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SITES PROJECT AUTHORITY



BEFORE THE

STATE WATER RESOURCES CONTROL BOARD

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| IN THE MATTER OF SITES PROJECT AUTHORITY WATER RIGHT APPLICATION 025517X01; PETITION FOR PARTIAL ASSIGNMENT OF STATE FILED APPLICATION 025517; PETITIONS FOR RELEASE OF PRIORITY OF STATE FILED APPLICATIONS 025513, 025514, 025517 (REMAINING), 022235, 023780, AND 023781 IN FAVOR OF THE PORTION OF STATE FILED APPLICATION 025517 ASSIGNED TO SITES PROJECT AUTHORITY. | **CORRECTED WRITTEN TESTIMONY OF WESLEY WALKER, P.E.** |

## INTRODUCTION

1. My name is Wesley Walker. I am a registered engineer in California, specializing in the areas of hydrology, water supply, reservoir operations modeling, and water rights. I am a Senior Engineer at MBK Engineers. MBK Engineers specializes in water resources engineering, and performs these services for cities, counties, state and federal agencies, individual landowners, and other entities. I joined MBK Engineers in 2017 and have been a Senior Engineer since January 2023. I have a Bachelor of Science degree in Mechanical Engineering from Loyola

Marymount University and a Master of Science degree in Civil and Environmental Engineering from the University of California, Davis. A true and correct copy of my current CV is contained in SITES-026.

2. I have over seven years of experience in water resources planning, reservoir operations modeling, water accounting, water availability, water unavailability, and water rights throughout California and Nevada. I have worked directly as part of the consultant team for the Sites Reservoir Project (Project) since the Spring of 2021. Specifically, I led the development of each water availability analysis, as well as the subsequent Voluntary Agreement (VA) analysis, submitted by the Sites Project Authority (Authority). This effort included the organization and review of available data and modeling results, working with staff in the preparation of the water rights face value demands, quality control of the water rights face value demands, and development of each of the spreadsheet tools used to complete the technical analyses and calculations. All materials related to the water availability analyses including, AHO-039 through AHO-049, are incorporated into my testimony.

3. I prepared this testimony at the request of Andrew Hitchings of Somach Simmons & Dunn on behalf of the Authority.

4. My testimony provides relevant material to the Administrative Hearing Office (AHO) in response to the issues raised in the Notice of Public Hearing dated March 1, 2024, and Amended Hearing Notice dated June 5, 2024. My testimony should be considered in connection with that of Angela Bezzone.

## WATER AVAILABILITY ANALYSIS

5. The Authority submitted a water right application for the Project on May 11, 2022 (Application) and submitted supplemental materials on January 6, 2023 (Supplement). On June 16, 2023, the Authority submitted an analysis of: (1) the net effect to Delta outflow from the Project's diversions and VA flows, and (2) the interaction of the Project's potential diversions and VA flows.

6. Included with the Application and the Supplement was a Water Availability Analysis (WAA) report (WAA Report) summarizing the background, approach, results, and

conclusions for multiple water availability analyses prepared in support of the Authority's application to evaluate the availability of water for appropriation for the Project. The version of the WAA Report and associated analyses contained within the Supplement (AHO-039) superseded the May 11, 2022, version of the WAA Report and analyses.

7. When evaluating an application to appropriate water, the State Water Resources Control Board (State Water Board) needs to find there is "unappropriated water available to supply the applicant" (Wat. Code, § 1375, subd. (d)). Unappropriated water is water that: has never been appropriated, has been appropriated and is no longer being appropriated, and water appropriated that returns to the watercourse. Unappropriated water does not include water that has been, is being applied to, or which is or may be reasonably needed for useful and beneficial purposes on lands riparian to a natural channel. (*Id.*, §§ 1201, 1202.) While the State Water Board has recognized that "[t]he face value of permits and licenses ... is not a good measure of amounts likely to be used or the availability of unappropriated water" (State Water Board Decision 1650, p. 6, ¶ 21), an analysis that uses face value demands provides a conservative estimate of unappropriated water.

8. A finding of unappropriated water differs from determining the amount of water available for appropriation. In determining the amount of water available for appropriation for beneficial uses, the State Water Board must also "take into account, when it is in the public interest, the amount of water required for recreation and the preservation and enhancement of fish and wildlife resources," and "the amount of water needed to remain in the source for protection of beneficial uses, including any uses specified to be protected in any relevant water quality control plan." (Wat. Code, §§ 1243, 1243.5.)

9. As such, to determine whether water is available for the Project, the Authority sought to answer two questions: (1) Is unappropriated water available to supply the Project; and (2) Is water available for appropriation by the Project?

10. To answer these questions, three different methods to evaluate water availability were presented in the WAA Report – Historical, CalSim II, and Face Value – resulting in six different analyses. (AHO-039, pp. 16-17.) The Face Value Analysis answers the first question of

whether there is unappropriated water available, while the Historical Analysis and the CalSim II Analysis provide answers to the second question of whether water is available for appropriation. Combining the results from the three approaches, the WAA Report provides evidence that there is unappropriated water to supply the Project, and that there is water available for appropriation by the Project when considering the amount of water required to remain in the source to support instream beneficial uses, including the beneficial uses identified in any applicable water quality control plans, such as recreation and the preservation and enhancement of fish and wildlife. (Wat. Code, §§ 1201, 1202, 1243, 1243.5.) These findings are supported by the range of analyses included in the WAA Report, which use both historical and climate-changed hydrology and current and potential, future regulatory conditions.

11. Each method evaluated water availability from the Sacramento River by relying upon different supply and demand datasets. A brief summary of the background, approach, and summary results for each analysis are discussed below. AHO-039, provides a high-level summary of the assumptions and parameters included in each of the WAA Report's analyses. (AHO-039, pp. 16-17.) AHO-039also demonstrate how each of the water availability analyses, and all the water availability analyses, collectively, meet the requirements noted in the State Water Board, Division of Water Rights' (Division) Acceptance Letter (AHO-039, pp. 16-17; AHO-260).

12. Results presented below are annual or annual average volumes. These volumes are computed on a water year basis (October through September) but are limited to the September 1 through June 14 period of the Authority's requested season of diversion.

**UNAPPROPRIATED WATER AVAILABILITY**

13. The Face Value Analysis was developed to meet Division staff's request to estimate unappropriated water from a watershed-wide perspective, using the maximum potential demands of all existing water rights within the Sacramento River watershed and in the Delta. (AHO-039, pp. 66-97.)

14. The Face Value Analysis compares the monthly unimpaired flow data (supply) to the calculated maximum diversion and storage volumes based on the face value of water rights

(demand) for each subwatershed in the Sacramento River watershed[1] and the Delta (including export demands and in-Delta consumptive uses). The Face Value Analysis provides an evaluation of unappropriated water by considering potential availability in watersheds that are not only directly downstream of the Project's points of diversion (PODs), but which are upstream and/or tributary to the flow path, while also assuming the full face value use – including storage rights – of existing water rights and claims within the Sacramento River watershed. Assuming all water right holders have a demand for the full face value of their rights every year is a conservative assumption because it overestimates demand. As the Face Value Analysis only estimates unappropriated water available after accounting for all riparian use and all appropriations, the analysis does not include any minimum or bypass flow requirements, water quality requirements, other regulatory requirements, or return flows. The inclusion of minimum flow requirements and/or return flows would result in a departure from the intent of the Face Value Analysis, which is to determine the volumes and frequency of unappropriated water relative to the unimpaired flow of a watershed. Minimum flow requirements necessary to protect public trust resources and/or avoid unreasonable impacts on fish and wildlife or other instream beneficial uses are not an appropriation of water. (See *California Trout, Inc. v. State Water Resources Control Bd.* (1979) 90 Cal.App.3d 816, 820-822.) Likewise, the Face Value Analysis does not account for return flows as there is no requirement in any water right that a specific rate or volume return to a waterbody.

15. The Face Value Analysis is used to estimate unappropriated water at five points of analysis (POA) located within the Sacramento River watershed: the Sacramento River at Red Bluff (Tehama-Colusa Canal [TCC] POD), the Sacramento River at Hamilton City (Glenn-Colusa Irrigation District [GCID] POD), the Sacramento River at Wilkins Slough, the Sacramento River at Freeport, and the Delta. The net availability is the volume of unappropriated water available at the TCC and GCID PODs after considering whether unappropriated water is available at any of the downstream POAs. This ensures that the water shown as available at the

[1] As noted, this includes all senior water rights in the demand area, including those held by the Cachil Dehe Band of Wintun Indians of the Colusa Indian Community Council.

TCC and GCID PODs does not include water that is or may be reasonably needed for useful and beneficial purposes pursuant to riparian rights, or is otherwise appropriated at each of the five POAs. The Face Value Analysis was performed using the Face Value Tool (AHO-047) developed by MBK Engineers. The Face Value Analysis is completed on a monthly timestep using historical hydrology from October 1921 through September 2014.

16. Under the Face Value Analysis, unappropriated water is available at the TCC POD in 55 out of 93 years (~59%) in annual volumes ranging from approximately 15,000 acre-feet to approximately 8,681,000 acre-feet, with an annual average of approximately 1,118,000 acre-feet. Unappropriated water is available at the GCID POD[2] in 55 out of 93 years (~59%) in annual volumes ranging from approximately 15,000 acre-feet to approximately 9,557,000 acre-feet, with an annual average of approximately 1,299,000 acre-feet.

17. Estimates of the quantity of water available for diversion under the Face Value Analysis that could be physically diverted by the Project are included in the analysis. (AHO-039, pp. 196-199.) However, regulatory constraints that limit when or how much water might be available are not included in the Face Value Analysis, nor are operations of Sites Reservoir or any other project or infrastructure in the Sacramento/Delta watershed. Notwithstanding these limitations, potential diversions relative to the available volumes of unappropriated water calculated in the Face Value Analysis can be made by limiting the monthly volume of unappropriated water available at each timestep to the diversion capacity at both of the Sites PODs. The Face Value Analysis estimates that annual combined potential diversions at the TCC and GCID PODs range from approximately 15,000 acre-feet to approximately 1,383,000 acre-feet, with an annual average of approximately 330,000 acre-feet.

18. Consistent with the Authority's petition for partial assignment of state-filed Application 25517, the Face Value Analysis assumes a September 30, 1977 priority date for the Project. A sensitivity test was completed using the Face Value Tool which adjusted the assumed priority date for the Project to May 11, 2022. This change resulted in a reduction to the estimated

[2] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

annual average volume of unappropriated water available at the TCC POD from approximately 1,118,000 acre-feet to approximately 999,000 acre-feet. The annual frequency of availability decreased from 59% of years to 50% of years. Although the more junior priority date results in less unappropriated water available for the Project, unappropriated water is available to supply the Project at both a September 30, 1977 priority date and a May 11, 2022 priority date.

## WATER AVAILABLE FOR APPROPRIATION

19. Determining whether water is available for appropriation is arguably the more difficult question to answer. This is due to the need to consider not only whether water is available after all riparian uses and all other appropriations, but also whether water remains available after accounting for the water required to remain in the source to support instream beneficial uses, including the beneficial uses identified in any applicable water quality control plans. Applying proposed diversion criteria and other requirements intended to protect these uses to a water availability analysis allows for the determination of whether there is water available for appropriation. However, since these criteria and other requirements are not an appropriation of water, these criteria and/or requirements should only be included in an analysis that evaluates the physical availability of water, not the legal availability of unappropriated water.

### Historical Analysis – Sacramento River

20. The Authority developed the Historical Analysis to evaluate whether water is available for appropriation under historical conditions after accounting for the face value demands of downstream water rights and all applicable Sites-specific diversion criteria. (AHO-039, pp. 20-48.) Accordingly, the Historical Analysis calculates water available for appropriation by comparing historical stream gauge data to the face value of downstream water rights[3] (including rights junior to state-filed Application 25517 and export demands in the Delta), while also accounting for Sites-specific pulse protection or minimum flow requirements, and/or other Sites-specific diversion criteria. The use of historical gauge data (i.e., actual observed river flows) provides a valuable reference point for supply as it includes the resulting conditions

[3] As noted above, this includes all senior water rights in the demand area, including those held by the Cachil Dehe Band of Wintun Indians of the Colusa Indian Community Council.

relative to existing regulatory criteria and historical diversions. The Historical Analysis was performed using the Sites Historical WAA Tool (AHO-045) developed by MBK Engineers. The Historical Analysis was completed on a daily timestep and covers approximately 22 years, from January 1, 2000, through September 30, 2021. (AHO-039, pp. 20-29 and 32-45.)

21. The supply and demand calculation described above is completed at each of the five POAs located along the flow path: the Sacramento River at Red Bluff (TCC POD), the Sacramento River at Hamilton City (GCID POD), the Sacramento River at Wilkins Slough, the Sacramento River at Verona, and the Delta. After completing the supply and demand calculations at each POA, the net availability calculation is completed for each of the Project's PODs by limiting the total volume of water available for appropriation to the minimum volume available across all five of the POAs along the flow path at each daily timestep. This ensures that the water shown as available is above the volumes needed for senior water right holders and Sites-specific flow requirements along the entire flow path.

22. Under the Historical Analysis, water is available for appropriation at the TCC POD in 18 out of 22 years (~78%), in volumes ranging from approximately 2,000 acre-feet to approximately 3,878,000 acre-feet, with an annual average of approximately 749,000 acre-feet. Water is available for appropriation at the GCID POD[4] in 18 out of 22 years (~78%), in volumes ranging from approximately 2,000 acre-feet to approximately 3,884,000 acre-feet, with an annual average of approximately 752,000 acre-feet. Volumes of water available for appropriation at the GCID POD are often the same as those available at the TCC POD, and the two should not be added together to determine water available for Sites Reservoir.[5]

23. The structure of the Historical Analysis allows for a conservative, but realistic estimate of the water physically available that could be diverted. This is because the Historical Analysis includes the proposed diversion limits, conveyance capacity, and possible operational limitations in Application 25517X01. The Historical Analysis estimates that the annual combined

[4] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

[5] Less conservative assumptions for the Historical Analysis show water available for appropriation more frequently and in greater volumes. (AHO-039, pp. 167-173.)

potential diversions at the TCC and GCID PODs range from approximately 2,000 acre-feet to approximately 1,236,000 acre-feet, with an annual average of approximately 287,000 acre-feet. (AHO-039, pp. 151-154.)

24. The Authority's petition for partial assignment of state-filed Application 25517 includes the request for a priority date of September 30, 1977. However, the Historical Analysis includes several assumptions and operational limitations that essentially result in the availability calculations using a priority date of May 11, 2022, for the Project. These assumptions and limitations on whether water is available for the Project specifically include: requiring the satisfaction of the face value demands of all water rights on the Sacramento River downstream of the Sites PODs (including the winter water rights which Sites agreed to subordinate to), the requirement that Term 91 curtailments cannot be in effect, and the requirement that the Delta must be in an Excess condition. The net effect of including these requirements and assumptions results in the Authority ensuring that all downstream water right holders, at least relative to the flow path from the Sites PODs through the Delta, are satisfied prior to the Project diverting. Despite limiting availability and potential diversions by the above assumptions and conditions, water is available for appropriation by the Project under the Historical Analysis.

**Historical Analysis – Funks and Stone Corral Creeks**

25. The Funks and Stone Corral Creeks Historical Analysis is the only analysis that includes an estimate of the unappropriated water available on Funks and Stone Corral Creeks. The geographic granularity of the CalSim II and Face Value analyses do not allow for estimates of water availability on Funks and Stone Corral Creeks given the relatively small watershed-areas and runoff volumes of each creek. (AHO-039, pp. 29-32 and 45-48.)

26. The Funks and Stone Corral Creeks analysis estimates unappropriated water at the POD located on each creek (i.e., at Golden Gate Dam on Funks Creek and at Sites Dam on Stone Corral Creek). The analysis uses estimated streamflow data as available supply and the face value of downstream water rights on each creek as the corresponding demand to complete the water availability calculation. Historical streamflow data was unavailable for Funks Creek, and streamflow data for Stone Corral Creek was only available for the period of 1958-1985.

Therefore, the Authority developed monthly streamflow data for Funks and Stone Corral Creeks through a streamflow correlation and watershed-area proration. The Funks and Stone Corral Creeks analysis was performed using the Funks-Stone Corral WAA tool (AHO-041) developed by MBK Engineers. The analysis was completed on a monthly timestep for the period of January 2000 through September 2021.

27. As Funks Creek ultimately joins Stone Corral Creek – downstream of Sites Reservoir – the results of the Funks and Stone Corral Creeks water availability analysis are presented as a combined value. The analysis estimates that unappropriated water is available in 7 out of 22 years (~30%), in volumes ranging from approximately 700 acre-feet to approximately 24,000 acre-feet, with an annual average of approximately 2,900 acre-feet. The water in each creek will potentially be diverted to storage at dams that do not have a maximum diversion capacity; therefore, the combined maximum possible diversion is equal to the estimated volumes of unappropriated water for both creeks.

**CalSim II Analysis**

28. The CalSim II Analysis is used to estimate water available for appropriation using the Sites CalSim II model developed by the Authority (Testimony of Chad Whittington, SITES-109). The CalSim II Analysis evaluates water availability from an operationally realistic, system-wide perspective, but also provides the ability to comparatively analyze the potential changes to the volumes and frequency of water availability resulting from climate change and/or changes to regulatory requirements. (AHO-039, pp. 49-65.) The Authority incorporated Sites Reservoir into the CalSim II model to simulate Project operations, with respect to Central Valley Project (CVP) and State Water Project (SWP) operations, senior diverter demand (as represented by the 2020 level of development and land use in the Sacramento Valley and the estimated 2030 level of development and land use in the San Joaquin Valley), and other system and regulatory requirements (including the Sites-specific flow and diversion criteria). By including these demands and requirements, the availability estimated in the CalSim II Analysis provides a reasonable estimate of the quantities of water available for appropriation.

29. The diversion and operations logic in the Sites CalSim II model simulates the volume of water that is diverted into Sites Reservoir at each monthly timestep. Since this diverted volume is limited by the physical capacity of the diversion infrastructure and the reservoir's storage capacity, the actual volume of water available for appropriation at each timestep may be higher. To estimate the total volumes of water that may be available for appropriation at each timestep of the CalSim II simulation, MBK Engineers developed the CalSim WAA tool (AHO-043). The analysis was completed on a monthly timestep, across the 82-year period of historical hydrology simulated in CalSim II, from October 1921 through September 2003.

30. Under the CalSim II Analysis, water is available in 74 out of 82 years (~89%) at the TCC POD in annual volumes ranging from approximately 15,000 acre-feet to approximately 5,249,000 acre-feet, with an annual average of approximately 1,448,000 acre-feet. At the GCID POD,[6] water is available in 74 out of 82 years (~89%) in annual volumes ranging from approximately 15,000 acre-feet to approximately 5,275,000 acre-feet, with an annual average of approximately 1,453,000 acre-feet.

31. The CalSim II Analysis includes an estimate of the volume of water available for diversion that could physically be diverted by the Authority, which comes directly from the Sites CalSim II model. As noted above, the CalSim II model simulates the operations of Sites Reservoir with respect to the rest of the CVP-SWP system and includes the diversion limits, conveyance and storage capacity, and other operational limitations proposed in Application 25517X01. As such, the estimated diversions provide an operationally realistic, system-wide perspective of potential diversions of water available for appropriation by the Project. The estimates of annual combined potential diversions at the TCC and GCID PODs range from 7,000 acre-feet to 1,055,000 acre-feet, with an annual average of 276,000 acre-feet. (AHO-039, pp. 176-178.)

[6] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

## FUTURE CONDITIONS

32. The WAA Report also includes estimates of the volumes and frequency of water available for appropriation by the Project under potential future hydrologic and regulatory conditions. Two different climate change scenarios were evaluated, along with an unimpaired flow analysis assuming implementation of an updated Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan). (AHO-039, pp. 98-140.)

**Climate Change**

33. Two versions of the Sites CalSim II model were developed by the Authority with different input hydrology to analyze operations of Sites Reservoir under climate change scenarios: 2035 central tendency (CT) climate change hydrology and 2070 CT climate change hydrology. Results from both of these CalSim II models were input to the Sites CalSim WAA tool (AHO-043) to analyze availability under the climate change scenarios.

34. Under the 2035 CT hydrology, water is available in 73 out of 82 years (~88%) at the TCC POD, in annual volumes ranging from approximately 32,000 acre-feet to approximately 5,330,000 acre-feet, with an annual average volume of approximately 1,518,000 acre-feet (approximately 70,000 acre-feet greater than under historical hydrology). At the GCID POD,[7] water is available in 73 out of 82 years (~88%), in annual volumes ranging from approximately 32,000 acre-feet to approximately 5,330,000 acre-feet, with an annual average of approximately 1,522,000 acre-feet (approximately 69,000 acre-feet greater than under historical hydrology).

35. Similar to the CalSim II results with historical hydrology, the Sites CalSim II model with 2035 CT hydrology simulates diversions by the Authority considering the diversion limits, proposed conveyance and storage capacity, and other operational limitations proposed in Application 25517X01. Under the 2035 CT hydrology, annual combined potential diversions at the TCC and GCID PODs range from approximately 2,000 acre-feet to approximately 967,000 acre-feet, with an annual average of approximately 303,000 acre-feet (approximately 27,000 acre-feet more than under historical hydrology). (AHO-039, pp. 179-181.)

[7] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

36. Under the 2070 CT hydrology, water is available in 70 out of 82 years (~84%) at the TCC POD, in annual volumes ranging from approximately 53,000 acre-feet to approximately 5,176,000 acre-feet, with an annual average volume of approximately 1,455,000 acre-feet (approximately 2,000 acre-feet more than under historical hydrology). At the GCID POD,[8] water is available in 70 out of 82 years (~84%), ranging from approximately 53,000 acre-feet to approximately 5,176,000 acre-feet, with an annual average of approximately 1,468,000 acre-feet (approximately 15,000 acre-feet greater than under historical hydrology).

37. Similar to the CalSim II results with historical and 2035 CT hydrology, the Sites CalSim II model with 2070 CT hydrology simulates diversions by the Authority considering the diversion limits, proposed conveyance and storage capacity, and other operational limitations proposed in Application 25517X01. Under the 2070 CT hydrology, annual combined potential diversions at the TCC and GCID PODs range from approximately 10,000 acre-feet to approximately 1,114,000 acre-feet, with an annual average of approximately 309,000 acre-feet (approximately 33,000 acre-feet more than under historical hydrology). (AHO-039, pp. 182-184.)

**Updates to Bay-Delta Plan**

38. State Water Board staff requested that the Authority develop an estimate of availability under a 55% unimpaired flow requirement, a proposed update to the Bay-Delta Plan. In response, the Authority developed a water availability analysis by post-processing the CalSim II model developed for Alternative 4 of the 2019 Reinitiation of Consultation on the Coordinated Long-Term Operations (ROC on LTO) of the CVP and SWP (Alternative 4 Model). The Alternative 4 Model includes a representation of potential unimpaired flow requirements, which are similar to those proposed by the State Water Board for the Bay-Delta Plan update.

39. Regulatory conditions in CalSim II can be modified to analyze future conditions, however the granularity of supply and demands in CalSim II limits the utility of the model to evaluate the various regulatory conditions proposed for the Bay-Delta Plan update. The modeling

[8] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

parameters and assumptions used in the Alternative 4 Model provide some representation of the requirements proposed in the Bay-Delta Plan update. The modeling assumptions included in the Alternative 4 Model produce a simulation that is largely focused on CVP/SWP operations.

40. To meet State Water Board staff's request to evaluate a 55% unimpaired flow requirement, the results from the Alternative 4 Model were post-processed to estimate the volumes and frequency of water available for appropriation by the Project under the unimpaired flow requirement simulated in the Alternative 4 Model. This analysis was performed using the CalSim UIF WAA tool (AHO-046) developed by MBK Engineers. The analysis was completed on a monthly timestep and covers the 82-year period of 2030 CT hydrology simulated in the Alternative 4 Model.

41. Post-processing of the Alternative 4 Model shows water is available in 51 out of 82 years (~61%) at the TCC POD in annual volumes ranging from approximately 10,000 acre-feet to approximately 4,046,000 acre-feet, with an annual average volume of approximately 658,000 acre-feet (approximately 860,000 acre-feet less than under 2035 CT hydrology[9]). At the GCID POD,[10] water is available in 51 out of 82 years (~61%) in annual volumes ranging from approximately 10,000 acre-feet to approximately 4,051,000 acre-feet, with an annual average of approximately 663,000 acre-feet (approximately 859,000 acre-feet less than under 2035 CT).

42. Since Sites Reservoir is not modeled in the Alternative 4 Model, the Alternative 4 Model does not estimate diversions by the Project. Similar to the Face Value Analysis, estimates of the quantity of water available for diversion under the Alternative 4 Model that could be physically diverted by the Project are made by limiting the monthly volume of water available at each timestep to the diversion capacity at each of the Sites PODs. This approach does not account for the available reservoir capacity relative to Project operations, but it does account for the conveyance capacity proposed in Application 25517X01 and the regulatory conditions included in the Alternative 4 Model. Annual combined potential diversions at the TCC and

[9] The Alternative 4 Model uses 2030 CT hydrology. As such, results are most appropriately compared to the results of the Sites CalSim II model with 2035 CT hydrology rather than historical hydrology.

[10] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

GCID PODs under the Alternative 4 Model range from approximately 10,000 acre-feet to approximately 1,763,000 acre-feet,[11] with an annual average of approximately 327,000 acre-feet (approximately 24,000 acre-feet more than under 2035 CT). (AHO-039, pp. 185-187.)

**DIVISION OF WATER RIGHTS' WATER AVAILABILITY TOOL**

43. Included as Appendix B to the Supplement was a summary of results from the Division's Water Availability Tool (Division's WAA Tool). (AHO-042.) The Division's WAA Tool (AHO-040) relies upon the Water Unavailability Methodology developed by the Division to implement water right curtailments within the Delta watershed. Division staff incorporated changes to historical unimpaired flow to represent supply, the face value of post-1914 appropriative water rights or maximum use reported under statements of diversion and use of all senior diverters within the Delta watershed to represent demand, and a year-round instream flow demand of 55% of unimpaired flow for the Sacramento River (including its tributaries and the Calaveras, Mokelumne, and Cosumnes subwatersheds) and a February through June instream flow demand of 40% of unimpaired flow for the Merced, Tuolumne, and Stanislaus subwatersheds.

44. The Authority does not endorse the Division's WAA Tool nor the results presented in Appendix B. The Sites Authority noted several concerns with the Division's WAA Tool's approach and input data, which result in inaccurate and/or unrealistic water supply and demand estimates. Specifically, (1) the Division's WAA Tool attempts to simultaneously answer the questions of whether unappropriated water is available to supply the Project and whether water is available for appropriation by the Project under a potential future regulatory requirement (AHO-040, pp. 4-5), and (2) the structure of the Division's WAA Tool and the face value water right demands developed for the tool are likely to produce erroneous estimates of the volume and timing of water availability, with most of the issues likely to produce an underestimate of availability (AHO-040, pp. 5-6). Despite these concerns, and at the State Water Board staff's request, the Authority ran the Division's WAA Tool to generate an estimate of water availability

[11] In actual operations, the 1,763,000 acre-feet would be limited by the storage capacity of Sites Reservoir, 1,500,000 acre-feet.

for the Project. The Division's WAA Tool provides estimates of water availability on a monthly timestep, across a 101-year period of historical hydrology from October 1921 through September 2022.

45. Using the Division's WAA Tool and including a year-round instream flow demand of 55% of unimpaired flow for the Sacramento River watershed (including its tributaries and the Calaveras, Mokelumne, and Cosumnes subwatersheds) and a February through June instream flow demand of 40% of unimpaired flow for the Stanislaus, Tuolumne, and Merced subwatersheds, water is available in 26 out of 101 years (~26%) at the TCC POD in annual volumes ranging from approximately 1,000 acre-feet to approximately 1,170,000 acre-feet, with an annual average volume of approximately 92,000 acre-feet. At the GCID POD,[12] water is available in 27 out of 101 years (~27%) in annual volumes ranging from approximately 4,000 acre-feet to approximately 1,631,000 acre-feet, with an annual average volume of approximately 141,000 acre-feet.

46. Results from the Division's WAA Tool can be processed to estimate monthly diversions. However, given the structure of the analysis, the same limitations relative to the diversion estimates from the Authority's Face Value Analysis should be considered when reviewing diversion estimates from the Division's WAA Tool. (See ¶ 17, above.) Annual combined potential diversions at the TCC and GCID PODs range from approximately 4,000 acre-feet to approximately 565,000 acre-feet, with an annual average of approximately 59,000 acre-feet.

47. An additional availability scenario was completed using the Division's WAA Tool which included post-processing to account for the Bend Bridge Pulse Protection Criteria and the Wilkins Slough Minimum Flow Requirement, as well as inclusion of all pending water right applications and unassigned state-filed applications. This scenario also included the year-round instream flow demand of 55% of unimpaired flow for the Sacramento River watershed (including its tributaries and the Calaveras, Mokelumne, and Cosumnes subwatersheds) and a February

[12] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

through June instream flow demand of 40% of unimpaired flow for the Stanislaus, Tuolumne, and Merced subwatersheds. Under this scenario, water is available in 15 out of 101 years (~15%) at the TCC POD in annual volumes ranging from approximately 15,000 acre-feet to approximately 594,000 acre-feet, with an annual average volume of approximately 25,000 acre-feet. At the GCID POD,[13] water is available in 17 out of 101 years (~17%) in annual volumes ranging from approximately 28,000 acre-feet to approximately 805,000 acre-feet, with an annual average volume of approximately 39,000 acre-feet.

48. Under this additional scenario, annual combined potential diversions at the TCC and GCID PODs range from approximately 28,000 acre-feet to approximately 241,000 acre-feet, with an annual average of approximately 22,000 acre-feet. The same limitations relative to the diversion estimates from the Sites Face Value Analysis should be considered when reviewing diversion estimates from the Division's WAA Tool. Table **1** provides a summary of the annual average availability, annual frequency of availability, annual average potential diversion, maximum annual diversion, and months with availability for each analysis performed with the Division's WAA Tool.

49. Overall, and despite the Authority's noted concerns with the Division's WAA Tool, the results indicate that there is water available for appropriation at the Authority's proposed PODs under the conditions analyzed.

**Table 1.** Summary of Estimated Volume and Frequency of Water Available for Appropriation and Potential Diversions Using Division's WAA Tool

| **Analysis*** | Annual Average Water Available (acre-feet)[1] | Annual Frequency of Water Availability[2] | Annual Average Potential Diversion (acre-feet)[2] | Maximum Annual Potential Diversion (acre-feet)[2] | Months With Availability[2] |
|---|---|---|---|---|---|
| Division's WAA Tool | 92,000 | 27% | 59,000 | 565,000 | October - May |
| Division's WAA Tool (with post-processing, pending applications, and state-filed applications) | 25,000 | 17% | 22,000 | 241,000 | November - April |

[1] Values are provided for the TCC POD. Values at the GCID POD are nominally bigger than at the TCC POD.
[2] Volumes and frequencies are provided for the combined potential diversion and availability at the TCC and GCID PODs.

[13] Results presented for the GCID POD do not account for potential diversions at the TCC POD.

## VOLUNTARY AGREEMENT ANALYSIS

50. The Authority's January 6, 2023, submittal addressed the VAs qualitatively, reasoning that the Project, "... will not reduce or otherwise modify proposed VA additive flows because the additive flows are accounted for within existing water right demands used to calculate water available for the Sites Project and the results of the calculations show water is available for the Sites Project." (AHO-039, p. 144.)

51. Following further discussions with and requests from State Water Board staff, the Authority understood that staff requested the Authority prepare a quantitative analysis to answer the following questions: "How the Sites Project diversions may interact with the VA flow assets" and "How the Sites Project may affect Delta outflow under the VAs."

52. The Authority responded to this request via their June 16, 2023 submission (AHO-048 and AHO-049), which included two different analyses, a Daily Comparison and a Monthly Comparison, respectively.

53. Both the Daily and Monthly comparisons identified that potential Project diversions and VA flow assets would have limited interaction. Diversions to Sites Reservoir will occur during periods when flows are available above regulatory requirements, Sites-specific requirements, and senior water right demands. Most of the Project diversions occur during December through March of Wet and Above Normal years. VA flow assets are proposed to be deployed during times when additional flow is expected to be most beneficial to the system. The default deployment schedule for VA flow assets is primarily March through May of Above Normal, Below Normal, and Dry years.

54. Instances of overlap between potential Project diversions and VA flow assets were analyzed in the Daily Comparison by comparing estimated potential diversion from the Sites Historical WAA Tool with the VA flow actions modeled in CalSim 3 for the VA with Lower San Joaquin River alternative prepared by DWR in support of the State Water Board's Scientific Basis Report Supplement.[14] Overlap between potential Project diversions and the VA flow assets

[14] Draft Scientific Basis Report Supplement in Support of Proposed Voluntary Agreements for the Sacramento River, Delta and Tributaries Update to the San Francisco Bay/Sacramento-San Joaquin Delta Water Quality Control Plan (January 2023).

in the VA with Lower San Joaquin River alternative occurs in the spring months of Wet and Above Normal years, typically during periods with relatively high Delta outflow. Given the approximate assumptions for the default deployment schedule of the VA assets, it is unclear how and when VA flow assets would be deployed during these same times in actual operations. In drier years, overlap between potential Project diversions and VA flow assets is minimal, as potential Project diversions typically occur during individual storm events in the winter months, outside of the primary period that VA flow assets are anticipated to be utilized under the default deployment schedule.

55. The Monthly Comparison evaluated how Delta outflow might change due to Sites Reservoir operations and implementation of the VAs. By combining the change in Delta outflow from the Sites CalSim II model with the change in Delta outflow from the VA with Lower San Joaquin River CalSim 3 model, a net change to Delta outflow can be calculated. Reductions to Delta outflow resulting from Project diversions primarily occur in the winter months and mostly in Wet and Above Normal years. Conversely, most VA flow assets are deployed in the spring months of Above Normal, Below Normal, and Dry years. Relative to the VA Baseline condition, the combination of these changes results in the following net change to annual Delta outflow: approximately 0% in Wet years and increases of approximately 3% in Above Normal years, 6% in Below Normal years, 9% in Dry years, and 4% in Critical years.

**SUMMARY**

56. The Authority prepared three methods to evaluate water availability, which resulted in the submission of six different water availability analyses. Each analysis uses different assumptions and analytical approaches, which allowed the Authority to determine that unappropriated water is available to supply the Project and that water is available for appropriation by the Project. The Authority also presented water availability results from the Division's WAA Tool and provided an analysis of the potential interaction between Project diversions and VA flow assets, including the net effect to Delta outflow when considering the Project diversions and VA flow assets.

57. As presented above and discussed in the WAA Report, each water availability analysis submitted by the Authority was developed to evaluate availability under a different set of assumptions and input datasets. The Face Value Analysis provides an estimate of the availability of unappropriated water, while the Historical and CalSim II analyses provide estimates of water available for appropriation by the Project. Each of the six analyses submitted by the Authority, along with the results of the Division's WAA Tool, demonstrate that water is available for appropriation. A summary of the annual average availability, annual frequency of availability, annual average potential diversion, maximum annual diversion, and months with availability for each analysis developed by the Authority is presented in Table **2**. The frequency of annual availability under the Authority's water availability analyses ranges from 59% of years to 89% of years, the annual average volumes of water available range from approximately 658,000 acre-feet to approximately 1,518,000 acre-feet, and the annual maximum volume of water available ranges from approximately 3,878,000 acre-feet to approximately 8,681,000 acre-feet. Water is shown as available in all months from September through June in the CalSim II Analysis and in all months from December through June in the Historical and Face Value analyses. Water is also shown as available under both of the climate change scenarios and the potential future regulatory conditions simulated in the Alternative 4 Model. Taken together, the results of the analyses demonstrate unappropriated water exists and that water is available for appropriation to supply the Project.

58. Each water availability analysis also provides an estimate of potential diversions across a range of conditions and assumptions. The estimates of potential diversions under each of the Authority's water availability analyses are fairly consistent in annual average diversion volumes. Diversions occur at the same annual frequency as the estimates of availability, with annual average diversions ranging from approximately 276,000 acre-feet to approximately 330,000 acre-feet and the annual maximum diversions ranging from approximately 967,000 acre-feet to approximately 1,763,000 acre-feet.[15]

[15] In actual operations the 1,763,000 acre-feet would be limited by the storage capacity of Sites Reservoir, 1,500,000 acre-feet.

**Table 2.** Summary of Estimated Volume and Frequency of Water Available for Appropriation and Potential Diversions for Each of the Authority's Water Availability Analyses

| **Analysis** | Annual Average Water Available (acre-feet)[1] | Annual Frequency of Water Availability[2] | Annual Average Potential Diversion (acre-feet)[2] | Maximum Annual Potential Diversion (acre-feet)[2] | Months With Availability[2] |
|---|---|---|---|---|---|
| Historical | 749,000 | 78% | 287,000 | 1,236,000 | December – June |
| CalSim II | 1,448,000 | 89% | 276,000 | 1,055,000 | September - June |
| CalSim II – 2035 CT | 1,518,000 | 88% | 303,000 | 967,000 | October - June |
| CalSim II – 2070 CT | 1,455,000 | 84% | 309,000 | 1,114,000 | October - June |
| CalSim II – Alternative 4 Model | 658,000 | 61% | 327,000 | 1,763,000 | September - June |
| Face Value | 1,118,000 | 59% | 330,000 | 1,383,000 | December- June |

[1] Values are provided for the TCC POD. Values at the GCID POD are nominally bigger than at the TCC POD for some of the analyses.

[2] Volumes and frequencies are provided for the combined potential diversion and availability at the TCC and GCID PODs.