accomplished by ICF staff.

So, regarding the last line of your email -- no, I was not intending to add edits to Ch 2 of the EIR/EIS based on BA input. ICF's revisions to the BA should also be made to the EIR/EIS so that we don't end up with different language/edits.

Thank you,

Laurie

From: Briard, Monique [mailto:Monique.Briard@icf.com]
Sent: Tuesday, September 29, 2020 5:12 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: John Spranza <John.Spranza@hdrinc.com>; 'Alicia Forsythe' <aforsythe@sitesproject.org>; Berryman, Ellen <Ellen.Berryman@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Williams, Nicole <Nicole.Williams@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir BA Data Needs Addressed

Hi Jelica,

Thank you for working on obtaining the additional information needed for the BA project description. I've included Laurie, Nicole and Ellen U on this response since we are all working together on the project description updates for both the BA and the EIR/EIS simultaneously. Nicole, Ellen U and Ellen B met today to go over the updates you provided and added bubble comments in the word document to:

- acknowledge that some of the info is already in Chapter 2 of the EIR/EIS (Yay! And will be added to the BA by Ellen B)
- identify where the info would go in chapter 2 of EIR/EIS if it is not already in there
- identify if the info seemed to conflict with what is already in Chapter 2 of the EIR/EIS
- identify if the info doesn't quite get to what we were looking for

Tracking all of the emails, meeting minutes, etc. last month to develop the PD took a lot of effort so we'd like to implement a process change to implement some efficiencies to the update process. During our bi-weekly EIR/EIS call yesterday, we talked with Laurie about making project description updates directly into the working version of Chapter 2 of the EIR/EIS text on the Sites SharePoint site vs. sending it to us in email. One, this new process will eliminate us having to interpret information that could require further clarification and two, will make sure that the new information is inserted into the right section of the document. For the most part, the information needed for the EIR/S and BA project description is the same so we'd like for the updates to be made in the EIR/S and then we can move the new information into the BA. Our plan is to turn on the notification option in SharePoint so that we know when the Chapter 2 EIR/EIS is updated. I realize that this was sent prior to our call so I'm hoping that you are agreeable to these changes in

the process. Lastly, we are wondering if Laurie has the information in this word document and is in the process of integrating it into the EIR/S on SharePoint?

Thanks,
Monique

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Monday, September 28, 2020 11:54 AM
To: Berryman, Ellen <Ellen.Berryman@icf.com>
Cc: John Spranza <John.Spranza@hdrinc.com>; 'Alicia Forsythe' <aforsythe@sitesproject.org>; Luu, Henry <Henry.Luu@hdrinc.com>; Briard, Monique <Monique.Briard@icf.com>
Subject: FW: Sites Reservoir BA Data Needs Addressed

Hello Ellen

We took out the data needs identified in the BA project description and followed up with both HR/HC. Integration also provided some guidance. Let us know if you have any questions – hope this helps.

BTW – you'll see that there are some items we are going to be following up on with the Authority.

Thanks

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Friday, September 25, 2020 6:57 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Edits/responses are attached.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 24, 2020 6:02 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>

Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

I've combined HR/HC responses and responded to the recreation question by looking at the WSIP application. Please confirm that it looks good to you before we share this information with ICF. You'll see a couple of comments for additional information – perhaps you know the answers.

Laurie – take a look too.

Thanks

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!

HR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Luu, Henry
Sent: Thursday, September 24, 2020 9:27 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Attached are HR's responses.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Luu, Henry
Sent: Wednesday, September 23, 2020 10:32 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

See attached for HC responses. I anticipate HR's comments tomorrow.

I have a couple of additional comments to HC responses:

- GCID is working on refining the initial list of improvements...updates hopefully within the next couple of weeks.

- I think reservoir facilities will require more than 4 years to construction (including roads & bridges). I recommend we assume 6 years of construction with concurrent construction of reservoir and conveyance facilities.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 5:30 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

See revised data needs from BA. It shows areas that overlap with the EIR/S. other areas need clarification. Can we get input from HR/HC?

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 4:19 PM
To: 'Laurie Warner Herson' <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Laurie

See attached BA needs. I went ahead and revised it slightly by highlighting areas that were identified as "highlights/notes from previous requests by EIR/S team"

Hope this helps consolidate and identify meeting topics.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Laurie Warner Herson [<mailto:laurie.warner.herson@phenixenv.com>]
Sent: Thursday, September 17, 2020 3:31 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: Fwd: Sites Reservoir REIR/SEIS - Construction Appendix

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FYI - this was the email exchange that Monique referenced. I offered to help Nicole keep things moving because her husband may have COVID.

I am going to pull together the list of topics, based on the EIR/EIS Ch 2 consolidated comments I sent to ICF yesterday. I will send the list to you two to incorporate permitting needs (I'm assuming they will be very similar, if not the same). Then Jelica can run with the meetings as she has in the past.

If you already have started a list, let me know and I'll add to it.

Begin forwarded message:

From: "Williams, Nicole" <Nicole.Williams@icf.com>
Date: September 17, 2020 at 2:19:21 PM PDT
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: "Briard, Monique" <Monique.Briard@icf.com>, "Unsworth, Ellen" <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie --

Thanks we're waiting on test results, but we know it is not the flu. And of course mandatory quarantine is always fun.

Will do regarding the location for the appendix.

Regarding helping out -- would it be possible for you to pull together an initial list of meeting topics and participants (assuming HR/HC participation) you think are needed based on your review/consolidation of the chapter 2 comments and any conversations you've had about the BA description with John/Jelica? For example, you indicated yesterday in your email there might be some issues with Roads so that might be one meeting that is needed if we weren't provided the information flagged in chapter 2 or if HR had questions about the information we were asking for.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 1:39 PM

Draft_0003989

To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Nicole –

I am so sorry to hear that COVID has hit your family. Please let me know what we can do to help out so you can focus on your family.

I think we should put the construction appendix in the working draft folder in the environmental planning library since it is an attachment to the EIR/EIS:

<https://sitesreservoirproject.sharepoint.com/:f/r/EnvPlanning/Shared%20Documents/Construction%20Appendix?csf=1&web=1&e=be4fub>

Wishing you the best,

Laurie

From: Williams, Nicole [mailto:Nicole.Williams@icf.com]
Sent: Thursday, September 17, 2020 1:08 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie – we’ve made progress on the construction appendix, but unfortunately my husband came down with COVID-related symptoms yesterday, and this has impacted my week. We’ll upload it early next week. Can you let me know where you want it on sharepoint?

Cheers, Nicole

NICOLE L. WILLIAMS | Senior Environmental Planner | (o) 916.231.9614 | (m) 530.867.0470 | nicole.williams@icf.com | icf.com
ICF | 980 9th Street Suite 1200 Sacramento CA 95814 |



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From: Obegi, Doug [dobegi@nrdc.org]
Sent: 9/30/2020 1:22:47 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Thanks Ali. I think it'd be great to include them in the meeting (both of them were involved in developing the attachment to your email this am).

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 30, 2020 1:21 PM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Rachel Zwillinger asked if it would be okay to add in Gary Bobker and Grey Reis from TBI to the doodle poll and meeting. They were not on the email trail and thus, I haven't sent them the doodle poll. Let me know your preference. I am comfortable either way -- just wanted to check with you first.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 30, 2020 9:27 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com) <john.spranza@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Thanks Ali. I'll fill out the Doodle poll.

Best,
Doug

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 30, 2020 8:57 AM
To: Obegi, Doug <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>; Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com) <john.spranza@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug and all – I'd like to schedule some time to discuss and confirm the operational criteria that you all would like to see modelled. Please complete the doodle poll below so I can get a meeting for us on the calendar.

<https://www.doodle.com/poll/cpnk5pqs82d48vga>

Also, I believe the attached document is the most recent / up to date that we have in our files on the groups thoughts. I was thinking we can start our discussion with this document and go from there. Please let me know if there is something more recent we should be reviewing.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, September 21, 2020 6:32 PM
To: 'Obegi, Doug' <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org;
brandon.dawson@sierraclub.org
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Thanks for your email and for watching our agendas / keeping up to date with the project.

I want to assure you that we have not changed our position from my June email. We will have Jacobs evaluate at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. Jacobs is working on a number of revisions to the Sites Calsim model, including modifications to the baseline, which we expect to be completed in the coming weeks. We will reach out to you soon for a meeting in October to discuss where we are on operational criteria along with confirming the criteria that you would like to see modelled.

Once we have the modifications to the Calsim model completed, we will run a series of analyses using the results of Calsim to test the operational criteria and resulting effects to juvenile salmon. These include follow on modeling (that uses the output of the Calsim modeling), such as DSM2 and OBAN, along with spreadsheet analyses based on recent scientific papers – many of which you cite below.

We truly appreciate your input and I will be reaching out in a few weeks to schedule some time to chat in October.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 16, 2020 9:28 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1lfr@aol.com>; jon@baykeeper.org;
brandon.dawson@sierraclub.org
Subject: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Dear Ali and Jerry,

I hope you're both hanging in there these days, and that you and your families are all safe and sound between fires, hazardous air quality, COVID, and everything else that is making 2020 suck.

I'm writing about the proposal to select a preferred alternative for the Sites Project at tomorrow's meeting of the Authority's Board of Directors (https://3hm5en24txyp2e4cxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/02-03-EIR_EIS-Selection-of-Preferred-Project-for-Purposes-of-CEQA.pdf). It appears from the memo to the Board of Directors that the CEQA document will only consider 2 alternatives, with identical operational parameters for those alternatives (meaning that there are no operational alternatives being considered). The memo further states that the preferred alternative will be the basis for the application for a biological opinion and a CESA incidental take permit. I strongly urge the Board and staff at the Authority to take a different approach.

First, considering only a single operational scenario would violate CEQA's mandate to consider a reasonable range of alternatives, a point that state agencies have also made previously with respect to the environmental review for this project. So I hope that I'm misunderstanding the memo to the Board in concluding that this is the only operational alternative that is being considered. In addition, that approach is inconsistent with our last email exchange in June, where you stated that:

"We will have Jacobs conduct an analysis of at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. However, based on analyses we completed last summer / fall, we expect these criteria to result in a project that's not affordable and provides very little water to accomplish the project objectives. Thus, we don't anticipate that this will result in an alternative that we would carry forward for detailed analysis in the Revised EIR as we don't anticipate it to result in a feasible project."

I'm unaware of any such discussions to refine one or more operational alternatives since our email exchange in June. Has the Authority decided not to model any such alternatives? In addition, is the Authority not planning to model an alternative that is consistent with the SWRCB's 55% of unimpaired flow proposal from the July 2018 Framework (https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf)? In addition to violating CEQA, the failure to include analysis of these or similar alternatives should preclude state agencies from relying on the CEQA document for a water rights proceedings and for CESA permitting.

Second, as we have previously emphasized, the proposed operations being considered would significantly harm juvenile salmon migrating down the Sacramento River in the winter and spring months, as the best available science demonstrates a very strong flow: survival relationship for juvenile fall-run, spring-run, and winter-run Chinook salmon in the upper, middle, and lower Sacramento River and in the Delta (see citations below), and it would harm Longfin Smelt and other species downstream as a result of reducing Delta outflow during these months.

I strongly urge the Board to consider a reasonable range of alternatives that includes more protective operational parameters, including an alternative that is consistent with the SWRCB's 55% of unimpaired flow framework for the Sacramento River and an alternative similar to the operations that we have previously proposed. We remain willing to work with you to refine such an alternative.

Thank you for consideration of our views.

Sincerely,
Doug

Citations:

- Stuart Munch et al 2020. *Science for integrative management of a diadromous fish stock: interdependencies of fisheries, flow and habitat restoration*, Can. J. Fish. Aquat. Sci. 77: 1487–1504 (2020) [dx.doi.org/10.1139/cjfas-2020-0075](https://doi.org/10.1139/cjfas-2020-0075);
- Michel, Cyril 2019. *Decoupling outmigration from marine survival indicates outsized influence of streamflow on cohort success for California's Chinook salmon populations*, Can. J. Fish. Aquat. Sci. 76: 1398–1410 (2019) [dx.doi.org/10.1139/cjfas-2018-0140](https://doi.org/10.1139/cjfas-2018-0140);
- Friedman, W. R. et al. 2019. *Modeling composite effects of marine and freshwater processes on migratory species*. Ecosphere 10(7):e02743. [10.1002/ecs2.2743](https://doi.org/10.1002/ecs2.2743);
- Mark Henderson et al, 2018. *Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat and predation related covariates*. Can. J. Fish. Aquat. Sci. 76(9): 1549-1561, <https://doi.org/10.1139/cjfas-2018-0212>;
- Notch, Jeremy et al 2020. *Outmigration survival of wild Chinook salmon smolts through the Sacramento River during historic drought and high water conditions*. Environ Biol Fish, <https://doi.org/10.1007/s10641-020-00952-1>
- Russell Perry et al 2018. *Flow-mediated effects on travel time, routing, and survival of juvenile Chinook salmon in a spatially complex, tidally forced river delta*. Can. J. Fish. Aquat. Sci. 75(11): 1886-1901, <https://doi.org/10.1139/cjfas-2017-0310>.

DOUG OBEGI
*Senior Attorney**
Water Program

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** Admitted to practice in California*

From: Briard, Monique [Monique.Briard@icf.com]
Sent: 9/30/2020 2:29:45 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]
CC: John Spranza [John.Spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Berryman, Ellen [Ellen.Berryman@icf.com]; Luu, Henry [Henry.Luu@hdrinc.com]; Williams, Nicole [Nicole.Williams@icf.com]; Unsworth, Ellen [Ellen.Unsworth@icf.com]
Subject: RE: Sites Reservoir BA Data Needs Addressed

Hi Laurie,

I apologize. I didn't mean to imply that I was asking you to update the BA project description as the data gaps are resolved. Since you weren't on the email chain, I was just confirming that you had the information that Jelica had forwarded to us so that to your point, we are all using the same language/edits since our review identified a potential conflict (highlighted is Ellen U's comment bubble).

- Diameter range and linear of feet of tunnel associated with saddle dams 3 and 5 (page 2-9)
12 foot ID concrete tunnel, 828 feet to 832 feet long. (Sheet STS-361-C-4601 and C-4602)
I see this in the drawings but it doesn't match the current text in chapter 2, which was added based on HR comment bubble:

The tunnel would be reinforced concrete with a steel liner; its diameter is expected to range from 10 feet to 12 feet and it would be approximately 1,225 linear feet (HR Response to Chapter 2 review on September 17, 2020). The tunnel design would consider geological conditions and geological recommendations for siting and design; the tunnel and liner designs would be in accordance with applicable requirements of U.S. Army Corps of Engineers Engineering Manual EM-1110-2-2901, Tunnels and Shafts in Rock (USACE 1997) (Design Criteria TM HR2.6 June 29)

Thanks,
Monique

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, September 30, 2020 11:40 AM
To: Briard, Monique <Monique.Briard@icf.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: John Spranza <John.Spranza@hdrinc.com>; 'Alicia Forsythe' <aforsythe@sitesproject.org>; Berryman, Ellen <Ellen.Berryman@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Williams, Nicole <Nicole.Williams@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir BA Data Needs Addressed

Hi Monique,

While I intend to continue to work with Nicole to fill data gaps in the EIR/EIS project description as discussed on Monday (including an upcoming discussion with the Authority agents tomorrow to obtain direction on a list of items) I think that consistency between the BA and EIR/EIS is an ICF function and can more easily be accomplished by ICF staff.

So, regarding the last line of your email – no, I was not intending to add edits to Ch 2 of the EIR/EIS based on BA input. ICF's revisions to the BA should also be made to the EIR/EIS so that we don't end up with different language/edits.

Thank you,

Laurie

From: Briard, Monique [<mailto:Monique.Briard@icf.com>]

Sent: Tuesday, September 29, 2020 5:12 PM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>

Cc: John Spranza <John.Spranza@hdrinc.com>; 'Alicia Forsythe' <aforsythe@sitesproject.org>; Berryman, Ellen <Ellen.Berryman@icf.com>; Luu, Henry <Henry.Luu@hdrinc.com>; Williams, Nicole <Nicole.Williams@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>

Subject: RE: Sites Reservoir BA Data Needs Addressed

Hi Jelica,

Thank you for working on obtaining the additional information needed for the BA project description. I've included Laurie, Nicole and Ellen U on this response since we are all working together on the project description updates for both the BA and the EIR/EIS simultaneously. Nicole, Ellen U and Ellen B met today to go over the updates you provided and added bubble comments in the word document to:

- acknowledge that some of the info is already in Chapter 2 of the EIR/EIS (Yay! And will be added to the BA by Ellen B)
- identify where the info would go in chapter 2 of EIR/EIS if it is not already in there
- identify if the info seemed to conflict with what is already in Chapter 2 of the EIR/EIS
- identify if the info doesn't quite get to what we were looking for

Tracking all of the emails, meeting minutes, etc. last month to develop the PD took a lot of effort so we'd like to implement a process change to implement some efficiencies to the update process. During our bi-weekly EIR/EIS call yesterday, we talked with Laurie about making project description updates directly into the working version of Chapter 2 of the EIR/EIS text on the Sites SharePoint site vs. sending it to us in email. One, this new process will eliminate us having to interpret information that could require further clarification and two, will make sure that the new information is inserted into the right section of the document. For the most part, the information needed for the EIR/S and BA project description is the same so we'd like for the updates to be made in the EIR/S and then we can move the new information into the BA. Our plan is to turn on the notification option in SharePoint so that we know when the Chapter 2 EIR/EIS is updated. I realize that this was sent prior to our call so I'm hoping that you are agreeable to these changes in the process. Lastly, we are wondering if Laurie has the information in this word document and is in the process of integrating it into the EIR/S on SharePoint?

Thanks,
Monique

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>

Sent: Monday, September 28, 2020 11:54 AM

To: Berryman, Ellen <Ellen.Berryman@icf.com>

Cc: John Spranza <John.Spranza@hdrinc.com>; 'Alicia Forsythe' <aforsythe@sitesproject.org>; Luu, Henry <Henry.Luu@hdrinc.com>; Briard, Monique <Monique.Briard@icf.com>

Subject: FW: Sites Reservoir BA Data Needs Addressed

Hello Ellen

We took out the data needs identified in the BA project description and followed up with both HR/HC. Integration also provided some guidance. Let us know if you have any questions – hope this helps.

BTW – you'll see that there are some items we are going to be following up on with the Authority.

Thanks

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Friday, September 25, 2020 6:57 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Edits/responses are attached.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 24, 2020 6:02 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

I've combined HR/HC responses and responded to the recreation question by looking at the WSIP application. Please confirm that it looks good to you before we share this information with ICF. You'll see a couple of comments for additional information – perhaps you know the answers.

Laurie – take a look too.

Thanks

Jelica Arsenijevic
Environmental Project Manager

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Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

From: Luu, Henry
Sent: Thursday, September 24, 2020 9:27 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

Attached are HR's responses.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

From: Luu, Henry
Sent: Wednesday, September 23, 2020 10:32 AM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Jelica,

See attached for HC responses. I anticipate HR's comments tomorrow.

I have a couple of additional comments to HC responses:

- GCID is working on refining the initial list of improvements...updates hopefully within the next couple of weeks.
- I think reservoir facilities will require more than 4 years to construction (including roads & bridges). I recommend we assume 6 years of construction with concurrent construction of reservoir and conveyance facilities.

Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 5:30 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Henry

See revised data needs from BA. It shows areas that overlap with the EIR/S. other areas need clarification. Can we get input from HR/HC?

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



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M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Arsenijevic, Jelica
Sent: Thursday, September 17, 2020 4:19 PM
To: 'Laurie Warner Herson' <laurie.warner.herson@phenixenv.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hey Laurie

See attached BA needs. I went ahead and revised it slightly by highlighting areas that were identified as "highlights/notes from previous requests by EIR/S team"

Hope this helps consolidate and identify meeting topics.

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!



2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Laurie Warner Herson [<mailto:laurie.warner.herson@phenixenv.com>]
Sent: Thursday, September 17, 2020 3:31 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>
Subject: Fwd: Sites Reservoir REIR/SEIS - Construction Appendix

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FYI - this was the email exchange that Monique referenced. I offered to help Nicole keep things moving because her husband may have COVID.

I am going to pull together the list of topics, based on the EIR/EIS Ch 2 consolidated comments I sent to ICF yesterday. I will send the list to you two to incorporate permitting needs (I'm assuming they will be very similar, if not the same). Then Jelica can run with the meetings as she has in the past.

If you already have started a list, let me know and I'll add to it.

Begin forwarded message:

From: "Williams, Nicole" <Nicole.Williams@icf.com>
Date: September 17, 2020 at 2:19:21 PM PDT
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: "Briard, Monique" <Monique.Briard@icf.com>, "Unsworth, Ellen" <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie –

Thanks we're waiting on test results, but we know it is not the flu. And of course mandatory quarantine is always fun.

Will do regarding the location for the appendix.

Regarding helping out – would it be possible for you to pull together an initial list of meeting topics and participants (assuming HR/HC participation) you think are needed based on your review/consolidation of the chapter 2 comments and any conversations you've had about the BA description with John/Jelica? For example, you indicated yesterday in your email there might be some issues with Roads so that might be one meeting that is needed if we weren't provided the information flagged in chapter 2 or if HR had questions about the information we were asking for.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, September 17, 2020 1:39 PM
To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>
Subject: RE: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Nicole –

I am so sorry to hear that COVID has hit your family. Please let me know what we can do to help out so you can focus on your family.

I think we should put the construction appendix in the working draft folder in the environmental planning library since it is an attachment to the EIR/EIS:

<https://sitesreservoirproject.sharepoint.com/:f:/r/EnvPlanning/Shared%20Documents/Construction%20Appendix?csf=1&web=1&e=be4fub>

Wishing you the best,

Laurie

From: Williams, Nicole [mailto:Nicole.Williams@icf.com]
Sent: Thursday, September 17, 2020 1:08 PM

To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>

Cc: Briard, Monique <Monique.Briard@icf.com>; Unsworth, Ellen <Ellen.Unsworth@icf.com>

Subject: Sites Reservoir REIR/SEIS - Construction Appendix

Hi Laurie – we’ve made progress on the construction appendix, but unfortunately my husband came down with COVID-related symptoms yesterday, and this has impacted my week. We’ll upload it early next week. Can you let me know where you want it on sharepoint?

Cheers, Nicole

NICOLE L. WILLIAMS | Senior Environmental Planner | (o) 916.231.9614 | (m) 530.867.0470 | nicole.williams@icf.com | icf.com
ICF | 980 9th Street Suite 1200 Sacramento CA 95814 |

—



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From: Rachel Zwillinger [RZWILLINGER@defenders.org]
Sent: 9/30/2020 2:51:52 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Re: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Thanks!

Sent from my iPhone

On Sep 30, 2020, at 2:51 PM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Yep. I just wanted to double check with Doug first and he would like to include them. I will send the email onto them now. Thanks for the suggestion!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Rachel Zwillinger <RZWILLINGER@defenders.org>
Sent: Wednesday, September 30, 2020 10:34 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Hi Ali. Thanks for reaching out and setting up this conversation. The staff at The Bay Institute—Gary Bobker and Greg Reis—have been tracking the project carefully and may have helpful modeling insights. Would it be okay to loop them into this discussion?

Rachel

Sent from my iPhone

On Sep 30, 2020, at 8:56 AM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Doug and all – I'd like to schedule some time to discuss and confirm the operational criteria that you all would like to see modelled. Please complete the doodle poll below so I can get a meeting for us on the calendar.

<https://www.doodle.com/poll/cpnk5pqs82d48vga>

Also, I believe the attached document is the most recent / up to date that we have in our files on the groups thoughts. I was thinking we can start our discussion with this document and go from there. Please let me know if there is something more recent we should be reviewing.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, September 21, 2020 6:32 PM
To: 'Obegi, Doug' <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1lfr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Thanks for your email and for watching our agendas / keeping up to date with the project.

I want to assure you that we have not changed our position from my June email. We will have Jacobs evaluate at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. Jacobs is working on a number of revisions to the Sites Calsim model, including modifications to the baseline, which we expect to be completed in the coming weeks. We will reach out to you soon for a meeting in October to discuss where we are on operational criteria along with confirming the criteria that you would like to see modelled.

Once we have the modifications to the Calsim model completed, we will run a series of analyses using the results of Calsim to test the operational criteria and resulting effects to juvenile salmon. These include follow on modeling (that uses the output of the Calsim modeling), such as DSM2 and OBAN, along with spreadsheet analyses based on recent scientific papers – many of which you cite below.

We truly appreciate your input and I will be reaching out in a few weeks to schedule some time to chat in October.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 16, 2020 9:28 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact)

<rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com)
<barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org;
brandon.dawson@sierraclub.org

Subject: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Dear Ali and Jerry,

I hope you're both hanging in there these days, and that you and your families are all safe and sound between fires, hazardous air quality, COVID, and everything else that is making 2020 suck.

I'm writing about the proposal to select a preferred alternative for the Sites Project at tomorrow's meeting of the Authority's Board of Directors (https://3hm5en24txyp2e4cxvxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/02-03-EIR_EIS-Selection-of-Preferred-Project-for-Purposes-of-CEQA.pdf). It appears from the memo to the Board of Directors that the CEQA document will only consider 2 alternatives, with identical operational parameters for those alternatives (meaning that there are no operational alternatives being considered). The memo further states that the preferred alternative will be the basis for the application for a biological opinion and a CESA incidental take permit. I strongly urge the Board and staff at the Authority to take a different approach.

First, considering only a single operational scenario would violate CEQA's mandate to consider a reasonable range of alternatives, a point that state agencies have also made previously with respect to the environmental review for this project. So I hope that I'm misunderstanding the memo to the Board in concluding that this is the only operational alternative that is being considered. In addition, that approach is inconsistent with our last email exchange in June, where you stated that:

"We will have Jacobs conduct an analysis of at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. However, based on analyses we completed last summer / fall, we expect these criteria to result in a project that's not affordable and provides very little water to accomplish the project objectives. Thus, we don't anticipate that this will result in an alternative that we would carry forward for detailed analysis in the Revised EIR as we don't anticipate it to result in a feasible project."

I'm unaware of any such discussions to refine one or more operational alternatives since our email exchange in June. Has the Authority decided not to model any such alternatives? In addition, is the Authority not planning to model an alternative that is consistent with the SWRCB's 55% of unimpaired flow proposal from the July 2018 Framework (https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf)? In addition to violating CEQA, the failure to include analysis of these or similar alternatives should preclude state agencies from relying on the CEQA document for a water rights proceedings and for CESA permitting.

Second, as we have previously emphasized, the proposed operations being considered would significantly harm juvenile salmon migrating down the Sacramento River in the winter and spring months, as the best available science demonstrates a very strong flow: survival relationship for juvenile fall-run, spring-run, and winter-run Chinook salmon in the upper, middle, and lower Sacramento River and in the Delta (see citations below), and it would harm Longfin Smelt and other species downstream as a result of reducing Delta outflow during these months.

I strongly urge the Board to consider a reasonable range of alternatives that includes more protective operational parameters, including an alternative that is consistent with the SWRCB's 55% of unimpaired flow framework for the Sacramento River and an alternative similar to the operations that we have previously proposed. We remain willing to work with you to refine such an alternative.

Thank you for consideration of our views.

Sincerely,
Doug

Citations:

- Stuart Munch et al 2020. *Science for integrative management of a diadromous fish stock: interdependencies of fisheries, flow and habitat restoration*, Can. J. Fish. Aquat. Sci. 77: 1487–1504 (2020) [dx.doi.org/10.1139/cjfas-2020-0075](https://doi.org/10.1139/cjfas-2020-0075);
- Michel, Cyril 2019. *Decoupling outmigration from marine survival indicates outsized influence of streamflow on cohort success for California's Chinook salmon populations*, Can. J. Fish. Aquat. Sci. 76: 1398–1410 (2019) [dx.doi.org/10.1139/cjfas-2018-0140](https://doi.org/10.1139/cjfas-2018-0140);
- Friedman, W. R. et al. 2019. *Modeling composite effects of marine and freshwater processes on migratory species*. Ecosphere 10(7):e02743. [10.1002/ecs2.2743](https://doi.org/10.1002/ecs2.2743);
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From: Micko, Steve/SAC [Steve.Micko@jacobs.com]
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Subject: Sites: DSM2 Alt A2 Preliminary Effects Analysis Results

Hi all,

You may access NAA and ALTA2 DSM2 results for the preliminary effects analysis at the link below:

https://jacobsengineering-my.sharepoint.com/:f/g/personal/steve_micko_jacobs_com/EkQT0oTshJ1NhkCVM28Z4hIB4JmQhX_wQffED3I71kUZqw

At this link you will find:

- [_Readme_20200930.Pdf](#)
- Description of modeled scenarios and DSM2 trend reporting spreadsheet
- [NODOS_Trend_Reporting_rev02cy_DV2_HistClim_DSM2__NAA_091720_ALTA2_092020_PrelimEffects.xlsm](#)
- DSM2 trend reporting spreadsheet with the following modeled results for preliminary effects analysis:
 - No Action Alternative
 - ALTA2 PEA

The DSM2 trend reporting spreadsheet contains flow, EC, X2 distance and chloride output parameters.

Note that some flow locations in DSM2 may coincide with flow locations available in CalSim II.

For consistency, please observe flows from CalSim II at boundary condition or controlled flow locations.

Please let me know if you have any questions.

Best,
Steve

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