Addendum No. 1 to the Supplemental Environmental Impact Report

McCormack-Williamson Tract Levee Modification and Habitat Restoration Project – Phase B

State Clearinghouse Number 2003012112

Prepared for:

California
Department of Water Resources

December 2023

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Prepared for:

California Department of Water Resources
1146 9th Street
Sacramento, CA 95814

Contact:

Judah Grossman
Senior Environmental Scientist,
Delta Ecosystem Enhancement Unit
Division of Multi-Benefit Initiatives
916.460.0418

Prepared by:

GEI Consultants
2868 Prospect Park Drive, Suite 400
Sacramento, CA 95670

Contact:

Ryan Jolley
Senior Project Director
916.596.0790

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I certify that this Addendum is complete.

By: Steve Rothert Date: 3/4/2024

Steve Rothert
Division Manager
Division of Multibenefit Initiatives
California Department of Water Resources

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Abbreviations and Acronyms

2023 Phase B	2023 Revised Phase B
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
EC	electrical conductivity
EIR	Environmental Impact Report
ft	feet
HEC-RAS	Hydrologic Engineering Center River Analysis System
MHHW	mean higher high water
MLLW	mean lower low water
MMRP	Mitigation Monitoring and Reporting Program
MWT	McCormack-Williamson Tract
North Delta Project	North Delta Flood Control and Ecosystem Restoration Project
project or proposed project	McCormack-Williamson Tract Levee Modification and Habitat Restoration Project
RD	Reclamation District
RSP	rock slope protection
SEIR	Supplemental EIR
SRA	shaded riverine aquatic
SMUD	Sacramento Municipal Utility District
DCC	Delta Cross Channel
WSE	Water surface elevation
NAVD88	North American Vertical Datum 1988

1. Introduction

1.1 Project Background

1.1.1 CEQA Compliance

The California Department of Water Resources (DWR) is pursuing the McCormack-Williamson Tract (MWT) Levee Modification and Habitat Restoration Project (project or proposed project) to reduce flood risk in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes, and incorporates landscape scale restoration of Sacramento-San Joaquin River Delta habitat. Through support and funding from DWR's Division of Multi-Benefit Initiatives, Delta Levees Program, the project would be implemented by Reclamation District (RD) 2110.

The project was originally evaluated by DWR, as lead agency under the California Environmental Quality Act (CEQA)[1], as part of the North Delta Flood Control and Ecosystem Restoration (North Delta) Project Environmental Impact Report (EIR). The North Delta Draft EIR was prepared in 2007 (DWR 2007) and the North Delta Final EIR was prepared and certified by DWR in 2010 (DWR 2010). The North Delta EIR analyzed Alternative 1-A, which included two project elements – the MWT project and the Grizzly Slough Project. The Grizzly Slough Project is currently being implemented. The MWT project was separated into Phases A and B. DWR prepared an addendum (DWR 2018) to the North Delta EIR and constructed Phase A of the MWT project in 2018 and 2019. Phase A of the MWT project consisted of work on the MWT interior, including constructing the Tower Levee near a communications tower in the northwest corner of MWT. Phase B of the MWT project is underway and consists of implementing the remaining project components of the larger MWT project.

In 2022, DWR prepared a Draft Supplemental EIR (SEIR) (DWR 2022a), to consider recent changes, refinements, and additions to Phase B of the MWT project; changes to the physical environment at MWT from flooding in 2017 and subsequent abandonment of agricultural production; and construction of the Phase A of the MWT project in 2018 and 2019. On August 29, 2022, DWR certified the Final SEIR (DWR 2022b), adopted the associated Mitigation Monitoring and Reporting Program (MMRP), and approved the project. The Draft and Final North Delta EIR, Draft and Final SEIR, and MMRP are available upon request from DWR's Contact identified on the title page.

[1] CEQA is found at California Public Resources Code, Sections 21000 et seq., and the State CEQA Guidelines are found at California Code of Regulations, Title 14, Section 15000 et seq.

1.1.2 2023 Flooding and Emergency Project

During the state and federally declared emergencies from winter 2023 storms, the Mokelumne River Levee along MWT overtopped and subsequently breached in January 2023. This resulted in the complete inundation of the MWT interior, levee breaches in three locations – along the Mokelumne River, Dead Horse Cut, and Snodgrass Slough, and several additional critical erosion sites on the landside and waterside of the MWT perimeter levees. From September to November 2023, RD 2110 conducted emergency repairs, which were exempt from CEQA, to stabilize the three breach sites and repair six critical erosion sites. The emergency repairs reduced the likelihood of breaches deepening and widening, prevented further levee degradation and breaching, and allowed access to the remaining infrastructure and resources on the tract. As part of the 2023 emergency flood repairs, a low-flow weir on the Mokelumne River levee was completed consistent with the design for Phase B of the MWT project.

DWR, in coordination with RD 2110, has decided not to drain floodwaters and return the MWT interior to its pre-January 2023 condition. Restoration of substantial amounts of habitat can still be achieved by leaving the tract inundated and constructing a modified Phase B of the MWT project. The MWT levees were not repaired to pre-January 2023 flood elevations and conditions at the breach sites, and therefore, the MWT interior cannot be returned to its pre-January 2023 state under existing conditions. As a result, much of MWT interior remains inundated and is subject to a small amount of tidal action through the breach on the MWT Southwest Levee along Dead Horse Cut. As a result of these changed conditions at MWT, the approach to implementation of Phase B of the MWT Project has changed as well.

Instead of implementing the Phase B project as originally designed, a modified Phase B project emerged that incorporated the new baseline/changes in conditions at MWT (i.e., levee erosion/breaches and inundation of the MWT interior). The modified Phase B project (the "2023 Phase B Project") would include elements of the original Phase B Project but would also include construction of a flood weir on the MWT East Levee, completing a repair to the MWT West Levee, and degrading a large section of the MWT Southwest Levee to tidal elevations to improve tidal hydrology to the tract. This in turn would increase tidal marsh restoration benefits, improve water quality via improved tidal flows, and provide associated fish and aquatic food web habitat benefits on the tract. Additionally, soil and sediment excavated from levee degrade work will be beneficially reused in the dry northwest corner of MWT inside the tower ring levee areas as substrate for riparian habitat restoration.

1.1.3 Addendum No. 1 to the Final Supplemental EIR

This Addendum No. 1 to the Final SEIR for the Phase B project, State Clearinghouse No. 2016092015, addresses proposed modifications and refinements to the original Phase B project to account for emergency repairs conducted in 2023 and the current inundated condition of MWT. These proposed project modifications and refinements involve adjustments to the proposed levee modifications and habitat restoration activities due to the new and existing flooded condition.

State CEQA Guidelines Section 15164 states that minor technical changes or additions may be addressed by a supplement to the EIR or an addendum, depending on whether such changes or additions result in new significant effects or a substantial increase in the severity of previously identified significant effects. DWR has determined that the modifications and refinements of the proposed levee modifications and habitat restoration activities (described in Section 2, "Project Modifications and Refinements") constitute minor technical changes to the project, and none of the conditions described in State CEQA Guidelines Section 15162 (see Section 1.2, "Regulatory Context") requiring preparation of a subsequent EIR or negative declaration have occurred. Therefore, DWR has prepared this addendum to the MWT project Final SEIR in accordance with Section 15164 of the State CEQA Guidelines.

1.2 Regulatory Context

Section 15162(a) of the State CEQA Guidelines describes the conditions requiring preparation of a subsequent EIR as follows:

1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

    a) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

    b) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

    c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

    d) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

Based on the substantial evidence in light of the project's whole record, as supplemented with the analysis provided in Section 3, "Environmental Analysis," none of the conditions in State CEQA Guidelines Section 15162(a) requiring a subsequent EIR have occurred. Because none of

these conditions have occurred, the lead agency shall determine whether to prepare a subsequent negative declaration, an addendum, or no further documentation (State CEQA Guidelines Section 15162[b]).

Section 15164(a) of the State CEQA Guidelines states that a lead agency may prepare an addendum to a previously certified EIR if some changes or additions are necessary but none of the conditions described in Section 15162 calling for preparation of a subsequent EIR have occurred. DWR, as lead agency, has prepared this addendum in accordance with State CEQA Guidelines Section 15164 because this the analysis provided in this document demonstrates that the proposed refinement of the levee modifications and habitat restoration activities constitute changes to the project but would not trigger any of the conditions in State CEQA Guidelines Section 15162(a), as specified above, requiring a subsequent EIR. The purpose of this addendum, therefore, is to provide the additional substantial evidence and CEQA analysis necessary to address the minor technical changes to the project and supplement the administrative record for the project.

2. Project Modifications and Refinements

After flooding and inundation of MWT in 2023, the Phase B project was refined due to the changes in conditions and circumstances under which the Phase B must now be implemented. The 2023 2023 Phase B project is consistent with the long-standing project objectives that were outlined in the North Delta EIR and maintained in the Phase B SEIR.

The 2023 Phase B project continues to provide flood benefits by ameliorating effects of flood events. The 2023 Phase B project also maximizes opportunities for habitat restoration on MWT under the changed conditions, post-January 2023 flood. The decision not to drain floodwaters and return the MWT interior to its pre-January 2023 condition was made in part because restoration of substantial amounts of habitat could still be achieved by leaving the tract inundated and modifying the Phase B project. Furthermore, many areas inside the tract are already starting to experience process-based habitat restoration via natural recruitment to tidal marsh and riparian habitat types. These processes are expected to increase when the designed Phase B levee degrades are completed. The SEIR also acknowledged that if the island flooded again, it may not be reclaimed but the project could still move forward. The original proposal for habitat restoration in the North Delta EIR included minor grading and process-based habitat restoration. As such, the 2023 Phase B project maintains the approach of passive, nature-based restoration of habitat on MWT.

The 2023 Phase B project modifications and refinements were developed based on site assessments after flooding and updates to hydrologic modeling that was performed for planning of Phase B. The following discussion addresses minor modifications and refinements to the specific information presented in the SEIR. The modifications and refinements include adjustments to the proposed levee modifications and habitat restoration activities. **Figure 1** illustrates the proposed modifications and refinements.

2.1 Phase B Project Components

2.1.1 Levee Modifications and Habitat Restoration

During flooding in 2023, the Mokelumne River Levee breached at essentially the same location that the breach was proposed for the project in the Phase B SEIR. As a result, rock slop protection (RSP) was installed to stabilize the breach during emergency repairs in 2023 and construction of the Mokelumne Breach at the design location was completed. Additionally, the turnaround area along the levee on the southeast end of the MWT was completed to facilitate access for emergency repair activities in 2023. The proposal to degrade the MWT East Levee remains essentially the same as was proposed in the SEIR, but no longer includes internal levee reslope at the north and south ends. Minor changes are proposed to the design of the MWT Southwest Levee and West Levee Repair, as discussed below.

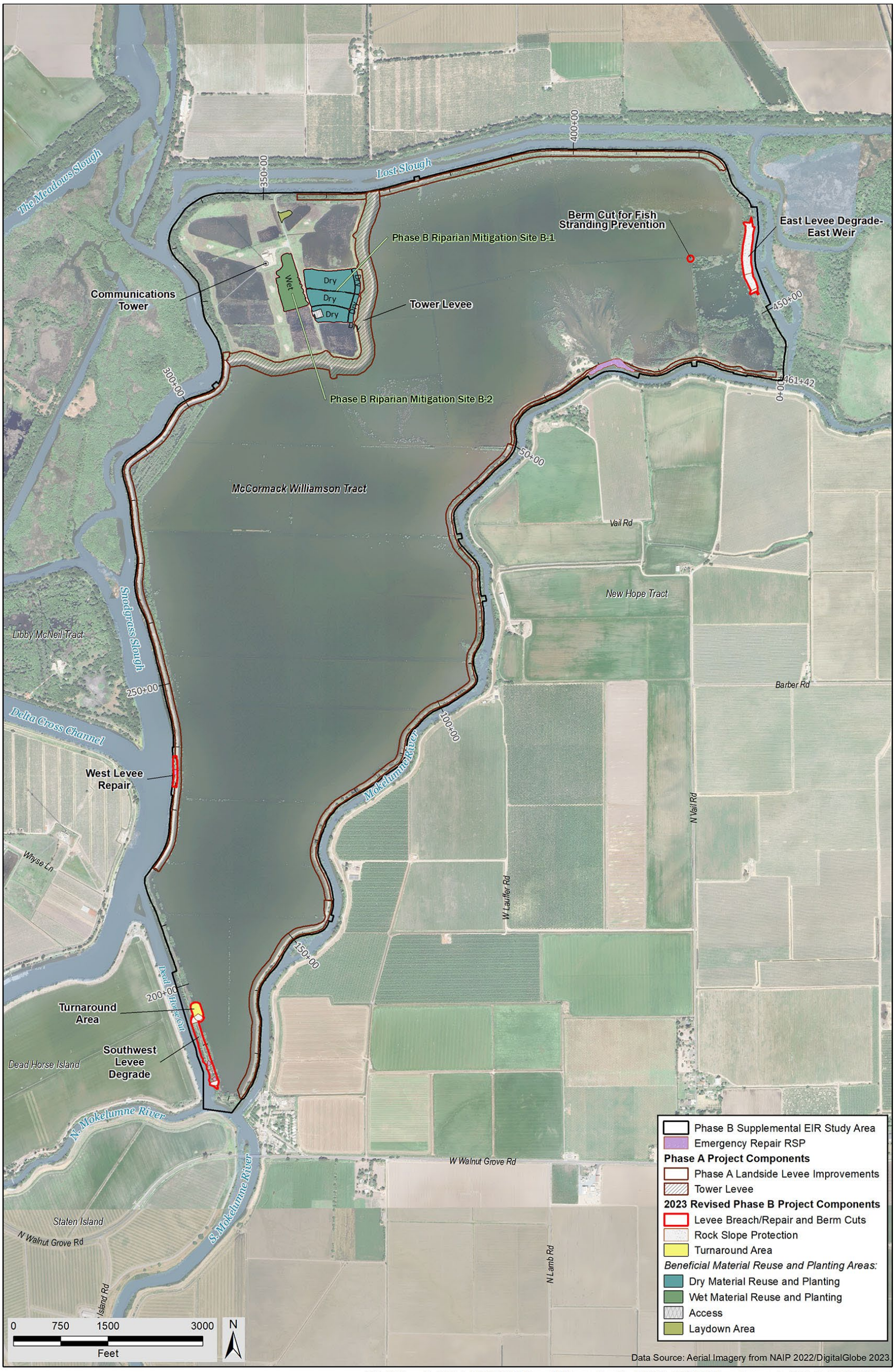

Figure Source: GEI Consultants, Inc. 2023.

Figure 1. Phase A and 2023 Revised Phase B Project Components

The Phase B original design incorporated significant interior grading to facilitate habitat restoration, including excavating a tidal channel network and onsite borrow excavation to generate fill material for constructing marsh plains, riparian floodplains, and riparian berms. These project components can no longer be developed because the interior of MWT remains completely inundated and grading, excavation, and fill activities cannot be conducted in submerged conditions. The sediment generated from degrading levees that was originally proposed for use to enhance the landside levee slope and habitat (along the MWT East and Southwest levees) also is no longer proposed because of the inundated condition of these areas. Sediment generated from levee degrades would now be placed into cells within the northwest corner of MWT, which is protected by the Tower Levee. These low-lying areas had been used as borrow areas during construction of the Tower Levee. Placement of material sourced from the MWT East and Southwest Levee degrades in these cells would bring their elevation up to pre-borrow activity levels and would create new areas for riparian habitat mitigation to offset impacts from the 2023 Phase B project; and an interior berm would be cut at one location, as discussed below.

Completely Degrade MWT Southwest Levee to Match Elevation of Island Floor

A portion of the MWT Southwest Levee breached during flooding in 2023 and a small area of the breach was stabilized with RSP during fall 2023 emergency repairs. During site assessments conducted after flooding in 2023, it was also discovered that Dead Horse Cut contains a significant amount of sediment. The original Phase B design proposed to excavate the MWT Southwest Levee to elevation 0.0 feet (ft)[2] to match the MWT elevation surface. The 2023 Phase B project has been revised to degrade the MWT Southwest Levee to approximately elevation 2.5 ft (a higher elevation than was previously proposed). This change in design was made to eliminate the need to excavate, manage, and haul a significant amount of wet soil/sediment from inundated areas and Dead Horse Cut and to minimize potential water quality impacts.

Repair MWT West Levee

The west levee repair remains in the 2023 Phase B project; however, a small critical erosion area at this site was stabilized with RSP placement during the emergency repairs in 2023 bringing this site up to approximately 14 ft elevation. The 2023 Phase B project would complete the remaining work to repair this levee section to the pre-breach elevation, restoring access along the levee roadway to pre-breach conditions.

Modify Landform and Restore Agricultural Land to Habitat

Beneficial Re-use Areas of Levee Degrade Material and Riparian Planting Areas

The northwest corner of MWT was used as a borrow site for Phase A and consists of several cells with relatively low site elevations and a high-water table. Using sediment and dry material generated from excavation activities for levee modifications, riparian woodland and scrub-shrub habitat would be created at two sites in the northwest corner through beneficial reuse of material to increase site elevations closer to the previous grade. These new areas are referred to as

[2] Based on site elevations, there's about 1,200 acres of tidal aquatic habitat that is at or lower than the MHHW elevation of 5.1 ft elevation.

"Beneficial Re-use of Material and Riparian Planting Areas" on Figure 1 and are shown in more detail in **Figure 2**. Approximately 9.5 acres of riparian habitat would be developed in these areas. This acreage was determined based on available material for reuse and riparian habitat mitigation that is needed to offset construction-related impacts to riparian habitat from the 2023 Phase B project (refer to the environmental analysis in Section 3.2, "Biological Resources," for more information). These new project features are referred to as Phase B Mitigation Sites B-1 and B-2 and are discussed further below.

Phase B Mitigation Site B-1 consists of an approximately 5.9-acre area in the eastern portion of the northwest corner that would receive dry material excavated from higher ground during levee degrades and would be brought to an elevation of approximately 2.0 ft elevation for riparian woodland restoration. Phase B Mitigation Site B-2 consists of an approximately 3.6-acre area to the west of the riparian woodland mitigation site would receive wet material generated by in-water work at the MWT Southwest Levee degrade. This material would be placed in a bermed-off area and allowed to dry out before leveling the site in preparation for planting. At final grade, this site is expected to be at an elevation of approximately 0.7 to 1.0 ft. Therefore, this area would be a little wetter and closer to the water table than the riparian woodland planting area. The additional moisture is expected to provide appropriate growing conditions for riparian scrub-shrub plantings, and conditions less likely to naturally transition to taller stature riparian forest over time.

Berm Cut

A berm around the scour pond on the east side of the MWT isolates this area from the rest of the interior as water levels become lower. The Phase B project included cutting this berm and excavating a tidal channel into this area. However, the tidal channel has been removed from the 2023 Phase B project due to the inundated condition of MWT. Therefore, the 2023 Phase B project includes cutting the existing berm around the scour pond to maintain hydraulic connection, as shown in Figure 1. Cutting the berm would allow flow of water and fish passage between the scour pond and MWT.

2.1.2 Utility Relocations and Decommissioning

MWT contains abandoned gas lines and gas wells. The SEIR included surveying, locating, avoiding, and if needed, removing, gas lines prior to grading; mapping and avoiding gas wells prior to excavation; and applying an avoidance buffer around abandoned gas wells for placement of fill. These activities are no longer required because grading and excavation have been removed from the project and MWT is completely inundated. The remaining 2023 Phase B work locations would not conflict with abandoned gas lines and gas wells.

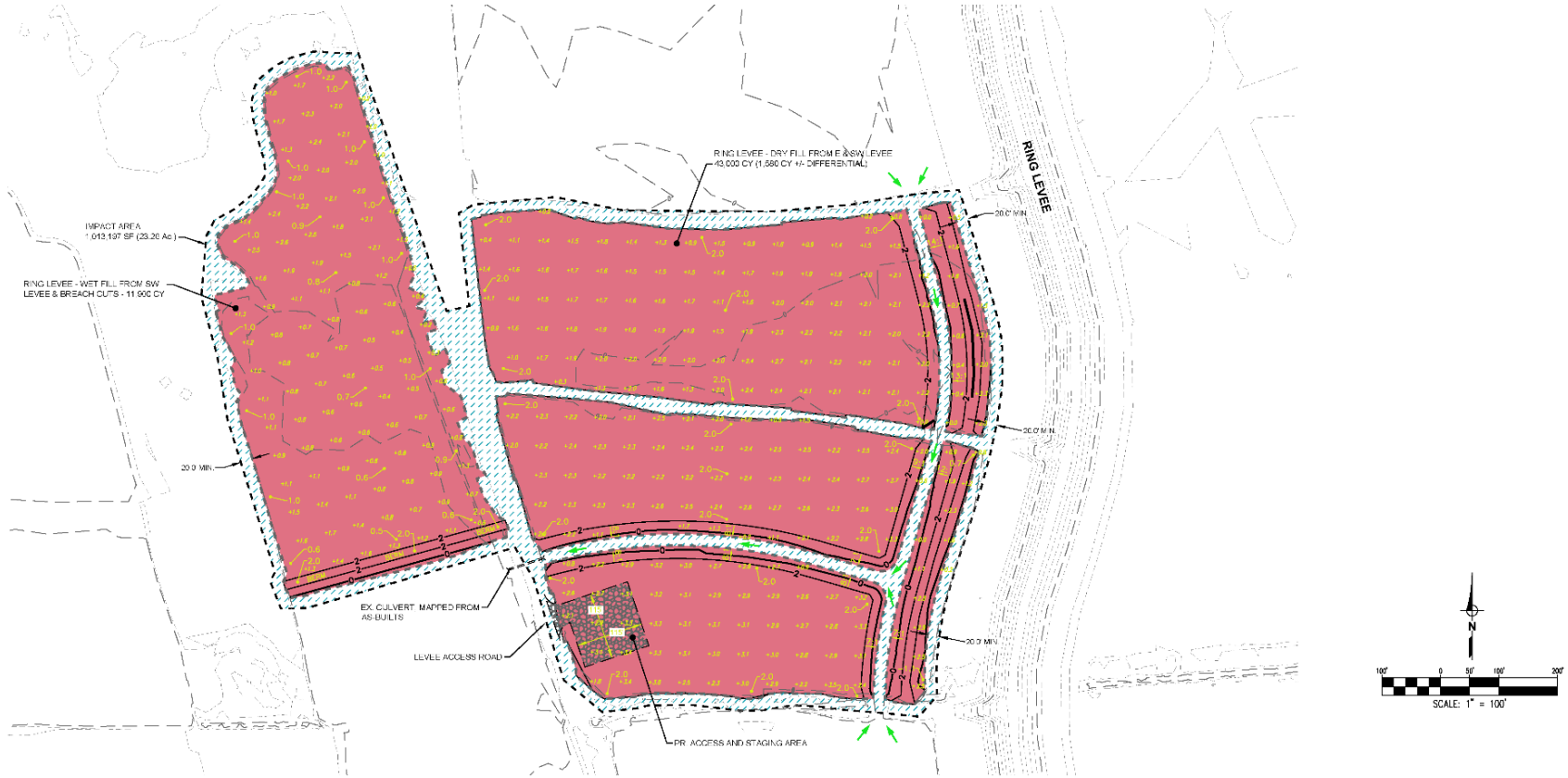

Figure 2. Phase B Mitigation Sites B-1 and B-2 in the Northwest Corner of McCormack-Williamson Tract

2.2 Phase B Project Construction

Project construction would occur primarily as described in the SEIR, except several components have been removed from the 2023 Phase B project and would not be constructed. This results in a substantially shorter construction period and less intensive construction activities than were evaluated in the Phase B SEIR.

Additional in-water work would be required to excavate the MWT Southwest Levee degrade and construct a turnaround at this location. The cut along the berm around the scour pond on the east of the MWT interior would be made using a small excavator that is mobilized to the location when the berm is exposed. The excavator would then reach out to excavate the berm cut which would also involve limited in-water work.

Sacramento Municipal Utilities District (SMUD) would continue as planned for the Phase B project. The relocation of power line and decommissioning of the SMUD line on MWT would occur independently of construction of Phase B.

2.3 Phase B Project Operations and Maintenance

After emergency repairs were completed, the mean lower low water (MLLW) on site was estimated to average around 4.9 ft elevation and the mean higher high water (MHHW) around 5.1 ft elevation, resulting in a minimal daily tidal range (approximately 0.2 ft). When the MWT Southwest Levee degrade is completed as designed in the 2023 Phase B project, the MLLW is estimated to be around 3.9 ft elevation and the MHHW around 5.6 ft elevation, resulting in a substantially increased daily tidal range (approximately 1.5 ft) – from 0.2 ft under existing conditions to up to 1.7 ft elevation difference after the 2023 Phase B project. The increase in tidal range created by the 2023 Phase B project is expected to contribute to tidal marsh expansion and tidal circulation improvements.

RD 2110 would implement a mitigation plan for riparian plantings to offset loss of riparian woodland and scrub resulting from implementation of the 2023 Phase B project. This is expected to include approximately 10.8 acres of habitat created in the northwest corner of MWT. An adaptive management plan for Phase B would no longer cover the MWT interior since no plantings or long-term management of riparian vegetation is proposed on the interior.

Anticipated Habitat Evolution

The 2023 Phase B project anticipates that a substantial amount of habitat restoration would still occur naturally. The anticipated evolution of habitat on MWT after the 2023 Phase B project would differ from what was presented in the Phase B SEIR because grading, excavation, fill, and landside levee resloping activities cannot be conducted due to MWT being completely inundated after flooding in 2023. However, the 2023 Phase B project would substantially increase tidal action and circulation and allow additional water onto MWT through the MWT East Weir during large storm events. In addition, habitat is naturally recruiting on the tract's interior following the 2023 inundation and the 2023 Phase B project would enhance this natural recruitment through creation of beneficial hydrology regimes resulting from the changed tidal inundation patterns. **Table 1** shows the expected acreages of natural evolution of habitat at MWT after construction of the Phase B project**.**

Table 1. 2023 Revised Phase B Project Anticipated Habitat Evolution

Expected Habitat Evolution on MWT (Excluding Northwest Corner)	Approximate Acreage
Subtidal Open Water	160
Shallow Subtidal - Potential Marsh Expansion	798
Tidal Marsh	328
Riparian Scrub/Mixed Riparian Woodland/Valley Oak Woodland	171
Grand Total	**1,457**

3. Environmental Analysis

This section analyzes the potential effects on the physical environment from implementing the proposed project modifications and refinements. This analysis has been prepared to determine whether any of the conditions in State CEQA Guidelines Section 15162 (described in Section 1.1) would occur as a result of the proposed modifications and refinements.

A summary of changes to impacts evaluated in the SEIR is provided in **Appendix A**. The proposed project modifications and refinements would result in no change or a reduction to previously identified effects analyzed and disclosed in the SEIR for the following topic areas:

- Geology, Seismicity, Soils and Mineral Resources
- Transportation and Navigation
- Air Quality
- Noise
- Land Use, Agriculture, Recreation, and Economics
- Energy
- Visual Resources
- Public Health and Hazards
- Cultural and Tribal Cultural Resources
- Greenhouse Gas Emissions

Two topic areas – Hydrology and Water Quality and Biological Resources – are discussed in more detail below to evaluate if the proposed project modifications and refinements would cause any new significant or potentially significant impacts or a substantial increase in the severity of previously identified significant effects analyzed and disclosed in the SEIR.

3.1 Hydrology and Water Quality

3.1.1 Changes Due to 2023 Flooding

The SEIR evaluated impacts based on conditions that existed prior to 2023 but after flooding in 2017, which included that the MWT perimeter levees remained intact and the interior of MWT was not inundated. Several changes to hydrologic conditions on MWT have occurred due to flooding in 2023, and hydrologic conditions now are different than those assessed in the SEIR. Levee breaches that formed during flooding in 2023 were stabilized by the emergency repairs but the levees at these locations were not restored to heights/conditions that existed prior to flooding. Freshwater from the Mokelumne River now enters MWT through the Mokelumne Breach that formed during flooding and was stabilized during emergency repairs in 2023. A minimal amount of tidal action (approximately 0.2 ft) currently extends onto MWT through the MWT Southwest Levee that was partially eroded during flooding in 2023. MWT remains inundated due to these changes and seepage is anticipated to occur to an extent under existing conditions. Lastly, because MWT is inundated, it is currently susceptible to wind-wave action and potentially

erosion. However, the landside of most MWT perimeter levees was resloped and vegetated during Phase A of the project, which provides protection against wind-wave erosion.

3.1.2 Updated Impact Analysis

The project modifications and refinements associated with the 2023 Phase B project would complete the levee degrades/breaches originally proposed by Phase B, and result in the following two changes to hydrologic conditions: 1) additional freshwater would flow onto the tract through the MWT East Levee degrade during higher flow events and the completed Southwest Levee breach, and 2) the daily tidal range on MWT would increase substantially by approximately 1.5 ft, as discussed in Section 2.3 “Phase B Project Operations and Maintenance.”

A quantitative assessment of the existing conditions and the original Phase B project was performed for the SEIR by cbec, using the USACE's Hydrologic Engineering Center River Analysis System (HEC-RAS) hydraulic modeling tool. The Phase B model was updated for this Addendum to reflect changes that have occurred due to flooding in 2023 and the subsequent emergency repairs, as discussed above in the section, and for implementation of the project modifications and refinements. The results of updated modeling are provided in an addendum to the hydrologic modeling report prepared by cbec for the SEIR, which is provided in **Appendix B (cbec 2023)**.

Using the updated HEC-RAS model, the same data that were generated to evaluate flood impacts in the SEIR – water surface elevations and maximum velocities – were generated for the updated existing conditions scenario and the 2023 Phase B project modifications and refinements. The updated model evaluated three different alternatives of the 2023 Phase B project. Each alternative accounted for differences in the design of the MWT Southwest Levee degrade. The 2023 Phase B project modifications and refinements ultimately selected and evaluated in this Addendum corresponds to ‘2023 Alt B’ in the modeling report which is provided in Appendix B.

The results of updated HEC-RAS modeling at each index point evaluated in the SEIR, and one new index point along Dead Horse Cut where high velocities were identified in the SEIR analysis, is provided in **Tables 2** and **3**. Table 2 provides a comparison of estimated maximum water surface elevations under updated existing conditions (referred to as the ‘2023 condition’) compared to the 2023 Phase B project modifications and refinements and a comparison of the differences in water surface elevations to those that were previously identified for the Phase B project and evaluated in the SEIR. Table 3 provides a comparison of estimated maximum velocities under the 2023 condition compared to the 2023 Phase B project modifications and refinements and a comparison of the differences in maximum velocities to the those that were previously identified for the Phase B project and evaluated in the SEIR.

Table 2. Maximum Water Surface Elevations for the 100-year Design Storm

Location	2023 Condition Maximum WSE (ft, NAVD88)	2023 Phase B Project Maximum WSE (ft, NAVD88)	2023 WSE Difference (2023 Project minus 2023 conditions, ft)	SEIR WSE Difference (project minus 2023 conditions, ft)
Bensons Ferry	20.66	19.54	-1.12	-1.35
Beach Lake	16.47	16.27	-0.2	-0.27
Point Pleasant North	16.31	16.09	-0.22	-0.31
Point Pleasant South	16.28	16.06	-0.22	-0.31
Lambert Road Upstream (Stone Lake)	16.31	16.09	-0.22	-0.31
Snodgrass Slough at Lambert Road	16.34	16.11	-0.23	-0.31
Snodgrass Slough at Twin Cities Rd	17.57	17.05	-0.52	-0.60
Snodgrass Slough at DCC	17.52	16.99	-0.53	-0.58
Dead Horse Cut (near SW degrade)[1]	17.45	17.07	-0.38	-
Dead Horse Island	15.38	1.48	-13.9	-13.92
South Fork Moke at New Hope Bridge	17.08	16.67	-0.41	-0.32
South Fork Moke at Beaver Slough	12.60	12.34	-0.26	-0.20
South Fork Moke at Hog Slough	10.34	10.22	-0.12	-0.10
North Fork Moke at New Hope Road	16.23	15.86	-0.37	-0.38
North Fork Moke at latitude of Beaver Slough	13.50	13.24	-0.26	-0.28
North Fork Moke at latitude of Hog Slough	11.60	11.43	-0.17	-0.18

Notes: Delta Cross Channel (DCC), Water surface elevation (WSE), North American Vertical Datum 1988 (NAVD88), feet (ft), Supplemental Environmental Impact Report (SEIR)

Blue values = flood reduction under the 2023 Phase B project modifications and refinements conditions equal to or less than -0.05

Red values = flood increase under the 2023 Phase B project modifications and refinements conditions equal to or less than +0.05

[1]New index point added for 2023 analysis.

Source: cbec 2023

Table 3. Maximum Velocities for the 100-year Design Storm

Location	2023 Condition Maximum Velocity (ft/sec, NAVD88)	2023 Phase B Project Maximum WSE (ft, NAVD88)	WSE Difference (2023 Project minus 2023 conditions, ft)	SEIR WSE Difference (project minus 2023 conditions, ft)
Bensons Ferry	4.23	4.95	0.72	0.96
Snodgrass Slough at Lambert Road	1.10	1.05	-0.05	-0.05
Snodgrass Slough at Twin Cities Rd	0.53	0.51	-0.02	-0.03
Snodgrass Slough at DCC	1.93	1.35	-0.58	-0.91
Dead Horse Cut (near SW degrade)[1]	8.89	9.19	0.3	-
South Fork Moke at New Hope Bridge	5.63	5.47	-0.16	-0.13
South Fork Moke at Beaver Slough	3.54	3.43	-0.11	-0.08
South Fork Moke at Hog Slough	1.97	1.89	-0.08	-0.07
North Fork Moke at New Hope Road	7.05	6.85	-0.2	-0.24
North Fork Moke at latitude of Beaver Slough	4.99	4.84	-0.15	-0.15
North Fork Moke at latitude of Hog Slough	4.79	4.64	-0.15	-0.16

Notes: Delta Cross Channel (DCC), Water surface elevation (WSE), North American Vertical Datum 1988 (NAVD88), feet per second (ft/sec), Supplemental Environmental Impact Report (SEIR)

Blue values = reduction under the 2023 Phase B project modifications and refinements conditions equal to or less than -0.05

Red values = increase under the 2023 Phase B project modifications and refinements conditions equal to or less than +0.05

[1]New index point added for 2023 analysis.

Source: cbec 2023

Sediment transport modeling was conducted for the SEIR to evaluate long-term changes in channel bed conditions for the Mokelumne River, Snodgrass Slough, and the North and South Mokelumne Rivers. The sediment transport modeling was conducted at a large scale by considering routing of flows through MWT after the Phase B project was constructed. The project modifications and refinements would continue to result in flows being routed through MWT after the 2023 Phase B project is constructed. Therefore, the project modifications and refinements would not change the sediment transport analysis provided in the SEIR.

Salinity modeling was conducted for the SEIR to evaluate changes in salinity in the Sacramento-San Joaquin River Delta and compliance with Revised Water Rights Decision-1641 (SWRCB 2000) water quality objectives. Salinity levels were primarily dependent on the length of the MWT Southwest Levee degrade, which controls tidal action on MWT. A 1,500- to 1,000-ft-long degrade of the MWT Southwest Levee was evaluated in the SEIR. The project modifications and refinements include an approximately 1,000-ft-long degrade at this location, and therefore, the salinity analysis in the SEIR would not change. Furthermore, due to flooding in 2023, MWT is now subject to a small amount of tidal action (approximately 0.2 ft) through the breach at the MWT Southwest Levee degrade location, which may to some small extent reduce the impacts of salinity from the 2023 Phase B project compared to the 2023 condition.

Impacts from the project modifications and refinements on groundwater seepage, methylmercury, release of pesticides, salinity, and changes in water use, would not change or would be reduced and are not discussed further. The changes in the impact analysis for hydrology and water quality are discussed further below.

Flood Control and Levee Stability

Impacts on flood elevations would be similar to those identified in the SEIR because maximum water surface elevations during the 100-year design flood with the project modifications and refinements would be reduced compared to the 2023 condition, as shown in Table 2, and the potential surge effect in areas downstream of MWT would continue to be eliminated. This is a result of the MWT East Levee continuing to allow flood flows on to the tract and the MWT Southwest Levee allowing flood flows to pass through MWT and downstream. The reductions in water surface elevations from the project modifications and refinements are slightly less than the reductions that were identified for the Phase B project in the SEIR, as shown in Table 2. This difference is attributed to MWT's current inundation and possibly work already completed, such as the Mokelumne River breach. Overall, the project modifications and refinements continue to provide a net benefit to both upstream and downstream waterways with no new significant environmental impacts.

Impacts on scour from the project modifications and refinements would be similar to those identified in the SEIR. RSP placement remains proposed at the levee modifications where it is necessary to protect against erosion/scour from the approaching flow. As discussed at the beginning of Section 3.1.2, "Updated Impact Analysis," the project modifications and refinements would not change the evaluation of sediment transport. Changes in erosion and scour due to changes in velocities would be similar to impacts evaluated in the SEIR. Maximum velocities during the 100-year design flood would be reduced compared to the 2023 condition at most index points, and similar to reductions identified for Phase B in the SEIR, as shown in Table 3. Maximum velocities would continue to increase at Bensons Ferry upstream of MWT

and Dead Horse Cut (the new index point) downstream of MWT, , as shown in Table 3. This increase would be slightly less than the increase that was identified and evaluated for the Phase B project in the SEIR, but impacts would be similar to those evaluated in the SEIR. In addition, implementing Mitigation Measures FC-2 (Provide Payment to Protect Dead Horse Island East Levee) from the SEIR would further reduce the potentially significant impacts associated with potential erosion and scour on the Dead Horse Island east levee.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on flood elevation, seepage, or erosion and scour or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

Geomorphology and Sediment Transport

Impacts on sediment accumulation in channels and on land would be similar to those identified in the SEIR because, as discussed at the beginning of Section 3.1.2, "Updated Impact Analysis," the project modifications and refinements would not change the evaluation of sediment transport.

Impacts on scouring on levees, in channels, and on land would also be similar because, as discussed at the beginning of Section 3.1.2, "Updated Impact Analysis," the project modifications and refinements would not change the evaluation of sediment transport, and as discussed above in the "Flood Control and Levee Stability" section, changes in maximum velocities would be similar. In addition, implementing Mitigation Measures FC-2 (Provide Payment to Protect Dead Horse Island East Levee) would reduce the potentially significant impacts associated with potential erosion and scour on the Dead Horse Island east levee to less than significant.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on geomorphology and sediment transport or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

Water Quality

Impact mechanisms on water quality from pollutants during construction would be similar for in-water work but the extent of these impact would be reduced because there would be substantially less in-water construction activities conducted for 2023 Phase B project. The majority of interior grading activities have been removed from the project. In-water work activities potentially required for the project modifications and refinements, including excavation and development of the turnaround at the MWT Southwest Levee degrade and excavation of the berm cut on the interior of MWT, are similar to the types of in water activities evaluated in the SEIR for the MWT Southwest Levee degrade and Mokelumne River breach. To protect water quality during construction silt curtains and sediment controls would be used, water quality sampling would be performed during construction, permits would be obtained and permit conditions implemented

along with environmental commitments, as discussed in the SEIR. In addition, Mitigation Measure WQ-2 (Inspect Sediment and Turbidity Control Barriers Daily during Construction for Proper Function and Replace Immediately if Not Functioning Effectively) would reduce the potentially significant impacts to surface water quality during in-water work to less than significant.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on water quality or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

3.2 Biological Resources

3.2.1 Changes Due to 2023 Flooding

The SEIR identified and evaluated impacts from inundation of MWT after the degrading/breaching of levees originally planned for the project. Because inundation of MWT already occurred from flooding in 2023, outside of any project action or activity, impacts occurring from inundation have already occurred and the inundated condition of MWT is now part of baseline conditions.

Land Cover

Potential impacts in the 2023 Phase B SEIR were evaluated based on conditions that existed at MWT prior to flooding in 2023. Land cover conditions have changed to a large extent due to inundation. Further, small changes in land cover occurred during the emergency repairs completed in 2023, such as installation of RSP and other ground disturbance associated with construction. The mapping of land covers has been updated where activities are proposed for the 2023 Phase B project modifications and refinements and is provided in **Figures 3-6**. The following new land covers have been identified on MWT.

Tidally Inundated Transitional Habitat

The MWT interior below 5.1 feet elevation has been tidally inundated since the 2023 flood, with little tidal prism or tidal range to promote establishment of tidal marsh habitat. This tidally inundated transitional habitat is currently functioning similar to a shallow lake ecosystem, primarily shallow subtidal open water. Narrow bands of transitional emergent wetland vegetation will likely establish at the uppermost fringe of the current tidal inundation zone.

Figure Source: GEI Consultants, Inc. 2023.

Figure 3. Current Land Cover Types on Northwest Corner of McCormack-Williamson Tract

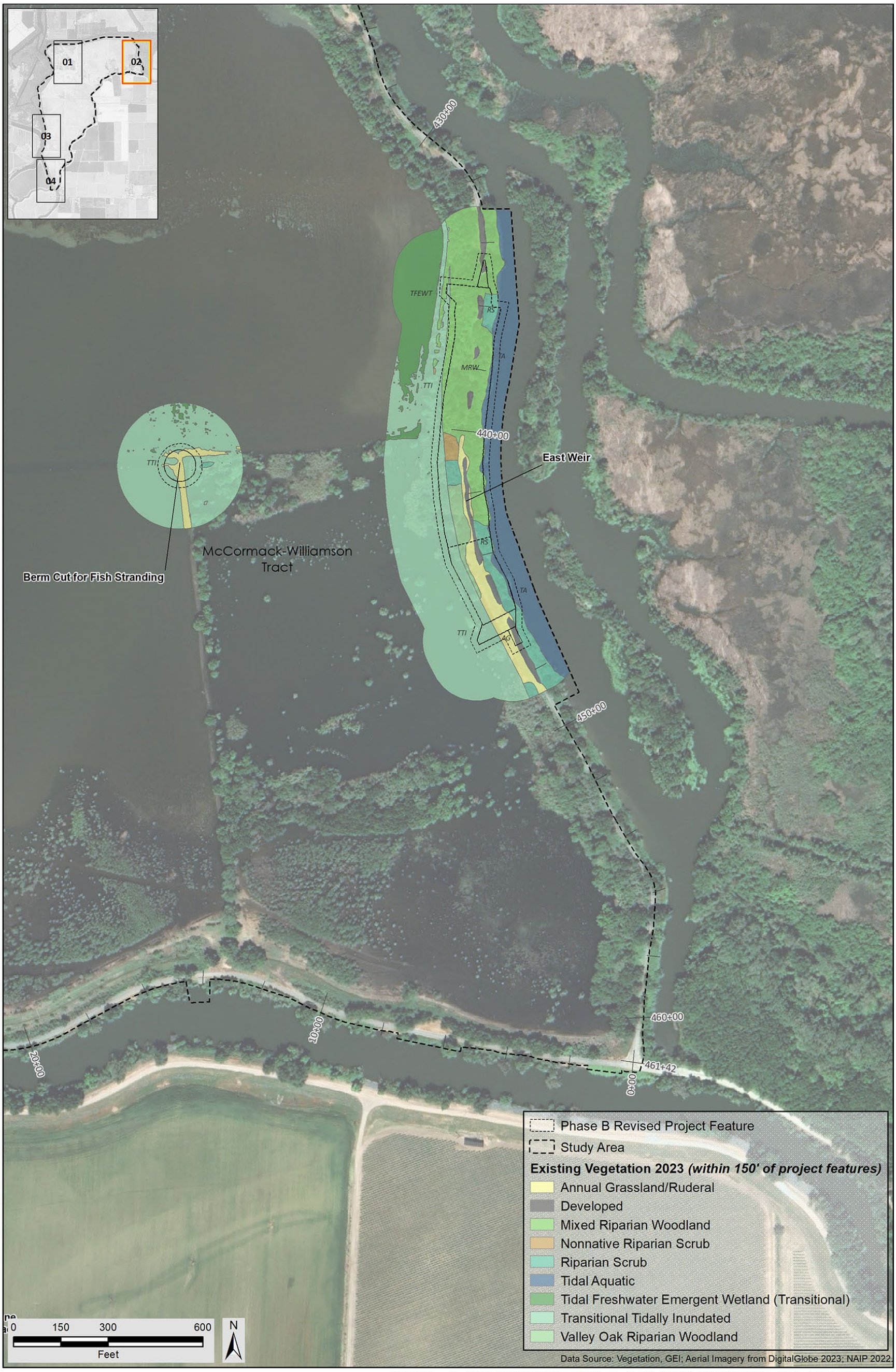

Figure Source: GEI Consultants, Inc. 2023.

Figure 4. Current Land Cover Types on Eastern McCormack-Williamson Tract

Existing

Figure Source: GEI Consultants, Inc. 2023.

Figure 5. Current Land Cover Types on Western McCormack-Williamson Tract

Figure Source: GEI Consultants, Inc. 2023.

Figure 6. Current Land Cover Types on Southwestern McCormack-Williamson Tract

3.2.2 Updated Impact Analysis

Table 4 provides a comparison of impacts on land cover types and wildlife habitat associations that were identified in the Phase B SEIR to those anticipated from the 2023 Phase B project. These impacts are based on the refined 2023 Phase B project footprint and updated land cover mapping completed by GEI in 2023, as discussed above in Section 3.2.1, "Changes Due to 2023 Flooding" and shown in Figures 3-6.

Impacts of the 2023 Phase B project on biological resources would generally be less than identified in the SEIR because impacts associated with the previously proposed Phase B project – specifically, the Mokelumne River Breach and extensive excavation, grading, and landside levee resloping on the interior of the tract – would not occur under the 2023 Phase B project. However, the extent of impact on some aquatic habitats and associated resources may increase slightly because areas that were formerly upland are now flooded. These changes in impacts on biological resources are discussed further below.

Table 4. Comparison of MWT Habitat and Land Cover Type Impacts in the Supplemental EIR and for the 2023 Phase B Project[1]

Wildlife Habitat	Land Cover Type	Temporary Impacts SEIR	Temporary Impacts 2023 Phase B	Permanent Impacts SEIR	Permanent Impacts 2023 Phase B
Tidal perennial aquatic habitat	Tidal aquatic	1.59	1.18	1.82	0.74
	Tidally inundated transitional	--	1.92	--	1.86
Tidal perennial aquatic habitat	Tidal aquatic	1.59	1.17	1.82	0.76
	Tidally inundated transitional	--	3.11	--	1.85
Tidal freshwater emergent marsh habitat	Tidal freshwater emergent wetland	0.07	--	0.01	--
Nontidal freshwater emergent wetland	Perennial freshwater emergent wetland	--	--	13.05	--
	Seasonal freshwater emergent wetland	0.07	--	4.38	--
Lacustrine	Farm and borrow pit depressions	--	--	--	--
	Agricultural ditch	0.02[2]	--	19.84[2]	--
Valley/foothill riparian[3]	Valley oak riparian woodland	0.17	--	3.35	0.28
	Mixed riparian woodland	1.35	0.50	33.97	1.70
	Early successional mixed riparian woodland	0.03	--	16.05	--
	Riparian scrub	0.42	0.14	8.44	1.28
	Nonnative riparian woodland	--	--	--	--
	Nonnative riparian scrub	0.32	0.12	6.02	1.03

Wildlife Habitat	Land Cover Type	Temporary Impacts SEIR	Temporary Impacts 2023 Phase B	Permanent Impacts SEIR	Permanent Impacts 2023 Phase B
Grassland	Annual grassland/ruderal	63.68	19.68	1,218.77	4.21
	Perennial grassland	13.08	0.24	7.50	0.13
Developed	Developed	0.16	0.46	1.84	0.86
	Rock slope protection	--	0.04	--	0.23
Totals		**80.94[2]**	**24.28**	**1,315.20[2]**	**12.32**

Notes: MWT=McCormack-Williamson Tract (MWT), Supplemental Environmental Impact Report (SEIR)

Green values = impacts quantities for the 2023 Phase B project that are less than those identified in the SEIR

Red values = impacts quantities for the 2023 Phase B project that are greater than those identified in the SEIR

[1] Impact acreages associated with Sacramento Municipal Utility District relocations are not included.

[2] Agricultural ditch impact acreages for Phase B are provided for comparison purposes but habitat conditions have changed substantially since agricultural production ceased (most ditches no longer support open water); these acreages duplicate those of the underlying or overhanging land cover types they overlap and are not included in the acreage totals.

[3] Cottonwood-willow woodland addressed in the North Delta EIR is included in mixed riparian woodland and Himalayan blackberry is included in nonnative riparian scrub.

[4] Permanent impacts include areas of cover types that are disturbed by construction activities or changed from inundation of MWT.

Vegetation

As shown in Table 4, impacts of the 2023 Phase B project on habitat and land cover types would be substantially less than discussed in the SEIR, and some impacts have been completely eliminated. The only exception is the impact on the newly established tidally inundated transitional habitat. This habitat represents the current condition on the majority of the MWT interior, which is currently open water but is anticipated to transition to marsh and riparian habitats, at least partially, as water levels recede and vegetation becomes established. Although 2.6 acres of tidal perennial aquatic habitat would be permanently impacted by project implementation and 3.1 acres would be temporarily impacted, MWT currently supports more than 1,000 acres[3] of tidal aquatic and transitional habitat and the loss of this tiny fraction would not have a substantial adverse effect and would not result in a new significant impact. In addition, under the project modifications and refinements, permanent impacts on tidal aquatic habitat would be reduced by 60 percent and total permanent impacts on tidal and nontidal aquatic, transitional, marsh, and wetland habitats would be reduced from 19.26 acres to 2.61 acres.

Impacts on riparian habitat resulting from the project modifications and refinements would also be substantially less under the 2023 Phase B project. These impacts would include:

- permanent loss of 0.28 acre of valley oak riparian woodland instead of 3.35 acres under the original Phase B project;
- 1.7 acres of mixed riparian woodland instead of 33.97 acres;
- 1.28 acres of riparian scrub instead of 8.44 acres;

[3] Based on site elevations, there's about 1,200 acres of tidal aquatic habitat that is at or lower than the MHHW elevation of 5.1 ft elevation.

- 1.03 acres of nonnative riparian scrub and temporary impact on 0.5 acre of mixed riparian woodland instead of 6.02 acres and 1.35 acres, respectively;
- 0.14 acre of riparian scrub instead of 0.42 acre; and
- 0.12 acre of nonnative riparian scrub instead of 0.32 acre.

Creation of approximately 9.5 acres of riparian habitat in the mitigation areas inside the tower ring levee would compensate for these project-related impacts. Mitigation Measure VEG-1 (Replace Valley/Foothill Riparian Cover Types) would be implemented to ensure riparian impacts are reduced to a less-than-significant level.

Potential impacts associated with establishment of invasive nonnative plants and loss or disturbance of special-status plant species would also be reduced by implementing the 2023 Phase B project, because the extent of equipment use and grading activities would be a fraction of what was previously proposed and much less suitable habitat for special-status plants would be disturbed. In addition, implementing Mitigation Measures VEG-6 (Avoid Introduction and Spread of New Noxious Weeds during and after Project Construction), VEG-7 (Conduct Preconstruction Surveys for Special-status Plants), and VEG-8 (Avoid and Minimize Impacts on Special-status Species and Compensate for Special-status Species Loss) would reduce the potentially significant impacts associated with invasive nonnative plants and special-status species to less than significant.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on habitats and land cover types or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

Fish

Implementing the project modifications and refinements would reduce loss of shaded riverine aquatic (SRA) cover during construction compared to those discussed in the SEIR because no activities related to the 2023 Phase B project would be implemented at the Mokelumne River Levee breach location. Although a limited amount of loss of SRA cover would still occur at the MWT East and Southwest Levee degrade areas, this loss would be offset by the anticipated development of riparian vegetation providing SRA cover on higher ground adjacent to aquatic habitat throughout much of the MWT interior. In addition, implementing Mitigation Measure Fish-2 (Replace Shaded Riverine Aquatic Habitat) would reduce the potentially significant impacts associated with loss of SRA to less than significant.

Implementing the 2023 Phase B project would not change impacts discussed in the SEIR associated with potential loss of native fish from predation or violation of salinity standards during project operation. These impacts would not increase and would remain less than significant. Potential for fish entrapment or delayed migration during project operation is also expected to be similar under the project modifications and refinements. Although the depth of the MWT Southwest Levee Degrade would be approximately 2.5 ft higher than was previously proposed in the Supplementation EIR, this elevation would be several feet below the typical

water surface elevation during the high and low tide cycles and would provide ample opportunity for fish to enter and leave the MWT interior. Similarly, the removal of interior land grading to create a system of tidal channels is not anticipated to reduce the ability of fish to leave the MWT interior via the MWT Southwest Levee Degrade, because the natural tidal outflow patterns would lead fish to this location. The 2023 Phase B project still includes a fish notch to prevent fish from becoming entrained in the east scour pond, as discussed above.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on fish or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

Wildlife

For the reasons described above under "Vegetation," the project modifications and refinements would result in substantially reduced loss and disturbance of habitat for wildlife associated with riparian and tidal and nontidal freshwater emergent wetland. There would be an increase of 0.79 acres in loss and disturbance of tidal perennial aquatic habitat, due to the current conditions on the MWT interior, however, only 2.82 acres of the more than 1,000 acres of tidal aquatic and transitional habitat currently present would be permanently loss (refer to the discussion in the "Vegetation" section above). This would not have a substantial adverse effect on wildlife associated with this habitat and would not result in a new significant impact.

Similarly, impacts on many specific wildlife species and groups discussed in the SEIR would be substantially reduced or eliminated under the 2023 Phase B project, including impacts on valley elderberry longhorn beetle, monarch butterfly, greater sandhill crane, Swainson's hawk, western burrowing owl, other nesting raptors, colonial waterbird rookeries, tricolored blackbird, western yellow-billed cuckoo, other nesting migratory birds, and bats. These impact reductions are a result of eliminating project work at the Mokelumne River Breach site, excavation for gas pipeline removal, and/or vegetation removal and grading for tidal channel and floodplain habitat restoration activities. Despite the reduction in impacts, mitigation measures identified in the SEIR that still apply under the project modifications and refinements would be implemented. These include: WILD-1 (Implement Mitigation Measure VEG-1, Replace Valley/Foothill Riparian Cover Types), WILD-2 (Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance), WILD-3 (Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources), WILD-9 (Avoid and Minimize Impacts on Elderberry Shrubs), WILD-10 (Compensate for Unavoidable Impacts on Elderberry Shrubs), WILD-13 (Conduct Preconstruction Surveys for Nesting Swainson's Hawks before Construction and Maintenance), WILD-14 (Avoid and Minimize Construction-related Disturbances within 0.5 Mile of Active Swainson's Hawk Nest Sites), WILD-17 (Conduct Habitat Assessment and Preconstruction Surveys for Burrowing Owls), WILD-18 (Avoid or Minimize Disturbance of Occupied Burrows), WILD-20 (Create New or Enhance Existing Suitable Burrows and Replace Lost Burrowing Owl Foraging Habitat), WILD-23 (Conduct Preconstruction Surveys for Tricolored Blackbird), WILD-24 (Minimize Construction-related Disturbances in the Vicinity of Active Tricolored Blackbird Colonies), WILD-27 (Conduct Preconstruction Surveys to Locate

Rookeries), WILD-28 (Minimize Construction-related Disturbances within 0.25 Mile of Active Rookeries), and WILD-31 (Conduct Preconstruction Surveys for Bats).

There is a low potential for the 2023 Phase B project to have increased impacts compared to those identified in the SEIR for giant garter snake, western pond turtle, and California black rail. The potential increase in impacts for all these species is associated with the current flooded condition of the MWT interior. As a result, suitable habitat for these species now also occurs on the interior when formerly it was limited to the levees and exterior of the tract.

Overall, impacts on aquatic habitat for giant garter snake would be reduced when compared to the original Phase B project evaluated in the SEIR, due to the lack of project work at the Mokelumne River Breach location. However, the 2023 Phase B project would impact additional aquatic habitat on the interior side of the East Weir, West Levee Repair, and MWT Southwest Levee degrade areas, but these impacts would be temporary, and degrading the MWT Southwest Levee would ultimately create additional aquatic habitat. Overall, the increase in impacts would be minor and temporary and would not cause a new significant or potentially significant impact or substantial increase in the severity of the previously identified significant impact. In addition, Mitigation Measures WILD-11 (Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake) and WILD-12 (Minimize Construction-related Disturbance in Suitable Giant Garter Snake Habitat) would be implemented to reduce potentially significant impacts on giant garter snake to a less-than-significant level.

Overall, impacts on western pond turtle habitat would be reduced, when compared to the original Phase B project evaluated in the SEIR, because no potentially suitable nesting habitat would be affected by excavation for gas pipeline removal and/or vegetation removal and grading for tidal channel and floodplain habitat restoration activities. However, the 2023 Phase B project would impact additional aquatic habitat on the interior side of the MWT East Levee degrade, MWT West Levee repair, and MWT Southwest Levee degrade areas, but these impacts would be temporary, and degrading the MWT Southwest Levee would ultimately create additional aquatic habitat. Overall, the increase in aquatic impacts would be minor and temporary and would not cause a new significant or potentially significant impact or substantial increase in the severity of the previously identified significant impact. In addition, Mitigation Measure WILD-22 (Avoid and Minimize Construction-related Disturbances in the Vicinity of Occupied Habitat) would be implemented to reduce potentially significant impacts on western pond turtle to a less-than-significant level.

Depending on how habitat on the MWT interior develops before construction activities begin, it is possible that the interior side of the MWT East Levee degrade, MWT West Levee repair, and MWT Southwest Levee degrade areas could provide suitable habitat for California black rail. If such habitat is present, potential for construction-related impacts under the 2023 Phase B project would be greater than described in the SEIR but would represent a very small proportion of the extent of suitable habitat at MWT. Overall, the amount of potentially suitable habitat that could be affected would remain very small and the increase would not cause a new significant or potentially significant impact or substantial increase in the severity of the previously identified significant impact. In addition, Mitigation Measures WILD-25 (Conduct Preconstruction Surveys for California Black Rail) and WILD-26 (Minimize Construction-related Disturbances

in the Vicinity of Active California Black Rail Nest Sites) would be implemented to reduce potentially significant impacts on California black rail to a less-than-significant level.

For the reasons described above, implementing the proposed project modifications and refinements would not result in any new significant or potentially significant impacts on wildlife or substantial increase in the severity of the previously identified significant impacts. Implementing mitigation measures identified in the Phase B SEIR that remain applicable under the current project conditions would reduce all remaining potentially significant and significant impacts to a less-than-significant level.

4. Conclusions

Based on the Final EIR and the analysis in this addendum, the 2023 Phase B project would result in none of the conditions described in Section 15162 of the State CEQA Guidelines that would trigger the need to prepare a subsequent EIR. Most importantly, the proposed minor technical changes evaluated in this addendum:

1. Demonstrate that no major revisions must be made to the Final EIR due to new or substantially increased significant effects,
2. Illustrate that the circumstances surrounding implementation of the project will not require major revisions to the Final EIR due to new or substantially increased significant effects,
3. Establish that there is no new information of substantial importance that the 2023 Phase B project:
    - would result in any new significant environmental effects,
    - would substantially increase the severity of previously identified significant effects,
    - would result in mitigation measures or alternatives previously found to be infeasible becoming feasible, and
    - would result in availability/implementation of mitigation measures or alternatives which are considerably different from those analyzed in the previous document that would substantially reduce one or more significant effects on the environment.

These conclusions confirm that a subsequent EIR is not required, and this addendum to the Final SEIR is the appropriate CEQA document under State CEQA Guidelines Section 15164 to evaluate the minor technical changes and resulting environmental impacts thereof.

5. References

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Appendix A.

Summary of Changes to Supplemental Environmental Impact Report Impacts from the Revised 2023 Phase B Project

Table A. Summary of Changes to Supplemental Environmental Impact Report Impacts from the Revised 2023 Phase B Project

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
3.1 Hydrology and Water Quality				
FC-1 (North Delta EIR): Raise Flood Elevations and Increase the Frequency of Flooding.	LTS	No mitigation required.	LTS	Similar impact; water surface elevations during 100-year floods both upstream and downstream of MWT are estimated to be reduced under the 2023 Phase B project compared to existing conditions in 2023.
FC-2 (North Delta EIR): Increase the Degree or Quantity of Seepage.	PS	Mitigation Measure FC-1 (Updated): Develop a Seepage-Monitoring Program and Control Seepage.	LTS	Reduced impact; MWT is now inundated under existing conditions and increased seepage may already be occurring, and additional changes in hydrology would increase seepage to a lesser extent than were analyzed in the SEIR.
FC-5 (North Delta EIR): Increase the Degree or Quantity of Scour.	PS	Mitigation Measure FC-2 (New): Provide Payment to Protect Dead Horse Island East Levee.	LTS	Similar impact; sediment transport was conducted at a broad scale and is not anticipated to change; RSP continues to be proposed to protect against scouring at degrade/breach sites; and velocities changes would be similar to those in the SEIR.
GEOMORPH-2 (North Delta EIR): Increase in Sediment Accumulation in Channels as a Result of Levee Modifications.	LTS	No mitigation required.	LTS	No change: sediment transport was conducted at a broad scale and is not anticipated to change.
GEOMORPH-3 (North Delta EIR): Increase in Sediment Accumulation on Land as a Result of Levee Modifications.	B	No mitigation required.	B	No change: sediment transport was conducted at a broad scale and is not anticipated to change.
GEOMORPH-4 (North Delta EIR): Increase in Scouring on Levees and in Channels as a Result of Levee Modifications.	PS	Mitigation Measure FC-2 (New): Provide Payment to Protect Dead Horse Island East Levee.	LTS	Similar impact; sediment transport was conducted at a broad scale and is not anticipated to change; RSP continues to be proposed to protect against scouring at degrade/breach sites; and velocities changes would be similar to those in the SEIR.
GEOMORPH-5a (North Delta EIR): Increase in Scouring on Land as a Result of Levee Modifications (McCormack-Williamson Tract East Levee).	LTS	No mitigation required.	LTS	No change; RSP continues to be proposed to protect against scouring at degrade/breach sites.
GEOMORPH-5b (North Delta EIR): Increase in Scouring on Land as a Result of Levee Modifications (Mokelumne River Levee).	LTS	No mitigation required.	LTS	No change; no changes in use of RSP to protect against scouring at degrade/breach sites.
GEOMORPH-5c (North Delta EIR): Increase in Scouring on Land as a Result of Levee Modifications (Dead Horse Island).	PS	Mitigation Measure FC-2 (New): Provide Payment to Protect Dead Horse Island East Levee.	LTS	Similar impact; sediment transport was conducted at a broad scale and is not anticipated to change; RSP continues to be proposed to protect against scouring at degrade/breach sites; and velocities changes would be similar to those in the SEIR.
WQ-1 (North Delta EIR): Release of a Pollutants during Construction and Dredging.	PS	Mitigation Measure WQ-2 (New): Inspect Sediment and Turbidity Control Barriers Daily during Construction for Proper Function and Replace Immediately if Not Functioning Effectively.	LTS	Similar impact: impact mechanisms on water quality form pollutants during construction would be similar for in-water water but the extent of construction activities occurring would be substantially reduced.
WQ-3 (North Delta EIR): Release of Methylmercury.	LTS	No mitigation required.	LTS	No change or reduced impact; MWT is now inundated under existing conditions.
WQ-4 (New): Release of Pesticides.	PS	Mitigation Measure PH-1 (Updated): Properly Dispose of Contaminated Material.	LTS	Reduced impact: the extent of construction activities occurring would be substantially reduced.
WQ-5 (New): Change in Salinity.	LTS	No mitigation required.	LTS	Similar or slightly reduced impact; changes in hydrology are within the limits of what was analyzed for the Phase B SEIR, however, since MWT is now inundated under existing conditions, the change in salinity from additional hydraulic changes under the 2023 Phase B project may be less.
WSM-1 (North Delta EIR): Change in Water Uses as Result of the Project.	LTS	No mitigation required.	LTS	No change; impact is associated with water diversions and conflicts between water users and environmental needs or access to water supplies.
GW-2 (North Delta EIR): Potential Groundwater Seepage to Adjacent Islands/Tracts as a Result of Frequent Inundation of McCormack-Williamson Tract.	PS	Mitigation Measure FC-1 (Updated): Develop a Seepage Monitoring Program and Control Seepage.	LTS	Reduced impact; MWT is now inundated under existing conditions and increased seepage may already be occurring, and additional changes in hydrology would increase seepage to a lesser extent than were analyzed in the SEIR.
3.2 Geology, Seismicity, Soils, and Mineral Resources				
GEO-3 (North Delta EIR): Increase the Potential for Structural Damage and Injury as a Result of Development on Materials Subject to Liquefication.	LTS	No mitigation required.	LTS	No change; impact is associated with tubular steel poles for the new SMUD distribution line connections, which would still be implemented.
GEO-4 (North Delta EIR): Increase the Potential for Accelerated Runoff, Erosion, and Sedimentation as a Result of Grading, Excavation, and Levee Construction Activities.	LTS	No mitigation required.	LTS	Reduced impact; the extent of ground disturbance would be less because excavation for abandoned gas line removal and tidal channel creation and grading of the MWT interior would not occur.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
GEO-5 (North Delta EIR): Increase the Potential for Structural Damage and Injury as a Result of Development on Expansive Soils.	LTS	No mitigation required.	LTS	No change; impact is associated with new SMUD distribution line connections, which would still be implemented.
GEO-9 (New): Destruction of a Unique Paleontological Resource or Site.	LTS	No mitigation required.	LTS	Reduced impact; the already low potential for impact (due to low paleontological sensitivity of MWT) would be reduced because excavation for abandoned gas line removal and tidal channel creation would not occur.
3.3 Transportation and Navigation				
TN-6 (New): Temporary Increase in Vehicle Miles Traveled During Construction.	LTS	No mitigation required.	LTS	Reduced impact; vehicle miles travelled would be substantially less because of the substantial amount of construction activities on the tract interior that were removed from the project.
3.4 Air Quality				
AIR-1 (North Delta EIR): Generation of Pollutant Emissions in Excess of SMAQMD and SJVAPCD Threshold Levels (Construction Emissions Only).	PS	Mitigation Measure AIR-2 (Updated): Implement SMAQMD Required to Reduce NO_x Emissions from Off-Road Powered Equipment. Mitigation Measure AIR-4 (Updated): Implement SMAQMD Requirements to Pay an Offsite Mitigation Fee. Mitigation Measure AIR-7 (New): Implement the SMAQMD Basic Construction Emission Control Practice.	LTS	Reduced impact; pollutant emissions would be substantially reduced due to removal of several Phase B project components including landside levee resloping, interior channel excavation and grading, and abandoned gas line removal.
AIR-2 (North Delta EIR): Exposure of Sensitive Receptors to Elevated Levels of Diesel Exhaust and an Increased Health Risk.	LTS	No mitigation required.	LTS	Reduced impact; diesel particulate matter emissions would be substantially reduced due to removal of several Phase B project components including landside levee resloping, interior channel excavation and grading, and abandoned gas line removal.
AIR-4 (New): Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People.	LTS	No mitigation required.	LTS	Reduced impact; diesel exhaust, the primary source of project-related odors, would be substantially reduced due to removal of several Phase B project components including landside levee resloping, interior channel excavation and grading, and abandoned gas line.
3.5 Noise				
NZ-1 (North Delta EIR): Exposure of Noise-Sensitive Land Uses to Noise from General Construction Activities.	PS	Mitigation Measure NZ-1 (North Delta EIR): Limit Noise-Generating Construction Activity and Heavy Trucking to Daytime Hours.	LTS	Reduced impact; construction-related noise on MWT within 2,500 feet of occupied residences would be reduced due to removal of several Phase B project components including landside levee resloping, interior channel excavation and grading, and abandoned gas line.
NZ-2 (North Delta EIR): Exposure of Noise-Sensitive Land Uses to Noise from Material Hauling Operations.	PS	Mitigation Measure NZ-1 (North Delta EIR): Limit Noise-Generating Construction Activity and Heavy Trucking to Daytime Hours.	LTS	Reduced impact; noise associated with material hauling would be reduced because less rock slope protection would need to be imported.
NZ-3 (North Delta EIR): Exposure of Noise-Sensitive Land Uses to Noise from Modified Pump Operations.	LTS	No mitigation required.	LTS	No change if pump operations inside Tower Levee would still occur; reduced or eliminated if pump operations inside the Tower levee are reduced or would not occur, respectively.
NZ-4 (North Delta EIR): Exposure of Noise-Sensitive Land to Ground borne Vibrations from Construction Activities.	LTS	No mitigation required.	LTS	No change; there would still be no sensitive receptors within 75 feet of heavy equipment operations.
3.6 Biological Resources				
VEG-1 (North Delta EIR): Loss or Disturbance of Valley/Foothill Riparian Land Cover Types.	PS	Mitigation Measure VEG-1 (Updated): Replace Valley/Foothill Riparian Cover Types. Mitigation Measure VEG-2 (Updated): Avoid and Minimize Impacts on Sensitive Biological Resources.	LTS	Reduced impact; loss of riparian cover resulting from Phase B Project implementation would be limited to portions of the levee degrade and breach areas that currently support such vegetation. Temporary impacts would be approximately 1.5 acres less and permanent impacts would be more than 60 acres less. In addition, nearly 10 acres of riparian vegetation would be planted in the northwest corner of MWT and approximately 170 acres are expected to become established elsewhere on the tract.
VEG-2 (North Delta EIR): Loss or Disturbance of Nontidal Freshwater Emergent Wetland Land Cover Types.	LTS	No mitigation required.	LTS	No impact; the non-tidal wetland on the MWT interior is currently flooded and would therefore no longer become inundated as a result of Phase B Project implementation.
VEG-3 (North Delta EIR): Loss or Disturbance of Tidal Perennial Aquatic Land Cover Types.	LTS	No mitigation required.	LTS	Increased impact; approximately 5 acres of transitional tidally inundated habitat would be impacted. This impact was not identified in the SEIR because the habitat is a result of the 2023 breaches. MWT currently supports more than 1,000 acres of tidal aquatic and transitional habitat and the loss of this tiny fraction would not have a substantial adverse effect and would not result in a new significant impact. In addition, approximately 1.5 fewer acres of tidal aquatic habitat would be impacted.
VEG-4 (North Delta EIR): Loss or Disturbance of Tidal Freshwater Emergent Wetland Land Cover Type.	LTS	No mitigation required.	LTS	No impact; tidal freshwater emergent wetland was limited to the waterside Mokelumne River breach location where Phase B project implementation would no longer occur.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
VEG-5 (North Delta EIR): Establishment of Invasive Nonnative Plants.	PS	Mitigation Measure VEG-6 (Update): Avoid Introduction and Spread of New Noxious Weeds during Project Construction.	LTS	Reduced impact; potential for introduction and spread of invasive nonnative plants would be less because landside levee resloping and interior channel excavation and grading would not occur. Portions of Mitigation Measure VEG-6 that remain applicable would be implemented.
VEG-6 (North Delta EIR): Loss or Disturbance of Special-status Species.	PS	VEG-2 (Updated): Avoid and Minimize Impacts on Sensitive Biological Resources. VEG-7 (Update): Conduct Preconstruction Surveys for Special-status Plants VEG-8 (Updated): Avoid and Minimize Impacts on Special-status Species and Compensate for Special-status Species Loss.	LTS	Reduced impact; the amount of suitable habitat for special-status plants was reduced by 2023 levee breaches, flooding, and rock slope protection placed during emergency repairs.
VEG-7 (North Delta EIR): Loss of Disturbance of Perennial Grassland.	LTS	No mitigation required.	LTS	Reduced impact; the amount of perennial grassland impacted has been reduced from more than 20 acres to less than 0.5 acre.
Fish-4 (North Delta EIR): Loss of Shaded Riverine Aquatic Cover as a Result of Construction.	PS	Mitigation Measure Fish-2 (Updated): Replace Shaded Riverine Aquatic Habitat.	LTS	Reduced impact; shaded riverine aquatic habitat at the Mokelumne River breach location would no longer be impacted by Phase B project implementation.
Fish-7 (North Delta EIR): Fish Entrapment or Delayed Migration from Project Operation.	PS	Mitigation Measure Fish-3 (Updated): Monitor for Fish Stranding and Fill any Substantial Hydrologically Disconnected Scour Pools that Form Following Large Flood Events.	LTS	Similar impact; potential for scour pools after large flood events is unchanged. Although the depth of the MWT Southwest Levee Degrade would be approximately 2.5 ft higher than was previously proposed in the Supplementation EIR, this elevation would be several feet below the typical water surface elevation during the high and low tide cycles and would provide ample opportunity for fish to enter and leave the MWT interior. Similarly, the removal of interior land grading to create a system of tidal channels is not anticipated to reduce the ability of fish to leave the MWT interior via the MWT Southwest Levee Degrade, because the natural tidal outflow patterns would lead fish to this location.
Fish-8 (North Delta EIR): Potential for Loss of Native Fish from Predation as a Result of Project Operation.	LTS	No mitigation required.	LTS	No impact; potential for increased predation is associated with inundation of the MWT interior, which is currently flooded and would therefore no longer be an impact of Phase B Project implementation.
Fish-10 (New): Violate Salinity Standards to Protect Fish during Project Operation.	LTS	No mitigation required.	LTS	Similar or slightly reduced impact; changes in hydrology are within the limits of what was analyzed for the Phase B SEIR, however, since MWT is now inundated under existing conditions, the change in salinity from additional hydraulic changes under the 2023 Phase B project may be less.
WILD-1 (North Delta EIR): Loss of Riparian-associated Wildlife Habitat.	PS	Mitigation Measures WILD-1 (Updated): Implement Mitigation Measure VEG-1, Replace Valley/Foothill Riparian Cover Types. Mitigation Measure WILD-2 (Update): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Update): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources.	LTS	Reduced impact; loss of riparian cover resulting from Phase B Project implementation would be limited to portions of the levee degrade and breach areas that currently support such vegetation. Temporary impacts would be approximately 1.5 acres less and permanent impacts would be more than 60 acres less. In addition, nearly 10 acres of riparian vegetation would be planted in the northwest corner of MWT and approximately 170 acres are expected to become established elsewhere on the tract.
WILD-2 (North Delta EIR): Loss of Tidal Freshwater Emergent Wetland-Associated Wildlife Habitat.	LTS	No mitigation required.	LTS	No impact; tidal freshwater emergent wetland was limited to the waterside Mokelumne River breach location where Phase B project implementation would no longer occur.
WILD-3 (North Delta EIR): Loss or Disturbance of Tidal Perennial Aquatic-associated Wildlife Habitat.	LTS	No mitigation required.	LTS	Increased impact; approximately 5 acres of transitional tidally inundated habitat would be impacted. This impact was not identified in the SEIR because the habitat is a result of the 2023 breaches. MWT currently supports more than 1,000 acres of tidal aquatic and transitional habitat and the loss of this tiny fraction would not have a substantial adverse effect on associated wildlife species and would not result in a new significant impact. In addition, approximately 1.5 fewer acres of tidal aquatic habitat would be impacted.
WILD-4 (North Delta EIR): Loss of Disturbance of Nontidal Freshwater Emergent Wetland-Associated Wildlife Habitat.	PS	Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measures WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources.	LTS	No impact; the non-tidal wetland on the MWT interior is currently flooded and would therefore no longer become inundated as a result of Phase B Project implementation.
WILD-7 (North Delta EIR): Potential Effects on Greater Sandhill Crane as a Result of Loss of Agricultural Lands.	LTS	No mitigation required.	LTS	No impact; grassland/ruderal habitat on the MWT interior is currently flooded and would therefore no longer become inundated as a result of Phase B Project implementation.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
WILD-8 (North Delta EIR): Potential Effects on Valley Elderberry Longhorn Beetle.	PS	Mitigation Measure WILD-9 (Updated): Avoid and Minimize Impacts on Elderberry Shrubs. Mitigation Measure WILD-10 (Updated): Compensate for Unavoidable Impacts on Elderberry Shrubs.	LTS	Reduced impact; impacts on elderberry shrubs resulting from Phase B Project implementation would be limited to portions of the levee degrade and breach areas that currently support such vegetation. Elderberry shrubs at the Mokelumne River breach location would no longer be removed and those in the interior of the tracts would no longer be inundated by Phase B Project implementation because the tract is already flooded.
WILD-9 (North Delta EIR): Potential Effects on Giant Garter Snake.	PS	Mitigation Measure WILD-11 (Updated): Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake. Mitigation Measure WILD-12 (Updated): Minimize Construction-related Disturbance in Suitable Giant Garter Snake Habitat.	LTS	Similar impact; work would no longer occur in suitable habitat at the Mokelumne River breach location; however, additional work in suitable aquatic habitat would occur on the interior side of the other levee work areas. These impacts would be temporary, and degrading the MWT Southwest Levee would ultimately create additional aquatic habitat. Therefore, the increase in impacts would be minor and temporary.
WILD-10 (North Delta EIR): Loss or Disturbance of Swainson's Hawk Nests or Foraging Habitat.	PS	Mitigation Measure WILD-1 (Updated): Implement Mitigation Measure VEG-1, Replace Valley/Foothill Riparian Cover Types Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources Mitigation Measure WILD-13 (Updated): Conduct Preconstruction Surveys for Nesting Swainson's Hawks before Construction and Maintenance. Mitigation Measure WILD-14 (Updated): Avoid and Minimize Construction-related Disturbances within 0.5 Mile of Active Swainson's Hawk Nest Sites. Mitigation Measure WILD-15 (Updated): Replace or Compensate for the Loss of Swainson's Hawk Foraging Habitat.	LTS	Reduced impact; potential for loss of active Swainson's hawk nest trees and disturbance of active nests during construction would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur; there would be no loss of foraging habitat because the MWT interior is currently flooded and would therefore no longer become inundated as a result of Phase B Project implementation.
WILD-11 (North Delta EIR): Loss or Disturbance of Nesting or Wintering Western Burrowing Owls.	PS	Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources. Mitigation Measure WILD-17 (Updated): Conduct Habitat Assessment and Preconstruction Surveys for Burrowing Owls. Mitigation Measure WILD-18 (Updated): Avoid or Minimize Disturbance of Occupied Burrows. Mitigation Measure WILD-20 (Updated): Create New or Enhance Existing Suitable Burrows and Replace Lost Burrowing Owl Foraging Habitat.	LTS	Reduced impact; potential for loss and disturbance of occupied burrows during construction would be less because abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur; there would be no loss of foraging habitat because the MWT interior is currently flooded and would therefore no longer become inundated as a result of Phase B Project implementation.
WILD-12 (North Delta EIR): Loss or Disturbance of Raptor Nest Sites.	PS	Mitigation Measure WILD-1 (Updated) Implement Mitigation Measure VEG-1, Replace Valley/Foothill Cover Types. Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources.	LTS	Reduced impact; potential for loss of active raptor nest trees and disturbance of active nests during construction would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
WILD-13 (North Delta EIR): Loss of Western Pond Turtle or Suitable Habitat.	PS	Mitigation Measure WILD-22 (Updated): Avoid and Minimize Construction-related Disturbances in the Vicinity of Occupied Habitat.	LTS	Reduced impact; potential for loss of nests during construction and loss of nesting habitat would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur. Additional work in suitable aquatic habitat would occur on the interior side of the other levee work areas. These impacts would be temporary, and degrading the MWT Southwest Levee would ultimately create additional aquatic habitat. Therefore, the increase in impacts would be minor and temporary.
WILD-14 (North Delta EIR): Loss of Tricolored Blackbird Nesting Habitat.	PS	Mitigation Measure WILD-1 (Updated): Implement Mitigation Measure VEG-1, Replace Valley/Foothill Riparian Cover Types. Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources. Mitigation Measure WILD-23 (Updated): Conduct Preconstruction Surveys for Tricolored Blackbird. Mitigation Measure WILD-24 (Updated): Minimize Construction-related Disturbances in the Vicinity of Active Tricolored Blackbird Colonies.	LTS	Similar impact; depending on conditions when construction activities occur, the MWT interior could provide higher quality nesting habitat for tricolored blackbird than anticipated in the SEIR; however, potential habitat loss and disturbance of active nest colonies would be reduced because abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.
WILD-15 (North Delta EIR): Loss or Disturbance of California Black Rail or Suitable Nesting Habitat.	PS	Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources. Mitigation Measure WILD-25 (Updated): Conduct Preconstruction Surveys for California Black Rail. Mitigation Measure WILD-26 (Updated): Minimize Construction-related Disturbances in the Vicinity of Active California Black Rail Nest Sites.	LTS	Similar impact; depending on conditions when construction activities occur, the MWT interior could provide higher quality nesting habitat for black rail than anticipated in the SEIR; however, potential for loss or disturbance of active nests would be reduced because less work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.
WILD-16 (North Delta EIR): Loss or Disturbances of Colonial Waterbird Rookeries.	PS	Mitigation Measure WILD-1 (Updated): Implement Mitigation Measure VEG-1, Replace Valley/Foothill Riparian Cover Types. Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources. Mitigation Measures WILD-27 (Updated): Conduct Preconstruction Surveys to Locate Rookeries. Mitigation Measures WILD-28 (Updated): Minimize Construction-related Disturbances within 0.25 Mile of Active Rookeries.	LTS	Reduced impact; potential for loss of active colony nest trees and disturbance of active colonies during construction would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.
WILD-19 (North Delta EIR): Loss or Disturbance of Migratory Birds.	PS	Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources.	LTS	Reduced impact; potential for loss and disturbance of active migratory bird nests during construction would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
WILD-20 (North Delta EIR): Loss or Disturbance of Bats and Bat Habitat as a Result of Construction Activities.	PS	Mitigation Measure WILD-2 (Updated): Avoid and Minimize Effects on Nesting Birds during Construction and Maintenance. Mitigation Measure WILD-3 (Updated): Implement Mitigation Measure VEG-2, Avoid and Minimize Impacts on Sensitive Biological Resources. Mitigation Measure WILD-31 (Updated): Conduct Preconstruction Surveys for Bats.	LTS	Reduced impact; loss of potential roosting trees resulting from Phase B Project implementation would be limited to portions of the levee degrade and breach areas that currently support such vegetation. Many fewer trees would be removed than anticipated in the SEIR.
Impact WILD-21 (New): Loss or Disturbance of Monarch Butterfly.	LTS	No mitigation required.	LTS	Reduced impact; potential for loss and disturbance of monarch butterfly during construction would be reduced because no work is required at the Mokelumne River breach location and abandoned gas line removal, landside levee resloping, and interior channel excavation and grading would not occur.
WILD-22 (New): Loss or Disturbance of Western Yellow-billed Cuckoo.	LTS	No mitigation required.	LTS	Reduced impact; loss of potentially suitable riparian habitat for yellow-billed cuckoo resulting from Phase B Project implementation would be limited to portions of the levee degrade and breach areas that currently support such vegetation. Therefore, substantially less habitat would be affected.
3.7 Land Use, Agriculture, Recreation, and Economics				
LU-1 (North Delta EIR): Loss of Farmland.	PS	Mitigation Measure LU-3 (New): Consultation with Landowners and Pole Placement to Minimize Agricultural Impacts.	LTS	No change; impact is associated with the new SMUD distribution line connections, which would still be implemented.
LU-3 (North Delta EIR): Inconsistency with Agricultural Objectives of Local, Regional, and State Plans.	PS	Mitigation Measure LU-3 (New): Consultation with Landowners and Pole Placement to Minimize Agricultural Impacts.	LTS	No change; impact is associated with the new SMUD distribution line connections, which would still be implemented.
REC-6 (New): Disruption of Boating Activities from Utility Relocations.	LTS	No mitigation required.	LTS	No change; impact is associated with the new SMUD distribution line connections, which would still be implemented.
3.8 Energy				
EN-1 (New): Cause Wasteful, Inefficient, or Unnecessary Consumption of Energy Usage.	LTS	No mitigation required.	LTS	Reduced impact; energy usage would be substantially reduced due to removal of several Phase B project components including work at the Mokelumne River breach location, landside levee resloping, interior channel excavation and grading, and abandoned gas line.
PUB-1 (North Delta EIR): Increase in Use of Energy.	LTS	No mitigation required.	LTS	Reduced impact; energy use result from use of fuels would be substantially reduced due to removal of several Phase B project components including work at the Mokelumne River breach location, landside levee resloping, interior channel excavation and grading, and abandoned gas line removal.
3.9 Visual Resources				
VIS-2 (North Delta EIR): Permanent Changes in Viewshed.	LTS	No mitigation required.	LTS	Reduced impact; visual changes on MWT, compared to the current inundated condition of the tract, would be reduced due to removal of several Phase B project components including work at the Mokelumne River breach location, landside levee resloping, interior channel excavation and grading, and abandoned gas line removal.
3.10 Public Health and Hazards				
PH-2 (North Delta EIR): Potential Exposure to Currently Unidentified Contaminated Waters or Soils during Construction.	PS	Mitigation Measure PH-1 (Updated): Properly Dispose of Contaminated Materials.	LTS	Reduced impact; potential to encounter unidentified contaminated waters and soils during construction would be reduced because no work is required at the Mokelumne River breach location and landside levee resloping and interior channel excavation and grading would not occur.
PH-5 (New): Potential Exposure to Known Hazardous Materials.	LTS	No mitigation required.	LTS	Reduced impact; potential exposure to know hazardous materials during construction would be less because abandoned gas pipelines would not be removed and interior channel excavation and grading would not occur.
3.11 Cultural and Tribal Cultural Resources				
CR-15 (New): Impacts on Previously Unidentified Human Remains.	PS	Mitigation Measure CR-1 (New): Implement Measures to Treat and/or Protect Previously Unidentified Human Remains, if Discovered.	LTS	Reduced impact; potential to encounter human remains would be less because excavation for abandoned gas line removal and tidal channel creation and grading of the MWT interior would not occur.
CR-16 (New): Impacts on Previously Unidentified Cultural Resources within the New SMUD Distribution Line Locations.	PS	Mitigation Measure CR-2 (New): Conduct Cultural Resource Survey and Implement Measures to Preserve, Replace, and/or Recover Any Significant Cultural Resources Prior to Project Implementation.	LTS	No change; impact is associated with new SMUD distribution line connections, which would still be implemented.

SEIR Impact	SEIR Significance Before Mitigation	SIER Mitigation Measure	SEIR Significance After Mitigation	Summary of Changes Due to the Revised 2023 Phase B Project
CR-17 (New): Impacts on Previously Unidentified Archaeological Resources.	PS	Mitigation Measure CR-3 (New): Implement Measures to Preserve, Replace, and/or Recover Any Significant Archaeological, if Discovered.	LTS	Reduced impact; potential to encounter archaeological resources would be less because excavation for abandoned gas line removal and tidal channel creation and grading of the MWT interior would not occur.
TCR-1 (New): Impacts on Tribal Cultural Landscape Site P-34-005225.	LTS	No mitigation required.	LTS	Similar impact; implementing Phase B Project components would not adversely impact existing landscape elements associated with P-34-005225.
TCR-2 (New): Impacts on Previously Unidentified Tribal Cultural Resources.	PS	Mitigation Measure TCR-1 (New): Implement Measures to Avoid, Preserve, Treat, and/or Protect and Previously Unidentified Tribal Cultural Resources, if Discovered.	LTS	Reduced impact; potential to impact unidentified TCRs would be less because Phase B project components have been substantially reduced.
3.12 Greenhouse Gas Emissions				
GHG-1 (New): Generate Greenhouse Gas Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment.	LTS	No mitigation required.	LTS	Reduced impact; greenhouse gas emissions would be substantially reduced due to removal of several Phase B project components including work at the Mokelumne River breach location, landside levee resloping, interior channel excavation and grading, and abandoned gas line removal.
GHG-2 (New): Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purposes of Reducing Greenhouse Gas Emissions.	LTS	No mitigation required.	LTS	Similar impact; implementing Phase B Project components would not conflict with DWR's Climate Action Plan Phase 1: Greenhouse Gas Emissions Reduction Plan.

Appendix B.

Flood Model and Onsite Hydrology Addenda

TECHNICAL MEMORANDUM

Date:	October 11, 2023
To:	Petra Unger and Nick Duffort, AECOM
From:	Toby Stegman and Chris Campbell
Project:	McCormick-Williamson Tract Levee Modification and Habitat Development Project
Subject:	Flood Model and Onsite Hydrology Addenda

1 INTRODUCTION

DWR in coordination with RD 2110 has decided not to reclaim the tract interior to its previous condition following the winter 2023 storms because of reoccurring flooding of MWT and the need to reduce flood risk downstream. The MWT levees were previously repaired to partial height elevations following breaching during the winter 2017 storms. However, emergency levee repairs following the winter 2023 storms are intended to minimize further degradation at the breach sites and are expected to be completed in October 2023. Following emergency levee repair, this will represent a new existing condition for subsequent flood and onsite hydrologic assessments. For the Phase B project, this means water cannot be removed from the tract. As a result, MWT remains flooded and is subject to a low-level of tidal action through a breach on the MWT Southwest Levee. Since MWT remains inundated, land cover and vegetation conditions have changed to an extent and the conditions and circumstances under which the Phase B project would be implemented have changed. However, substantial amounts of habitat restoration could still be achieved by modifying the Phase B project while leaving the tract inundated.

Note: this memorandum serves as addenda to the January 2022 Flood Model Design Options Screening Report and the March 2022 Onsite Hydrology Report.

2 2023 FLOOD EVENT

During the state and federally declared emergencies from the winter 2023 storms, the Mokelumne River Levee along MWT overtopped and subsequently breached in January 2023. This resulted in the complete inundation of MWT with subsequent breaches along Dead Horse Cut and Snodgrass Slough. Site assessments resulted in the observation of three breach locations and several critical landside and waterside erosion sites. In September 2023, prior to the next flood season, RD 2110 began construction of emergency repairs to stabilize the three breach sites to reduce the likelihood that they continue to

deepen and widen, repair critical erosion to prevent further levee degradation and breaching at six sites, and to establish and allow access to the remaining infrastructure and resources on the tract.

3 MODEL GEOMETRY AND TOPOGRAPHY UPDATES

The 2022 Supplemental Environmental Impact Report (SEIR) model was updated to best reflect the current day configuration of MWT after the floods of 2017 and 2023. First, the existing conditions scenario was updated to include new survey data within MWT and reflect the current emergency levee repair efforts within the tract. Next, we developed the design surfaces by layering on the project features over the 2023 existing conditions while simulating a few different Southwest (SW) levee degrade configurations. The following sections further describe these efforts.

3.1 TOPOGRAPHIC SOURCES

3.1.1 2022 MWT INTERIOR ATV SURVEY

In November of 2022, cbec conducted an ATV based RTK GPS survey of the tract interior, per the MBK control network, over approximately 1,000 acres out of 1,450 acres (excluding the ring levee). This data was used to supplement the 2017 Delta LiDAR. A comparison of the ATV survey and the 2017 LiDAR revealed some discrepancies between the data. **Figure 1** shows the extent of the ATV survey, as well as the elevation difference between the LiDAR and survey. The warmer colors denote areas where the LiDAR data was observed to be higher than the survey data. Cooler colors show areas where the LiDAR data was lower than the ATV survey. It is notable that the area just southeast of the ring levee has ATV survey elevations roughly between 0.5 and 1 ft lower than the LiDAR data. Other areas within the tract had ATV survey elevations just slightly higher (<0.5 ft) than the LiDAR. It is hypothesized that these discrepancies are partially an artifact from the vegetation filtering processing of the LiDAR, however, it is unclear why there is a larger discrepancy southeast of the ring levee as there was no evidence of vegetation or standing water in the LiDAR. Further investigation into the unfiltered point cloud data would be required to test this hypothesis. Because the ATV survey was the most recent and accurate elevation data available, the ATV survey was incorporated into the existing condition surface where available. Supplemental data of field ditches were also included in the effort and the data was collected in conjunction with the ATV survey.

3.1.2 2017 MBK LEVEE CREST SURVEY

In 2017, MBK conducted a levee crest survey of MWT. The levee crest was sampled roughly every 100 ft around the tract. The levee crest is denoted in **Figure 1**. These elevations were enforced within the model surface by interpolating the levee crest point data to a continuous raster surface which was extended out 5 ft on each side of the levee centerline. The MBK survey data was converted from NGVD29 to NAVD88 by adding 2.54 ft (MBK, 2014).

3.1.3 2023 MWT EMERGENCY BREACH REPAIRS

Due to the flooding in 2023 several levee breaches around MWT require emergency repairs. During the preparation of this memo, the repairs are under construction and are expected to be completed in October of 2023. The three levee repairs locations include the Mokelumne River breach, West Levee breach (across from Delta Cross Channel along Snodgrass Slough), and the SW levee degrade (along Dead Horse Cut) (**Figure 1**). It should be noted that all three locations are locations where partial height levee repairs were previously completed post 2017 flood.

The Mokelumne River breach was repaired to an elevation of 7.0 ft with a bottom width of 260 ft. The side slopes were set at 20:1 and 28:1 to allow for driving access across the degrade and allow emergency repairs to be conducted on the SW levee. The emergency repairs enact a similar design to the 2022 SIER project model configuration for the Mokelumne River repair. Additionally, approximately 50 linear ft of the West Levee was repaired to an elevation of 11.2 ft. Lastly, the SW levee breach was partially repaired by placing rock endcaps along the breach and resloping the levee crest with a 7:1 and 6:1 side slope. The reader is referred to West Yost's design repair plans for more information (West Yost, 2023).

3.2 2023 EXISTING CONDITIONS

The SEIR 2020 conditions included the construction of a ring levee around the communications tower in the northwest corner of the tract in November 2018 and landside levee resloping which was completed in November 2019 (cbec, 2022). The 2020 conditions also featured partial height levee repairs to the levee failures which occurred in 2017. These are the same locations where we saw levee breaching over the winter of 2023.

The 2023 existing conditions surface was created by starting with the 2020 existing conditions surface and mosaicking updated elevations for the MWT project area within the levees from the composite ATV survey data and the 2017 LiDAR (area within the white levee lines in **Figure 1**). Next, the levee crests were reinforced using MBK's levee profile data. Lastly, the emergency levee repairs were added to the existing conditions surface at the three locations.

3.3 2023 DESIGN ALTERNATIVES

Three Phase B design scenarios were screened against the 2023 existing condition. The three scenarios do not include interior channel and marsh plain grading due to the tract being submerged as the tract interior was not reclaimed. **Figure 2** is a general depiction of the project scenarios and can be used in conjunction with **Table 1** to identify specific project feature locations. **Table 1** below denotes the model topographic configurations used for the project conditions in the 2022 SEIR and the 2023 design screening. Alternative A was used to best approximate the previously proposed project conditions which were screened as part of the 2022 SEIR. The new Alternative A did not feature the same interior tract landform grading that was originally proposed, as the tract is currently inundated which prohibits large scale grading. Because of this, the Manning's roughness were not modified in the current runs from the existing conditions. The full description of the alternatives screened as part of this analysis is shown in **Table 1**.

Alternatives B and C serve to test the sensitivity of SW levee degrade along Dead Horse Cut. Due to the extreme difficulty and expense of doing in-water earth work, two alternatives were developed to test the impacts of not fully degrading the SW levee to internal field grade (~0 ft). Alternative B only degrades the SW levee down to 2.5 ft, while keeping all other project features the same. Alternative C only partially degrades the levee to 0 ft (~250 ft width), while leaving about 750 ft of the levee degraded to 2.5 ft.

Table 1. 2022 SEIR design vs 2023 model configurations

Feature	Existing Conditions	Proposed Project Conditions			
	2023	SEIR Proj	2023 Alt A	2023 Alt B	2023 Alt C
East Levee Degrade	None	900 ft bottom width at 11.1 ft, with 12:1 side-slopes			
Mokelumne River Breach	Constructed according to Emergency repair plans.	270 ft bottom width at 7ft with 7% and 3.5% side-slopes	Constructed according to Emergency repair plans		
Southwest Levee Degrade	Constructed according to Emergency repair plans	1,000 ft bottom width at interior grade (0 ft) with 7:1 side-slopes		1,000 ft bottom width at 2.5 ft, with 7:1 side-slopes	1,000 ft bottom width. 750 ft section set to 2.5 ft, and 250 ft width set to 0 ft. 7:1 side-slopes
West Levee Breach	Constructed according to Emergency repair plans	Repaired to full height			
Levee Reslope	Per 2019 as-built conditions, no additional Phase B resloping	Per 2019 as-built conditions, with additional Phase B resloping	Per 2019 as-built conditions, no additional Phase B resloping		
Ring Levee	Per 2018 as-built condition				
Landform Modification	None	. Excavate tidal channels. Degrade interior berms along ditches	None		

4 FLOOD IMPACT ANALSYSIS

The flood impacts were assessed for the 100-year design storm developed by David Ford Consulting Engineers using design storm data within the HEC-1 watershed runoff model (David Ford, 2004). The 100-yr design storm has a peak inflow along the Cosumnes River at Michigan bar of about 73,000 cfs, which is only about 5,000 cfs greater than the flood event experienced over the winter of 2023. More details about the model boundary conditions can be found in the *Flood Model Design Options Screening Report* revised by cbec on 1/5/2022 (cbec, 2022).

The 2023 design alternatives were screened against the 2023 existing conditions to better understand how the inundation pattern of the study area may be altered due to the proposed project. A series of index points were developed to query the model results at important locations within the study area. **Figure 3** denotes the model index points used in the subsequent sections. The index points were used to sample and compare water surface elevation (WSE) and velocity data. Furthermore, these results were then compared to the results obtained from the SEIR model runs.

4.1 MODEL BREACH ASSUMPTIONS

Under the 2020 existing conditions (SEIR), the restricted height levees bounding MWT were assumed to breach if water elevations reach a specific level at two historical 1997 breach locations on MWT, (east and SW levee, see **Figure 1**). This was informed by historic and repeated overtopping and levee failures on MWT. Modeled levee breach widths, depths and failure mechanisms were set to be similar to those utilized in the 2015 MBK North Delta modeling efforts (MBK, 2015), as well as informed from the 1997 calibration breach parameters (cbec, 2020). The historic breaches are located on the east levee adjacent to Lost Slough and in the southwest levee adjacent to Dead Horse Cut (**Table 2**). In addition to the levee breach assumption adapted from the 1997 flood event, the 2020 conditions allow the partially repaired 2017 breaches to be triggered by an overtopping event at the same location. Since these levees were repaired to a lower elevation than the permitted restricted height, these levee failures would occur earlier in a flood simulation when compared to the levee being repaired to full height.

For the 2023 conditions, the east levee and SW levee were allowed to breach if they were overtopped. The east levee configuration was left the same since the post 2023 flood repair height was the same as the post 2017 flood repair height, but the SW levee has a slightly different configuration. The SW levee was again damaged in 2023, thus the 2023 conditions feature an emergency repair which leaves the levee degraded below MLLW but amours the end caps of the levee breach with rock to prevent further lateral erosion of the opening. This means the interior of the tract will remain inundated for the entire simulation where, under the 2020 conditions the tract started dry, and only filled with water once a levee breached.

With project conditions, the tract's interior water level rises with the increasing flood flows, as the tract will remain inundated under tidal conditions. This alleviates pressure along the levees, and greatly reduces any chances for the MWT levee to experience a levee failure under the project conditions.

However, the Dead Horse Island levee failure was applied to the project conditions. If water overtops the Dead Horse Island levee it will fail under both existing and project conditions (**Table 2**).

Table 2. – Model Breach Assumptions

Location	Existing Conditions		Proposed Project Conditions			
	2020	2023	SEIR Proj	2023 Alt A	2023 Alt B	2023 Alt C
East Levee	500 ft breach. 2h formation time. Overtopping failure at 19.5 ft	500 ft breach. 2h formation time. Overtopping failure at 19.5 ft	None			
Mokelumne Levee	310 ft breach. 4h formation time. Overtopping Failure mode at 12.5 ft	None Elevation set to 7.0 ft				
West Levee (Snodgrass)	150 ft breach. 4h formation time. Overtopping failure at 11 ft		None Repaired to full height	None Repaired to full height		
SW Levee (Dead Horse Cut)	500 ft breach. 8h formation time. Overtopping failure at 16.5 ft	150 ft breach. 4h formation time. Overtopping failure at 11 ft (failure simulates further erosion in the breach)	None			
Dead Horse Island	50 ft breach. 2h formation time. Overtopping failure at 16.5 ft					

4.2 WATER SURFACE ELEVATION DIFFERENCES

Maximum water surface elevation from the proposed scenario conditions were compared to the 2023 conditions at locations surrounding MWT. Results from the previous modeling to the support the SEIR

are also presented. **Figure 3** details the locations of comparison, and **Tables 3** and **4** detail model results from the 100-year flood event.

4.2.1 100-YEAR WATER SURFACE ELEVATION RESULTS

Water surface elevation results for the updated 2023 model runs are shown in **Table 3**. Overall, the maximum water surface elevations only slightly changed from the 2020 conditions to the 2023 conditions. **Table 4** shows the relative difference between the model runs. Most of the changes between the existing conditions comes from lower water surface elevations under the 2023 scenario within Snodgrass Slough and extending north though Beach/ Stone Lake and Point Pleasant. This is likely due to the lower repaired elevation of the levee breaches in 2023 vs 2020, however, the overall magnitude of difference is small and less than 0.2 ft.

Within the project scenarios, the SEIR project design shared similar water surface elevations as the updated 2023 design conditions within 0.2 ft. Also of note is that the overall sensitivity of the SW levee degrade configurations is nearly negligible under flood conditions.

Table 3. Maximum water surface elevations for the 100-yr design storm

Location	Maximum WSE (ft, NAVD88)					
	Existing Conditions		Proposed Project Condition			
	2020	2023	SEIR Proj	2023 Alt A	2023 Alt B	2023 Alt C
Bensons Ferry	20.75	20.66	19.40	19.54	19.54	19.54
Beach Lake	16.63	16.47	16.36	16.27	16.27	16.27
Point Pleasant North	16.44	16.31	16.13	16.09	16.09	16.09
Point Pleasant South	16.41	16.28	16.10	16.06	16.06	16.06
Lambert Road Upstream (Stone Lake)	16.45	16.31	16.14	16.09	16.09	16.09
Snodgrass Slough at Lambert Road	16.47	16.34	16.16	16.11	16.11	16.11
Snodgrass Slough at Twin Cities Rd	17.59	17.57	16.99	17.05	17.05	17.05
Snodgrass Slough at DCC	17.52	17.52	16.94	16.99	16.99	16.99
Dead Horse Cut (near SW degrade)[1]	-	17.45	-	17.07	17.07	17.07
Dead Horse Island	15.40	15.38	1.48	1.48	1.48	1.48
South Fork Moke at New Hope Bridge	17.07	17.08	16.75	16.67	16.67	16.67
South Fork Moke at Beaver Slough	12.58	12.60	12.38	12.34	12.34	12.34
South Fork Moke at Hog Slough	10.33	10.34	10.23	10.22	10.22	10.22
North Fork Moke at New Hope Road	16.23	16.23	15.85	15.86	15.86	15.86
North Fork Moke at latitude of Beaver Slough	13.51	13.50	13.23	13.24	13.24	13.24
North Fork Moke at latitude of Hog Slough	11.61	11.60	11.43	11.43	11.43	11.43

[1]*New index point added for 2023 analysis.*

Table 4 compares the 2020 conditions to the updated 2023 model runs and the SEIR project scenario (blue columns). **Table 4** also highlights the overall differences found between the 2023 project and 2023 existing conditions difference values, and SEIR project and 2020 existing conditions difference (green columns). The difference observed between the 100-yr WSE values are on the order of 0.1 ft or less, thus indicating that the new 2023 model updates have led to no substantive changes to in the WSEs observed around MWT.

Table 4. Differences in maximum water surface elevations for the 100-yr design storm

Location	Scenario minus 2020 Condition (ft)					2023 Alt vs SEIR Proj (ft)	
	2023 Cond.	2023 Alt A	2023 Alt B	2023 Alt C	SEIR Proj	Diff	Notes
Bensons Ferry	-0.09	-1.21	-1.21	-1.21	-1.35	0.1	2022 SEIR lower
Beach Lake	-0.16	-0.36	-0.36	-0.36	-0.27	-0.1	2023 Alt lower
Point Pleasant North	-0.13	-0.35	-0.35	-0.35	-0.31	0.0	no change
Point Pleasant South	-0.13	-0.35	-0.35	-0.35	-0.31	0.0	no change
Lambert Road Upstream (Stone Lake)	-0.14	-0.36	-0.36	-0.36	-0.31	-0.1	2023 Alt lower
Snodgrass Slough at Lambert Road	-0.13	-0.36	-0.36	-0.36	-0.31	0.0	no change
Snodgrass Slough at Twin Cities Rd	-0.02	-0.54	-0.54	-0.54	-0.60	0.1	2022 SEIR lower
Snodgrass Slough at DCC	0.00	-0.53	-0.53	-0.53	-0.58	0.1	2022 SEIR lower
Dead Horse Island	-0.02	-13.92	-13.92	-13.92	-13.92	0.0	no change
South Fork Moke at New Hope Bridge	0.01	-0.40	-0.40	-0.40	-0.32	-0.1	2023 Alt lower
South Fork Moke at Beaver Slough	0.02	-0.24	-0.24	-0.24	-0.20	0.0	no change
South Fork Moke at Hog Slough	0.01	-0.11	-0.11	-0.11	-0.10	0.0	no change
North Fork Moke at New Hope Road	0.00	-0.37	-0.37	-0.37	-0.38	0.0	no change
North Fork Moke at latitude of Beaver Slough	-0.01	-0.27	-0.27	-0.27	-0.28	0.0	not change
North Fork Moke at latitude of Hog Slough	-0.01	-0.18	-0.18	-0.18	-0.18	0.0	no change

4.3 MAXIMUM VELOCITIES DIFFERENCES

Maximum velocity values from the proposed project scenario conditions were compared to the 2023 conditions at locations surrounding MWT. Results from the previous modeling to support the SEIR are also presented. **Figure 3** details the locations of comparison, and **Tables 5 and 6** detail model results from the 100-year flood event.

4.3.1 100-YEAR VELOCITY RESULTS

Table 5 outlines the maximum velocity values modeled under the 100-yr flood event and is presented in the same manner as **Table 3** above. Velocity differences for the two existing conditions runs are similar with the largest differences being experienced in Snodgrass Slough, which are similar results as observed

within the WSE results. Among the project alternatives we again see the 2023 project alternatives with similar velocity results across the alternatives for the SW levee degrade.

Table 5. Maximum velocity for the 100-yr design storm

Location	Maximum WSE (ft/s, NAVD88)					
	Existing Conditions		Proposed Project Condition			
	2020	2023	SEIR Proj	2023 Alt A	2023 Alt B	2023 Alt C
Bensons Ferry	4.21	4.23	5.17	4.945	4.945	4.945
Snodgrass Slough at Lambert Road	1.11	1.10	1.06	1.05	1.05	1.05
Snodgrass Slough at Twin Cities Rd	0.54	0.53	0.51	0.51	0.51	0.51
Snodgrass Slough at DCC	2.48	1.93	1.57	1.35	1.35	1.35
Dead Horse Cut (near SW degrade)[1]	-	8.89	-	9.21	9.19	9.20
South Fork Moke at New Hope Bridge	5.82	5.63	5.69	5.47	5.47	5.47
South Fork Moke at Beaver Slough	3.53	3.54	3.45	3.43	3.43	3.43
South Fork Moke at Hog Slough	1.97	1.97	1.90	1.89	1.89	1.89
North Fork Moke at New Hope Road	7.21	7.05	6.97	6.85	6.85	6.85
North Fork Moke at latitude of Beaver Slough	4.99	4.99	4.84	4.84	4.84	4.84
North Fork Moke at latitude of Hog Slough	4.79	4.79	4.63	4.64	4.64	4.64

[1]*New index point added for 2023 analysis.*

Table 6 below shows the maximum velocity differences between the 2020 project conditions and the differences between the SEIR and 2023 alternatives. This is the same format shown for the WSEs in **Table 4**. Some differences are observed between the scenarios and the 2020 conditions, which were observed up to 1.13 ft/s. However, the overall differences between the project and the existing conditions due to the 2023 model updates (shown in the grey columns) are limited to within 0.2 ft/s or less. These limited changes among the project updates are anticipated to yield no substantive changes to the system.

Table 6. Differences in maximum velocity for the 100-yr design storm

Location	Scenario minus 2020 Condition (ft/s)					2023 Alt vs SEIR Proj (ft/s)	
	2023 Base	2023 Alt A	2023 Alt B	2023 Alt C	SEIR Proj	Diff	Notes
Bensons Ferry	0.02	0.74	0.74	0.74	0.96	-0.2	2023 Alt lower
Snodgrass Slough at Lambert Road	-0.01	-0.06	-0.06	-0.06	-0.05	0.0	no change
Snodgrass Slough at Twin Cities Rd	-0.01	-0.03	-0.03	-0.03	-0.03	0.0	no change
Snodgrass Slough at DCC	-0.55	-1.13	-1.13	-1.13	-0.91	-0.2	2023 Alt lower
South Fork Moke at New Hope Bridge	-0.19	-0.35	-0.35	-0.35	-0.13	-0.2	2023 Alt lower
South Fork Moke at Beaver Slough	0.01	-0.10	-0.10	-0.10	-0.08	0.0	no change
South Fork Moke at Hog Slough	0.00	-0.08	-0.08	-0.08	-0.07	0.0	no change
North Fork Moke at New Hope Road	-0.16	-0.36	-0.36	-0.36	-0.24	-0.1	2022 SEIR lower
North Fork Moke at latitude of Beaver Slough	0.00	-0.15	-0.15	-0.15	-0.15	0.0	not change
North Fork Moke at latitude of Hog Slough	0.00	-0.15	-0.15	-0.15	-0.16	0.0	no change

5 TIDAL MUTTING ANALYSIS

5.1 TIDAL DATUMS

In this analysis, we calculated the tidal datums using an online tool developed by the National Oceanic and Atmospheric Administration (https://access.co-ops.nos.noaa.gov/datumcalc/). Time series data at long established gage locations at New Hope Landing and Benson's Ferry were analyzed for updated 2023 existing condition and project conditions to understand how these water levels will vary with project implementation. These values were also compared to the SEIR tidal datum values. Additionally, eight locations internal to MWT were analyzed under the project conditions to aid in informing the restoration plan and better understand tidal dampening adjacent to MWT and tidal muting inside of MWT (**Figure 4**). The tidal model simulated a one-month period from 4/29/2016 to 5/27/2016. Further information about the tidal runs can be found in the *Onsite Hydrology Report* (cbec, 2022).

Tabel 8 below outlines the tidal datum analysis results. **Figure 4** shows the corresponding index point locations. The first two locations listed in the table are points exterior to MWT and offer an assessment of how the tidal datum might change if the tract was to go from dry to inundated. Currently the tract is flooded after the 2023 flood events, however both the New Hope and Benson's Ferry tidal datums remained similar between the updated 2023 existing and project conditions when compared to their SEIR counterparts.

The index points within the tract were used to understand how the tidal signal which enters MWT though the SW levee degrade will be muted given different configurations of the SW levee degrade. In a previous section we noted that the 100-yr water surface elevations were relatively unimpacted by the slight variations in the SW levee degrade configuration proposed with the 2023 model updates. This is likely

due to the relative submergence ratio of the berm being much higher under a flood and having less interaction with any material left in the degrade where not fully excavated to field grade (~0 ft). Under tidal conditions, MLLW is observed close to 2.9 ft (**Table 8**, New Hope 2020 conditions), suggesting that even if material was left up to 2.5 ft the tract interior would remain connected to the system thought the SW levee degrade. Although, the degrade is not likely to disconnect under normal conditions, a small berm has the potential to decrease the efficiency of water moving through the SW levee degrade at low stages (3-6 ft). The data suggest this response in when comparing the MLLW values for the proposed project alternatives. Starting at tidal point 1, the SEIR project has the lowest stage value, and values increase as more material is left within the SW degrade. The largest difference between the SEIR project and the 2023 alternative A is the absence of internal grading within the tract. This is observed to have about a 0.1 ft increase in the MLLW values, as the tidal channels increased the tidal energy experienced in the tract, which would increase the tidal range.

As we move further away from the SW levee degrade, the tidal range is expected to decrease. Among the 2023 alternatives, option A offers a full levee degrade to the tract internal and offers the greatest tidal range of the three alternatives, these differences are observed in the bottom range of the tidal datums. Alternative B, which features a SW levee degrade to only 2.5 ft yields about a 0.2 ft increase in MLLW when compared to Alternative A. The small degrade (~250 ft) to 0 ft within Alternative C, can increase the tidal range by 0.1 ft, when compared to Alternative A.

Approximately 1.75 miles to the north of the SW levee degrade tidal point 4 is among some of the widest width of the levees within the tract before the ring levee constricts the flow between the Mokelumne River's north levee. Around this point we start to see the difference between the alternatives diminish, and once we move through the flow constriction to tidal point 6 the tidal ranges are in near agreement. Of note is point 8 which had a tidal channel connection degrade through a small berm in the SEIR project alternative, offering greater tidal connection to this point. The updated project alternatives offer no internal grading due to the tract being inundated. This means that tidal point 8 experiences a slow tidal flux across several small agricultural berms and channels. It is believed that the current alternatives could have increased tidal range at this location with a few small berm degrades within MWT along the east end.

Table 1. Modeled tidal datums

Location	Tide Cycle	2022 SEIR		Project WSE (ft, NAVD88)				Difference (ft)					
								2023 Proj - 2023 Cond.			2023 Proj - SEIR Proj.		
		2020 Cond	SEIR Proj	2023 Cond	2023 Alt A	2023 Alt B	2023 Alt C	2023 Alt A	2023 Alt B	2023 Alt C	2023 Alt A	2023 Alt B	2023 Alt C
New Hope Landing	MHHW	6.1	5.8	6.1	5.8	5.8	5.8	-0.3	-0.3	-0.3	0.0	0.0	0.0
	MHW	5.7	5.5	5.7	5.5	5.5	5.5	-0.2	-0.2	-0.2	0.0	0.0	0.0
	MTL	4.6	4.6	4.5	4.6	4.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0
	MLW	3.4	3.7	3.4	3.7	3.7	3.7	0.3	0.3	0.3	0.0	-0.1	0.0
	MLLW	2.9	3.3	2.9	3.3	3.3	3.3	0.4	0.4	0.4	0.0	0.0	0.0
Benson's Ferry	MHHW	6.0	5.8	6.0	5.7	5.7	5.7	-0.3	-0.3	-0.3	-0.1	-0.1	-0.1
	MHW	5.7	5.5	5.7	5.5	5.5	5.5	-0.2	-0.2	-0.2	0.0	0.0	0.0
	MTL	4.7	4.7	4.7	4.7	4.7	4.7	0.0	0.0	0.0	0.0	0.0	0.0
	MLW	3.7	3.9	3.7	4.0	3.9	4.0	0.3	0.2	0.3	0.1	0.0	0.1
	MLLW	3.3	3.6	3.3	3.6	3.6	3.6	0.3	0.3	0.3	0.0	0.0	0.0
Pt 1	MHHW	-	5.7	5.1	5.6	5.6	5.6	0.5	0.5	0.5	-0.1	-0.1	-0.1
	MHW	-	5.4	5.1	5.3	5.3	5.3	0.2	0.2	0.2	-0.1	-0.1	-0.1
	MTL	-	4.6	5.0	4.6	4.6	4.6	-0.4	-0.4	-0.4	0.0	0.0	0.0
	MLW	-	3.8	4.9	3.8	3.9	3.9	-1.1	-1.0	-1.0	0.0	0.1	0.1
	MLLW	-	3.4	4.9	3.5	3.7	3.6	-1.4	-1.3	-1.4	0.1	0.3	0.2
Pt 2	MHHW	-	5.7	5.1	5.6	5.6	5.6	0.5	0.5	0.5	-0.1	-0.1	-0.1
	MHW	-	5.4	5.1	5.3	5.3	5.3	0.2	0.2	0.2	-0.1	-0.1	-0.1
	MTL	-	4.6	5.0	4.6	4.6	4.6	-0.4	-0.4	-0.4	0.0	0.0	0.0
	MLW	-	3.8	4.9	3.9	4.0	3.9	-1.1	-1.0	-1.0	0.1	0.2	0.1
	MLLW	-	3.5	4.9	3.5	3.7	3.6	-1.4	-1.3	-1.3	0.0	0.2	0.1
Pt 3	MHHW	-	5.7	5.1	5.6	5.6	5.6	0.5	0.5	0.5	-0.1	-0.1	-0.1
	MHW	-	5.4	5.1	5.3	5.3	5.3	0.2	0.2	0.2	-0.1	-0.1	-0.1
	MTL	-	4.6	5.0	4.6	4.6	4.6	-0.4	-0.4	-0.4	0.0	0.0	0.0
	MLW	-	3.8	4.9	3.9	4.0	4.0	-1.0	-1.0	-1.0	0.1	0.2	0.2
	MLLW	-	3.5	4.9	3.6	3.7	3.7	-1.3	-1.2	-1.3	0.1	0.2	0.2
Pt 4	MHHW	-	5.7	5.1	5.6	5.6	5.6	0.5	0.5	0.5	-0.1	-0.1	-0.1
	MHW	-	5.4	5.1	5.3	5.3	5.3	0.2	0.2	0.2	-0.1	-0.1	-0.1
	MTL	-	4.7	5.0	4.7	4.7	4.7	-0.3	-0.3	-0.3	0.0	0.0	0.0
	MLW	-	4.0	4.9	4.0	4.1	4.1	-0.9	-0.9	-0.9	0.0	0.1	0.1
	MLLW	-	3.7	4.9	3.8	3.9	3.9	-1.1	-1.1	-1.1	0.1	0.2	0.2
Pt 5	MHHW	-	5.6	5.1	5.6	5.6	5.6	0.5	0.5	0.5	0.0	0.0	0.0
	MHW	-	5.3	5.1	5.3	5.3	5.3	0.2	0.2	0.2	0.0	0.0	0.0
	MTL	-	4.7	5.0	4.7	4.7	4.7	-0.3	-0.3	-0.3	0.0	0.0	0.0
	MLW	-	4.1	4.9	4.0	4.1	4.1	-0.9	-0.9	-0.9	-0.1	0.0	0.0
	MLLW	-	3.8	4.9	3.8	3.9	3.9	-1.1	-1.1	-1.1	0.0	0.1	0.1

Pt 6	MHHW	-	5.6	5.1	5.6	5.6	5.6	0.5	0.5	0.5	0.0	0.0	0.0
	MHW	-	5.3	5.1	5.3	5.3	5.3	0.2	0.2	0.2	0.0	0.0	0.0
	MTL	-	4.7	5.0	4.7	4.7	4.7	-0.3	-0.3	-0.3	0.0	0.0	0.0
	MLW	-	4.1	4.9	4.1	4.1	4.1	-0.9	-0.9	-0.9	0.0	0.0	0.0
	MLLW	-	3.8	4.9	3.8	3.9	3.9	-1.1	-1.1	-1.1	0.0	0.1	0.1
Pt 7	MHHW	-	5.6	5.1	5.6	5.6	5.6	0.5	0.5	0.5	0.0	0.0	0.0
	MHW	-	5.3	5.1	5.3	5.3	5.3	0.2	0.2	0.2	0.0	0.0	0.0
	MTL	-	4.7	5.0	4.7	4.7	4.7	-0.3	-0.3	-0.3	0.0	0.0	0.0
	MLW	-	4.1	4.9	4.1	4.1	4.1	-0.8	-0.8	-0.8	0.0	0.0	0.0
	MLLW	-	3.9	4.9	3.9	3.9	3.9	-1.0	-1.0	-1.0	0.0	0.0	0.0
Pt 8	MHHW	-	5.6	5.1	5.5	5.5	5.5	0.4	0.4	0.4	-0.1	-0.1	-0.1
	MHW	-	5.3	5.1	5.2	5.2	5.2	0.1	0.1	0.1	-0.1	-0.1	-0.1
	MTL	-	4.7	5.0	4.8	4.8	4.8	-0.2	-0.2	-0.2	0.1	0.1	0.1
	MLW	-	4.1	4.9	4.4	4.4	4.4	-0.6	-0.6	-0.6	0.3	0.3	0.3
	MLLW	-	3.9	4.9	4.3	4.3	4.3	-0.7	-0.7	-0.7	0.4	0.4	0.4

MHHW = Mean higher, high water, MHW = Mean high water, MTL = Mean tide level, MLW = Mean low water, and MLLW = Mean lower, low water.

6 SUMMARY OF FINDINGS

This technical memorandum serves to document the updates made to the project design and existing conditions following the 2023 flood events. Additional topography previously collected post 2017 flood was incorporated in this analysis since the last revision to the SEIR document in early 2022. Furthermore, emergency repairs which are currently underway during the preparation of this document were included in the existing conditions simulations. The project alternatives proposed within this analysis serve to test the implications of not fully degrading the SW levee and leaving either all or a portion of it approximately 2.5 ft higher than internal grade.

Flood and tidal simulations were conducted for both the updated existing conditions and project alternatives. The flood model results were screened for any possible impacts to water surface elevation and velocity at a series of index points (**Figure 3**). Model results were compared between the current runs and the data presented in the SEIR. Model results appear to be insensitive to a range of SW levee degrade geometry configurations. Furthermore, it is hypothesized that if material was left in the SW levee degrade that the system would likely scour this material under flood conditions, as velocities in the area are capable of transporting sediment. Further, anecdotal evidence of this is provided through observations of scour at this location in Dead Horse Cut after the levee breaches in 2017. Overall, comparisons between the 2023 model updates and the data previously presented in the SEIR work led us to the conclusion that these project changes should yield no substantive changes to flood hydrology of the system.

The final analysis conducted looked at the tidal datum evolution of the site with the project implemented. Overall changes to the expected tidal ranges were reviewed. Across the simulations, we observed the MHHW values were the most muted with distance inward from the SW levee degrade progressing to the

northeast. Leaving levee material to 2.5 ft elevation slightly reduced the tidal range as the material prevents water from leaving the tract on low tide. However, it is anticipated that if the berm was not fully degraded to the internal grade, that this would occur naturally during floods. Comparison of the SIER project tidal datums to the updated 2023 configurations, suggests that the internal grading offers some enhanced tidal range, by allowing more efficient transfer of energy through tidal channels. However, this impact was minimal (~0.1 ft) and is not currently feasible due to the tract being currently inundated.

In conclusion, we anticipate that the selection of any of the three proposed 2023 project alternatives will result in no substantive changes to tidal hydrology of the system.

7 REFERENCES

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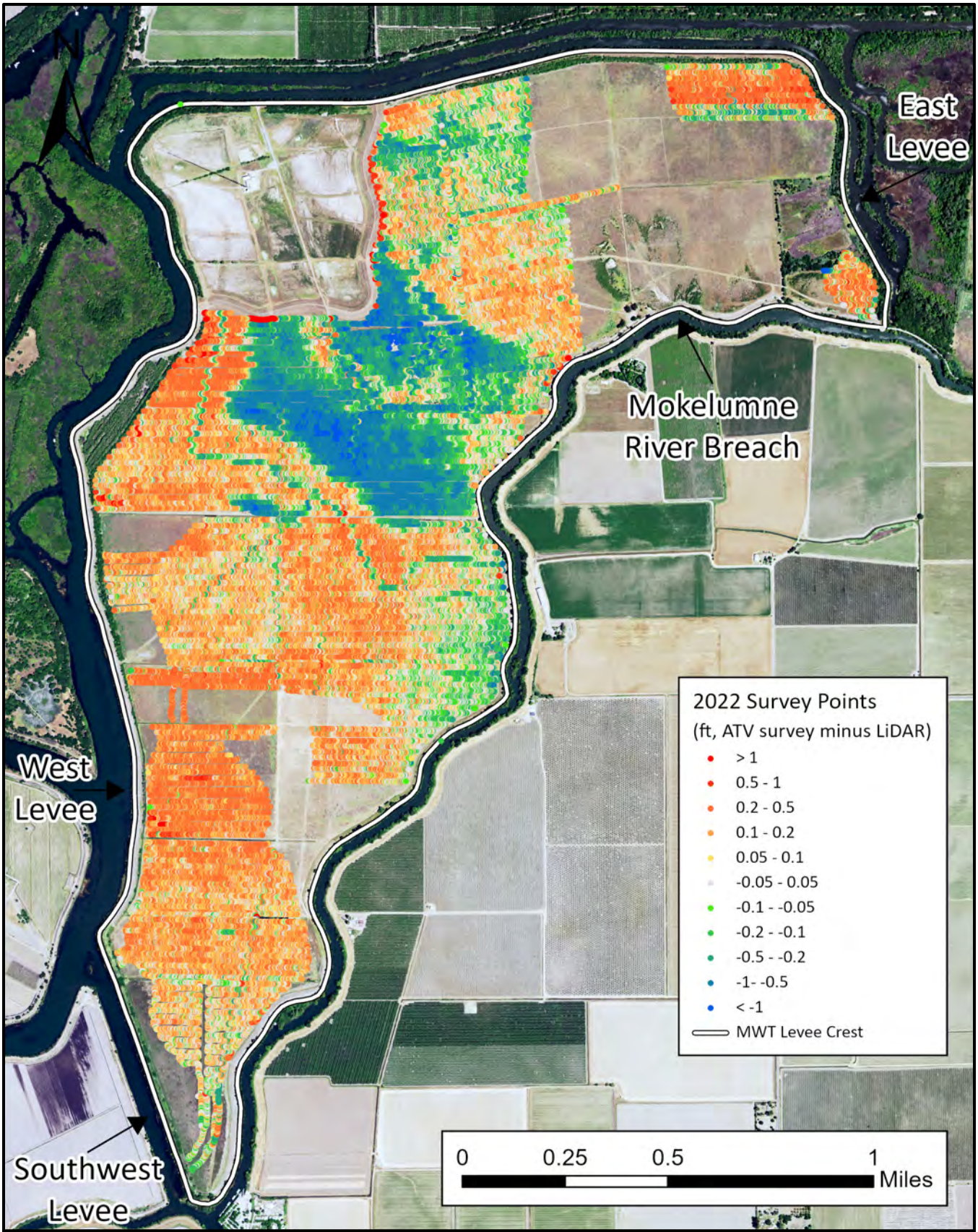

Notes:

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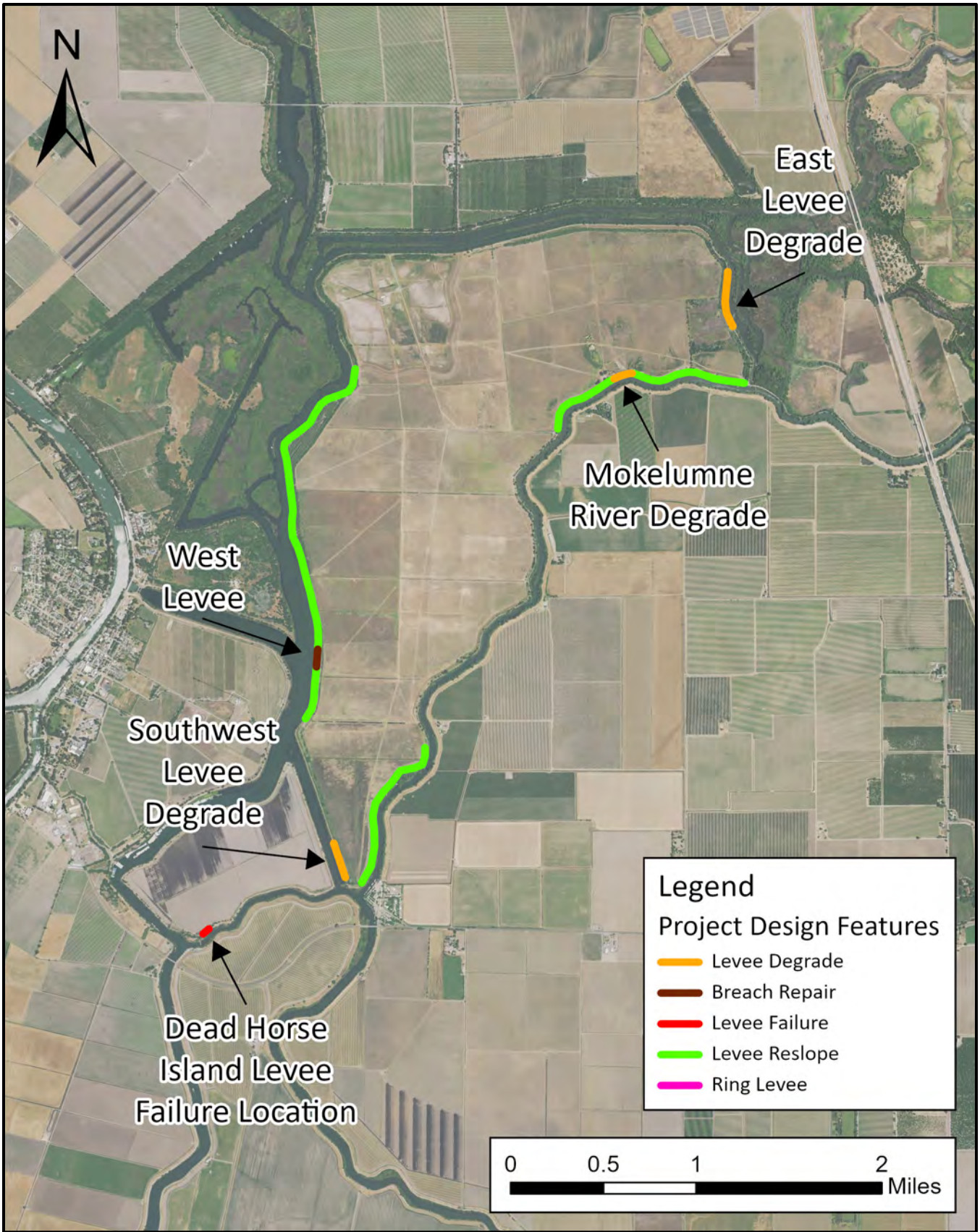
MWT Levee Modification and Habitat Development Project
Updated Model Topography

Project No. 15−1020	Created By: TKS	Figure 1



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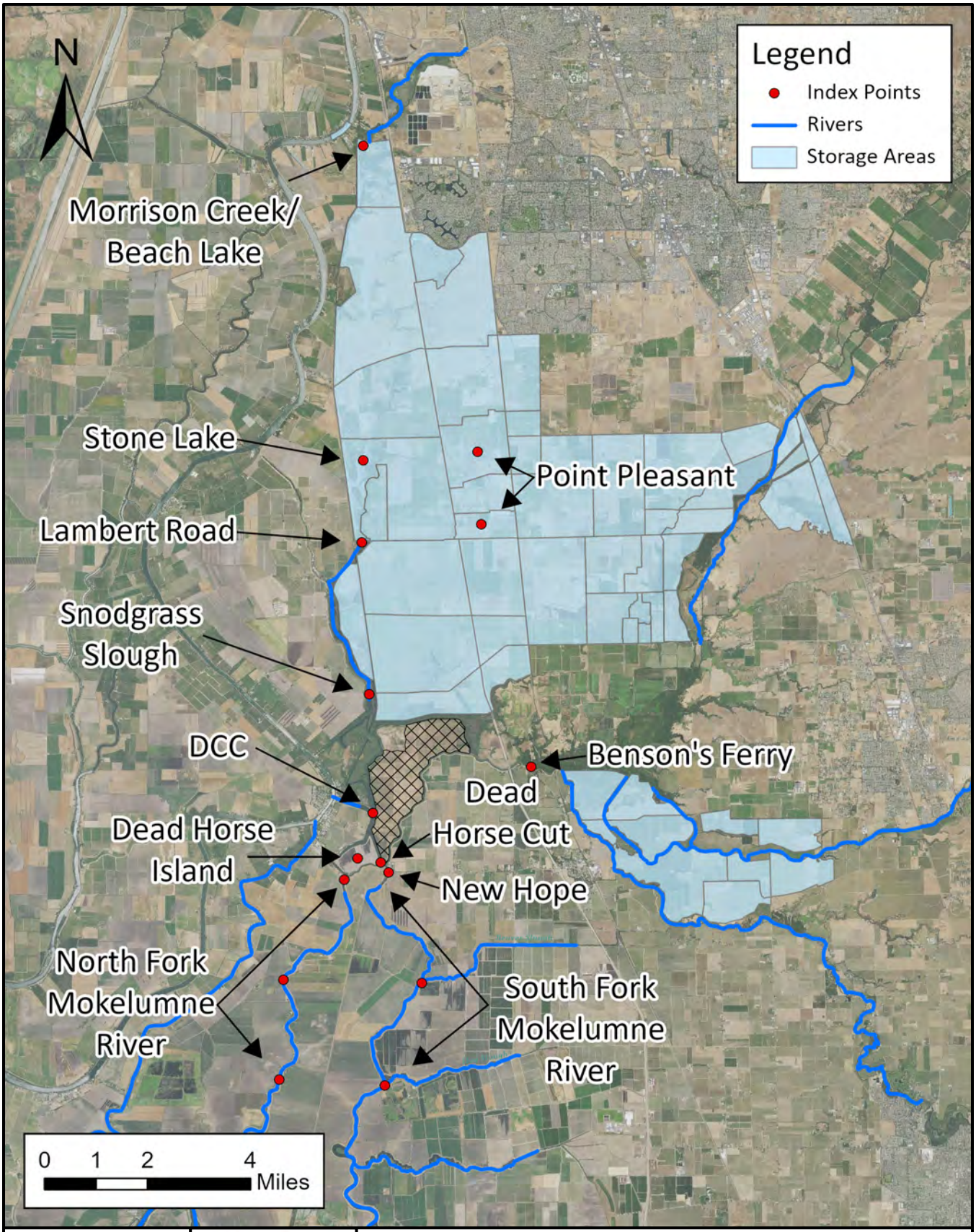
MWT Levee Modification and Habitat Development Project
2023 Project Design Map

Project No. 15−1020	Created By: TKS	Figure 2



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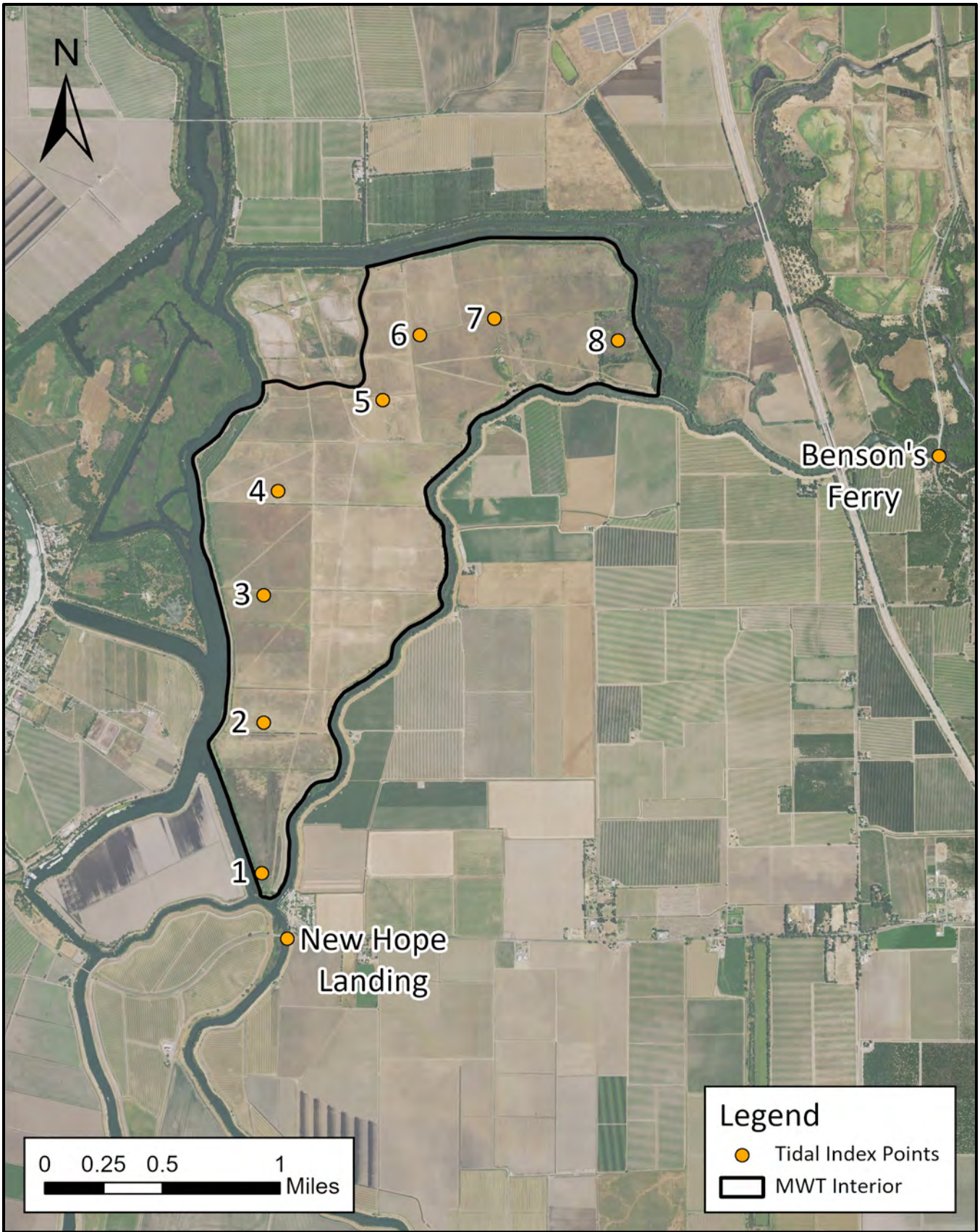
MWT Levee Modification and Habitat Development Project
Flood Model Index Points

Project No. 15−1020	Created By: TKS	Figure 3



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MWT Levee Modification and Habitat Development Project
Tidal Model Index Points

Project No. 15−1020	Created By: TKS	Figure 4