

FINAL EIR

for the

BELVEDERE SEISMIC UPGRADE PROJECT

STATE CLEARINGHOUSE NUMBER 2022010159



Prepared for
City of Belvedere

November 2023

Prepared by
Amy Skewes-Cox, AICP

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In conjunction with

BASELINE ENVIRONMENTAL CONSULTING
ECORPS CONSULTING
ENVIRONMENTAL COLLABORATIVE
NATALIE MACRIS
PARAMETRIX (FORMERLY PARIS) TRANSPORTATION CONSULTING)
WORDSMITH WORD PROCESSING
TOM CAMARA GRAPHICS

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Chapter I INTRODUCTION



A. PURPOSE OF THE FINAL EIR

This document, together with the Draft EIR (DEIR), is the Final Environmental Impact Report (Final EIR or FEIR) for the Belvedere Seismic Upgrade Project (State Clearinghouse Number 2022010159). The DEIR identified the potentially significant environmental impacts of the project and recommended mitigation measures to reduce or eliminate significant impacts. This document responds to public comments on the DEIR, revises the DEIR as necessary, and provides a Mitigation Monitoring and Reporting Program (MMRP) for the project.

According to the California Environmental Quality Act (CEQA) (as amended January 1, 2023), lead agencies are required to consult with public agencies having jurisdiction over a proposed project and to provide the general public with an opportunity to comment on the DEIR. For this project, the City of Belvedere is the lead agency. This document has been prepared to respond to comments received on the DEIR and to clarify any errors, omissions, or misinterpretations of the analysis or findings in the DEIR.

This document, together with the DEIR, will constitute the FEIR if the City of Belvedere certifies the FEIR as complete and adequate under CEQA.

B. ENVIRONMENTAL REVIEW PROCESS

The DEIR was made available for public review from October 5, 2022, through November 28, 2022. The general public was advised of the availability of the DEIR through notification via email and Notices of Availability (NOA) mailed to neighbors in proximity to the project site. Public agencies and interest groups were also notified by mail. The DEIR notification was also sent via the State Clearinghouse to various state agencies. The DEIR and NOA were posted on the City of Belvedere website on October 8, 2022.

During the public review period on the DEIR, written comments were made. A copy of written comments on the DEIR and responses to the comments can be found in Chapter II of this document.

In addition, comments on the DEIR were made at a public hearing held before the City of Belvedere Planning Commission on November 9, 2022. Chapter II of this document provides written summaries of and responses to those comments.

The FEIR will be presented to the City of Belvedere Planning Commission at its meeting scheduled for **December 11, 2023, at 6:30 PM**, at the City of Belvedere Council Chambers at City Hall located at 450 San Rafael Avenue, Belvedere, California. The meeting will be in person and also on Zoom at <https://us02web.zoom.us/j/81384159398>. The Planning Commission will be asked to make a recommendation to the City Council regarding certification of the FEIR, including a requirement to make a Statement of Overriding Considerations for any significant and unavoidable impacts. The Belvedere City

Council will take final action on certification. Before acting on the project, the City Council must certify the FEIR, adopt Findings of Fact as required by CEQA, adopt a Statement of Overriding Considerations if the project would result in significant and unavoidable impacts, and adopt the MMRP (see Chapter IV of this document). In addition, the City Council must make the necessary findings for the adoption of mitigation measures associated with the project.

C. REPORT ORGANIZATION

This document consists of the following chapters:

- *Chapter I: Introduction.* This chapter includes a discussion of the purpose and organization of the FEIR.
- *Chapter II: Comment Letters and Responses for the DEIR.* This chapter contains the names of individuals and agencies commenting on the DEIR and reproductions of letters and emails received on the DEIR. The comments are numbered in the margins of the comment letters and responses are keyed to the comment numbers. Where revisions to the DEIR are appropriate, these are summarized and the actual text changes are shown in Chapter III.
- *Chapter III: DEIR Text Changes.* This chapter contains corrections or clarifications that have been made based on comments received on the DEIR or for other reasons. The changes show language that has been added to or deleted from the DEIR. Double underlined text represents language that has been added to the DEIR; text in ~~strikeout~~ has been deleted from the DEIR.
- *Chapter IV: Mitigation Monitoring and Reporting Program.* This chapter identifies mitigation measures referenced in the EIR as necessary to avoid or reduce the project's potentially significant impacts and provides a program for implementation and monitoring of these measures. The timing and entity responsible for monitoring are identified.

Chapter II COMMENT LETTERS AND RESPONSES FOR THE DEIR



This chapter includes a reproduction of each comment letter (including emails) that addressed the DEIR and was received during the public review period. Each letter is followed by responses to comments made in the letter.

COMMENT NUMBER

A. Local Agency Comments and Responses

1. City of Belvedere Protect Belvedere Project Draft EIR Review Committee..... A1-1 to A1-37

B. Federal and State Agency Comments and Responses

1. California Department of Fish and Wildlife.....B1-1 to B1-12

C. Public and Public Interest Group Comments and Responses

1. William Rothman..... C1-1 to C1-8
2. Susan Cluff..... C2-1 to C2-7
3. Susan Cluff C3-1 to C3-5
4. William Rothman..... C4-1

- D. Public Hearing Comments and ResponsesD1 to D4**

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A. LOCAL AGENCY COMMENTS AND RESPONSES

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CITY OF BELVEDERE

Memorandum

June 29, 2023

TO: Mayor Wilkinson and City Council

FROM: The Protect Belvedere Project Draft EIR Review Committee.
Robert Zadnik, City Manager

SUBJECT: Summary of the Committee's findings and comments.

Dear Council,

Thank you for the opportunity to review and provide comments on the Draft Environmental Impact Report (DEIR) document.

It is important to note that the purpose of an Environmental Impact Report is to be a thorough public disclosure document of potential impacts associated with the project and associated mitigation measures or alternatives and to identify their level of significance.

The California Environmental Quality Act (CEQA) establishes guidelines for which topics should be studied based on adopted significance criteria. For this DEIR, the potential impacts are organized under several categories ranging from Biological Resources, Geology and Soils, Hydrology, Transportation, Noise, Vibration, Cultural Resources, etc.

The Committee focused its review on categories that were identified as potentially impactful. Fortunately, the report finds these impacts as less than significant with their associated implementation of mitigation measures. Additionally, the Committee examined and commented on broader narratives, the project description, and other general content of the DEIR.

During the month of October, the Committee held three publicly noticed and advertised meetings:

A1-1



- October 23, 2022, Staff and the consultants introduced the initial meeting with background information on the project. The Committee assigned groups to review segments of the DEIR. Public comment was received.
- October 26, 2022, On October 23rd, Committee members provided summaries of their comments orally and in writing. Staff and the consultants provided clarifying responses to specific topics. The committee called for public comment.
- October 12, 2022, the Committee reviewed a draft version of the Summary of Comments and approved a final version with edits. The Committee called for public comment.

A1-1

Attached to this memo is a summary of the Committee's comments. Comments from the public are also summarized; however, staff encouraged the public to submit their official comments in writing.

Attachments

1. Summary of Committee and Public Comments
2. [Draft EIR Document](#)

ATTACHMENT 1

• **Summary of Comments at BSUP EIR Committee Meeting – October 12, 2022**

From Committee

- | | |
|--|-------------|
| 1. Need for pre-construction surveys for private residences, not just the China Cabin. | A1-2 |
| 2. Sheet piles could impact BLOA outfalls and pumps due to vibration. | |
| 3. Important to know who’s responsible for getting permits. Is it practical to have contractors responsible for getting approvals/permits? | A1-3 |
| 4. What happens if a regulatory agency does not respond and their approval is tied to an impact being less than significant? | |
| 5. Using water for air impact mitigation measures may be a problem if water shortages exist. | A1-4 |
| 6. Construction staging on West Shore and Belvedere may be questionable. | A1-5 |
| 7. Utility disruptions on Beach Road are of concern. | A1-6 |

Public Comments (Larry Stoehr, William Rothman, and Susan Cluff)

Note, residents were asked to submit formal comments through City Hall or by emailing EIRcomments@cityofbelvedere.org. The following public comments were received and have been included in this Draft to provide additional context for the Committee.

- | | |
|--|--------------|
| 1. Page 2-13 mentions turbidity curtains but these could interfere with BLPOA letting water out in winter/wet months. (L. Stoehr) | A1-7 |
| 2. Page 4.6-1: Says levees were built with dredge material but this may not be true. (L. Stoehr) | A1-8 |
| 3. Important to survey homes and request release for those who don’t want survey; needed within 100 ft. of construction. (L. Stoehr) | A1-9 |
| 4. Are original Scoping meeting comments addressed in this report? (W. Rothman) | A1-10 |
| 5. Magnification of seismic effect possible (W. Rothman) | A1-11 |
| 6. EIR says that pipes may break, but agencies have stated that pipes are state of the art (W. Rothman) | A1-12 |
| 7. City process needs to be thorough (W. Rothman) | A1-13 |
| 8. Need dates of future meetings (S. Cluff) | A1-14 |
| 9. Need to define “nearby” in terms of noise, etc. (S. Cluff) | A1-15 |
| 10. Need to know where utilities connect as it’s too risky to lose water and wastewater connections. (S. Cluff) | A1-16 |
| 11. Check evacuation routes; is Yacht Club available for emergency evacuations? (S. Cluff) | A1-17 |
| 12. Other buildings besides China Cabin are historic; need to study other buildings. (S. Cluff) | A1-18 |
| 13. In terms of noise, anything greater than 80 dBA is significant. (S. Cluff) | A1-19 |

• **Summary of Comments at BSUP EIR Committee Meeting – October 23, 2022**

From the Committee

Transportation

- | | |
|--|--------------|
| 1. Traffic discussion was a bit light. Consider additional detail and mitigation measures. | A1-20 |
|--|--------------|

2. A detailed construction traffic management plan is needed.
3. There clearly will be a significant impact on the traffic, both motor and pedestrian, but the impact seems unavoidable.
4. What thought has been given to the school bus and routes?

A1-21

Cultural Resources and Tribal Cultural

Cultural Resources

1. According to the EIR, there will be a City qualified professional on site as well as an archeologist on site. Will they be on site monitoring 8-5 daily?
2. Who will be monitoring the ground vibration level and will that person be on site 8-5 daily?
3. There are a number of older structures, in addition to China Cabin, on both sides of Beach Road. While they are not historic, they are old and many on pilings or pillars above ground level. What mitigation measure is in place for them in terms of vibration and movement?
4. Should there be damage to individual buildings or homes, is there a process in place for repair?
5. Will photos and diagrams be taken of these buildings as well as China Cabin?

A1-22

Tribal Cultural Resources

1. The mitigation for the demolition and destruction of the roads mentions a tribal representative. Is it realistic to assume that someone will be on site 8 - 5 daily?
2. There is mention of an awareness training program. Who will monitor that program?
3. If different workmen are brought in at different times for different aspects of the work, who will make sure that everyone is properly trained to be aware of what might be encountered?

A1-23

Geology & Soils

1. Could be settlement based on vibrating aspect of construction - more specifics are needed.
2. What are "unacceptable" levels of settlement?
3. Has the assumption that the levees are built of dredged material from the Lagoon been confirmed?
4. After settlement monitoring is conducted, what happens if damage is detected?
5. Working with outside agencies who may or may not have to install flexible pipes, is there a guarantee that the work will be coordinated so that the project will not be left unfinished while waiting for an agency to schedule pipe installation?
6. p.9 - What scouring and erosion protection is being proposed for Beach Road?

A1-24

Noise

1. 90 dBA at 40-50 feet is a very challenging level of noise.

A1-25

2. Could vibration driver add to settlement and add risk to personal property?
3. Define old structure v. new structure.
4. Is 45' of distance from source of noise an arbitrary measurement?
5. There is reference to noise barriers and sound blankets in sensitive areas. Aren't all of the areas on San Rafael Avenue and Beach Road sensitive?
6. What exactly are these barriers and how will they affect the people living behind them? View? Air quality?
7. Do physical noise barriers work?
8. Since most of the dwellings on Beach Road are multistory, how will these barriers work on upper floors?
9. There is reference to a disturbance coordinator. Will that person be on site daily 8 -5?
10. Will the disturbance coordinator be available to residents, and will they have authority to remedy a situation?
11. There is a statement that trucks, etc. will only be able to idle for 5 minutes. Who will be monitoring this and will they be present daily from 8 - 5?
12. Does the silent driver machine have other attachments for starting sheet pile run? If so, can it be used in lieu of the vibratory hammer?

A1-25

Hydrology

1. Provide information on overtopping and sheet flow risk to lagoon
2. Request for more detail about function of a turbidity curtain
3. Discussion of regulatory permits and approvals is fairly general. Should more detail be provided?
4. Some general, non-specific language should be cleaned up. For example, use of "near" and "around" terminology is vague when referencing the machinery being used.
5. Should more detail be given towards required Regulatory permits?
6. What is the definition of "waters of the United States". Does Richardson Bay on the San Rafael side of the project fall under this definition?
7. Does Rip Rap removal add to potential flood risk?
8. Under Regulatory, should the project be considered wetland?

A1-26

Air Quality, GHG Emissions, Hazards & Hazardous Materials

1. Under hazardous materials around schools: Why is Belvedere Nursery School not included?
2. Belvedere Way should remain open for pedestrians.
3. Given the statewide drought, should an alternative water source be identified?
4. Additional Comment from Committee member Hanson:
"I think that this has been very simplified. Hosing down dust twice a day will not make much of a difference. The effect of the dirt, dust and air quality for the people living on San Rafael Avenue and Beach Road has not been addressed adequately."

A1-27

Biological resources - Wildlife, vegetation, etc.

1. More definition on silt screen or turbidity curtain is needed.
2. The regulatory process is significant. Does the report mention the regulatory permits and should there be more detail in the Draft EIR?
3. All impacts are listed as less than significant if mitigation measures are used.
4. Permits are mentioned in Hydrology and Biology sections with different parties (City/Contractor) involved; this should be clarified.
5. If the contractor encounters ground water, is this considered “in-water” work?

A1-28

General Comments

1. Will there be utility service coordination so homeowners are not left without service?
2. How does summer “in water” work and an 8-month construction schedule fit into the overall project calendar?
3. Is the construction schedule of 3 - 4 months (for Beach Road) realistic?
4. Who monitors that the work does not start before 8 and ends at 5?
5. Why is lowering the Belvedere Lagoon necessary?
6. Lagoon water level, Work along SRA will need water lowered. Coordinate with BLPOA
7. p 10, public review period should be described as a minimum 45 day period.
8. Will the earlier NOP comments be addressed in this report? Specifically:
 - Emergency access and blockage of roadways.
 - Impacts on utility lines.
 - Potential damage to homes from sheet pile installation.
 - Impacts on roads and utilities from sheet pile construction.
 - Conflict of interest issues.
 - Need to define permitting timing.

A1-29

A1-30

A1-31

A1-32

A1-33

A1-34

9. Chapter 3 - Project Description

- a. Correct figure 3-1 (correct area of work)
- b. Correct figure 3-4 (new graphic, without seawall?),
- c. Correct figure 3-5 & 6 (West Shore area is currently shown in project)
- d. p. 45, 3.5 Project objectives – Describe how would this protect property. During construction to protect property? Belvedere residents and property? Is this discussed anywhere?

A1-35

A1-36

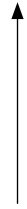
10. Additional Chapter 3 Comments from Committee member Hansen:

“There are several very detailed graphs as to where staging areas will be located. I do not believe that the staging areas on West Shore Road are viable. Traffic? Children playing?
The graph for staging for Beach Road shows that the staging area will be along two blocks of Beach Road. Those two blocks have two large buildings of townhouses, all of which have very narrow setbacks from the street and front

A1-37

LETTER A1

right on the sidewalk. It seems that another staging area not on Beach Road has to be identified. It is unrealistic to expect the people living on Beach Road to have all of the equipment stored in front of their homes. It adds to additional noise, dirt and obstructing the use of gardens or decks on the fronts of these buildings, not to mention ingress and egress.”



A1-37

From the Public

(none)

LETTER A1**City of Belvedere Protect Belvedere Project Draft EIR Review Committee**

- A1-1 This comment summarizes the overall process undertaken by the City of Belvedere Protect Belvedere Project Draft EIR Review Committee, and no response is needed.
- A1-2 This comment indicates that there is a need for pre-construction surveys for private residences, not just the China Cabin, and that sheet piles could affect the Belvedere Lagoon Property Owners Association (BLPOA) outfalls and pumps due to vibration. These concerns would be addressed through implementation of Mitigation Measure GEO-2 presented on page 4.6-16 of the DEIR, which requires the following:

A geotechnical report shall be prepared by a qualified geotechnical engineer and shall evaluate the potential for vibration-induced settlement from proposed sheet pile installation and the potential for damage to existing improvements (e.g., structures, utilities, fences, walls, guardrails, walkways, and patios) from vibration-induced settlement. If the geotechnical report identifies existing improvements that could potentially be damaged by vibration-induced settlement, a preconstruction survey of the potentially affected improvements shall be performed, allowable settlement amounts shall be estimated for the potentially affected improvements, and the allowable settlement amounts shall account for estimated future settlement amounts that are expected to occur due to the construction of the existing levees and placement of fill materials that previously occurred in the project area. Settlement monitoring shall be performed during construction activities. If the geotechnical report identifies any existing improvements that are very likely to experience damage due to vibration-induced settlement, measures shall be implemented to prevent such damage prior to the start of sheet pile installation near the existing improvements. Such measures may include relocation of utilities, installation of flexible connections on utilities, temporary shoring/bracing of the existing improvements, or use of alternative methods for sheet pile installation near the existing improvements, such as use of a silent pile driver.

If settlement monitoring indicates that construction activities have caused unacceptable levels of settlement or observable damage to existing improvements, or that construction activities would be expected to cause unacceptable levels of settlement if construction activities continue using the same methods, the vibration-causing activities shall cease and measures shall be implemented to prevent further settlement or damage to existing improvements. Such measures may include relocation of utilities, installation of flexible connections on utilities, temporary shoring/bracing of existing improvements, or use of alternative methods for sheet pile installation such as use of a silent pile driver. If any damage is caused to existing improvements as a result of vibration-induced settlement during sheet pile installation, the City of Belvedere shall repair the damage following the completion of project construction activities near the area of damage.

In addition, implementation of Mitigation Measure NOISE-2 presented on pages 4.11-18 through 4.11-20 of the DEIR would require that pre-construction surveys be prepared for all potentially affected buildings within 45 feet of the proposed sheet pile alignment, provided that the property owner approves of the survey. Mitigation Measure NOISE-2 also indicates that the use of impact pile driving equipment shall be limited to situations where the target depth cannot be reached using other pile driving equipment; and the use of impact pile driving shall be prohibited within 45 feet of residential/commercial buildings, the use of vibratory pile driving shall be prohibited within 16 feet

of residential/commercial buildings, and the use of a vibratory roller shall be prohibited within 19 feet of residential/commercial buildings to avoid potential vibration damage. Mitigation Measure NOISE-2 also requires preparation and implementation of a vibration management and monitoring plan.

Implementation of Mitigation Measures GEO-2 and NOISE-2 would ensure that potential impacts related to vibration-induced damage to private residences and BLPOA outfalls and pumps would be less than significant.

- A1-3 This comment asks about responsibilities for obtaining project permits and approvals. The City of Belvedere would be responsible for obtaining permits and may rely on consultant assistance in this effort, which is a standard practice. Permits would need to be obtained before contractors begin work. Regulatory agencies would use standard procedures to provide the necessary permits. Their approval would not necessarily be tied to an impact being less than significant, but their approval would be tied to the applicable regulation for which they are granting the permit.
- A1-4 This comment indicates that using water for air impact mitigation measures may be a problem if water shortages exist. Due to the linear nature and phasing of the proposed construction activities, only relatively small areas of soil disturbance (e.g., trenching/drilling ahead of sheet pile installation or trenching for utility work), limited soil stockpiling, and limited construction staging would occur at any given time. Therefore, the use of water for dust control would be relatively limited and adequate water supplies should be available for such use even during drought conditions. The use of water during construction is also addressed on DEIR page 4.16-4.
- A1-5 This comment indicates that construction staging on West Shore Road and Belvedere Way may be questionable. Staging areas are needed for temporary storage of equipment and materials during construction. Staging areas proposed for West Shore Road and Belvedere Way are shown in DEIR Figure 3-9. The DEIR recognizes that the proposed staging could interfere with the use of Belvedere Way for evacuation and includes Mitigation Measure HAZ-1 to reduce this potential impact to less than significant by requiring a Construction Staging Plan to ensure that construction staging activities would not interfere with evacuation. By comparison, the staging areas along West Shore Road would be located in turnouts. As such, the use of these areas for staging would not significantly affect traffic or evacuation.
- A1-6 The comment indicates that utility disruptions on Beach Road are of concern. Limited utility service disruptions for some bayside properties along Beach Road would be necessary to install the sheet piling. Prior to the installation of the sheet piles, utility services to these buildings would be interrupted for about 4 to 8 hours to establish temporary service connections. Following the installation of the sheet piles, permanent utility service connections to the buildings would be re-established either through or around the new sheet piles. While the permanent service connections are re-established, there may be a second period of service interruptions for about 4 to 8 hours. Utility disruption issues are addressed on DEIR pages 4.16-3 through 4.16-4.
- A1-7 The comment indicates that turbidity curtains could interfere with BLPOA water releases in winter/wet months. The DEIR recognizes the potential impact on the operation of BLPOA lagoon water control facilities along San Rafael Avenue arising from sheet piling installation, including the turbidity curtain. Mitigation Measure HYDRO-1a requires the contractor(s) to coordinate with the City of Belvedere Department of Public Works and BLPOA. It is acknowledged that this

coordination should strive to avoid impacts on BLPOA's critical water control operations. Accordingly, Mitigation Measure HYDRO-1a on pages 4.9-17 through 4.9-18 has been revised as follows (see also Chapter III) to require that coordination with BLPOA be expanded to ensure that interference with BLPOA's critical water control operations is avoided or minimized to the extent practical:

Mitigation Measure HYDRO-1a: The following measures shall be implemented to reduce the risk of disturbed soils and spills/releases from affecting water quality in nearby surface waters during construction activities near or below the waterline of San Francisco Bay and the Belvedere Lagoon:

- The contractor(s) shall avoid sheet piling installation in the Bay along the exterior side of the Beach Road levee during tidal periods when the tidal water level is at 2.5 feet mean lower low water (MLLW) or higher.
- The contractor(s) shall install a turbidity curtain in the Bay to hydraulically isolate the narrow, approximately 400-foot-long strip of the bay where sheet pile installation occurs from the rest of the Bay. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out and concrete has fully cured.
- The contractor(s) shall install a turbidity curtain in the lagoon to hydraulically isolate the portion of the lagoon where sheet pile installation occurs from the rest of the lagoon. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out.
- The contractor(s) shall coordinate with the City of Belvedere Public Works Department and the Belvedere Lagoon Property Owners Association (BLPOA) to ensure that the lagoon is drawn down to the winter operating level prior to and for the duration of sheet pile installation activities in the lagoon and BLPOA's culverts and other water control facilities along San Rafael Avenue are shut off from the Bay for the duration of sheet piling installation and thereafter while the turbidity curtain remains installed, and further coordinate with BLPOA to ensure that interference with BLPOA's critical water control operations is avoided or minimized to the extent practical.

A1-8 The comment questions whether levees were built with dredge material. The DEIR (page 4.6-1) statement cited in the comment is part of a paragraph that reviews the geologic history of the project site. The levees are a combination of native soils, dredged fill, compacted fill, and/or placed rip-rap / concrete walls. These variable subsurface conditions have been accounted for in the design of the BSUP. Seismic performance is controlled by the native soft clays (Bay Mud) and loose sands (old sand bars) that underlie the fill materials.

A1-9 The comment states that it is important to survey homes and request releases for those who do not want a survey, and indicates that a survey is needed within 100 feet of construction. The comment does not provide justification for why a preconstruction survey is needed within 100 feet of construction, and therefore a distance of 100 feet is arbitrary. Mitigation Measure NOISE-2 requires a preconstruction survey of potentially affected buildings within 45 feet of the proposed sheet pile alignment, provided that the property owner approves of the survey. The buffer distance of 45 feet is supported by substantial evidence based on the evaluation of potential vibration-induced damage to buildings presented on pages 4.11-15 to 4.11-16 of the DEIR. Mitigation Measure GEO-

- 2 also requires a preconstruction survey of improvements that may potentially be affected by vibration-induced settlement of soil, and the potentially affected improvements would be determined through a geotechnical evaluation. The City would need to determine if a release form would be required for those not wanting a preconstruction survey.
- A1-10 The comment asks if the original scoping meeting comments are addressed in the DEIR. Page 3-9 of the DEIR and Appendix D of the DEIR summarize comments made at the scoping meeting. These comments, as relevant to the EIR, were addressed in the DEIR.
- A1-11 This comment indicates that magnification of seismic effect is possible. As indicated on page 4.6-14 of the DEIR, the project would generally improve the seismic stability of the existing levees within the project site, and this is considered a beneficial effect because the project would reduce the potential for seismically induced lateral spreading and slope failure to cause damage to the levees and improvements along the levees including roadways, pedestrian paths/sidewalks, and utilities. As indicated on pages 4.6-14 to 4.6-15 of the DEIR, the proposed design of the project does not include ground stabilization measures beyond the ends of the proposed sheet piles, which could create locations near the east and west ends of the proposed sheet piles on the Beach Road segment where there could be a sudden change in seismically induced lateral displacements over a short distance, as the stability of the geologic materials adjacent to the sheet piles would be improved and supported (relative to existing conditions), and the geologic materials just beyond the sheet piles would not be strengthened. This interface could cause increased differential movement/displacement (i.e., little movement next to the sheet pile and greater movement beyond the support of the sheet pile) that could adversely affect subsurface utilities. The potential for the project to exacerbate conditions related to differential ground displacement and adversely affect existing critical utilities is addressed by Mitigation Measure GEO-1 presented on page 4.6-15 of the DEIR, which requires the City to work with utility agencies to find an effective means to install flexible utility connections on utilities that have non-flexible pipes (including water, wastewater, and gas lines) that are located near the eastern and western ends of the proposed sheet piles along Beach Road to ensure that utilities would be capable of withstanding expected ground movements during seismic events. Mitigation Measure GEO-1 would require the City to retain a qualified geotechnical engineer to assist in the design of the improved utility connections. The mitigation measure would require the installation of the new flexible connections to occur prior to the conclusion of construction. Implementation of Mitigation Measure GEO-1 would ensure that potential impacts related to exacerbating potential seismic deformation-related damage to utilities would be less than significant.
- A1-12 This comment indicates that the DEIR “says that pipes may break, but agencies have stated that pipes are state of the art.” Even state of the art pipes may break when subjected to lateral or vertical deformation that is beyond their design capacity, particularly pipes that are not made of flexible material or that do not have flexible connections at appropriate locations.
- A1-13 The comment states that the City process needs to be thorough. The comment is noted. The City process for the entire project would be thorough.
- A1-14 The comment requests dates of future meetings. It is not known which meetings are of interest to the commentor. The City maintains a list of interested parties and also updates its website to notify residents of various meetings. This FEIR provides the date of the City of Belvedere Planning Commission meeting at which the FEIR will be presented (see Chapter I).

- A1-15 This comment asks about the definition of “nearby” in terms of noise. In noise analyses, “nearby” refers to the noise-sensitive receptors located in the vicinity of the project that have the potential to be affected by the project. The locations of nearby noise-sensitive receptors are described on page 4.11-4 of the DEIR and include receptors within about 275 feet of the project alignment. As discussed on page 4.11-12 of the DEIR, the maximum distance of potential noise impacts from the project alignment associated with impact pile driving is 81 feet. Therefore, the description of nearby noise-sensitive receptors in the DEIR includes all receptors that could potentially be adversely affected by construction noise.
- A1-16 The comment requests information on the locations of utility connections. For bayside properties along Beach Road, service laterals (water, gas, sewer, electrical, and communication lines) connect to main transmission utility lines in Beach Road. Utility connections are addressed in *Section 4.16, Utilities and Service Systems*, of the DEIR.
- A1-17 This comment indicates the need to check evacuation routes and asks if the Yacht Club is available for emergency evacuations. Evacuation routes and areas are described on pages 4.8-2 through 4.8-4 of the DEIR. As indicated on pages 4.8-2 and 4.8-3 of the DEIR, Evacuation Area A is located at the San Francisco Yacht Club parking lot and western dock area. The project would not include construction or staging activities at the San Francisco Yacht Club; therefore, the project would not interfere with its use as an evacuation area.
- A1-18 The comment indicates that other buildings besides the China Cabin are historic and should be studied. The City determined that the measures included in Mitigation Measure NOISE-2 would be sufficient to prevent vibration impacts on older buildings. These measures include establishing vibration thresholds, preparing vibration plans, and using monitoring requirements to minimize or eliminate impacts on buildings. As the China Cabin is currently listed on the National Register of Historic Places, the City recommended that this building undergo additional consideration for construction vibration effects, which are addressed in Mitigation Measure CULT-1a. Recommended measures include increased vibration thresholds and monitoring by a qualified historic architect or preservation professional, if thresholds are exceeded. The historic significance of other buildings and resources in the project site vicinity is addressed in *Section 4.4, Cultural Resources*, of the DEIR.
- A1-19 This comment indicates that noise levels greater than 80 dBA should be considered as significant. As discussed on page 4.11-11 of the DEIR, the City of Belvedere Noise Ordinance does not include criteria for assessing noise impacts from construction. Therefore, the United States Federal Transit Administration’s general construction assessment criterion of 90 dBA 1-hour Leq at the nearest noise-sensitive receptor is used in the analysis. The FTA construction noise criteria are considered reasonable criteria for construction noise assessment. According to the FTA, if the combined noise level in 1 hour from the two noisiest pieces of equipment exceeds 90 dBA at a residential land use (or other noise-sensitive receptors), there may be a substantial adverse reaction. This issue is addressed in the DEIR noise analysis.
- A1-20 This comment requests additional details and mitigation measures in the DEIR traffic analysis but does not specify what details and mitigation measures are missing. All potential traffic effects would occur during the project’s construction; no impacts would occur outside of the project’s construction. Construction-related traffic impacts and mitigation measures are thoroughly discussed in *Section 4.14, Transportation/Traffic*, of the DEIR.

- A1-21 This comment states that a detailed construction traffic management plan is needed. As stated in the DEIR (pages 4.14-7 through 4.14-9), project construction work would be subject to the City of Belvedere's *Project Regulation Contractor Guidelines*, including applicable regulations for construction hours, staging, parking, and material delivery and requirements for minimum area of paved way to be kept clear.

In addition, DEIR Mitigation Measures TRANS-1a through TRANS-1e specify requirements for construction traffic control, including the requirement that the contractor produce a Traffic Control Plan (TCP) that at a minimum addresses the timing of construction-related truck traffic, all fencing and barricades, construction area signs, and flaggers and guards. Under these measures, closure of existing pedestrian sidewalks/walkways, bicycle facilities, or public transit facilities would be prohibited; the contractor would be required to provide safe, clearly identifiable and separated pedestrian pathways and maintain all bicycle routes; and the contractor would be required to work with bus agencies for authorization if construction would require the temporary closure of any existing bus stops. In addition, if required by the transit provider, the contractor would be required to establish temporary bus stops with appropriate passenger amenities during the construction period.

- A1-22 This comment asks questions about monitoring of cultural resources impacts during construction and mitigation measures for older structures. A cultural monitor would be on-site during ground-disturbing activity, no matter the time of day. If ground disturbance (i.e., paving, striping, or placing rock slope protection) is not occurring, a cultural monitor would not need to be present.

Ground vibration would be monitored by a vibration specialist. That individual would be on-site when construction activity is occurring in areas of vibration concern, no matter the time of day. An architectural historian would be on-site when construction activity is located near the China Cabin.

The City determined that Mitigation Measure NOISE-2 would be sufficient to prevent impacts on older buildings. These measures include establishing vibration thresholds, preparing vibration plans, and using monitoring requirements to minimize or eliminate impacts on buildings. As the China Cabin is currently listed on the National Register of Historic Places, the City recommended that this building undergo additional consideration for construction vibration effects, which are addressed in Mitigation Measure CULT-1a. Recommended measures include increased vibration thresholds and monitoring by a qualified historic architect or preservation professional, if thresholds are exceeded.

Mitigation Measure NOISE-2 details the process of how the project would handle vibration impacts on nearby buildings.

Photographs of the other buildings would be documented as part of the pre-construction vibration survey included in Mitigation Measure NOISE-2.

- A1-23 This comment asks questions about tribal cultural resources monitoring procedures. These procedures are addressed in Mitigation Measures TCR-1a through TCR-1c on DEIR pages 4.15-9 through 4.15-10.

A tribal monitor would be allowed to be present during ground-disturbing activity, no matter the time of day. The Federated Indians of Graton Rancheria are required to be given at least 48 hours of

notice whenever ground-disturbing activity would occur as part of the project; however, a tribal monitor is not required to be present.

The cultural resources and tribal resources awareness training program would be monitored by the cultural monitor and the construction site supervisor. All construction crew members involved with ground-disturbing activity would be required to complete environmental awareness training as part of the mitigation measures.

The training programs would be given as needed, and the construction site supervisor would be responsible for ensuring that all members are trained.

- A1-24 This comment indicates that there could be settlement based on the vibrating aspect of construction and that more specifics are needed. As discussed in Response to Comment A1-2 above, implementation of Mitigation Measures GEO-2 and NOISE-2 would ensure that potential impacts related to vibration-induced settlement would be less than significant.

The comment asks: "What are 'unacceptable' levels of settlement?" Unacceptable levels of settlement would be any settlement that exceeds the estimated allowable settlement amounts that would be developed by a geotechnical engineer for potentially affected improvements as required by Mitigation Measure GEO-2, as discussed in Response to Comment A1-2 above. Allowable settlement amounts would vary depending on the type of improvement undergoing settlement and characteristics of its construction.

The comment asks: "Has the assumption that the levees are built of dredged material from the Lagoon been confirmed?" As discussed on page 4.6-1 of the DEIR and according to the City of Belvedere's General Plan, the elevated areas that now support the streets and residential lots in the lagoon neighborhood were created in the mid- to late-1940s by construction of dikes at Beach Road and San Rafael Avenue and draining of the original interior lagoon. Native soils were then excavated from the lagoon area and placed as fill to form elevated streets and building pads. Fill material from other sources may have been used in the original construction of these dikes/roadway as they were constructed prior to dredging of the lagoon. As discussed on page 4.4-5 of the DEIR, prior to 1930, a roadway and structures were present in the area of Beach Road and a roadway was present in the area of San Rafael Avenue. Fill materials at the project site also include larger cobbles and boulders, as described on page 4.6-2 of the DEIR; these materials would not have come from dredging of native soil. Based on the review of historical aerial photos, improvements to Beach Road and San Rafael Avenue occurred during the period when soils were excavated from the lagoon and placed as fill in surrounding areas; therefore, some of the fill in the levees appears to be from dredged native material. As described on page 4.6-7 of the DEIR, the project Geotechnical Investigation indicates that most of the fill placement at the project site occurred in 1940 (Miller Pacific Engineering Group, 2022).

The comment asks: "After settlement monitoring is conducted, what happens if damage is detected?" As discussed in Response to Comment A1-2 above, Mitigation Measure GEO-2 requires that if any damage is caused to existing improvements as a result of vibration-induced settlement during sheet pile installation, the City of Belvedere shall repair the damage following the completion of project construction activities near the area of damage.

The comment asks: “Working with outside agencies who may or may not have to install flexible pipes, is there a guarantee that the work will be coordinated so that the project will not be left unfinished while waiting for an agency to schedule pipe installation?” As discussed in Response to Comment A1-11 above, Mitigation Measure GEO-1 requires that the City work with utility agencies to find an effective means to install flexible utility connections. Leaving the project unfinished while waiting for a utility agency would not be considered effective. Effective planning and coordination between the City and utility agencies, as required by Mitigation Measure GEO-1, would ensure that the project is not left unfinished.

The comment asks what scouring and erosion protection is being proposed for Beach Road. As discussed on pages 4.6-12 and 4.6-13 of the DEIR, soil erosion, which is discussed in detail in *Section 4.9, Hydrology and Water Quality*, of the DEIR, could occur during project grading and construction. As described in Section 4.9 of the DEIR, compliance with the State Water Resources Control Board’s Construction General Permit, including the preparation and implementation of a Stormwater Pollution Prevention Plan, would ensure that the project would result in less-than-significant impacts related to erosion or loss of topsoil during construction. Implementation of the requirements of the Belvedere Municipal Code, including Section 16.15.060 which requires the preparation and implementation of erosion control plans, would further reduce the potential for erosion or loss of topsoil to occur during project grading and construction. After construction is completed, the project site would be restored to existing conditions, in which surfaces are covered with riprap, pavement, and landscaping, which would minimize the potential for post-construction erosion.

The locations and typical cross-sections of proposed improvements along Beach Road are shown in DEIR Figures 3-4 and 3-8, respectively. As shown in these figures, some improvements along the Beach Road segment would be located inland from the shoreline and therefore would not change the susceptibility of the shoreline to erosion or scour. The only improvements along Beach Road that would alter the shoreline would be where new sheet piles would be installed on the bay side of the existing concrete seawall along some segments of Beach Road. The sheet piles would not be susceptible to erosion or scour and would reduce the susceptibility of the existing concrete seawall to erosion and scour by protecting the base of the existing seawall.

- A1-25 This comment suggests that 90 dBA at 40 to 50 feet is a very challenging level of noise. See Response to Comment A1-19 above regarding the use of a 90 dBA threshold. As discussed on page 4.11-12 of the DEIR, it is expected that sheet pile installation would progress about 25 feet horizontally per workday, although the actual progress may vary (BK Cooper and City of Belvedere, 2022). As the construction progresses along the proposed sheet pile alignments, construction noise impacts at individual sensitive receptors would generally be limited in frequency and duration. In addition, implementation of Mitigation Measure NOISE-1, which requires the development and implementation of a site-specific noise reduction plan and other measures such as using temporary noise barriers and avoiding impact pile driving where feasible in noise-sensitive areas, would reduce noise impacts related to project construction at the noise receptor locations.

The comment asks “Could vibration driver add to settlement and add risk to personal property?” See Response to Comment A1-2 above.

The comment asks about the definition of old structure and new structure. As mentioned on page 4.11-9 of the DEIR, the vibration analysis used the vibration damage potential threshold criteria

recommended by Caltrans (Caltrans, 2020), with different thresholds established for new residential structures and older residential structures. The thresholds for older residential structures are more conservative than those for the new residential structures. Because Caltrans did not provide a clear definition, such as the built year, for older residential structures, the DEIR vibration analysis conservatively assumed that all residential structures in the project vicinity are older residential structures.

The comment asks whether 45 feet of distance from the source of noise is an arbitrary measurement. The 45 feet of distance was calculated based on the typical vibration level generated by an impact pile driver (FTA, 2018) and the Caltrans structure damage vibration threshold. The reference vibration levels for the primary types of equipment that would generate ground vibration during project construction and the associated vibration calculations are included in Appendix E of the DEIR.

The comment asks whether all of the areas on San Rafael Avenue and Beach Road are sensitive and need noise barriers and sound blankets. As discussed on page 4.11-12 of the DEIR, a buffer distance of 81 feet and 44 feet would be required to reduce noise levels to below the 90 dBA threshold at the noise-sensitive receptors during impact and vibratory pile driving, respectively. As discussed on page 4.11-16 of the DEIR, there are six residential structures along San Rafael Avenue and six residential structures, the San Francisco Yacht Club, and the China Cabin along Beach Road that are located within the buffer distances. When sensitive receptors are located within the required buffer distance, temporary noise barriers would be placed between the proposed construction activities and the receptors, if feasible, in accordance with Mitigation Measure NOISE-1. In addition, Mitigation Measure NOISE-1 requires the development and implementation of a site-specific noise reduction plan to reduce construction noise impacts to the maximum extent feasible, subject to review and approval by the City of Belvedere. In addition, Mitigation Measure NOISE-1 requires impact pile driving to be avoided where feasible in noise-sensitive areas. Pre-drilling or the use of a vibratory pile driver or silent pile driver are quieter alternatives where the geological conditions permit their use.

The comment asks: "What exactly are these barriers and how will they affect the people living behind them? View? Air quality?" A noise barrier reduces sound levels at a receiver by breaking the direct line-of-sight between source and receiver with the construction of a temporary solid wall (e.g., plywood). A sound blanket system hung on scaffolding, or other noise reduction materials that result in an equivalent or greater noise reduction than plywood, may also be used. The noise barrier does not affect air quality but may affect views temporarily. As discussed above and in the DEIR, it is expected that sheet pile installation would progress about 25 feet horizontally per workday, although the actual progress may vary (BK Cooper and City of Belvedere, 2022). As the construction progresses along the proposed sheet pile alignments, the need for the temporary noise barrier at individual sensitive receptors would generally be limited in duration.

The comment asks whether physical noise barriers work. According to Appendix A of the Federal Highway Administration (FHWA) Construction Noise Handbook (FHWA, 2006),¹ a noise barrier that just barely breaks the line-of-sight between the construction equipment and the receptor can reduce noise levels by about 3 dBA. A larger barrier or a barrier that completely encloses the

¹ Federal Highway Administration (FHWA), 2006. FHWA Highway Construction Noise Handbook, August.

construction equipment can generally reduce noise levels by about 5 dBA to 10 dBA depending on the design.

The comment asks: "Since most of the dwellings on Beach Road are multistory, how will these barriers work on upper floors?" In accordance with Mitigation Measure NOISE-1, the composition, location, height, and width of the barriers during different phases of construction would be determined by a qualified acoustical consultant and incorporated into the site-specific noise reduction plan for the project.

The comment asks whether the noise disturbance coordinator would be on-site daily from 8 AM to 5 PM. As required by Mitigation Measure NOISE-1, the telephone number for the noise disturbance coordinator would be posted at the construction site. The preferred contact method would be via telephone.

The comment asks whether the noise disturbance coordinator would be available to residents, and whether the noise disturbance coordinator would have authority to remedy a situation. The designated noise disturbance coordinator would be available to residents and be responsible for responding to any local complaints about construction noise. As required by Mitigation Measure NOISE-1, the telephone number for the noise disturbance coordinator would be posted at the construction site. The preferred contact method would be via telephone.

The comment asks whether the 5-minute truck idling time would be monitored by designated personnel and whether this person would be on-site daily. The 5-minute idling time restriction is included in Mitigation Measures AIR-1 and NOISE-1, which would be enforced by the City. In addition, the California Air Resources Board (CARB) has rules that limit diesel truck and bus idling to 5 minutes, which can be enforced by CARB diesel truck inspectors who inspect smoking trucks and buses for tampering and maintenance problems in engines that can increase emissions. Local law enforcement agencies and the California Highway Patrol can also issue citations for idling beyond 5 minutes.

This comment asks: "Does the silent driver machine have other attachments for starting sheet pile run? If so, can it be used in lieu of the vibratory hammer?" As indicated on page 3 of the Construction Management Plan presented in Appendix C of the DEIR, "If there is ample room, the silent driver may utilize a 25"x15' 'rack' in-lieu of starting with a vibratory hammer to begin the sheet pile run."

- A1-26 The comment requests information on overtopping and sheet flow risk to the lagoon. This information can be found in *Section 4.9, Hydrology and Water Quality*, of the DEIR. More detailed information can be found in the listed reference document (Stetson Engineers Inc., 2022) titled *Hydraulic Design Basis for the Coastal Flood Barrier System of the Belvedere Critical Infrastructure Project*. This document can be viewed online at <https://www.cityofbelvedere.org/critical-infrastructure-project/>.

The comment requests more detail about the function of a turbidity curtain. A turbidity curtain acts something like a water filter. It functions to protect the water quality of an adjacent water body by providing a physical barrier that blocks small, turbidity-causing particles from migrating beyond the curtain into an adjacent water body. Turbidity curtains are commonly installed to contain and prevent turbidity caused by sediment disturbance from migrating to other waters.

The comment requests a more detailed review of hydrology-related regulatory permits and approvals. The *Regulatory Framework* subsection on pages 4.9-8 through 4.9-11 of the DEIR provides a comprehensive description of relevant regulations and permitting process. More detail suggested in the comment is not warranted. As noted on page 3-16 of the DEIR, each environmental topic section of the EIR addresses the project's required regulatory approvals related to that specific topic. The listing of federal, state, regional and local permitting on pages 3-16 and 3-17 of the DEIR is intended only to provide a summary. The commentor is referred to the detailed descriptions of the relevant regulatory framework for each of the other topics addressed in Chapter 4 of the DEIR. As an example, a detailed review of the regulatory framework pertaining to biological and wetland resources is provided on pages 4.3-16 through 4.3-20 of the DEIR.

The comment states: "Some general, non-specific language should be cleaned up." The DEIR authors believe that the DEIR's use of general, non-specific, descriptive terms is appropriate, given their context. The meaning of specific general or non-specific descriptive words can be derived from the context of their usage. For example, in *Section 3.9, Hydrology and Water Quality*, from the context of its usage the word "near" means "proximate" or "close enough to be potentially affected."

This comment asks: "What is the definition of 'waters of the United States.' Does Richardson Bay on the San Rafael side of the project fall under this definition?" As explained on page 4.3-17 of the DEIR, under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers is responsible for regulating the discharge of fill material into waters of the United States, and the term "waters" includes wetlands and non-wetland bodies of water that meet specific criteria as defined in the Code of Federal Regulations. As described on page 4.3-16 of the DEIR, regulated waters include the unvegetated upper limits to the tidal zones to Richardson Bay. Based on a review of field conditions, wetlands including coastal salt marsh, brackish water marsh, and special aquatic habitats such as eelgrass beds dominated by eelgrass (*Zostera marina*) are absent from the site. This determination is based on a preliminary wetland assessment that was conducted during the field reconnaissance surveys in 2021 and 2022 to determine the likely extent of regulated waters in the project site vicinity. The shoreline to the tidal zone of Richardson Bay is covered in riprap to the west of San Rafael Avenue, with a pedestrian path and ornamental landscaping separating the two along an elevated levee.

The comment asks if riprap removal would add to potential flood risk. As described on page 3-11 of the DEIR, where existing shoreline rock material must be moved along the San Rafael Avenue segment of the project, it would be temporarily stored and then replaced in its prior locations following construction and installation of the sheet piles. The proposed improvements along San Rafael Avenue consist of sheet pile improvements to reduce deformation and the risk of damage to roads and utilities during seismic events. The sheet piles would provide a vertical barrier between the Bay and the adjoining road and utilities. They would reduce the lateral displacement of the levees during earthquakes and thereby reduce the risk of levee deformation and resultant damage to roads and utilities. Any shoreline rock removal would be temporary and the rock would be replaced as part of project construction. Since any disturbance to the shoreline rock protection would be temporary, the disturbance would not add to a potential flood risk.

The comment asks if the project should be considered a wetland. See the above discussion of wetlands. Wetlands are absent in the regulated other waters at the project site.

A1-27 This comment asks why Belvedere Nursery School is not included in the school discussion in *Section 4.8, Hazards and Hazardous Materials*, of the DEIR. Belvedere Nursery School is not identified as a school on the California Department of Education's School Directory, which was referenced to identify schools near the project site as discussed on page 4.8-11 of the DEIR. Page 4.8-11 of the DEIR has been revised to discuss Belvedere Nursery School as shown in Chapter III, but this change does not affect the DEIR's conclusion regarding the significance of impacts. The following text has been added on page 4.8-11:

Belvedere Nursery School, a private preschool at 15 Cove Road Place, is located within one-quarter mile (approximately 275 feet to the north) of the east end of the Beach Road segment of the project. Reed Elementary School, a public elementary school at 1199 Tiburon Boulevard in Tiburon, is located within one-quarter mile (approximately 800 feet north) of the proposed staging area at the City Corporation Yard. ...

The comment states that Belvedere Way should remain open for pedestrians. As indicated in Mitigation Measure HAZ-1 on pages 4.8-12 to 4.8-13 of the DEIR, "The use of Belvedere Way for construction staging may include the posting of signs indicating that the area is restricted from public access except for emergency evacuation purposes; however, the use of Belvedere Way for construction staging shall not physically restrict public access to Belvedere Way and shall allow for the safe passage of pedestrians along Belvedere Way at all times." If Belvedere Way would be used for construction staging, restricting public access to Belvedere Way (except for emergency evacuation purposes) would be necessary to protect the public from potential hazards associated with construction staging activities (such as moving construction materials) and to prevent the public from interfering with the use of Belvedere Way for construction staging.

The comment asks: "Given the statewide drought, should an alternative water source be identified?" See Response to Comment A1-4 above.

The comment indicates that "...Hosing down dust twice a day will not make much of a difference. The effect of the dirt, dust and air quality for the people living on San Rafael Avenue and Beach Road has not been addressed adequately." Watering of exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) is a standard and very effective dust control method recommend by the Bay Air Quality Management District (2023).² As discussed on pages 4.2-15 to 4.2-16 of the DEIR, Mitigation Measure AIR-1 requires much more than only watering exposed surfaces two times per day, as it also requires the following:

- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

² Bay Area Air Quality Management District (BAAQMD), 2023. 2022 CEQA Air Quality Guidelines. April 20.

- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- A publicly visible sign shall be posted with the telephone number and person to contact at the City of Belvedere regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

As discussed on page 4.2-16 of the DEIR, implementation of Mitigation Measure AIR-1 would ensure that emissions of coarse particulate matter (PM₁₀) and fine particulate matter (PM_{2.5}) from dust generated during project construction activities would not result in a cumulatively considerable net increase in criteria air pollutants for which the region is in nonattainment, and the impact would be less than significant.

A1-28 The comment requests more information on silt screens and turbidity curtains. As discussed on page 4.3-28 of the DEIR, the sheet pile installation within tidal waters at the base of the existing seawall east of Beach Road would be accomplished using careful controls to minimize disturbance to regulated aquatic habitat but would result in temporary impacts during installation and permanent impacts associated with the sheet pile system and concrete cap installed between the exposed end of the sheet pile and the base of the existing seawall. A temporary work zone would be established at low tide when the base of the existing seawall is completely exposed. Turbidity curtains and other containment measures required as part of regulatory agency authorizations would be installed when water is absent. Turbidity curtains are a standard construction practice used to limit erosion and sedimentation when work must be performed in open water. Construction materials used to construct the turbidity curtain can vary, but must be designed to resist tidal wave action. This temporary work zone would be about 10 feet wide along the 480 linear feet of sheet pile to be installed within the tidal zone. The temporary construction zone would extend an average of 7.5 feet bayward of the sheet pile footprint, temporarily disturbing an additional 3,600 square feet of intertidal zone. Impacts associated with the temporary work zone and installation of the turbidity curtain would be temporary, with conditions quickly restored as gravel and sand along this zone are routinely moved through tidal action.

The comment asks if the DEIR should provide more detail on regulatory permits related to biological resources. Please refer to Response to Comment A1-26 for a discussion of the regulatory permits and process.

The comment notes that "all impacts are listed as less than significant if mitigation measures are used." As discussed in *Section 4.3, Biological Resources*, of the DEIR, all identified impacts would either be less than significant or would be mitigated to a level of less than significant with implementation of recommended mitigation measures.

The comment states: "Permits are mentioned in Hydrology and Biology sections with different parties (City/Contractor) involved; this should be clarified." Please refer to Response to Comment

- A1-26 for a discussion of the regulatory permits and process. If the project is approved, the City of Belvedere would be undertaking the project and would be the applicant for the required regulatory agency permits. A contractor(s) would be retained by the City to oversee project implementation and the selected contractor(s) must perform all work in compliance with conditions contained in the regulatory agency permits.
- The comment asks: "If the contractor encounters ground water, is this considered 'in-water' work?" The use of the term "in-water" in Mitigation Measure BIO-1a refers to the regulated waters of the Bay and Belvedere Lagoon, not groundwater encountered within the construction zone. However, any groundwater encountered in the construction zone would be dealt with as necessary to accomplish project tasks and would be disposed of using Best Management Practices that do not compromise any nearby regulated waters.
- A1-29 The comment asks: "Will there be utility service coordination so homeowners are not left without service?" Homeowners would be notified in advance of any potential temporary utility service interruptions. Potential utility service interruptions would be closely coordinated between the City, utility provider(s), and the contractor.
- A1-30 The comment asks: "How does summer 'in water' work and an 8-month construction schedule fit into the overall project calendar?" and "Is the construction schedule of 3 - 4 months (for Beach Road) realistic?" The overall schedule for construction activities associated with the project is based on an 8-month construction duration. Construction would begin on San Rafael Avenue and substantial completion of this work is expected to be achieved in 3 to 4 months. Construction would proceed on Beach Road after the substantial completion of work on San Rafael Avenue. Substantial completion on Beach Road would be expected to be achieved in another 3 to 4 months. The in-water installation of sheet piling on Beach Road is expected to be restricted to the period between July 1 through October 30.
- A1-31 The comment asks: "Who monitors that the work does not start before 8 and ends at 5?" Required construction start and end times would be specified in the construction contract. The City and the construction manager would monitor construction start and end times to ensure conformance with these requirements in the construction contract.
- A1-32 The comment asks why lowering of water levels in the Belvedere Lagoon is necessary and indicates that this work should be coordinated with BLPOA. Lagoon drawdown is necessary to lower the water level where possible and thereby avoid conditions where work would be done under open water conditions. This avoidance reduces turbidity impacts on water quality. As stated in Response to Comment A1-7, the DEIR recognizes the potential impact on the operation of BLPOA lagoon water control facilities along San Rafael Avenue arising from sheet piling installation, including lagoon drawdown during installation. Mitigation Measure HYDRO-1a requires the contractor(s) to coordinate with the City of Belvedere Department of Public Works and BLPOA. It is acknowledged that this coordination should strive to avoid impacts on BLPOA's critical water control operations. Accordingly, Mitigation Measure HYDRO-1a has been revised to require that coordination with BLPOA be expanded to ensure that interference with BLPOA's critical water control operations is avoided or minimized to the extent practical; see Response to Comment A1-7.
- A1-33 The comment states that the public review period should be described as a minimum 45-day period but does not provide an accurate DEIR page reference for where this comment applies. The

DEIR was circulated for over 45 days, as described in Chapter I of this document, and all CEQA requirements for circulation were met.

- A1-34 The comment lists issues that were identified in comments on the Notice of Preparation (NOP). Where relevant to the environmental analysis, these issues have been addressed in the DEIR and in these responses. The conflict of interest issue is not relevant to the EIR and has not been clearly defined. Permitting timing is variable and cannot be confirmed until permit applications have been made.
- A1-35 This comment requests corrections to Figures 3-1, 3-2, 3-5, and 3-6. These corrections have been made and the revised figures are included in Chapter III. These corrections do not affect the analysis or impact conclusions of the DEIR. Edits were done to correct the following:
- Figure 3-1 – Modify the “San Rafael Avenue Project Area” to remove the northern part where sheet piles would not be installed.
 - Figure 3-2 – Remove the flood barrier from the figure and just show sheet piling with a concrete cap below the ground.
 - Figures 3-5, 3-6, 4.10-1, and 4.10-2 – Edit and reduce the project location for San Rafael Avenue and West Shore Road to remove the northern part where sheet piles would not be installed.
- A1-36 The comment asks how the project objectives would protect property. The need to protect property from flooding is addressed in the project objectives (see Section 3.5 of the DEIR) as related to protecting roads that serve as critical transportation links in case of emergencies. This is public property that is at risk. Measures to protect private property during construction are addressed in the noise and vibration analysis and other sections of the DEIR.
- A1-37 The comment questions the viability of proposed West Shore Road and Beach Road staging areas and indicates that another staging area not on Beach Road should be identified. As described in DEIR Appendix C (Construction Management Plan), construction along Beach Road would necessitate temporary closure of the westside lane. While the lane is closed for the construction and installation of the sheet piling, it would also serve as a staging area for the sheet piles and equipment. This staging area would therefore be viable.

B. FEDERAL AND STATE AGENCY COMMENTS AND RESPONSES

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Marine Region
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109
wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



November 15, 2022

Robert Zadnik, City Manager
City of Belvedere
450 San Rafael Avenue
Belvedere, CA 94920
ElRcomments@cityofbelvedere.org

Dear Mr. Zadnik:

**Belvedere Seismic Upgrade Project (Project)
Draft Environmental Impact Report (DEIR)
SCH# 2022010159**

The California Department of Fish and Wildlife (Department) received a DEIR from the City of Belvedere for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.¹

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that the Department, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

DEPARTMENT ROLE

The Department is California’s Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the state. (Fish & G. Code, Section 711.7, subd. (a) & 1802; Pub. Resources Code, Section 21070; CEQA Guidelines Section 15386, subd. (a).) The Department, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, Section 1802.) Similarly for purposes of CEQA, the Department is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources. The Department is also responsible for marine biodiversity protection under the Marine Life Protection Act in coastal marine waters of California, and ensuring fisheries are sustainably managed under the Marine Life Management Act.

¹ CEQA is codified in the California Public Resources Code in section 21000 et seq. The “CEQA Guidelines” are found in Title 14 of the California Code of Regulations, commencing with section 15000.

Conserving California’s Wildlife Since 1870

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The Department is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) The Department expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, implementation of the Project may result in “take” as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

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PROJECT DESCRIPTION SUMMARY

Proponent: City of Belvedere

Objective: The objective of the Project is to stabilize levees and critical infrastructure near San Rafael and Beach Road to provide protection against deformation during an earthquake. Levee stabilization will be achieved using steel sheet piles.

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Location: The Project is located within the City of Belvedere along San Rafael Avenue and Beach Road.

Timeframe: Project construction is expected to take approximately 8 months and may begin as early as 2023.

MARINE BIOLOGICAL SIGNIFICANCE

The San Francisco Bay-Delta is the second largest estuary in the United States and supports numerous aquatic habitats and biological communities. It encompasses 479 square miles, including shallow mudflats. This ecologically significant ecosystem supports both state and federally threatened and endangered species and sustains important commercial and recreational fisheries.

STATE AND FEDERALLY LISTED, COMMERCIAL/RECREATIONALLY IMPORTANT, AND RARE SPECIES

Protected species under the State and Federal Endangered Species Acts that could potentially be present near Project activities include:

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- Chinook salmon (*Oncorhynchus tshawytscha*), state and federally threatened (Spring-run), state and federally endangered (Winter-run)
- Longfin smelt (*Spirinchus thaleichthys*), state-threatened
- Steelhead (*Oncorhynchus mykiss*), federally threatened (Central California Coast and Central Valley ESUs)
- Green sturgeon (*Acipenser medirostris*), federally threatened (southern DPS)
- White sturgeon (*A. transmontanus*), state species of special concern
- Brown pelican (*Pelecanus occidentalis californicus*), state fully protected

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- White-tailed kite (*Elanus leucurus*), state fully protected
- Coastal triquetrella (*Triquetrella californica*), California Rare Plant Rank (CRPR) 1B.2.

Several species with important commercial/recreational fisheries value and habitat value for spawning and rearing could potentially be present near Program activities; these include:

- Dungeness crab (*Cancer magister*)
- Pacific herring (*Clupea pallasii*)
- Surfperches (*Embiotocidae*)
- California halibut (*Paralichthys californicus*)
- Eelgrass (*Zostera marina*)

B1-3

COMMENTS AND RECOMMENDATIONS

The Department offers the comments and recommendations below to assist the City of Belvedere in adequately identifying and/or mitigating the Project’s significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document.

I. Project Level Impacts and Other Considerations

Pile Driving

Comment: The DEIR describes the installation of the sheet pile system potentially disturbing approximately 1200 feet of shoreline within Belvedere Lagoon. Piles would be installed with a vibratory or impact hammer. Driving piles with an impact hammer has shown the potential to exceed hydroacoustic thresholds which can injure or kill fish as described in the Interim Criteria for Injury to Fish from Pile Driving Activities (attachment 1). There does not appear to be an analysis of hydroacoustic noise levels from in-water pile driving activities. The noise estimates for pile driving presented in section 4.11 – Noise, are all above the water. If the City of Belvedere determines that any of the hydroacoustic thresholds may be exceeded, there is potential for state listed fish species to be impacted by the installation of the sheet pile system.

Recommendation: The Department recommends that the City of Belvedere consult with the Department regarding the potential need for a 2081(b) Incidental Take Permit if any of the estimated hydroacoustic impacts from pile driving exceed the hydroacoustic thresholds outlined in attachment 2.

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Recommendation: The Department recommends that the final EIR include modeled estimates for underwater sound generated by the installation of the sheet pile system. Estimates should be included for both vibratory and impacts hammers.

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B1-4

Eelgrass

Comment: California Public Resources Code (PRC Section 35630) outlines the importance of eelgrass protection and restoration in California and other West Coast states. Eelgrass has numerous benefits, as outlined within PRC 35630, such as habitat for listed and commercially valuable species, water quality, carbon sequestration, and shoreline protection.

Belvedere Cove contains numerous eelgrass beds with the largest along the northeastern corner of the cove. The DEIR does not describe potential impacts to eelgrass from Project activities such as elevated turbidity or direct impact from pile installation within eelgrass habitat. Given the proximity of eelgrass to pile driving activities below mean high water, it is reasonable to expect that impacts to eelgrass within Belvedere Cove could occur. The California Eelgrass Mitigation Policy (attachment 3) contains recommendations for avoidance and minimization measures, and recommendations for surveying eelgrass within, and adjacent to, the Project footprint.

B1-5

Recommendation: The Department recommends that the final EIR include discussion on the potential impacts from Project activities to eelgrass within and adjacent to the Project footprint.

Recommendation: The Department recommends that an additional mitigation measure (MM), BIO-4 (attachment 2), be included for eelgrass and include the following.

Mitigation Measure BIO-4 – Eelgrass. Eelgrass surveys, pre- and post-construction, will be conducted in accordance with the conditions and recommendations contained with the California Eelgrass Mitigation Policy. If it is determined, from the results of the pre-construction eelgrass survey, that potential impacts to eelgrass will occur from Project activities, an eelgrass monitoring and mitigation plan will be prepared. All surveys and plans will be provided to CDFW and NMFS, along with the other authorizing agencies, prior to and following the start of construction.

Compensatory Mitigation

Comment: The DEIR describes potential compensatory mitigation for the impacts to approximately 0.03 acres of habitat for state and federally listed species. As described in the DEIR, removal of marine debris such as piles and decking are being considered to offset the Projects impacts. If the Department needs to exercise its regulatory authority under CESA, the Department’s approval will require that the

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Project’s impacts be fully mitigated. In addition to the mitigation options considered in the DEIR, the final EIR should consider additional options such as abandoned vessel removal and/or purchase of habitat credits at a Department approved mitigation bank to meet the full mitigation requirement in Fish and Game Code Section 2081(b).

B1-6

Recommendation: The Department recommends early consultation on determining appropriate mitigation to offset the impacts from the loss of aquatic habitat. If the Department issues a CESA authorization of the Project, it would require that the Project’s impacts are fully mitigated. Proposed mitigation will need to be accepted prior to finalizing a Department authorization.

White-tailed kite (*Elanus leucurus*), California Fully Protected Species.

Comment: Page 4.3-15 states that the white-tailed kite, a California Fully Protected Species, has “some potential for nesting in the site vicinity” in “mature trees along the perimeter of the site”, while the species table on page 4.3-11 states that the “potential for occurrence in site vicinity” is “none – no suitable habitat present.” White-tailed kites are known to nest in ornamental trees in urban and suburban areas and may nest in close proximity to the Project site.

White-tailed kites, once threatened with extinction in California primarily due to habitat loss, shooting, and egg collection, recovered substantially in the mid 1900’s (Dunk 1995). The current population size in California is unknown, but the population is known to fluctuate relative to vole populations (their primary prey). Their threats include habitat loss from conversion and vegetation clearing, drought, and disturbance at nest sites (Dunk 1995).

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Noise from pile drivers, generators, and other equipment may cause nest abandonment, may be disruptive to hunting white-tailed kites, and exposure to vehicle noise has been shown to increase stress hormone levels in some raptor species (Hayward et al. 2011). Artificial light may attract or disorient white-tailed kites (Ogden 1996, Longcore and Rich 2004, 2016). It can also suppress the immune system of birds (Moore and Siopes 2000).

Based on the foregoing, Project impacts could result in a substantial adverse effect on white-tailed kites. Therefore, if a white-tailed kite nests where it may be disturbed by the Project, then Project impacts on white-tailed kite would be potentially significant.

Recommendation: MM BIO-2 in the DEIR, includes a nesting bird survey prior to construction and no-disturbance zones around active nests. For an adequate environmental setting and to reduce impacts to white-tailed kite to less than significant, the Department recommends including in MM BIO-2 that the survey and no-disturbance zone distance for white tailed kite shall be a minimum of 500 feet, or

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a greater distance if deemed necessary to avoid impacts by a qualified biologist, that the survey take place within seven days of the start of vegetation clearing or construction instead of 14 days, and the survey be repeated if seven or more days elapse without construction or vegetation removal activity at the Project site.

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Coastal triquetrella (*Triquetrella californica*), California Rare Plant Rank (CRPR) 1B.2.

Comment: The species table on page 4.3-9 states that that coastal triquetrella “Grows within 30 miles from the coast in coastal scrub, grasslands, and in open gravels on roadsides, hillsides, rocky slopes.” Bryophytes including mosses are less affected by urbanization and habitat degradation than vascular plants (McCune et al. 2020), and locally and regionally uncommon bryophytes may be found in areas highly disturbed by human activity, including urban centers (Sabovljevic and Grdovic 2009, Zarnowiec 1996). There is one CNDDDB occurrence of coastal triquetrella approximately two miles north of the project site. Based on the presence of coastal triquetrella nearby and the ability of related species to persist in urban environments, this species of moss may be present in the seawall, in portions of the landscaped trail on San Rafael Avenue, or in the landscaped median of Beach Road.

Special status plants including coastal triquetrella may be impacted by ground-disturbing activities and vegetation removal. For example, vehicle, equipment, and foot traffic may bury, excavate, crush, trample, or disturb special status plants. Soil disturbance may result in permanent loss of special status plants.

B1-8

Plants with a CRPR of 1B are rare throughout their range, endemic to California, and are seriously or fairly threatened. Most of the plants that are ranked 1B have declined significantly over the last century (CNPS 2021). Coastal triquetrella’s additional threat rank of 0.2 indicates that 20 to 80 percent of its occurrences are threatened (CNPS 2021). Impacts to CRPR 1B plant species and their habitat must be analyzed during preparation of environmental documents relating to CEQA as they meet the definition of endangered, rare, or threatened species (CEQA Guidelines, section 15380).

Impacts to special status plants including coastal triquetrella may result in local population declines or extirpation of a species. Insufficient mitigation may result in prolonged temporal or permanent impacts to a special status plant species’ range, distribution, and population in the State.

Recommendation: For an adequate environmental setting and to reduce impacts to special status plants such as coastal triquetrella to less than significant, the Department recommends including the below mitigation measure.

Mitigation Measure BIO-5: Pre-Project Special-Status Plant Surveys. Prior to the start of Project activities, a Qualified Biologist shall conduct a habitat assessment for

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special-status plants including but not limited to coastal triquetrella. If suitable habitat for special-status plants is present, botanical surveys shall be conducted during the appropriate blooming period and conditions for all special-status plants that have the potential to occur within or near the Project where they may be directly or indirectly impacted by for example, modifications to hydrological conditions More than one year of surveys during appropriate conditions may be necessary. Surveys and associated reporting shall be conducted according to the Department’s Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities². The survey reports shall be submitted to the Department prior to the start of construction. Project activities shall not proceed until the Department has provided written approval of the survey reports. If any special-status plant species are observed, the Project shall fully avoid direct and indirect impacts to all individuals and prepare and implement a Department-approved avoidance plan prior to Project activities. If impacts to special status plants cannot be avoided, the Project shall provide habitat compensation at a 3:1 mitigation to impact ratio including permanent protection of habitat through a conservation easement and funding and implementing a long term management plan, prior to Project activities, unless otherwise approved in writing by the Department.

B1-8

II. Editorial Comments and/or Suggestions

Comment: The Department recommends that all species referenced in the DEIR, including common species, include the scientific name in parentheses after the first use of the common name for clarity as different species can have the same common name. In addition, the Department recommends correcting typos in the common names of species: “Bottae pocket gopher” should be Botta’s pocket gopher, “brown towhee” should be California towhee (The species formerly considered brown towhee (*Pipilo fuscus*) has been split into the California towhee (*Melozone fusca*) and the Canyon towhee (*M. crissalis*)), and “bush tit” should be bushtit. Additionally, the correct scientific name for white-tailed kite is *Elanus leucurus*, not *Elanus caeruleus*. *Elanus caeruleus* is the scientific name of the related black-winged kite found in Europe, Africa, and Asia.

B1-9

Location in Document: Common and Scientific Names, Section 4.3, Page 4.3-1 and 4.3-15

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a data base which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity

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² CDFW, 2018. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline>

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Database (CNDDDB). The CNNDDB field survey form can be found at the following link: <https://wildlife.ca.gov/Data/CNDDDB/SubmittingData#44524420-pdf-field-survey-form>. The completed form can be mailed electronically to CNDDDB at the following email address: CNDDDB@wildlife.ca.gov. The types of information reported to CNDDDB can be found at the following link: <https://wildlife.ca.gov/Data/CNDDDB/Plants-and-Animals>.

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FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by the Department. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

B1-11

CONCLUSION

The Department appreciates the opportunity to comment on the DEIR to assist San Francisco Planning in identifying and mitigating Project impacts on biological resources.

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Questions regarding this letter or further coordination for Marine Region should be directed to Arn Aarreberg, Environmental Scientist, at (707) 791-4195 or Arn.Aarreberg@wildlife.ca.gov. Coordination for the Bay-Delta Region should be directed to Alex Single, Environmental Scientist, at (707) 799-4210 or Alex.Single@wildlife.ca.gov.

Sincerely,



Craig Shuman, D. Env
Marine Regional Manager

Attachment 1 – Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities

Attachment 2 – California Eelgrass Mitigation Policy

Attachment 3 – Draft Mitigation and Monitoring Reporting Plan, Additional Proposed Mitigation Measures

ec: Becky Ota, Program Manager
Department of Fish and Wildlife
Becky.Ota@wildlife.ca.gov

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Craig Weightman, Program Manager
Department of Fish and Wildlife
Craig.Weightman@wildlife.ca.gov

Eric Wilkins, Senior Environmental Scientist
Department of Fish and Wildlife
Eric.Wilkins@wildlife.ca.gov

Melanie Day, Senior Environmental Scientist
Department of Fish and Wildlife
Melanie.Day@wildlife.ca.gov

Arn Aarreberg, Environmental Scientist
Department of Fish and Wildlife
Arn.Aarreberg@wildlife.ca.gov

Alex Single, Environmental Scientist
Department of Fish and Wildlife
Alex.Single@wildlife.ca.gov

Anniken Lydon
San Francisco Bay Conservation and Development Commission
Anniken.Lydon@bcfdc.ca.gov

Holly Garber
Regional Water Quality Control Board
Holly.Garber@waterboards.ca.gov

State Clearinghouse (SCH No. 2022010159)
State.clearinghouse@opr.ca.gov

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Attachment 1. Hydroacoustic Memo

<i>NOAA's Fisheries Northwest and Southwest Regions</i>	<i>U.S. Fish and Wildlife Service Regions 1 & 8</i>	<i>California/Washington/ Oregon Departments of Transportation</i>	<i>California Department of Fish and Game</i>	<i>U.S. Federal Highway Administration</i>
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MEMORANDUM

June 12, 2008

From: Fisheries Hydroacoustic Working Group

Subject: Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities

To: Applicable Agency Staff

The signatory agencies, identified below, have agreed in principle to use the attached Interim Criteria for Injury to Fish from Pile Driving Activities. The agreement was concluded at a meeting in Vancouver, Washington on June 10-11, 2008 with key technical and policy staff from the Federal Highway Administration, NOAA Fisheries, U.S. Fish and Wildlife Service, the Departments of Transportation from California, Oregon, and Washington; and national experts on sound propagation activities that affect fish and wildlife species of concern. The agreed upon criteria identify sound pressure levels of 206 dB peak and 187 dB accumulated sound exposure level (SEL) for all listed fish except those that are less than 2 grams. In that case, the criteria for the accumulated SEL will be 183 dB.

These criteria will apply to all new projects beginning no later than 60 days from the date of this memorandum. During the interim 60 day period, the Transportation Agencies will work with the Services to identify projects currently in the consultation process and reach agreement on which criteria will be used to assess project effects.

The agencies agree to review the science periodically and revise the threshold and cumulative levels as needed to reflect current information. Behavioral impacts to fish and impacts to marine mammals are not addressed in this agreement. Sub-injurious effects will continue to be discussed in future meetings.

The respective agencies also agree to develop appropriate training for staff on these revised criteria, as well as a process to review and possibly refine the criteria, when appropriate.

For questions or concerns about the revised criteria, we recommend staff contact their agency environmental coordinator or agency expert on pile driving issues.

Carol S. Adkins



Federal Highway Administration*

*FHWA supports the use of these interim criteria in the states signing this agreement in principle. FHWA leaves the schedule for implementation to the discretion of the state DOTs in cooperation with their respective FHWA Division Offices and the Services.

Michael Dehan



NOAA Fisheries - NWR

Russell M. Strock



NOAA Fisheries - SWR

Ken S. Berg



US Fish and Wildlife Service Region 1

Michael E. Deyoung



US Fish and Wildlife Service Region 8

[Signature]
California Department of Transportation



[Signature]
California Department of Fish and Game



[Signature]
Oregon Department of Transportation



Megawala
Washington State Department of Transportation





NOAA FISHERIES

West Coast Region

Attachment 2. Summary of Eelgrass Transplant Actions in California

California Eelgrass Mitigation Policy and Implementing Guidelines

October 2014



Photo credit: www.Lorenz-Avelar.com

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- ATTACHMENT 1.** Graphic depiction of eelgrass habitat definition including spatial distribution and aerial coverage of vegetated cover and unvegetated eelgrass habitat.
- ATTACHMENT 2.** Example Eelgrass Habitat Percent Vegetated Cover.
- ATTACHMENT 3.** Flow chart depicting timing of surveys and monitoring.
- ATTACHMENT 4.** Eelgrass transplant monitoring report.
- ATTACHMENT 5.** Wetlands mitigation calculator formula and parameters.
- ATTACHMENT 6.** Example calculations for application of starting and final mitigation ratios for impacts to eelgrass habitat in southern California.
- ATTACHMENT 7.** Example mitigation area multipliers for delay in initiation of mitigation activities.
- ATTACHMENT 8.** Summary of Eelgrass Transplant Actions in California

I. National Marine Fisheries Service's (NMFS) California Eelgrass Mitigation Policy

A. Policy Statement

It is NMFS' policy to recommend **no net loss of eelgrass habitat function** in California.

For all of California, compensatory mitigation should be recommended for the loss of existing eelgrass habitat function, but only after avoidance and minimization of effects to eelgrass have been pursued to the maximum extent practicable. Our approach is congruous with the approach taken in the federal Clean Water Act guidelines under section 404(b)(1) (40 CFR 230). In absence of a complete functional assessment, eelgrass distribution and density should serve as a proxy for eelgrass habitat function. Compensatory mitigation options include comprehensive management plans, in-kind mitigation, mitigation banks and in-lieu-fee programs, and out-of-kind mitigation. While in-kind mitigation is preferred, the most appropriate form of compensatory mitigation should be determined on a case-by-case basis.

Further, it is the intent of this policy to ensure that there is no loss associated with delays in establishing compensatory mitigation. This should be accomplished by creating a greater amount of eelgrass than is lost, if the mitigation is performed contemporaneously or after the impacts occur. To achieve this, NMFS, in most instances, should recommend compensatory mitigation for vegetated and unvegetated eelgrass habitat be successfully completed at a ratio of at least 1.2:1 mitigation area to impact area. This ratio is based on present value calculation¹ using a discount rate of 0.03 (NOAA-DARP 1999). This ratio assumes that restored eelgrass habitat achieves habitat function comparable to existing eelgrass habitat within a period of three years or less (Hoffman 1986, Evans & Short 2005, Fonseca *et al.* 1990).

For ongoing projects, once mitigation has been successfully implemented to compensate for the loss of eelgrass habitat function within a specified footprint, NMFS should not recommend additional mitigation for subsequent loss of eelgrass habitat if 1) ongoing project activities result in subsequent loss of eelgrass habitat function within the same footprint for which mitigation was completed and 2) the project applicant can document that no new area of eelgrass habitat is impacted by project activities.

This policy does not address mitigation for potential eelgrass habitat. NMFS recognizes impacts to potential eelgrass habitat may preclude eelgrass movement or expansion to suitable unvegetated areas in the future, potentially resulting in declines in eelgrass abundance over time. In addition, it does not address other shallow water habitats. Regulatory protections in the estuarine/marine realm typically focus on wetlands and submerged aquatic vegetation. Mudflats, sandflats, and other superficially bare habitats do not garner the same degree of recognition and

¹ Present Value (PV) is a calculation used in finance to determine the present day value of an amount that is received at a future date. The premise of the equation is that receiving something today is worth more than receiving the same item at a future date; $PV = C_1/(1+r)^n$ where C_1 = resource at period 1, r = interest or discount rate, n =number of periods.

concern, even though these are some of the most productive and fragile ecosystems (Reilly *et al.* 1999). NMFS will continue to collaborate with federal and state partners on these issues.

B. Eelgrass Background and Information

Eelgrass species (*Zostera marina* L. and *Z. pacifica*) are seagrasses that occur in the temperate unconsolidated substrate of shallow coastal environments, enclosed bays, and estuaries. Eelgrass is a highly productive species and is considered to be a "foundation" or habitat forming species. Eelgrass contributes to ecosystem functions at multiple levels as a primary and secondary producer, as a habitat structuring element, as a substrate for epiphytes and epifauna, and as sediment stabilizer and nutrient cycling facilitator. Eelgrass provides important foraging areas and shelter to young fish and invertebrates, food for migratory waterfowl and sea turtles, and spawning surfaces for invertebrates and fish such as the Pacific herring. Eelgrass also provides a significant source of carbon to the detrital pool which provides important organic matter in sometimes food-limited environments (*e.g.*, submarine canyons). In addition, eelgrass has the capacity to sequester carbon in the underlying sediments and may help offset carbon emissions. Given the significance and diversity of the functions and services provided by seagrass, Costanza *et al.* (2007) determined seagrass ecosystems to be one of Earth's most valuable.

California supports dynamic eelgrass habitats that range in extent from less than 11,000 acres to possibly as much as 15,000 acres statewide. This is inclusive of estimates for poorly documented beds in smaller coastal systems as well as open coastal and insular areas. While among the most productive of habitats, the overall low statewide abundance makes eelgrass one of the rarest habitats in California. Collectively just five systems, Humboldt Bay, San Francisco Bay, San Diego Bay, Mission Bay and Tomales Bay support over 80 percent of the known eelgrass in the state. The uneven distribution of eelgrass resources increases the risk to this habitat and also contributes to its dynamic nature. Further, the narrow depth range within which eelgrass can occur further places this habitat at risk in the face of global climate change and sea level rise predictions.

Seagrass habitat has been lost from temperate estuaries worldwide (Duarte 2002, Lotze *et al.* 2006, Orth *et al.* 2006). While both natural and human-induced mechanisms have contributed to these losses, impacts from human population expansion and associated pollution and upland development is the primary cause (Short and Wyllie-Echeverria 1996). Human activities that affect eelgrass habitat distribution and abundance, including, but not limited to, urban development, harbor development, aquaculture, agricultural runoff, effluent discharges, and upland land use associated sediment discharge (Duarte 2008) occur throughout California. For example, dredging and filling; shading and alteration of circulation patterns; and watershed inputs of sediment, nutrients, and unnaturally concentrated or directed freshwater flows can directly and indirectly destroy eelgrass habitats. Conversely, in many areas great strides have been made at restoring water quality and expanding eelgrass resources through directed efforts at environmental improvements and resource enhancement. While improvements in eelgrass management have occurred overall, the importance of eelgrass both ecologically and economically, coupled with ongoing human pressure and potentially increasing degradation and losses associated with climate change, highlight the need to protect, maintain, and where feasible, enhance eelgrass habitat.

C. Purpose and Need for Eelgrass Mitigation Policy

Eelgrass warrants a strong protection strategy because of the important biological, physical, and economic values it provides, as well as its importance to managed species under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Vegetated shallows that support eelgrass are also considered special aquatic sites under the 404(b)(1) guidelines of the Clean Water Act (40 C.F.R. § 230.43). The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) developed this policy to establish and support a goal of protecting this resource and its habitat functions, including spatial coverage and density of eelgrass habitats. This NMFS policy and implementing guidelines are being shared with agencies and the public to ensure there is a clear and transparent process for developing eelgrass mitigation recommendations.

Pursuant to the MSA, eelgrass is designated as an essential fish habitat (EFH) habitat area of particular concern (HAPC) for various federally-managed fish species within the Pacific Coast Groundfish Fishery Management Plan (FMP) (PFMC 2008). An HAPC is a subset of EFH that is rare, particularly susceptible to human-induced degradation, especially ecologically important, and/or located in an environmentally stressed area. HAPC designations are used to provide additional focus for conservation efforts.

This policy and guidelines support but do not expand upon existing NMFS authorities under the MSA, the Fish and Wildlife Coordination Act (FWCA), and the National Environmental Policy Act (NEPA). Pursuant to the EFH provisions of the MSA, FWCA, and obligations under the NEPA as a responsible agency, NMFS annually reviews and provides recommendations on numerous actions that may affect eelgrass resources throughout California. Section 305(b)(1)(D) of the MSA requires NMFS to coordinate with, and provide information to, other federal agencies regarding the conservation and enhancement of EFH. Section 305(b)(2) requires all federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. Under section 305(b)(4) of the MSA, NMFS is required to provide EFH Conservation Recommendations to federal and state agencies for actions that would adversely affect EFH (50 C.F.R. § 600.925). NMFS makes its recommendations with the goal of avoiding, minimizing, or otherwise compensating for adverse effects to EFH. When impacts to NMFS trust resources are unavoidable, NMFS may recommend compensatory mitigation to offset those impacts. In order to fulfill its consultative role, NMFS may also recommend, among other things, the development of mitigation plans, habitat distribution maps, surveys and survey reports, progress milestones, monitoring programs, and reports verifying the completion of mitigation activities.

Eelgrass impact management and mitigation throughout California has historically been undertaken without a statewide strategy. Federal actions with impacts to eelgrass require considerable NMFS staff time for project review, coordination and development of conservation recommendations. As federal staff resources vary with budgets, and threats to aquatic resources remain steady or increase, regulatory streamlining and increased efficiency are crucial for continued protection of important coastal habitats, including eelgrass. The California Eelgrass Mitigation Policy (CEMP) is meant to increase efficiency of existing regulatory authorities in a

programmatic manner, provide transparency to federal agencies and action proponents, and ensure that unavoidable impacts to eelgrass habitat are fully and appropriately mitigated. It is the intent of NMFS to collaborate with other federal, state, and local agencies charged with the protection of marine resources to seek a unified approach to actions affecting eelgrass such that consistency across agencies with respect to this resource may be enhanced.

D. Relevance to Other Federal and State Policies

Based on our understanding of existing federal and state policies regarding aquatic resource conservation, the CEMP does not conflict with existing policies and complements the federal and state wetland policies as described below. NMFS does not intend to make any recommendations, which, if adopted by the action agency and carried out, would violate other federal, state, or local laws. The CEMP also complements the NOAA Aquaculture Policy and National Shellfish Initiative and builds upon the NOAA Seagrass Conservation Guidelines and the Southern California Eelgrass Mitigation Policy.

1. Corps/EPA Mitigation Rule and supporting guidance

In 2008, the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) issued revised regulations governing compensatory mitigation for authorized impacts to wetlands, streams, and other waters of the U.S. under Section 404 of the Clean Water Act. The regulations emphasize avoiding impacts to wetlands and other water resources. For unavoidable impacts, the rule incorporates Natural Resource Council recommendations to improve planning, implementing and managing wetland replacement projects, including: science-based assessment of impacts and compensation measures, watershed assessments to drive mitigation sites and plans, measurable and enforceable ecological performance standards for evaluating mitigation projects, mitigation monitoring to document whether the mitigation employed meets ecological performance standards, and complete compensation plans. The regulations also encourage the expansion of mitigation banking and in lieu fee agreements to improve the quality and success of compensatory mitigation projects.

The NMFS policy to recommend no net loss of eelgrass function and the eelgrass mitigation guidelines offered herein align with the provisions of the EPA and Corps mitigation rule, but provide more specific recommendations on how to avoid and minimize impacts to eelgrass and how to implement eelgrass surveys, assessments, mitigation, and monitoring.

2. State of California Wetland Conservation Policies

The 1993 State of California Wetlands Conservation Policy established a framework and strategy to ensure no overall net loss and long-term gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property, reduce procedural complexity in administration of state and federal wetlands conservation programs, and encourage partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation and restoration.

The State of California is also developing a Wetland and Riparian Area Protection Policy. The first phase of this effort was published as the “Preliminary Draft Wetland Area Protection Policy” with the purpose of protecting all waters of the State, including wetlands, from dredge and fill discharges. It includes a wetland definition and associated delineation methods, an assessment framework for collecting and reporting aquatic resource information, and requirements applicable to discharges of dredged or fill material. The draft specifies that dredge or fill projects will provide for replacement of existing beneficial uses through compensatory mitigation. The preliminary policy includes a determination that compensatory mitigation will sustain and improve the overall abundance, diversity and condition of aquatic resources in a project watershed area.

Based on the definition of wetlands included in these state wetland policies, the policies do not directly apply to subtidal eelgrass habitat, but may apply to intertidal eelgrass habitat. The NMFS policy of recommending no net loss to eelgrass habitat function and recommendations for compensatory mitigation for eelgrass impacts complement the state protection policies for wetlands.

3. NOAA Aquaculture Policy and National Shellfish Initiative

In 2011, NOAA released the National Marine Aquaculture Policy and the National Shellfish Initiative. The Policy encourages and fosters sustainable aquaculture development that provides domestic jobs, products, and services and that is in harmony with healthy, productive, and resilient marine ecosystems, compatible with other uses of the marine environment, and consistent with the National Policy for the Stewardship of the Ocean, our Coasts, and the Great Lakes (National Ocean Policy). The goal of the Initiative is to increase populations of bivalve shellfish in our nation’s coastal waters—including oysters, clams, abalone, and mussels—through both sustainable commercial production and restoration activities. The Initiative supports shellfish industry jobs and business opportunities to meet the growing demand for seafood, while protecting and enhancing habitat for important commercial, recreational, and endangered and threatened species and species recovery. The Initiative also highlights improved water quality, nutrient removal, and shoreline protection as benefits from shellfish production and restoration. Both the Policy and the Initiative seek to improve interagency coordination for permitting commercial and restoration shellfish projects, as well as support research and other data collection to assess and refine conservation strategies and priorities.

The regulatory efficiencies, transparency, and compensation for impacts to eelgrass promoted by the CEMP directly support the National Aquaculture Policy statements and National Shellfish Initiative through: (1) protection of eelgrass, an important component of productive and resilient coastal ecosystems in California and habitat for wild species, and (2) improved coordination with federal partners regarding planning and permitting for commercial shellfish projects. Furthermore, research conducted under the direction of the National Shellfish Initiative could be informed by and also inform NMFS consultations regarding eelgrass impacts and mitigation in California.

4. NOAA Seagrass Conservation Guidelines

The NOAA publication, “Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters” (1998) was developed by Mark Fonseca of NOAA’s Beaufort Laboratory along with Jud Kenworthy and Gordon Thayer and was funded by NOAA’s Coastal Ocean Program. The document presents an overview of seagrass conservation and restoration in the United States, discusses important issues that should be addressed in planning seagrass restoration projects, describes different planting methodologies, proposes monitoring criteria and means for evaluation success, and discusses issues faced by resource managers. The CEMP considers information presented in the Fonseca *et al.* document, but deviates in some cases in order to provide reasonable and practicable guidelines for eelgrass conservation in California.

5. Southern California Eelgrass Mitigation Policy

In southern and central California, eelgrass mitigation has been addressed in accordance with the Southern California Eelgrass Mitigation Policy applied by NMFS, US Fish & Wildlife Service, California Department of Fish and Wildlife, California Coastal Commission, US Army Corps of Engineers, and other resource and regulatory agencies since 1991, and which has generally been effective at ensuring eelgrass impacts are mitigated in most circumstances. Given the success of the Southern California Eelgrass Mitigation Policy over its 20-year history, this policy reflects an expansion of the application of the Southern California policy with minor modifications to ensure a high standard of statewide eelgrass management and protection. This policy will supersede the Southern California Eelgrass Mitigation Policy for all areas of California upon its adoption.

II. Implementing Guidelines for California

This policy and guidelines will serve as the guidance for staff and managers within NMFS for developing recommendations concerning eelgrass issues through EFH and FWCA consultations and NEPA reviews throughout California. This policy will inform NMFS’s position on eelgrass issues for California in other roles as a responsible, advisory, or funding agency or trustee. In addition, this document provides guidance to assist NMFS in performing its consultative role under the statutes described above. Finally, pursuant to NMFS obligation to provide information to federal agencies under Section 305(b)(1)(D) of the MSA, this policy serves that role by providing information intended to further the conservation and enhancement of EFH. Should this policy or guidelines be inconsistent with any formally-promulgated NMFS regulations, those formally-promulgated regulations will take precedence over any inconsistent provisions of this policy.

While many of the activities impacting eelgrass are similar across California, eelgrass stressors and growth characteristics differ between southern California (U.S./Mexico border to Pt. Conception), central California (Point Conception to San Francisco Bay entrance), San Francisco Bay, and northern California (San Francisco Bay to the California/Oregon border). The amount of scientific information available to base management decisions on also differs among areas within California, with considerably more information and history with eelgrass habitat management in southern California than the other regions. Gaps in region-specific scientific

information do not override the need to be protective of eelgrass habitat while relying on the best information currently available from areas within and outside of California. Although the primary orientation of this policy is toward statewide use, where indicated below, specific elements of this policy may differ between southern California, central California, northern California and San Francisco Bay.

NMFS will continue to explore the science of eelgrass habitat and improve our understanding of eelgrass habitat function, impacts, assessment techniques, and mitigation efficacy. Approximately every 5 years, NMFS intends to evaluate monitoring and survey data collected by federal agencies and action proponents per the recommendations of these guidelines. NMFS managers will determine if updates to these guidelines are appropriate based on information evaluated during the 5-year review. Updates to these guidelines and supporting technical information will be available on the NMFS website.

The information below serves as a common starting place for NMFS recommendations to achieve no net loss of eelgrass habitat function. NMFS employees should not depart from the guidelines provided herein without appropriate justification and supervisory concurrence. However, the recommendations that NMFS ultimately makes should be provided on a case-by-case basis to provide flexibility when site specific conditions dictate. In the EFH context, NMFS recommendations are provided to the action agency, which has final approval of the action; in accordance with the MSA, the action agency may take up NMFS recommendations or articulate its reasons for not following the recommendations. In the FWCA context, NMFS makes recommendations which must be considered, but the action agency is ultimately responsible for the wildlife protective measures it adopts (if any). For these reasons, neither this policy nor its implementing guidelines are to be interpreted as binding on the public.

A. Eelgrass Habitat Definition

Eelgrass distribution fluctuates and can expand, contract, disappear, and recolonize areas within suitable environments. Vegetated eelgrass areas can expand by as much as 5 meters (m) and contract by as much as 4 m annually (Donoghue 2011). Within eelgrass habitat, eelgrass is expected to fluctuate in density and patch extent based on prevailing environmental factors (*e.g.*, turbidity, freshwater flows, wave and current energy, bioturbation, temperature, etc.). To account for seagrass fluctuation, Fonseca *et al.* (1998) recommends that seagrass habitat include the vegetated areas as well as presently unvegetated spaces between seagrass patches.

In addition, there is an area of functional influence, where the habitat function provided by the vegetated cover extends out into adjacent unvegetated areas. Those functions include detrital enrichment, energy dampening and sediment trapping, primary productivity, alteration of current or wave patterns, and fish and invertebrate use, among other functions. The influence of eelgrass on the local environment can extend up to 10 m from individual eelgrass patches, with the distance being a function of the extent and density of eelgrass comprising the bed as well as local biologic, hydrographic, and bathymetric conditions (Bostrom and Bonsdorff 2000, Bostrom *et al.* 2001, Ferrell and Bell 1991, Peterson *et al.* 2004, Smith *et al.* 2008, van Houte-Howes *et al.* 2004, Webster *et al.* 1998). Detrital enrichment will generally extend laterally as well as down slope from the beds, while fish and invertebrates that utilize eelgrass beds may move away from the

eelgrass core to areas around the bed margins for foraging and in response to tides or diurnal cycles (Smith *et al.* 2008).

To encompass fluctuating eelgrass distribution and functional influence around eelgrass cover, for the purposes of this policy and guidelines, eelgrass habitat is defined as areas of vegetated eelgrass cover (any eelgrass within 1 m² quadrat and within 1 m of another shoot) bounded by a 5 m wide perimeter of unvegetated area (See Attachment 1 for a graphical depiction of this definition). Unvegetated areas may have eelgrass shoots a distance greater than 1 m from another shoot, and may be internal as well as external to areas of vegetated cover. For isolated patches and on a case-by-case basis, it may be acceptable to include an unvegetated area boundary less than or greater than 5 m wide. The definition excludes areas of unsuitable environmental conditions such as hard bottom substrates, shaded locations, or areas that extend to depths below those supporting eelgrass. Suitable depths can vary substantially depending upon site-specific conditions. In general, eelgrass does not extend deeper than 12 feet mean lower low water (MLLW) in most protected bays and harbors in Southern California, and is more limited in Central and Northern California embayments. However, eelgrass can grow much deeper in entrance channels and offshore areas

B. Surveying Eelgrass

NMFS may recommend action agencies conduct surveys of eelgrass habitat to evaluate effects of a proposed action. Eelgrass habitat should be surveyed using visual or acoustic methods and mapping technologies and scales appropriate to the action, scale, and area of work. Surveys should document both vegetated eelgrass cover as well as unvegetated areas within eelgrass habitat (See section II.A. for definition). Assessing impacts to eelgrass habitat relies on the completion of quality surveys and mapping. As such, inferior quality of surveys and mapping (*e.g.*, completed at an inappropriate scale or using inappropriate methods) may make proper evaluation of impacts impossible, and may result in a recommendation from NMFS to re-survey and re-map project areas. Also, to account for fluctuations in eelgrass habitat due to environmental variations, a reference site(s) should be incorporated into the survey (See section V.B.4 below for more details).

1. Survey Parameters

Because eelgrass growth conditions in California vary, eelgrass mapping techniques will also vary. Diver transects or boundary mapping may be suited to very small scale mapping efforts, while aerial and/or acoustic survey with ground-truthing may be more suited to larger survey areas. Aerial and above-water visual survey methods should be employed only where the lower limit of eelgrass is clearly visible or in combination with methods that adequately inventory eelgrass in deeper waters.

The survey area should be scaled as appropriate to the size of the potential action and the potential extent and distribution of eelgrass impacts, including both direct and indirect effects. The resolution of mapping should be adequate to address the scale of effects reasonably expected to occur. For small projects, such as individual boat docks, higher mapping resolution is appropriate in order to detect actual effects to eelgrass at a scale meaningful to the project size. At larger scales, the mapping resolution may be less refined over a larger area, assuming that

minor errors in mapping will balance out over the larger scale. Survey reports should provide a detailed description of the survey coverage (*e.g.*, number, location, and type of samples) and any interpolation methods used in the mapping.

While many parameters may be useful to describe eelgrass habitat condition (*e.g.*, plant biomass, leaf length, shoot:root ratios, epiphytic loading), many are labor intensive and may be impractical for resource management applications on a day-to-day basis. For this reason, four parameters have been identified for use in eelgrass habitat surveys and assessment of effects of an action on eelgrass. These parameters that should be articulated in eelgrass surveys are: 1) spatial distribution, 2) areal extent, 3) percentage of vegetated cover, and 4) the turion (shoot) density.

a) Spatial Distribution

The spatial distribution of eelgrass habitat should be delineated by a contiguous boundary around all areas of vegetated eelgrass cover extending outward a distance of 5 m, excluding gaps within the vegetated cover that have individual plants greater than 10 m from neighboring plants. Where such separations occur, either a separate area should be defined, or a gap in the area should be defined by extending a line around the void along a boundary defined by adjacent plants and including the 5 meter perimeter. The boundary of the eelgrass habitat should not extend into areas where depth, substrate, or existing structures are unsuited to supporting eelgrass habitat.

b) Aerial Extent

The eelgrass habitat aerial extent is the quantitative area (*e.g.*, square meters) of the spatial distribution boundary polygon of the eelgrass habitat. The total aerial extent should be broken down into extent of vegetated cover and extent of unvegetated habitat. Areal extent should be determined using commercially available geo-spatial analysis software. For small projects, coordinate data for polygon vertices could be entered into a spreadsheet format, and area could be calculated using simple geometry.

c) Percent Vegetated Cover

Eelgrass vegetated cover exists when one or more leaf shoots (turions) per square meter is present. The percent bottom cover within eelgrass habitat should be determined by totaling the area of vegetated eelgrass cover and dividing this by the total eelgrass habitat area. Where substantial differences in bottom cover occur across portions of the eelgrass habitat, the habitat could be subdivided into cover classes (*e.g.*, 20% cover, 50% cover, 75% cover).

d) Turion (Shoot) Density

Turion density is the mean number of eelgrass leaf shoots per square meter within mapped eelgrass vegetated cover. Turion density should be reported as a mean \pm the standard deviation of replicate measurements. The number of replicate measurements (*n*) should be reported along with the mean and deviation. Turion densities are determined only within vegetated areas of

eelgrass habitat and therefore, it is not possible to measure a turion density equal to zero. If different cover classes are used, a turion density should be determined for each cover class.

2. Eelgrass Mapping

For all actions that may directly or indirectly affect eelgrass habitat, an eelgrass habitat distribution map should be prepared on an accurate bathymetric chart with contour intervals of not greater than 1 foot (local vertical datum of MLLW). Exceptions to the detailed bathymetry could be made for small projects or for projects where detailed bathymetry may be infeasible. Unless region-specific mapping format and protocols are developed by NMFS (in which case such region-specific mapping guidance should be used), the mapping should utilize the following format and protocols:

a) Bounding Coordinates

Horizontal datum - Universal Transverse Mercator (UTM), NAD 83 meters, Zone 11 (for southern California) or Zone 10 (for central, San Francisco Bay, and northern California) is the preferred projection and datum. Another projection or datum may be used; however, the map and spatial data should include metadata that accurately defines the projection and datum.

Vertical datum - Mean Lower Low Water (MLLW), depth in feet.

b) Units

Transects, grids, or scale bars should be expressed in meters. Area measurements should be in square meters.

c) File Format

A spatial data layer compatible with readily available commercial geographic information system software producing file formats compatible with ESRI® ArcGIS software should be sent to NMFS when the area mapped supports at least 10 square meters of eelgrass. For those areas supporting less than 10 square meters of eelgrass, a table may alternatively be provided giving the vertices bounding x, y coordinates of the eelgrass areas in a spreadsheet or an ASCII file format. In addition to a spatial layer and/or table, a hard-copy map should be included with the survey report. The projection and datum should be clearly defined in the metadata and/or an associated text file.

Eelgrass maps should, at a minimum, include the following:

- A graphic scale bar, north arrow, legend, horizontal datum and vertical datum;
- A boundary illustrating the limits of the area surveyed;
- Bathymetric contours for the survey area, including both the action area(s) and reference site(s) in increments of not more than 1 foot;
- An overlay of proposed action improvements and construction limits;
- The boundary of the defined eelgrass habitat including an identification of area exclusions based on physical unsuitability to support eelgrass habitat; and

- The existing eelgrass cover within the defined eelgrass habitat at the time of the survey.

3. Survey Period

All mapping efforts should be completed during the active growth period for eelgrass (typically March through October for southern California, April through October for central California, April through October for San Francisco Bay, and May through September for northern California) and should be considered valid for a period of 60 days to ensure significant changes in eelgrass distribution and density do not occur between survey date and the project start date. The 60 day period is particularly important for eelgrass habitat survey conducted at the very beginning of the growing season, if eelgrass habitat expansion occurs as the growing season progresses. A period other than 60 days could be warranted and should be evaluated on a case-by-case basis, particularly for surveys completed in the middle of the growing season. However, when the end of the 60-day validity period falls outside of the region-specific active growth period, the survey could be considered valid until the beginning of the next active growth period. For example, a survey completed in southern California in the August-October time frame would be valid until the resumption of the active growth phase (i.e., in most instances, March 1). In some cases, NMFS and the action agency may agree to surveys being completed outside of the active growth period. For surveys completed during or after unusual climatic events (*e.g.*, high fluvial discharge periods, El Niño conditions), NMFS staff should be contacted to determine if any modifications to the common survey period are warranted.

4. Reference Site Selection

Eelgrass habitat spatial extent, aerial extent, percent cover and turion density are expected to naturally fluctuate through time in response to natural environmental variables. As a result, it is necessary to correct for natural variability when conducting surveys for the purpose of evaluating action effects on eelgrass or performance of mitigation areas. This is generally accomplished through the use of a reference site(s), which is expected to respond similarly to the action area in response to natural environmental variability. It is beneficial to select and monitor multiple reference sites rather than a single site and to utilize the average reference site condition as a metric for environmental fluctuations. This is especially true when a mitigation site is located within an area of known environmental gradients, and reference sites may be selected on both sides of the mitigation site along the gradient. Environmental conditions (*e.g.*, sediment, currents, proximity to action area, shoot density, light availability, depth, onshore and watershed influences) at the reference site(s) should be representative of the environmental conditions at the impact area (Fonseca *et al.* 1998). Where practical, the reference site(s) should be at least the size of the anticipated impact and/or mitigation area to limit the potential for minor changes in a reference site (*e.g.*, propeller scarring or ray foraging damage) overly affecting mitigation needs. The logic for site(s) selection should be documented in the eelgrass mitigation planning documents.

C. Avoiding and Minimizing Impacts to Eelgrass

This section describes measures to avoid and minimize impacts to eelgrass caused by turbidity, shading, nutrient loading, sedimentation and alteration of circulation patterns. Not all measures

are equally suited to a particular project or condition. Measures to avoid or minimize impacts should be focused on stressors where the source and control are within the purview of the permittee and action agency. Action agencies in coordination with NMFS should evaluate and establish impact avoidance and minimization measures on a case-by-case basis depending on the action and site-specific information, including prevailing current patterns, sediment source, characteristics, and quantity, as well as the nature and duration of work.

1. Turbidity

To avoid and minimize potential turbidity-related impacts to eelgrass:

- Where practical, actions should be located as far as possible from existing eelgrass; and
- In-water work should occur as quickly as possible such that the duration of impacts is minimized.

Where proposed turbidity generating activities must occur in proximity to eelgrass and increased turbidity will occur at a magnitude and duration that may affect eelgrass habitat, measures to control turbidity levels should be employed when practical considering physical and biological constraints and impacts. Measures may include:

- Use of turbidity curtains where appropriate and feasible;
- Use of low impact equipment and methods (*e.g.*, environmental buckets, or a hydraulic suction dredge instead of clamshell or hopper dredge, provided the discharge may be located away from the eelgrass habitat and appropriate turbidity controls can be provided at the discharge point);
- Limiting activities by tide or day-night windows to limit light degradation within eelgrass habitat;
- Utilizing 24-hour dredging to reduce the overall duration of work and to take advantage of dredging during dark periods when photosynthesis is not occurring; or
- Other measures that an action party may propose and be able to employ to minimize potential for adverse turbidity effects to eelgrass.

NMFS developed a flowchart for a stepwise decision making process as guidance for action agencies to determine when to implement best management practices (BMPs) for minimizing turbidity from dredging actions as part of a programmatic EFH consultation in San Francisco Bay. The parameters considered in the flow chart are relevant to all marine areas of California. This document is posted on the NMFS West Coast Region web page (http://www.westcoast.fisheries.noaa.gov/habitat/habitat_types/seagrass_info/california_eelgrass.html) and may be used to evaluate avoidance and minimization measures for any project that generates increased turbidity.

2. Shading

A number of potential design modifications may be used to minimize effects of shading on eelgrass. Boat docks, ramps, gangways, and similar structures should avoid eelgrass habitat to the maximum extent feasible. If avoidance of eelgrass or habitat is infeasible, impacts should be minimized by utilizing, to the maximum extent feasible, design modifications and construction materials that allow for greater light penetration. Action modifications should include, but are not limited to:

- Avoid siting over-water or landside structures in areas where shading of eelgrass habitat would occur;
- Maximizing the north-south orientation of the structure;
- Maximizing the height of the structure above the water;
- Minimizing the width and supporting structure mass to decrease shade effects;
- Relocating the structure in deeper water and limiting the placement of structures in shallow areas where eelgrass occurs to the extent feasible; and
- Utilizing light transmitting materials in structure design.

Construction materials used to increase light passage beneath the structures may include, but are not limited to, open grating or adequate spacing between deck boards to allow for effective illumination to support eelgrass habitat. The use of these shade reducing options may be appropriate where they do not conflict with safety, ADA compliance, or structure utility objectives.

NMFS developed a stepwise key as guidance for action agencies to determine which combination of modifications are best suited for minimizing shading effects from overwater structures on eelgrass as part of a programmatic EFH consultation in San Francisco Bay. The parameters considered in the flow chart are relevant to all marine areas of California. This document is posted on the West Coast Region web page (http://www.westcoast.fisheries.noaa.gov/habitat/habitat_types/seagrass_info/california_eelgrass.html) and may be used to evaluate avoidance and minimization measures for any project that results in shading.

3. Circulation patterns

Where appropriate to the scale and nature of potential eelgrass impacts, action parties should evaluate if and how the action may alter the hydrodynamics of the action area such that eelgrass habitat within or in proximity to the action area may be adversely affected. To maintain good water flow and low residence time of water within eelgrass habitat, action agencies should ensure actions:

- Minimize scouring velocities near or within eelgrass beds;
- Maintain wind and tidal circulation to the extent practical by considering orientation of piers and docks to maintain predominant wind effects;
- Incorporate setbacks on the order of 15 to 50 meters from eelgrass habitat where practical to allow for greater circulation and reduced impact from boat maneuvering, grounding, and propeller damage, and to address shading impacts; and
- Minimize the number of piles and maximize pile spacing to the extent practical, where piles are needed to support structures.

For large-scale actions in the proximity of eelgrass habitats, NMFS may request specific modeling and/or field hydrodynamic assessments of the potential effects of work on characteristics of circulation within eelgrass habitat.

4. Nutrient loading

Where appropriate to the scale and nature of potential eelgrass impacts, the following measures should be considered for implementation to reduce the potential for excessive nutrient loading to eelgrass habitat:

- diverting site runoff from landscaped areas away from discharges around eelgrass habitat;
- implementation of fertilizer reduction program;
- reduction of watershed nutrient loading;
- controlling local sources of nutrients such as animal wastes and leach fields; and
- maintaining good circulation and flushing conditions within the water body.

Reducing nutrient loading may also provide opportunities for establishing eelgrass as mitigation for project impacts.

5. Sediment loading

Watershed development and changes in land use may increase soil erosion and increase sedimentation to downstream embayments and lagoons.

- To the extent practicable, maintain riparian vegetation buffers along all streams in the watershed.
- Incorporate watershed analysis into agricultural, ranching, and residential/commercial development projects.
- Increase resistance to soil erosion and runoff. Sediment basins, contour farming, and grazing management are examples of key practices.
- Implement best management practices for sediment control during construction and maintenance operations (*e.g.*, Caltrans 2003).

Reducing sediment loading may also provide opportunities for establishing eelgrass as mitigation for project impacts in systems for which sedimentation is a demonstrable limiting factor to eelgrass.

D. Assessing Impacts to Eelgrass Habitat

If appropriate to the statute under which the consultation occurs, NMFS should consider both direct and indirect effects of the project in order to assess whether a project may impact eelgrass. NMFS is aware that many of the statutes and regulations it administers may have more specific meanings for certain terms, including “direct effect” and “indirect effect”, and will use the statutory or regulatory meaning of those terms when conducting consultations under those statutes.² Nevertheless, it is useful for NMFS to consider effects experienced

² In the EFH context, adverse effects include any impact that reduces quality and/or quantity of EFH, including direct or indirect physical, chemical, or biological alterations of the waters or substrate (50 CFR 600.910). The Council of Environmental Quality (CEQ) regulations regarding NEPA implementation (40 CFR 1508.8(a)) define direct and indirect impacts of an action for the purposes of NEPA. Other NMFS statutes provide their own definitions regarding effects.

contemporaneously with project actions (both at the project site and away from the project site) and which might occur later in time.

Generally, effects to eelgrass habitat should be assessed using pre- and post-project surveys of the impact area and appropriate reference site(s) conducted during the time period of maximum eelgrass growth (typically March through October for southern California, April through October for central California, April through October for San Francisco Bay, and May through September for northern California). NMFS should consider the likelihood that the effects would occur before recommending pre- and post-project eelgrass surveys. The pre-construction survey of the eelgrass habitat in the action area and an appropriate reference site(s) should be completed within 60 days before start of construction. After construction, a post-action survey of the eelgrass habitat in the action area and at an appropriate reference site(s) should be completed within 30 days of completion of construction, or within the first 30 days of the next active growth period following completion of construction that occurs outside of the active growth period. Copies of all surveys should be provided to the lead federal agency, NMFS, and other interested regulatory and/or resource agencies within 30 days of completing the survey. The recommended timing of surveys is intended to minimize changes in eelgrass habitat distribution and abundance during the period between survey completion and construction initiation and completion. For example, a post-action survey completed beyond 30 days following construction or outside of the active growing season may show declines in eelgrass habitat as a result of natural senescence rather than the action.

The lead federal agency and NMFS should consider reference area eelgrass performance, physical evidence of impact, turbidity and construction activities monitoring data, as well as other documentation in the determination of the impacts of the action undertaken. Impact analyses should document whether the impacts are anticipated to be complete at the time of the assessment, or whether there is an anticipation of continuing eelgrass impacts due to chronic or intermittent effects. Where eelgrass at the impact site declines coincident with and similarly to decline at the reference site(s), the percentage of decline at the reference site should be deducted from the decline at the impact site. However, if eelgrass expands within the reference site(s), the impact site should only be evaluated against the pre-construction condition of the reference site and not the expanded condition. If an action results in increased eelgrass habitat relative to the reference sites, this increase could potentially be considered (subject to the caveats identified herein) by NMFS and the action agency as potential compensation for impacts to eelgrass habitat that occur in the future (see Section II. E. 3). An assessment should also be made as to whether impacts or portions of the impact are anticipated to be temporary. Information supporting this determination may be derived from the permittee, NMFS, and other resource and regulatory agencies, as well as other eelgrass experts.

For some projects, environmental planning and permitting may take longer than 60 days. To accommodate longer planning schedules, it may also be necessary to do a preliminary eelgrass survey prior to the pre-construction survey. This preliminary survey can be used to anticipate potential impacts to eelgrass for the purposes of mitigation planning during the permitting process. In some cases, preliminary surveys may focus on spatial distribution of eelgrass habitat only or may be a qualitative reconnaissance to allow permittees to incorporate avoidance and minimization measures into their proposed action or to plan for future mitigation needs. The pre-

and post- project surveys should then verify whether impacts occur as anticipated, and if planned mitigation is adequate. In some cases, a preliminary survey could be completed a year or more in advance of the project action.

1. Direct Effects

Biologists should consider the potential for localized losses of eelgrass from dredging or filling, construction-associated damage, and similar spatially and temporally proximate impacts (these effects could be termed “direct”). The actual area of the impact should be determined from an analysis that compares the pre-action condition of eelgrass habitat with the post-action conditions from this survey, relative to eelgrass habitat change at the reference site(s).

2. Indirect Effects

Biologists should also consider effects caused by the action which occur away from the project site; furthermore, effects occurring later in time (whether at or away from the project site) should also be considered. Biologists should consider the potential for project actions to alter conditions of the physical environment in a manner that, in turn, reduce eelgrass habitat distribution or density (*e.g.*, elevated turbidity from the initial implementation or later operations of an action, increased shading, changes to circulation patterns, changes to vessel traffic that lead to greater groundings or wake damage, increased rates of erosion or deposition).

For actions where the impact cannot be fully determined until a substantial period after an action is taken, an estimate of likely impacts should be made prior to implementation of the proposed action based on the best available information (*e.g.*, shading analyses, wave and current modeling). A monitoring program consisting of a pre-construction eelgrass survey and three post-construction eelgrass surveys at the impact site and appropriate reference site(s) should be performed. The action party should complete the first post-construction eelgrass survey within 30 days following completion of construction to evaluate any immediate effects to eelgrass habitat. The second post-construction survey should be performed approximately one year after the first post-construction survey during the appropriate growing season. The third post-construction survey should be performed approximately two years after the first post-construction survey during the appropriate growing season. The second and third post-construction surveys will be used to evaluate if indirect effects resulted later in time due to altered physical conditions; the time frames identified above are aligned with growing season (attempting a survey outside of the growing season would show inaccurate results).

A final determination regarding the actual impact and amount of mitigation needed, if any, to offset impacts should be made based upon the results of two annual post-construction surveys, which document the changes in the eelgrass habitat (areal extent, bottom coverage, and shoot density within eelgrass) in the vicinity of the action, compared to eelgrass habitat change at the reference site(s). Any impacts determined by these monitoring surveys should be mitigated. In the event that monitoring demonstrates the action to have resulted in greater eelgrass habitat impacts than initially estimated, additional mitigation should be implemented in a manner consistent with these guidelines. In some cases, adaptive management may allow for increased success in eelgrass mitigation without the need for additional mitigation.

E. Mitigation Options

The term mitigation is defined differently by various federal and State laws, regulations and policies. In a broad sense, mitigation may include a range of measures from complete avoidance of adverse effects to compensation for adverse effects by preserving, restoring or creating similar resources at onsite or offsite locations. The Corps and EPA issued regulations governing compensatory mitigation to offset unavoidable adverse effects to waters of the United States authorized by Clean Water Act section 404 permits and other permits issued by the Corps (73 FR 19594; April 10, 2008). For those regulations (33 CFR 332.2 and 40 CFR 230.92, respectively), the Corps and EPA, define "compensatory mitigation" as "the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse effects which remain after all appropriate and practicable avoidance and minimization has been achieved."

When impacts to eelgrass would occur, the action agency should develop a mitigation plan to achieve no net loss in eelgrass function following the recommended steps in this policy. If NMFS determines a mitigation plan is needed, and it was not included with the EFH Assessment for the proposed action, NMFS may recommend, either as comments on the EFH Assessment or as an EFH Conservation Recommendation, that one be provided. Potential mitigation options are described below. The action agency should consider site specific conditions when determining the most appropriate mitigation option for an action.

1. Comprehensive management plans

NMFS supports the development of comprehensive management plans (CMPs) that protect eelgrass resources within the context of broader ecosystem needs and management objectives. Recommendations different from specific elements described below for in-kind mitigation may be appropriate where a CMP (*e.g.*, an enforceable programmatic permit, Special Area Management Plan, harbor plan, or ecosystem-based management plan) exists that is considered to provide adequate population-level and local resource distribution protections to eelgrass. One such CMP under development at the time these guidelines were developed is *City of Newport Beach Eelgrass Protection Mitigation Plan for Shallow Water in Lower Newport Bay: An Ecosystem Based Management Plan*. If satisfactorily completed and adopted, it is anticipated the protection measures for eelgrass within this area would be adequate to meet the objectives of this policy.

In general, it is anticipated that CMPs may be most appropriate in situations where a project or collection of similar projects will result in incremental but recurrent impacts to a small portion of local eelgrass populations through time (*e.g.*, lagoon mouth maintenance dredging, maintenance dredging of channels and slips within established marinas, navigational hazard removal of recurrent shoals, shellfish farming, and restoration or enhancement actions). In order to ensure that these alternatives provide adequate population-level and local resource distribution protections to eelgrass and that the plan is consistent with the overall conservation objectives of this policy, NMFS should be involved early in the plan's development.

2. In-kind mitigation

In-kind compensatory mitigation is the creation, restoration, or enhancement of habitat to mitigate for adverse impacts to the same type of habitat. In most cases in-kind mitigation is the preferred option to compensate for impacts to eelgrass. Generally, in-kind mitigation should achieve a final mitigation ratio of 1.2:1 across all areas of the state, independent of starting mitigation ratios. A starting mitigation ratio is the ratio of mitigation area to impact area when mitigation is initiated. The final mitigation ratio is the ratio of mitigation area to impact area once mitigation is complete. The 1.2:1 ratio assumes: (1) there is no eelgrass function at the mitigation site prior to mitigation efforts, (2) eelgrass function at the mitigation site is achieved within three years, (3) mitigation efforts are successful, and (4) there are no landscape differences (*e.g.*, degree of urban influence, proximity to freshwater source), between the impact site and the mitigation site. Variations from these assumptions may warrant higher or lower mitigation ratios. For example, a higher ratio would be appropriate for an enhancement project where the mitigation site has some level of eelgrass function prior to the mitigation action.

Typically, in-kind eelgrass mitigation involves transplanting or seeding of eelgrass into unvegetated habitat. Successful in-kind mitigation may also warrant modification of physical conditions at the mitigation site to prepare for transplants (*e.g.*, alter sediment composition, depth, etc.). In some areas, other in-kind mitigation options such as removing artificial structures that preclude eelgrass growth may be feasible. If in-kind mitigation that does not include transplants or seeding is proposed, post-mitigation monitoring as described below should be implemented to verify that mitigation is successful.

Information provided below in Section II.F includes specific recommendations for in-kind mitigation, including site selection, reference sites, starting mitigation ratios, mitigation methods, mitigation monitoring and performance criteria. Many of the recommendations provided in these guidelines for eelgrass assessments, surveys, and mitigation may apply throughout the state even if a non-transplant mitigation option is proposed.

3. Mitigation banks and in-lieu-fee programs

In 2006 and 2011, the NMFS Southwest Region (merged with the Northwest Region in 2013 to form the West Coast Region) signed interagency Memorandum of Understandings that established and refined a framework for developing and using combined or coordinated approaches to mitigation and conservation banking and in-lieu-fee programs in California. Other signatory agencies include: the California Resources Agency, California Department of Fish and Wildlife, the Corps, the US Fish & Wildlife Service, the EPA, the Natural Resource Conservation Service, and the State Water Resources Control Board.

Under this eelgrass policy, NMFS supports the use of mitigation bank and in-lieu fee programs to compensate for impacts to eelgrass habitat, where such instruments are available and where such programs are appropriate to the statutory structure under which mitigation is recommended. Mitigation banks and in-lieu fee conservation programs are highly encouraged by NMFS in heavily urbanized waters. Credits should be used at a ratio of 1:1 if those credits have been established for a full three-year period prior to use. If the bank credits have been in place for a

period less than three years, credits should be used at a ratio determined through application of the wetland mitigation calculator (King and Price 2004).

At the request of the action party, and only with approval of NMFS and other appropriate resource agencies and subject to the caveats below, surplus eelgrass area that, after 60-months, exceeds the mitigation needs, as defined in section II.F.6 Mitigation Monitoring and Performance Milestones, has the potential to be considered for future mitigation needs. Additionally, only with the approval of NMFS and other appropriate resource agencies and subject to the caveats below, eelgrass habitat expansion resulting from project activities, and that otherwise would not have occurred, has the potential to be considered for future mitigation needs. Exceeding mitigation needs does not guarantee or entitle the action party or action agency to credit such mitigation to future projects, since every future project must be considered on a case-by-case basis (including the location and type of impact) and viewed in light of the relevant statutory authorities.

4. Out-of-kind mitigation

Out-of-kind compensatory mitigation means the adverse impacts to one habitat type are mitigated through the creation, restoration, or enhancement of another habitat type. In most cases, out-of-kind mitigation is discouraged, because eelgrass is a rare, special-status habitat in California. There may be some scenarios, however, where out-of-kind mitigation for eelgrass impacts is ecologically desirable or when in-kind mitigation is not feasible. This determination should be made based on an established ecosystem plan that considers ecosystem function and services relevant to the geographic area and specific habitat being impacted. Any proposal for out-of-kind mitigation should demonstrate that the proposed mitigation will compensate for the loss of eelgrass habitat function within the ecosystem. Out-of-kind mitigation that generates services similar to eelgrass habitat or improves conditions for establishment of eelgrass should be considered first. NMFS and the federal action agency should be consulted early when out-of-kind mitigation is being proposed in order to determine if out-of-kind mitigation is appropriate, in coordination with other relevant resource agencies (e.g., California Department of Fish and Wildlife, California Coastal Commission, U.S. Fish and Wildlife Service)

F. In-kind Mitigation for Impacts to Eelgrass

As all mitigation project specifics will be determined on a case-by-case basis, circumstances may exist where NMFS staff will need to modify or deviate from the recommended measures described below before providing their recommendation to action agencies.

1. Mitigation Site Selection

Eelgrass habitat mitigation sites should be similar to the impact site. Site selection should consider distance from action, depth, sediment type, distance from ocean connection, water quality, and currents. Where eelgrass that is impacted occurs in marginally suitable environments, it may be necessary to conduct mitigation in a preferable location and/or modify the site to be better suited to support eelgrass habitat creation. Mitigation site modification should be fully coordinated with NMFS staff and other appropriate resource and regulatory agencies. To the extent feasible, mitigation should occur within the same hydrologic system

(e.g., bay, estuary, lagoon) as the impacts and should be appropriately distributed within the same ecological subdivision of larger systems (e.g., San Pablo Bay or Richardson Bay in San Francisco Bay), unless NMFS and the action agency concur that good justification exists for altering the distribution based on valued ecosystem functions and services.

In identifying potentially suitable mitigation sites, it is advisable to consider the current habitat functions of the mitigation site prior to mitigation use. In general, conversion of unvegetated subtidal areas or disturbed uplands to eelgrass habitats may be considered appropriate means to mitigate eelgrass losses, while conversion of other special aquatic sites (e.g., salt marsh, intertidal mudflats, and reefs) is unlikely to be considered suitable. It may be necessary to develop suitable environmental conditions at a site prior to being able to effectively transplant eelgrass into a mitigation area. Mitigation sites may need physical modification, including increasing or lowering elevation, changing substrate, removing shading or debris, adding wave protection or removing impediments to circulation.

2. Mitigation Area Needs

In-kind mitigation plans should address the components described below to ensure mitigation actions achieve no net loss of eelgrass habitat function. Alternative contingent mitigation should be specified and included in the mitigation plan to address situations where performance milestones are not met.

a) *Impacts to Areal Extent of Eelgrass Habitat*

Generally, mitigation of eelgrass habitat should be based on replacing eelgrass habitat extent at a 1.2 (mitigation) to 1 (impact) mitigation ratio for eelgrass throughout all regions of California. However, given variable degrees of success across regions and potential for delays and mitigation failure, NMFS calculated *starting* mitigation ratios using “The Five-Step Wetland Mitigation Ratio Calculator” (King and Price 2004) developed for NMFS Office of Habitat Conservation. The calculator utilizes methodology similar to Habitat Equivalency Analysis (HEA), which is an accepted method to determine the amount of compensatory restoration needed to provide natural resource services that are equivalent to loss of natural resource services following an injury (<http://www.darrp.noaa.gov/economics/pdf/heaoverv.pdf>). HEA is commonly used by NOAA during damage assessment cases, including those involving seagrass. Similar to HEA, the mitigation calculator is based on the “net present value” approach to asset valuation, an economics concept used to compare values of all types of investments, and then modified to incorporate natural resource services. Using the calculator allows for consistency in methodology for all areas within California, avoids arbitrary identification of size of the mitigation area, and avoids cumulative loss to eelgrass habitat that would likely occur with a standard 1:1 ratio (because of the complexity of eelgrass mitigation and the time for created eelgrass to achieve full habitat function).

The calculator includes a number of metrics to determine appropriate ratios that focus on comparisons of quality and quantity of function of the mitigation relative to the site of impact to ensure full compensation of lost function. (see Attachment 4). Among other metrics, the calculator employs a metric of likelihood of failure within the mitigation site based on regional mitigation failure history. As such, the mitigation calculator identifies a recommended starting

mitigation ratio (the mitigation area to eelgrass impact area) based on regional history of success in eelgrass mitigation. Increased initial mitigation site size should be considered to provide greater assurance that the performance milestones, as specified in Section II.F.6, will be met. This is a common practice in the eelgrass mitigation field to reduce risk of falling short of mitigation needs (Thom 1990). Independent of starting mitigation ratio utilized for a given mitigation action, mitigation success should generally be evaluated against a ratio of 1.2:1.

The elevated starting mitigation ratio should be applied to the area of impact to vegetated eelgrass cover only. For unvegetated eelgrass habitat, a starting mitigation ratio of 1.2:1 is appropriate.

To determine the recommended starting mitigation ratio for each region, the percentage of transplant successes and failures was examined over the history of transplanting in the region. NMFS staff examined transplants projects over the past 25 years in all mitigation regions (see Attachment 6). Eelgrass mitigation in Southern California has a 35-year history with 66 transplants performed over that period. In the past 25 years, a total of 47 eelgrass transplants for mitigation purposes have been conducted in Southern California. Forty-three of these were established long enough to evaluate success for these transplants. The overall failure rate, with failure defined as not meeting success criteria established for the project, was 13 percent. Eelgrass mitigation within central California has a better history of successful completion than within southern California, San Francisco Bay, and northern California. However, the number of eelgrass mitigation actions conducted in this region is low and limited to areas within Morro Bay. While the success of eelgrass mitigation in central California has been high, the low number of attempts makes mitigation in this region uncertain. Eelgrass habitat creation/restoration in San Francisco Bay and in northern California has had varied success.

In all cases, best information available at the time of this policy's development was used to determine the parameter values entered into the calculator formula. As regional eelgrass mitigation success changes and the results of ongoing projects become available, the starting mitigation ratio may be updated. Updates in mitigation calculator inputs should not be made on an individual action basis, because the success or lack of success of an individual mitigation project may not reflect overall mitigation success for the region. Rather NMFS should re-evaluate the regional transplant history approximately every 5 years, increasing the record of transplant success in 5 year increments for new projects implemented after NMFS' adoption of these guidelines. If the 5-year review shows that new efforts are more successful than those from the beginning of the 25-year period, NMFS staff should consider removing early projects (*e.g.*, those completed 20 years prior) from the analysis.

On a case-by-case basis and in consultation with action agencies, NMFS may consider proposals with different starting mitigation ratios where sufficient justification is provided that indicates the mitigation site would achieve the no net loss goal. In addition, CMPs could consider different starting mitigation ratios, or other mitigation elements and techniques, as appropriate to the geographic area addressed by the CMP.

Regardless of starting mitigation ratio, eelgrass mitigation should be considered successful, if it meets eelgrass habitat coverage over an area that is 1.2 times the impact area with comparable

eelgrass density as impacted habitat. Please note, delayed implementation, supplemental transplant needs, or NMFS and action agency agreement may result in an altered mitigation area. In the EFH consultation context, NMFS may recommend an altered mitigation area during implementation of the federal agency's mitigation plan following EFH consultation or NEPA review, or as an EFH Conservation Recommendation if the federal agency re-initiates EFH consultation.

(1) Southern California (Mexico border to Pt. Conception)

For mitigation activities that occur concurrent to the action resulting in damage to existing eelgrass habitat, a starting ratio of 1.38 to 1 (transplant area to vegetated cover impact area) should be recommended to counter the regional failure risk. That is, for each square meter of vegetated eelgrass cover adversely impacted, 1.38 square meters of new habitat with suitable conditions to support eelgrass should be planted with a comparable bottom coverage and eelgrass density as impacted habitat.

(2) Central California (Point Conception to mouth of San Francisco Bay).

For mitigation activities that occur concurrent to the action resulting in damage to existing eelgrass habitat, a starting ratio of 1.20 to 1 (transplant area to vegetated cover impact area) should be recommended based on a 0 percent failure rate over the past 25 years (4 transplant actions). It should however be noted that all of these successful transplants included a greater area of planting than was necessary to achieve success such that the full mitigation area would be achieved, even with areas of minor transplant failure.

(3) San Francisco Bay (including south, central, San Pablo and Suisun Bays).

For mitigation activities that occur concurrent to the action resulting in damage to the existing eelgrass bed resource, a ratio of 3.01 to 1 (transplant area to vegetated cover impact area) should be recommended based on a 60 percent failure rate over the past 25 years (10 transplant actions). That is, for each square meter adversely impacted, 3.01 square meters of new habitat with suitable conditions to support eelgrass should be planted with a comparable bottom coverage and eelgrass density as impacted habitat.

(4) Northern California (mouth of San Francisco Bay to Oregon border).

For mitigation activities that occur concurrent to the action resulting in damage to the existing eelgrass habitat, a starting ratio of 4.82 to 1 (transplant area to vegetated cover impact area) should be recommended based on a 75 percent failure rate over the past 25 years (4 transplant actions). That is, for each square meter of eelgrass habitat adversely impacted, 4.82 square meters of new habitat with suitable conditions to support eelgrass should be planted with a comparable bottom coverage and eelgrass density as impacted habitat.

b) *Impacts to Density of Eelgrass Beds*

Degradation of existing eelgrass habitat that results in a permanent reduction of eelgrass turion density greater than 25 percent, and that is a statistically significant difference from pre-impact density, should be mitigated based on an equivalent area basis. The 25 percent and statistically significant threshold is believed reasonable based on supporting information (Fonseca *et al.* 1998, WDFW 2008), and professional practice under SCEMP. In these cases, eelgrass remains present at the action site, but density may be potentially affected by long-term chronic or intermittent effects of the action. Reduction of density should be determined to have occurred when the mean turion density of the impact site is found to be statistically different ($\alpha=0.10$ and $\beta=0.10$) from the density of a reference and at least 25 percent below the reference mean during two annual sampling events following implementation of an action. The number of samples taken to describe density at each site (*e.g.*, impact and reference) should be sufficient to provide for appropriate statistical power. For small impact areas that do not allow for a sample size that provides statistical power, alternative methods for pre- and post- density comparisons could be considered. Mitigation for reduction of turion density without change in eelgrass habitat area should be on a one-for-one basis either by augmenting eelgrass density at the impact site or by establishing new eelgrass habitat comparable to the change in density at the impact site. For example, a 25 percent reduction in density of 100-square meters (100 turions/square meter) of eelgrass habitat to 75 turions/square meter should be mitigated by the establishing 25 square meters of new eelgrass habitat with a density at or above the 100 turions/square meter pre-impact density.

3. Mitigation Technique

In-kind mitigation technique should be determined on a case-by-case basis. Techniques for eelgrass mitigation should be consistent with the best available technology at the time of mitigation implementation and should be tailored to the specific needs of the mitigation site. Eelgrass transplants have been highly successful in southern and central California, but have had mixed results in San Francisco Bay and northern California. Bare-root bundles and seed buoys have been utilized with some mixed success in northern portions of the state. Transplants using frames have also been used with some limited success. For transplants in southern California, plantings consisting of bare-root bundles consisting of 8-12 individual turions each have proven to be most successful (Merkel 1988).

Donor material should be taken from the area of direct impact whenever practical, unless the action resulted in reduced density of eelgrass at the area of impact. Site selections should consider the similarity of physical environments between the donor site and the transplant receiver site and should also consider the size, stability, and history of the donor site (*e.g.*, how long has it persisted and is it a transplant site). Plants harvested should be taken in a manner to thin an existing bed without leaving any noticeable bare areas. For all geographic areas, no more than 10 percent of an existing donor bed should be harvested for transplanting purposes. Ten percent is reasonable based on recommendations in Thom *et al.* (2008) and professional practice under SCEMP. Harvesting of flowering shoots for seed buoy techniques should occur only from widely separated plants.

It is important for action agencies to note that state laws and regulations affect the harvesting and transplantation of donor plants and permission from the state, where required, should be obtained; for example, California Department of Fish and Wildlife may need to provide written authorization for harvesting and transplanting donor plants and/or flowering shoots.

4. Mitigation Plan

NMFS should recommend that a mitigation plan be developed for in-kind mitigation efforts. During consultation, NMFS biologists should request that mitigation plans be provided at least 60 days prior to initiation of project activities to allow for NMFS review. When feasible, mitigation plans should be developed based on preliminary or pre-project eelgrass surveys. When there is uncertainty regarding whether impacts to eelgrass will occur, and the need for mitigation is based on comparison of pre- and post-project eelgrass surveys, NMFS biologists should request that the mitigation plan be provided no more than 60 days following the post-project survey to allow for NMFS review and minimize any delay in mitigation implementation.

At a minimum, the mitigation plan should include:

- Description of the project area
- Results of preliminary eelgrass survey and pre/post-project eelgrass surveys if available (see Section II.B.1 and II.B.2)
- Description of projected and/or documented eelgrass impacts
- Description of proposed mitigation site and reference site(s) (see Section II.B.4)
- Description of proposed mitigation methods (see Section II.F.3)
- Construction schedule, including specific starting and ending dates for all work including mitigation activities. (see Section II.F.5)
- Schedule and description of proposed post-project monitoring and when results will be provided to NMFS
- Schedule and description of process for continued coordination with NMFS through mitigation implementation
- Description of alternative contingent mitigation or adaptive management should proposed mitigation fail to achieve performance measures (see Section II.F.6)

5. Mitigation Timing

Mitigation should commence within 135 days following the initiation of the in-water construction resulting in impact to the eelgrass habitat, such that mitigation commences within the same eelgrass growing season as impacts occur. If possible, mitigation should be initiated prior to or concurrent with impacts. For impacts initiated within 90 days prior to, or during, the low-growth period for the region, mitigation may be delayed to within 30 days after the start of the following growing season, or 90 days following impacts, whichever is longer, without the need for additional mitigation as described below. This timing avoids survey completion during the low growth season, when results may misrepresent progress towards performance milestones.

Delays in eelgrass mitigation result in delays in ultimate reestablishment of eelgrass habitat functions, increasing the duration and magnitude of project impacts to eelgrass. To offset loss of eelgrass habitat function that accumulates through delay, an increase in successful eelgrass

mitigation is needed to achieve the same compensatory habitat function. Because habitat function is accumulated over time once the mitigation habitat is in place, the longer the delay in initiation of mitigation, the greater the additional habitat area needed (i.e., mitigation ratio increasingly greater than 1.2:1) to offset losses. Unless a specific delay is authorized or dictated by the initial schedule of work, federal action agencies should determine whether delays in mitigation initiation in excess of 135 days warrant an increased final mitigation ratio. If increased mitigation ratios are warranted, NMFS should recommend higher mitigation ratios (see Attachment 7). Where delayed implementation is authorized by the action agency, the increased mitigation ratio may be determined by utilizing the Wetlands Mitigation Calculator (King and Price 2004) with an appropriate value for parameter D (See Attachment 4). Examples of delay multipliers generated using the Wetlands Mitigation Calculator are provided in Attachment 5.

Conversely, implementing mitigation ahead of impacts can be used to reduce the mitigation needs by achieving replacement of eelgrass function and services ahead of eelgrass losses. If eelgrass is successfully transplanted three years ahead of impacts, the mitigation ratio would drop from 1.2:1 to 1:1. If mitigation is completed less than three years ahead of impacts, the mitigation calculator can be used to determine the appropriate intermediate mitigation ratio.

6. Mitigation Monitoring and Performance Milestones

In order to document progress and persistence of eelgrass habitat at the mitigation site through and beyond the initial establishment period, which generally is three years, monitoring should be completed for a period of five years at both the mitigation site and at an appropriate reference site(s) (Section II.B.4. Reference Site Selection). Monitoring at a reference site(s) may account for any natural changes or fluctuations in habitat area or density. Monitoring should determine the area of eelgrass and density of plants at 0, 12, 24, 36, 48, and 60 months after completing the mitigation. These intervals will provide yearly updates on the establishment and persistence of eelgrass during the growing season. These monitoring recommendations are consistent with findings of the National Research Council (NRC 2001), the Corps requirements for compensatory mitigation (33 CFR 332.6(b)), and other regional resource policies (Corps 2010, Evans and Leschen 2010, SFWMD 2007).

All monitoring work should be conducted during the active eelgrass growth period and should avoid the recognized low growth season for the region to the maximum extent practicable (typically November through February for southern California, November through March for central California, November through March for San Francisco Bay, and October through April for northern California). Sufficient flexibility in the scheduling of the 6 month surveys should be allowed in order to ensure the work is completed during this active growth period. Additional monitoring beyond the 60-month period may be warranted in those instances where the stability of the proposed mitigation site is questionable, where the performance of the habitat relative to reference sites is erratic, or where other factors may influence the long-term success of mitigation. Mitigation plans should include a monitoring schedule that indicates when each of the monitoring events will be completed.

The monitoring and performance milestones described below are included as eelgrass transplant success criteria in the SCEMP. These numbers represent milestones and associated timelines

typical of successful eelgrass habitat development based on NMFS' experience with: (1) conducting eelgrass surveys and monitoring and (2) reviewing mitigation monitoring results for projects implemented under SCEMP. Restored eelgrass habitat is expected to develop through an initial 3 year monitoring period such that, within 36 months following planting, it meets or exceeds the full coverage and not less than 85 percent of the density relative to the initial condition of affected eelgrass habitat. Restored eelgrass habitat is expected to sustain this condition for at least 2 additional years.

Monitoring events should evaluate the following performance milestones:

- Month 0 – Monitoring should confirm the full coverage distribution of planting units over the initial mitigation site as appropriate to the geographic region.
- Month 6 – Persistence and growth of eelgrass within the initial mitigation area should be confirmed, and there should be a survival of at least 50 percent of the initial planting units with well-distributed coverage over the initial mitigation site. For seed buoys, there should be demonstrated recruitment of seedlings at a density of not less than one seedling per four (4) square meters with a distribution over the extent of the initial planting area. The timing of this monitoring event should be flexible to ensure work is completed during the active growth period.
- Month 12–The mitigation site should achieve a minimum of 40 percent coverage of eelgrass and 20 percent density of reference site(s) over not less than 1.2 times the area of the impact site.
- Month 24–The mitigation site should achieve a minimum of 85 percent coverage of eelgrass and 70 percent density of reference site(s) over not less than 1.2 times the area of the impact site.
- Month 36–The mitigation site should achieve a minimum of 100 percent coverage of eelgrass and 85 percent density of reference site(s) over not less than 1.2 times the area of the impact site.
- Month 48–The mitigation site should achieve a minimum of 100 percent coverage of eelgrass and 85 percent density of reference site(s) over not less than 1.2 times the area of the impact site.
- Month 60–The mitigation site should achieve a minimum of 100 percent coverage of eelgrass and 85 percent density of reference site(s) over not less than 1.2 times the area of the impact site.

Performance milestones may be re-evaluated or modified if declines at a mitigation site are also demonstrated at the reference site, and therefore, may be a result of natural environmental stressors that are unrelated to the intrinsic suitability of the mitigation site. In the EFH consultation context, NMFS should provide recommendations regarding modification of performance milestones as technical assistance during interagency coordination as described in

the mitigation plan or as EFH Conservation Recommendations if the federal action agency re-initiates EFH consultation.

7. Mitigation Reporting

NMFS biologists should request monitoring reports and spatial data for each monitoring event in both hard copy and electronic version, to be provided within 30 days after the completion of each monitoring period to allow timely review and feedback from NMFS. These reports should clearly identify the action, the action party, mitigation consultants, relevant points of contact, and any relevant permits. The size of permitted eelgrass impact estimates, actual eelgrass impacts, and eelgrass mitigation needs should be identified, as should appropriate information describing the location of activities. The report should include a detailed description of eelgrass habitat survey methods, donor harvest methods and transplant methods used. The reports should also document mitigation performance milestone progress (see II.F.6. Mitigation Monitoring and Performance Milestones). The first report (for the 0-month post-planting monitoring) should document any variances from the mitigation plan, document the sources of donor materials, and document the full area of planting. The final mitigation monitoring report should provide the action agency and NMFS with an overall assessment of the performance of the eelgrass mitigation site relative to natural variability of the reference site to evaluate if mitigation responsibilities were met. An example summary is provided in Attachment 3.

8. Supplemental Mitigation

Where development of the eelgrass habitat at the mitigation site falls short of achieving performance milestones during any interim survey, the monitoring period should be extended and supplemental mitigation may be recommended to ensure that adequate mitigation is achieved. In the EFH consultation context, NMFS should provide recommendations regarding extended monitoring as technical assistance during interagency coordination as described in the mitigation plan or as EFH Conservation Recommendations if the federal action agency re-initiates EFH consultation. In some instances, an adaptive management corrective action to the existing mitigation area may be appropriate. In the event of a mitigation failure, the action agency should convene a meeting with the action party, NMFS, and applicable regulatory and/or resource agencies to review the specific circumstances and develop a solution to achieve no net loss in eelgrass habitat function.

As indicated previously, while in-kind mitigation is preferred, the most appropriate form of compensatory mitigation should be determined on a case-by-case basis. In cases where it is demonstrated that in-kind replacement is infeasible, out-of-kind mitigation may be appropriate over completion of additional in-kind mitigation. The determination that an out-of-kind mitigation is appropriate will be made by NMFS, the action agency, and the applicable regulatory agencies, where a regulatory action is involved.

G. Special Circumstances

Depending on the circumstances of each individual project, NMFS may make recommendations different from those described above on a case by case basis. For the scenarios described below,

for example, NMFS could recommend a mitigation ratio of 1:1 or for use of out-of-kind mitigation. Because NMFS needs a proper understanding of eelgrass habitat in the project area and potential impacts of the proposed project to evaluate the full effects of authorized activities, NMFS should not make recommendations that diverge from these guidelines if they would result in surveys, assessments or reports inferior to those which might be obtained through the guidance in Section II. The area thresholds described below are taken from the SCEMP and/or reflect recommendations NMFS staff have repeatedly made during individual EFH consultations. These thresholds minimize impacts to eelgrass habitat quality and quantity, based on NMFS' experience with: (1) conducting eelgrass surveys and monitoring and (2) reviewing project monitoring results for projects implemented under SCEMP. The special circumstance included for shellfish aquaculture longlines is supported by Rumrill and Poulton (2004) and the NMFS Office of Aquaculture.

1. Localized Temporary Impacts

NMFS may consider modified target mitigation ratios for localized temporary impacts wherein the damage results in impacts of less than 100 square meters and eelgrass habitat is fully restored within the damage footprint within one year of the initial impact (e.g., placement of temporary recreational facilities, shading by construction equipment, or damage sustained through vessel groundings or environmental clean-up operations). In such cases, the 1.2:1 mitigation ratio should not apply, and a 1:1 ratio of impact to recovery would apply. A monitoring program consisting of a pre-construction eelgrass survey and three post-construction eelgrass surveys at the impact site and appropriate reference site(s) should be completed in order to demonstrate the temporary nature of the impacts. NMFS should recommend that surveys be completed as follows: 1) the first post-construction eelgrass survey should be completed within 30 days following completion of construction to evaluate direct effects of construction, 2) the second and third post-construction surveys should be performed approximately one year after the first post-construction survey, and approximately two years after the first post-construction survey, respectively, during the appropriate growing season to confirm no indirect, or longer term effects resulted from construction. A compelling reason should be demonstrated before any reduced monitoring and reporting recommendations are made.

2. Localized Permanent Impacts

a) If both NMFS and the authorizing action agencies concur, the compensatory mitigation elements of this policy may not be necessary for the placement of a single pipeline, cable, or other similar utility line across existing eelgrass habitat with an impact corridor of no more than 1 meter wide. NMFS should recommend the completion of pre- and post-action surveys as described in section II.B. and II.D. The actual area of impact should be determined from the post-action survey. NMFS should recommend the completion of an additional survey (after 1 year) to ensure that the action or impacts attributable to the action have not exceeded the 1-meter corridor width. NMFS should recommend that, if the post-action or 1 year survey demonstrates a loss of eelgrass habitat greater than the 1-meter wide corridor, mitigation should be undertaken.

b)) If both NMFS and the authorizing action agencies concur that the spacing of shellfish aquaculture longlines does not result in a measurable net loss of eelgrass habitat in the project

area, then mitigation associated with local losses under longlines may not be necessary. NMFS should recommend the completion of pre- and post-action surveys as described in section II.B. and II.D. NMFS should recommend the completion of additional post-action monitoring surveys (to be completed approximately 1 year and 2 years following implementation of the action) to ensure that the action or impacts attributable to the action have not resulted in net adverse impacts to eelgrass habitat. NMFS should recommend that, if the 1-year or 2-year survey demonstrates measurable impact to eelgrass habitat, mitigation should be undertaken. c) NMFS should consider mitigation on a 1:1 basis for impacts less than 10 square meters to eelgrass patches where impacts are limited to small portions of well-established eelgrass habitat or eelgrass habitat that, despite highly variable conditions, generally retain extensive eelgrass, even during poor years. A reduced mitigation ratio should not be considered where impacts would occur to isolated or small eelgrass habitat areas within which the impacted area constitutes more than 1% of the eelgrass habitat in the local area during poor years.

c) If NMFS concurs and suitable out-of-kind mitigation is proposed, compensatory mitigation may not be necessary for actions impacting less than 10 square meters of eelgrass.

III. Glossary of Terms

Except where otherwise specified, the explanations of the following terms are provided for informational purposes only and are described solely for the purposes of this policy; where a NMFS statute, regulation, or agreement requires a different understanding of the relevant term, that understanding of the term will supplant these explanations provided below.

Compensatory mitigation – restoration, establishment, or enhancement of aquatic resources for the purposes of offsetting unavoidable authorized adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Ecosystem – a geographically specified system of organisms, the environment, and the processes that control its dynamics. Humans are an integral part of an ecosystem.

Ecosystem function – ecological role or process provided by a given ecosystem.

Ecosystem services – contributions that a biological community and its habitat provide to the physical and mental well-being of the human population (*e.g.*, recreational and commercial opportunities, aesthetic benefits, flood regulation).

Eelgrass habitat – areas of vegetated eelgrass cover (any eelgrass within 1 square meter quadrat and within 1 m of another shoot) bounded by a 5 m wide perimeter of unvegetated area

Essential fish habitat (EFH) – EFH is defined in the MSA as “...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”

EFH Assessment – An assessment as further explained in 50 C.F.R. § 600.920(e).

EFH Consultation – The process explained in 50 C.F.R. § 600.920

EFH Conservation Recommendation – provided by the National Marine Fisheries Service (NMFS) to a federal or state agency pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act regarding measures that can be taken by that agency to conserve EFH. As further explained in 50 C.F.R. § 600.925, EFH Conservation Recommendations may be provided as part of an EFH consultation with a federal agency, or may be provided by NMFS to any federal or state agency whose actions would adversely affect EFH .

Habitat – environment in which an organism(s) lives, including everything that surrounds and affects its life, including biological, chemical and physical processes.

Habitat function – ecological role or process provided by a given habitat (*e.g.*, primary production, cover, food, shoreline protection, oxygenates water and sediments, etc.).

In lieu fee program – a program involving the restoration, establishment, and/or enhancement of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation needs; an in lieu fee program works like a mitigation bank, however, fees to compensate for impacts to habitat function are collected prior to establishing an on-the-ground conservation/restoration project.

In-kind mitigation – mitigation where the adverse impacts to a habitat are mitigated through the creation, restoration, or enhancement of the same type of habitat.

Mitigation – action or project undertaken to offset impacts to an existing natural resource.

Mitigation bank – a parcel of land containing natural resource functions/values that are conserved, restored, created and managed in perpetuity and used to offset unavoidable impacts to comparable resource functions/values occurring elsewhere. The resource functions/values contained within the bank are translated into quantified credits that may be sold by the banker to parties that need to compensate for the adverse effects of their activities.

Out-of-kind mitigation – mitigation where the adverse impacts to one habitat type are mitigated through the creation, restoration, or enhancement of another habitat type

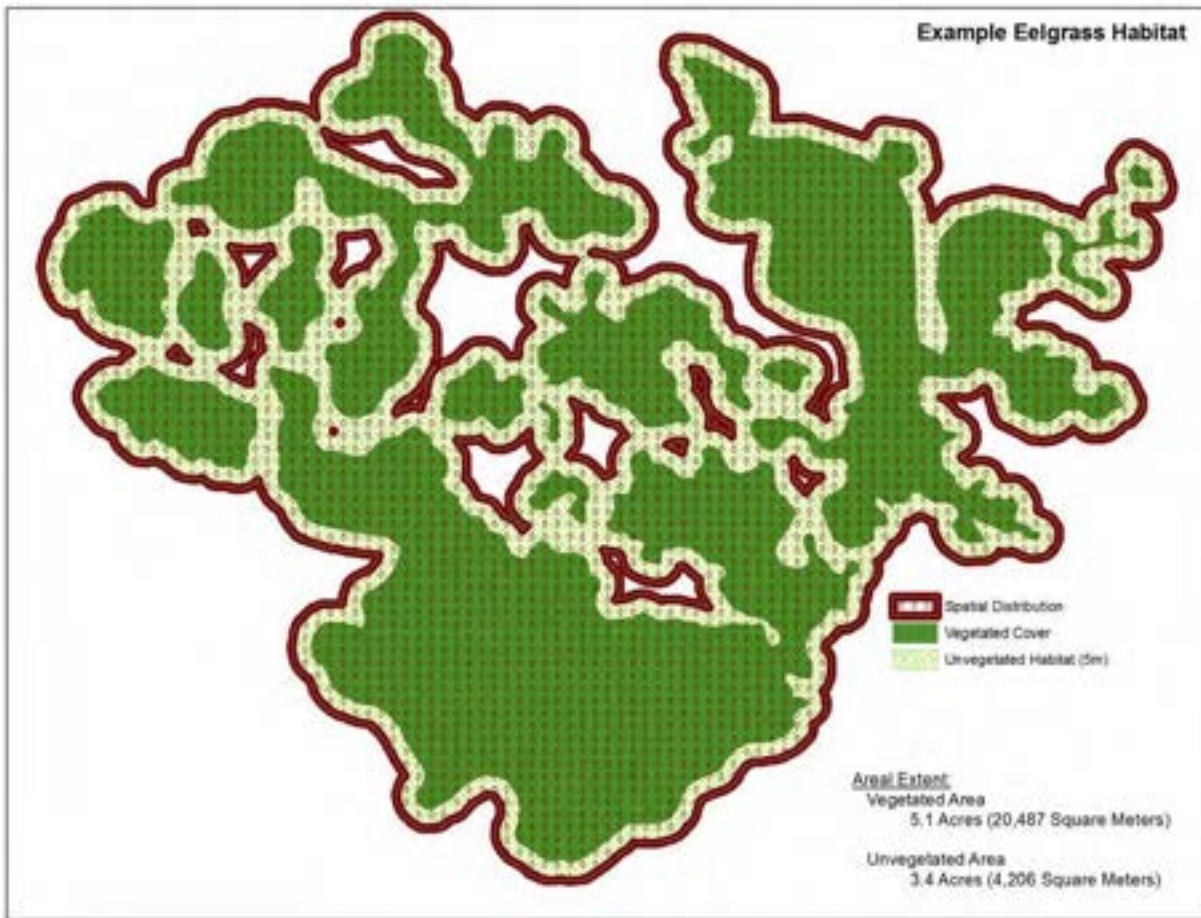
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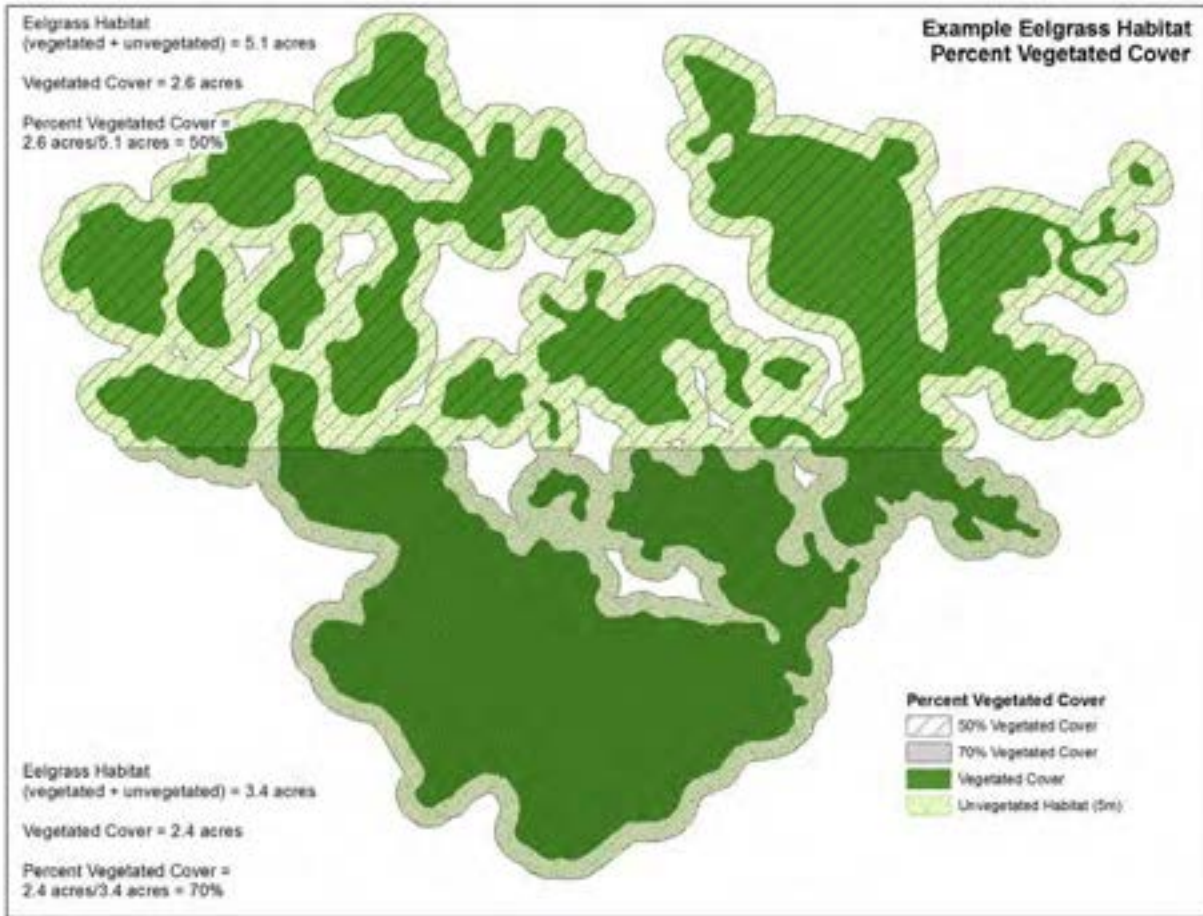
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ATTACHMENT 1. Graphic depiction of eelgrass habitat definition including spatial distribution and aerial coverage of vegetated cover and unvegetated eelgrass habitat.

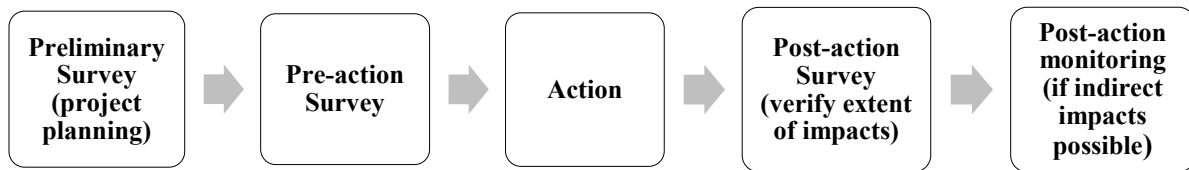


ATTACHMENT 2. Example Eelgrass Habitat Percent Vegetated Cover.



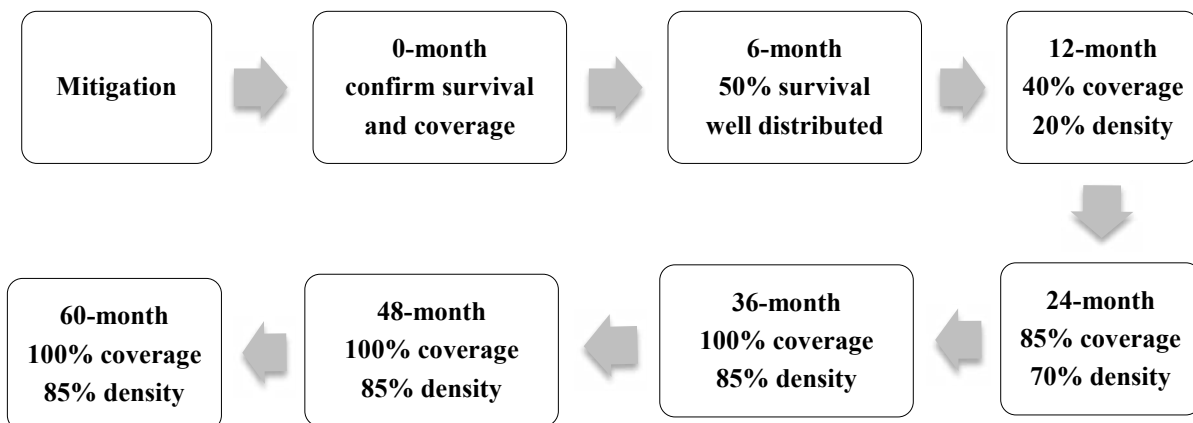
ATTACHMENT 3. Flow chart depicting timing of surveys and monitoring.

a) Eelgrass impact surveys



- All surveys should be completed during the growing season
- Surveys should be completed at the impact site and an appropriate reference site(s)
- A preliminary survey completed for planning purposes may be completed a year or more in advance of the action.
- Pre-action and post-action surveys should be completed within 60 days of the action.
- A survey is good for 60 days, or if that 60 day period extends beyond the end of growing season, until start of next growing season
- Two years of monitoring following the initial post-action monitoring event may be needed to verify lack or extent of indirect effects.
- Survey reports should be provided to NMFS and the federal action agency within 30 days of completion of each survey event

b) Eelgrass mitigation monitoring



- Mitigation should occur coincident or prior to the action
- All monitoring should be completed during the growing season
- Performance metrics for each monitoring event are compared to the 1.2:1 mitigation ratio
- Monitoring reports should be provided to NMFS and the federal action agency 30 days of completion of each monitoring event
- NMFS and action agency will evaluate if performance metrics met, and decide if supplemental mitigation or other adaptive management measures are needed

ATTACHMENT 4. Eelgrass transplant monitoring report.

In order to ensure that NMFS is aware of the status of eelgrass transplants, action agencies should provide or ensure that NMFS is provided a monitoring report summary with each monitoring report. For illustrative purposes only, an example of a monitoring report summary is provided below.

ACTION PARTY CONTACT INFORMATION:

Action Name (same as permit reference):

(a) Action party Information

Name	Address
Contact Name	City, State, Zip
Phone	Fax
Email	

MITIGATION CONSULTANT

Name	Address
Contact Name	City, State, Zip
Phone	Fax
Email	

PERMIT DATA:

Permit	Issuance Date	Expiration Date	Agency Contact

EELGRASS IMPACT AND MITIGATION NEEDS SUMMARY:

Permitted Eelgrass Impact Estimate (m ²):	
Actual Eelgrass Impact (m ²):	On (post-construction date):
Eelgrass Mitigation Needs (m ²):	Mitigation Plan Reference:
Impact Site Location:	
Impact Site Center Coordinates (actionion &	

datum):	
Mitigation Site Location:	
Mitigation Site Center Coordinates (actionion & datum):	

ACTION ACTIVITY DATA:

Activity	Start Date	End Date	Reference Information
Eelgrass Impact			
Installation of Eelgrass Mitigation			
Initiation of Mitigation Monitoring			

MITIGATION STATUS DATA:

	Mitigation Milestone	Scheduled Survey	Survey Date	Eelgrass Habitat Area (m ²)	Bottom Coverage (Percent)	Eelgrass Density (turions/m ²)	Reference Information
Month	0						
	6						
	12						
	24						
	36						
	48						
	60						

FINAL ASSESSMENT:

Was mitigation met?	
Were mitigation and monitoring performed timely?	
Were mitigation delay increases needed or were supplemental mitigation programs necessary?	

ATTACHMENT 5. Wetlands mitigation calculator formula and parameters.

Starting mitigation ratios for each region within California were calculated using “The Five-Step Wetland Mitigation Ratio Calculator” (King and Price 2004) developed for NMFS Office of Habitat Conservation. The discrete time equation this method uses to solve for the appropriate mitigation ratio is as follows:

$$R = \frac{\sum_{t=0}^{T_{max}} (1+r)^{-t}}{(B(1-E)(1+L) - A) \left[\sum_{t=D}^{C-D-1} \frac{(t+D)}{C(1+r)^t} + \sum_{t=C}^{T_{max}} (1+r)^{-t} \right] + \left[\sum_{t=D}^{T_{max}} \frac{1 - (1-k)^{(t-D)}}{(1+r)^{(t-D)}} \right]} (A(1+L))$$

The calculator parameters in the above equation and values used to calculate starting mitigation ratios for CEMP are as follows:

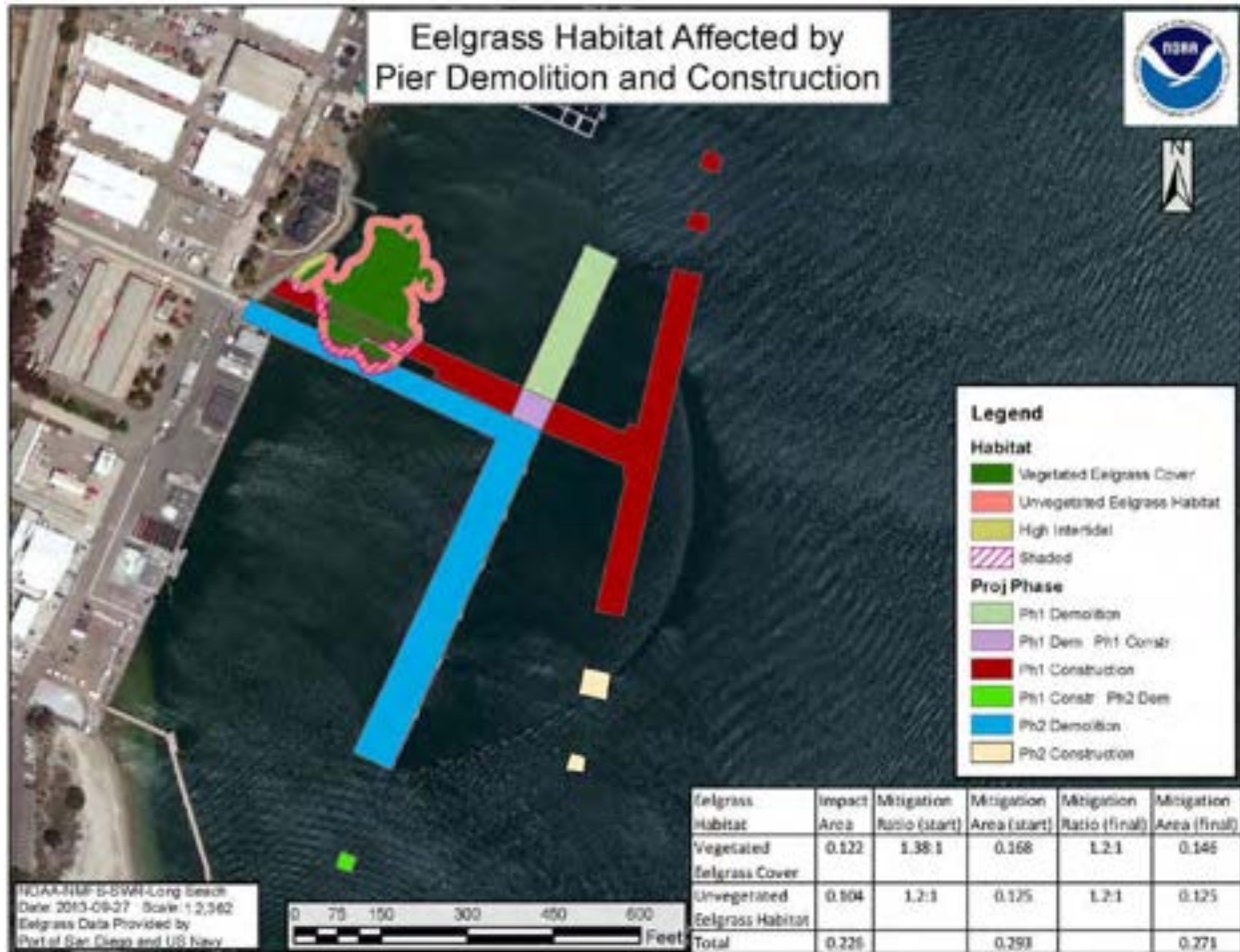
Symbol	Calculator Parameter	Value
A	The level of habitat function provided at the mitigation site prior to the mitigation project	0%
B	The maximum level of habitat function that mitigation is expected to attain, if it is successful	100%
C	The number of years after construction that the mitigation project is expected to achieve maximum function	3 yrs
D	The number of years before destruction of the impacted wetland that the mitigation project begins to generate habitat function	0 yrs
E	The percent likelihood that the mitigation project will fail and provide none of the anticipated benefits	various*
L	The percent difference in expected habitat function based on differences in landscape context of the mitigation site when compared with the impacted wetland	0%
k	The percent likelihood that the mitigation site, in the absence purchase or easement would be developed in any future year	0%
r	The discount rate used for comparing gains and losses that accrue at different times in terms of their present value	3%**
Tmax	The time horizon used in the analysis (chosen to maintain 1.2:1 ratio at E=100% and other parameter values listed above).	13 yrs

* The value for E was based on regional history of success in eelgrass mitigation and varied between regions (see Attachment X).

** NOAA suggests the use of a 3 percent real discount rate for discounting interim service losses and restoration gains, unless a different proxy for the social rate of time preference is more appropriate. (NOAA-DARP 1999) We use this value here, because it is based on best available information and is consistent with the NOAA Damage Assessment and Restoration Program.

ATTACHMENT 6. Example calculations for application of starting and final mitigation ratios for impacts to eelgrass habitat in southern California.

In this example, a pier demolition and construction would impact 0.122 acres of vegetated eelgrass habitat (dark green) and 0.104 acres of unvegetated habitat (pink). Area of impact is indicated by purple hatch mark. Application of recommended starting mitigation ratio for southern California (1.38:1) and final mitigation ratio (1.2:1) to compute starting and final mitigation area for this example are shown in the table.



ATTACHMENT 7. Example mitigation area multipliers for delay in initiation of mitigation activities.

Delays in eelgrass transplantation result in delays in ultimate reestablishment of eelgrass habitat values, increasing the duration and magnitude of project effects to eelgrass. The delay multipliers in the table below have been generated by altering the implementation start time within “The Five-Step Wetland Mitigation Ratio Calculator” (King and Price 2004).

MONTHS POST-IMPACT	DELAY MULTIPLIER (Percent of Initial Mitigation Area Needed)
0-3 mo	100%
4-6 mo	107%
7-12 mo	117%
13-18 mo	127%
19-24 mo.	138%
25-30 mo.	150%
31-36 mo	163%
37-42 mo.	176%
43-48 mo.	190%
49-54 mo.	206%
55-60 mo.	222%



ATTACHMENT 8. Summary of Eelgrass Transplant Actions in California

See table starting next page.

SUMMARY OF EELGRASS (*ZOSTERA MARINA*) TRANSPLANT PROJECTS IN CALIFORNIA

No.	Region	System	Location	Year	Size*	Type**	Consistent with Permit Conditions	Success Status***	Net Result****
Southern California Eelgrass Restoration History									
	Southern	San Diego Bay	North Island	1976	<0.1	SP	yes	no	-
	Southern	San Diego Bay	"Delta" Beach	1977	1.6	SP	yes	partial	-
	Southern	San Diego Bay	North Island	1978	<0.1	SP	yes	yes	+
	Southern	Newport Bay	Carnation Cove	1978	<0.1	SP	no	no	-
	Southern	Newport Bay	West Jetty	1980	<0.1	SP	yes	partial	0
	Southern	Mission Bay	multiple beaches	1982	<0.1	SP	no	partial	0
	Southern	LA/LB Harbor	Cabrillo Beach	1985	<0.1	BR	yes	yes	+
	Southern	Alamitos Bay	Peninsula	1985	<0.1	BR	yes	yes	+
	Southern	Huntington Hbr.	Main Channel	1985	<0.1	BR	yes	no	0
	Southern	Newport Bay	Upper	1985	<0.1	BR	yes	no	0
	Southern	Mission Bay	Sail Bay	1988	2.7	BR	yes	yes	+
	Southern	San Diego Bay	NEMS 1	1987	3.8	BR	no	yes	+
	Southern	San Diego Bay	Chula Vista Wildlife Reserve	1987	<0.1	BR	yes	no	+ ¹
	Southern	San Diego Bay	Harbor Island	1988	0.1	BR	yes	yes	+
	Southern	Huntington Harbour	Entrance Channel	1989	0.1	BR	no	yes	+
	Southern	San Diego Bay	Le Meridien Hotel	1990	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	Embarcadero	1991	<0.1	BR	yes	yes	+ ²
	Southern	Mission Bay	Sea World Lagoon	1991	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	Loew's Marina	1991	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	NEMS 2	1993	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	Sea Grant Study	1993	<0.1	BR	yes	yes	+
	Southern	Agua Hedionda Lagoon	Outer Lagoon	1993	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	NEMS 5	1994	0.4	BR	yes	yes	+
	Southern	Mission Bay	South Shores Basin	1994	2.9	BR	yes	yes	+
	Southern	Talbert Marsh	Talbert Channel	1995	<0.1	BR	na	yes	+ ⁴
	Southern	Mission Bay	various sites	1995	4.8	BR	yes	yes	+
	Southern	Mission Bay	Ventura Cove ⁵	1996	0.5	BR	yes	yes	+ ⁹
	Southern	Mission Bay	Santa Clara Cove	1996	<0.1	BR	yes	no	0 ¹⁰
	Southern	Mission Bay	West Mission Bay Drive Bridge	1996	<0.1	BR	no	yes	0 ¹⁰
	Southern	Mission Bay	De Anza Cove	1996	<0.1	BR	yes	yes	+
	Southern	Batiquitos Lagoon	all basins	1997	21.6 ⁷	BR	yes	yes	+ ⁸
	Southern	San Diego Bay	NEMS 5	1997	7.1	BR	yes	yes	+
	Southern	San Diego Bay	Convair Lagoon	1998	2.5	BR	yes	no	- ¹²
	Southern	San Diego Bay	NEMS 6	1999	0.3	BR	yes	yes	+
	Southern	Aqua Hedionda	Bristol Cove	1999	0.3	BR	yes	yes	+
	Southern	Aqua Hedionda	Middle Lagoon and Inner Lagoon	1999	4	BR	yes	yes	+
	Southern	Newport Bay	Balboa Is. Grand Cana	1999	<0.1	BR	yes	yes	+
	Southern	Mission Bay	West Ski Island	2001	0.2	BR	yes	yes	+

No.	Region	System	Location	Year	Size*	Type**	Consistent with Permit Conditions	Success Status***	Net Result****
	Southern	San Diego Bay	Expanded NEMS 6	2001	0.6	BR	yes	yes	+
	Southern	Newport Bay	USCG Corona del Mar	2002	<0.1	BR	yes	yes	+
	Southern	Huntington Harbour	Sunset Bay	2002	<0.1	BR	yes	yes	+
	Southern	San Diego Bay	Navy Enhancement Is.	2002	1	BR	yes	yes	+
	Southern	San Diego Bay	Coronado Bay Bridge	2003	0.3	BR	no	no	0
	Southern	LA Harbor	P300 Expansion Area	2003	5.9	BR	yes	partial	- ⁹
	Southern	Newport Bay	Newport Bay Channel Dredging	2004	0.4	BR	yes	no	-
	Southern	San Diego Bay	South Bay Borrow Pit	2004	4.2	BR	yes	yes	pending ⁹
	Southern	San Diego Bay	USCG ATC Pier	2004	0.1	BR	yes	yes	+
	Southern	San Diego Bay	South Bay Borrow Pit Sup.	2006	4.2	BR	yes	yes	pending ⁹
	Southern	San Diego Bay	D Street Marsh	2006	0.3	BR	yes	pending	pending
	Southern	LA Harbor	P300 Supplement	2007	0.8	BR	yes	yes	pending
	Southern	San Diego Bay	Glorietta Bay Shoreline Park	2007	0.2	BR	yes	yes	pending
	Southern	Bolsa Chica	Pilot Eelgrass Restoration	2007	0.5	BR	yes	yes	+ ⁴
	Southern	San Diego Bay	Borrow Pit Supplement	2007	4.2	BR	yes	yes	pending ⁹
	Southern	San Diego Bay	Sweetwater Silvergate Frac-out	2008	<0.1	BR	yes	yes	0 ¹¹
	Southern	San Diego Bay	Harbor Drive Bridge/NTC Channel	2009	<0.1	BR	yes	pending	pending
Southern California Eelgrass Success Rate (1989-2009, Last 20 Years)								87%	n=43
Central California Eelgrass Restoration History									
	Central	Morro Bay	Anchorage Area	1985	<0.1	BR	no	yes	+
	Central	Morro Bay	Target Rock	1997	<0.1	BR	no	yes	+
	Central	Morro Bay	Morro Bay Launch Ramp	2000	<0.1	BR	yes	yes	+
	Central	Morro Bay	Mooring Area A1	2002	0.3	BR	yes	yes	+
	Central	Morro Bay	Western Shoal	2010	0.8	BR	yes	pending	pending
Central California Eelgrass Success Rate (1985-2009, Inadequate History to Exclude Older Projects)								100%	n=4
San Francisco Bay Eelgrass Restoration History									
	San Francisco Bay	San Francisco Bay	Richmond Training Wall	1985	<0.1	BR	NA	no	NA ⁴
	San Francisco Bay	San Francisco Bay	Keil Cove and Paradise Cove	1989	0.1	Plugs	NA	partial	NA ⁴
	San Francisco Bay	San Francisco Bay	Bayfarm Island/Middle Harbor Shoal	1996	0.1	BR and Plugs	NA	partial	NA ⁴
	San Francisco Bay	San Francisco Bay	Bayfarm Island	1999	0.1	BR	NA	partial	NA ⁴
	San Francisco Bay	San Francisco Bay	Brickyard Cove, Berkeley	2002	0.2	BR	yes	yes	+ ¹²
	San Francisco Bay	San Francisco Bay	Emeryville Shoals	2002	0.1	Mixed Test	NA	no	NA ⁴
	San Francisco Bay	San Francisco Bay	Marin CDay, R&GC, Audubon	2006	0.6	Seed Bouy	NA	partial	pending ⁴
	San Francisco Bay	San Francisco Bay	Marin CDay, R&GC, Audubon	2006	<0.1	mod. TERFS	NA	partial	pending ⁴
	San Francisco Bay	San Francisco Bay	Marin CDay, R&GC, Audubon	2006	<0.1	Seeding	NA	no	NA ⁴
	San Francisco Bay	San Francisco Bay	Clipper Yacht Harbor, Sausalito	2007	<0.1	Frames	yes	pending	pending
	San Francisco Bay	San Francisco Bay	Albany, Emeryville, San Rafael	2007	<0.1	BR	NA	partial	pending ⁴
	San Francisco Bay	San Francisco Bay	Belvedere	2008	<0.1	Frames	yes	pending	pending
San Francisco Bay Eelgrass Success Rate (1985-2009, Inadequate History to Exclude Older Projects)								40%	n=10

No.	Region	System	Location	Year	Size*	Type**	Consistent with Permit Conditions	Success Status***	Net Result****
Northern California Eelgrass Restoration History									
	Northern	Humboldt Bay	Indian Island	1962	unknown	BR	unknown	no	-
	Northern	Bodega Harbor	Spud Point Marina	1964	1.3	BR	yes	no	-
	Northern	Humboldt Bay	Indian Island	1966	<0.1	BR	yes	no	-
	Northern	Humboldt Bay		1966	0.2	unknown	unknown	no	-
	Northern	Humboldt Bay	SR255 Bridge	2004	<0.1	BR	yes	no	-
	Northern	Humboldt Bay	Maintenance Dredging Project	2005	<0.1	BR	yes	yes	+
Northern California Eelgrass Success Rate (1962-2009, Inadequate History to Exclude Older Projects)								25%	n=4

* size in hectares

SP = sediment laden plug

** BR = bare root

*** success status is measured as yes, no, partial, pending, or unknown. Success rate is reported as percentage of successful over total completed within the past 25 years. yes = 1, partial = 0.5, no = 0, and pending or unknown are not counted in either the numerator or denominator in determining success percentage.

**** + = net increase in eelgrass coverage, 0 = no change in eelgrass coverage, - = net decrease in eelgrass coverage

1 Transplant was initially adversely impacted by an unknown source of sediment and was deemed unsuitable.

2 The transplant declined initially and later recovered from what was determined to be a one time sedimentation event.

3 Transplant was experimental due to dense beds of the exotic mussel *Musculista senhousia* which inhibited the growth of the transplant. Replacement transplant done elsewhere.

Transplant was completed in an area deemed unsuitable. Insufficient coverage required the construction of a remedial site. Monitoring continues at both the initial and remedial sites.

4 Transplant was experimental.

5 Multiple sites.

6 Mitigation for marina at Princess Resort, project not built

7 Amount of eelgrass present within all basins as of 2000 mapping.

8 Regional eelgrass decline has resulted in die-offs both within restoration and reference areas equally full recovery had not occurred at the time of evaluation, yet project exceeds control-corrected req.

9 Original site was constructed as a plateau that was underfilled and anticipated to fall short of objectives. A supplemental transplant was therefore completed when development began to exhibit shortfalls in area.

10 Shortfall mitigated by withdraw from established eelgrass mitigation bank.

11 Exception conditions from SCEMP requiring only replacement in place for unanticipated damage

12 Mitigated out-of-kind with non-eelgrass to satisfy permit requirements after shortfall in eelgrass mitigation.

Attachment 3

Draft Mitigation and Monitoring Reporting Plan, Additional Proposed Mitigation Measures

Biological Resources (BIO)			
Mitigation Measure (MM)	Description	Timing	Responsible Party
MM-BIO-2	<p><i>Mitigation Measure BIO-2:</i> Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act and California Fish and Game Code when nests are in active use. This shall be accomplished by taking the following steps.</p> <ul style="list-style-type: none"> • If construction is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within seven days prior to the onset of vegetation removal or construction, in order to identify any active nests on the project site and in the vicinity of proposed construction. The survey shall be repeated if seven or more days elapse without construction or vegetation removal activity at the Project site. • If no active nests are identified during the survey period, or if development is initiated during the non-breeding season (September through January), construction may proceed with no restrictions. • If active nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the California Department 	Prior to Ground Disturbance and continuing over the course of the Project	Project Applicant

	<p>of Fish and Wildlife (CDFW) and may vary depending on species and sensitivity to disturbance. The no-disturbance zone shall be fenced with temporary orange construction fencing or other conspicuous demarcation such as signage and flagging if construction is to be initiated on the remainder of the development site.</p> <ul style="list-style-type: none"> • A report of findings shall be prepared by the qualified biologist and submitted to the City of Belvedere for review and approval prior to initiation of construction within the no-disturbance zone during the nesting season (February through August). The report shall either confirm absence of any active nests or confirm that any young birds have fledged within a designated no-disturbance zone and construction can proceed. 		
MM-BIO-4	<p><i>Mitigation Measure BIO-4 – Eelgrass.</i> Eelgrass surveys, both pre and post-construction, will be conducted in accordance with the conditions and recommendations contained with the California Eelgrass Mitigation Policy. If it is determined, from the results of the pre-construction eelgrass survey, that potential impacts to eelgrass will occur from Project activities, an eelgrass monitoring and mitigation plan will be prepared. All surveys and plans will be provided to CDFW and NMFS, along with the other authorizing agencies, prior to and following the start of construction.</p>	<p>Prior to Ground Disturbance and continuing over the course of the Project</p>	<p>Project Applicant</p>
MM-BIO-5	<p><i>Mitigation Measure BIO-5: Pre-Project Special-Status Plant Surveys.</i> Prior to the start of Project activities, a Qualified Biologist shall conduct botanical surveys during the appropriate blooming period and conditions for all special-status plants that have the potential to occur within or near the Project, unless otherwise approved in writing by CDFW. More than one year of surveys may be necessary. Surveys shall be conducted according to CDFW's Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities³. The survey reports shall be submitted to CDFW prior to the start</p>	<p>Prior to Ground Disturbance and continuing over the course of the Project</p>	<p>Project Applicant</p>

³ CDFW, 2018. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline>

	<p>of construction. Project activities shall not proceed until CDFW has provided written approval of the survey reports. If any special-status plant species are observed, the Project shall fully avoid direct and indirect impacts to all individuals and prepare and implement a CDFW-approved avoidance plan prior to Project activities. If impacts to special status plants cannot be avoided, the Project shall provide habitat compensation at a 3:1 mitigation to impact ratio including permanent protection of habitat through a conservation easement and funding and implementing a long term management plan, prior to Project activities, unless otherwise approved in writing by CDFW.</p>		
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LETTER B1

California Department of Fish and Wildlife

- B1-1 This comment reviews the regulatory authority of the California Department of Fish and Wildlife (CDFW), which is noted, and does not address the adequacy of the DEIR. No additional response is necessary.
- B1-2 This comment briefly summarizes the project details such as location and schedule and does not address the adequacy of the DEIR.
- B1-3 This comment summarizes the marine biological significance of the project site vicinity and lists eight special-status species and five species with important commercial/recreational fishing values and habitat value for spawning that could possibly be present in the site vicinity. *Section 4.3, Biological Resources*, of the DEIR provides a detailed description of existing conditions in the site vicinity, including information on special-status species and the importance of the aquatic marine habitat along the shoreline and in the surrounding open bay waters. Seven of the eight special-status species identified in the comment are included in Tables 4.3-1 and 4.3-2 of the DEIR. Although North American green sturgeon was included in Table 4.3-2 and the discussion of special-status fish in Section 4.3 of the DEIR, the possible presence of white sturgeon (*Acipenser transmontanus*) was not included in Table 4.3-2 of the DEIR. This species has no formal listing status under the federal or state Endangered Species Acts, but is recognized as a California Species of Special Concern by CDFW. It is native to the west coast of North America with a range from Alaska to Baja California. Although occasionally found in the ocean, this species primarily resides in large rivers and their associated estuaries, including the Sacramento-San Joaquin system in California, the Fraser River (British Columbia), and the Columbia River and its tributaries (Washington and Oregon). White sturgeon in the Sacramento-San Joaquin system represent the southernmost known spawning population of the species. Given the special status and likely presence of this species in the open waters of Richardson Bay near the project site, Table 4.3-2 on page 4.3-10 of the DEIR has been revised to include a summary of information on white sturgeon as follows (see also Chapter III):

Tidewater goby <i>Eucyclogobius newberryi</i>	FE SSC	Brackish shallow lagoons and lower stream reaches where water is fairly still but not stagnant.	None – No suitable habitat present
<u>White sturgeon</u> <u><i>Acipenser transmontanus</i></u>	<u>SSC</u>	<u>Ranges from Baja California to Alaska; resides in large rivers and estuaries, including Sacramento-San Joaquin system.</u>	Low – May migrate through vicinity but essential habitat absent.

The inclusion of this species in the table and recognition of its potential presence do not alter the DEIR conclusions. The potential for occurrence of this species is low due to lack of essential habitat. Project construction and mitigation measures recommended to address in-water aquatic species would serve to avoid any adverse impacts on this species.

- B1-4 This comment suggests that an analysis of hydroacoustic noise levels from in-water pile driving activities should be prepared to evaluate the impact on fish and determine whether there would be the potential for incidental take of state-listed species requiring a 2081(b) Incidental Take Permit from CDFW. In response to the comment, the potential impacts of underwater noise that would be

generated by the installation of the sheet piles were further evaluated and have been included in this FEIR.

Based on the additional analysis included in the FEIR as presented below, the effects of elevated underwater sound levels during sheet pile driving for the project are anticipated to be less than significant, assuming adequate controls and construction restrictions are implemented as required in Mitigation Measures BIO-1a through BIO1c in *Section 4.3, Biological Resources*, of the DEIR. Given that no significant impacts on state-listed special-status species are anticipated, it appears that a 2081(b) Incidental Take Permit from CDFW is not necessary. However, Mitigation Measure BIO-1c acknowledges that the City of Belvedere must obtain all necessary authorizations from CDFW, the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) as required by federal and state law for potential harm to special-status fish species. If required, such authorization would be obtained through interagency coordination in accordance with the U.S. Army Corps of Engineers Section 404 consultation and the CDFW Section 2081 Incidental Take Permit process. The project would be required to adhere to any additional conditions and restrictions required as part of the authorizations from regulatory agencies.

The following revisions have been made to Table 4.11-1 on page 4.11-2 of the DEIR to include additional definitions of acoustical terms that are used in the underwater noise analysis (see also Chapter III):

TABLE 4.11-1 DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
Decibel (dB)	A unit describing the amplitude of sound on a logarithmic scale. Sound described in decibels is usually referred to as sound or noise "level." <u>Decibel is a unit that describes the amplitude of sound, which is determined based on the pressure of the sound measured and the reference pressure. The reference pressure for water is 1 micro-Pascal (µPa), and for air is 20 micro-Pascals. In this analysis, underwater sound pressure levels are expressed in decibels.</u> This unit is not used for airborne sound pressure levels in this analysis because it includes frequencies that the human ear cannot detect.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All airborne sound levels in this report are A-weighted.
Maximum Sound Levels (L_{max})	The maximum sound level measured during a given measurement period. <u>In this analysis, this term is used to describe airborne sound levels.</u>
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period. For this CEQA evaluation, L_{eq} refers to a 1-hour period unless otherwise stated.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels during the evening from 7:00 AM to 10:00 PM and after addition of 10 decibels to sound levels during the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to sound levels during the night between 10:00 PM and 7:00 AM.
Ambient Noise Level	The existing level of environmental noise at a given location from all sources near and far.

TABLE 4.11-1 DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
<u>Sound Exposure Level (SEL)</u>	<u>The time integral of frequency-weighted squared instantaneous sound pressures, which are measured in decibels referenced to 1 μPa² sec. SEL is used to characterize sound energy associated with a pile driving pulse or series of pulses.</u>
<u>Cumulative Sound Exposure Level (cSEL)</u>	<u>Cumulative SEL can be estimated from the single-strike SEL and the number of strikes that likely would be required to place the pile at its final depth using the following equation: cSEL = single-strike SEL + 10 log (# of pile strikes).</u>
<u>Peak Sound Pressure Level (Peak SPL)</u>	<u>In this analysis, this term is used to describe underwater sound levels. Sound pressure is the sound force per unit area expressed in decibels. Peak SPL is the largest absolute value of the instantaneous sound pressure.</u>
Vibration Decibel (VdB)	A unit describing the amplitude of vibration on a logarithmic scale.
Peak Particle Velocity (PPV)	The maximum instantaneous peak of a vibration signal.
Root Mean Square (RMS) Velocity	The average of the squared amplitude of a vibration signal.

Source: Charles M. Salter Associates, Inc., 1998; FTA, 2018; Caltrans, 2020b.

The following revision has been made to the discussion on page 4.11-4 of the DEIR to account for the discussion of potential noise impacts on protected fish species in Section 4.11, *Noise* (see also Chapter III):

Noise-sensitive receptors are defined as land uses where noise-sensitive people may be present or where noise-sensitive activities may occur. Noise-sensitive receptors include ..., and (4) the Belvedere Nursery School located 275 feet to the north of the proposed installation of sheet piles along Beach Road. As discussed in Section 4.3, Biological Resources, special-status fish species may occur in the bay waters in the vicinity of the project site and are considered as noise-sensitive receptors. Potential noise impacts on protected fish species and marine mammals are discussed in Section 4.3, Biological Resources, of this EIR and therefore are not addressed in this section.

The following revision has been made to the discussion on page 4.11-9 of the DEIR, following Table 4.11-5, to address acoustic thresholds for fish (see also Chapter III):

Fisheries Hydroacoustic Working Group (FHWG)

In 2008, the Fisheries Hydroacoustic Working Group (FHWG), including the Federal Highway Administration, NOAA Fisheries Northwest and Southwest Regions, U.S. Fish and Wildlife Service, the Department of Transportation from California, Oregon, and Washington, and California Department of Fish and Game, issued an agreement in principle for interim criteria for injury to fish from impact pile driving activities (FHWG, 2008), as presented in Table 4.11-6a. The criteria were established for the underwater noise levels at which physiological effects of impact pile driving on fish could be expected. There is no current vibratory pile driving threshold for fish because vibratory driving generates lower sound levels and different sound wave forms that result in reduced adverse effects on fish as compared to impact pile driving.

TABLE 4.11-6A INTERIM IMPACT PILE DRIVING UNDERWATER NOISE CRITERIA FOR FISH

<u>Type</u>	<u>Interim Criteria for Injury</u>
<u>Peak Sound Pressure Level (SPL)</u>	<u>206 dB for all sizes of fish</u>
<u>Cumulative Sound Exposure Level (cSEL)</u>	<u>187 dB for fish size of 2 grams or greater</u> <u>183 dB for fish size of less than 2 grams</u>

Notes: dB = decibels. Underwater peak SPL decibel levels are referenced to 1 μPa, and the SEL is referenced to 1 μPa²-sec.
Source: FHWG, 2008.

The following revision has been made to the discussion on page 4.11-10 of the DEIR after the first paragraph and before the *Noise from Construction-Related Traffic* subsection to include the discussion of the potential impacts of underwater noise that would be generated by the installation of the sheet piles (see also Chapter III):

Underwater Noise from Pile Driving

Construction activities, specifically pile driving, can generate noise levels that have the potential to cause adverse effects on sensitive biological resources such as fish unless appropriate controls are implemented as is currently proposed as part of the project. Typical underwater sound levels from impact and vibratory pile driving in the Bay Area are summarized in Table 4.11-7a. As shown in the table, the peak sound pressure level (SPL) measured at 10 meters (32.8 feet) from an impact hammer used to install sheet piles for similar projects in the Bay Area was lower than the interim peak SPL criteria of 206 dB shown in Table 4.11-6a. In addition, underwater sound levels generated using a vibratory hammer were substantially lower than the impact pile driver. As discussed in Section 4.3, Biological Resources, vibratory hammers that would be used as part of the sheet pile installation for the proposed project generate different sound wave forms from impact hammers and would not cause physical injury or mortality to fish.

TABLE 4.11-7A UNDERWATER SOUND LEVELS MEASURED FOR SIMILAR PROJECTS IN SAN FRANCISCO BAY AREA

<u>Pile Type</u>	<u>Peak SPL (dB)</u>	<u>Single-Strike</u>		<u>Project and Location</u>
		<u>SEL (dB)</u>		
<u>Impact Hammer</u>				
<u>24-inch AZ Steel Sheet</u>	<u>205</u>	<u>179</u>		<u>Berth 23, Port of Oakland (Vortex)</u> <u>Oakland, CA – San Francisco Bay</u>
<u>Vibratory Hammer</u>				
	<u>177</u>	<u>162</u>		<u>Berth 23, Port of Oakland (Vortex)</u> <u>Oakland, CA – San Francisco Bay</u>
<u>24-inch AZ Steel Sheet</u>	<u>175</u>	<u>162</u>		<u>Berth 30, Port of Oakland</u> <u>Oakland, CA – San Francisco Bay</u>
	<u>177</u>	<u>163</u>		<u>Berth 35/37, Port of Oakland (Dutra)</u> <u>Oakland, CA – San Francisco Bay</u>

Notes: SPL = sound pressure level; SEL = sound exposure level; dB = decibels. Underwater peak SPL decibel levels are referenced to 1 μPa, and the SEL is referenced to 1 μPa²-sec. Sound levels were measured 10 meters (32.8 feet) from the pile with a water depth of about 15 meters (49.2 feet). Source: California Department of Transportation (Caltrans), 2020b.

The isopleth distance, which is defined as the distance within which a specific sound pressure level is anticipated to extend from the source, was estimated for each FHWG pile driving interim criterion sound pressure level using the multi-species pile driving calculator developed by the National Marine Fisheries Service (NMFS, 2022), as included in Appendix E. The isopleth distance was estimated based on the underwater sound pressure level produced by the sound source (impact pile driving), the threshold underwater sound pressure level, and the underwater sound attenuation rate. Regarding source sound pressure levels, the peak SPL and sound exposure level (SEL) measurements collected during impact pile driving for a similar project at the Port of Oakland (see Table 4.11-7a) were used in this analysis. The cumulative sound exposure level (cSEL) was calculated based on the single-strike SEL reported in Table 4.11-7a and the estimated number of pile strikes. As mentioned in Chapter 3, Project Description, sheet piles would predominantly be driven using vibratory hammers, and impact hammers would only need to be used when the vibratory hammer is not able to complete the installation. It is estimated that up to 50 strikes with an impact hammer might occur per day if refusal is encountered and an impact hammer is needed. Regarding the sound attenuation rate, an in-water sound attenuation rate of 4.5 dB per doubling of distance was conservatively applied in the absence of a site-specific attenuation rate, in accordance with Caltrans guidance (Caltrans, 2020b). The estimated isopleth distances to the FHWG pile driving criteria for fish are summarized in Table 4.11-8a.

TABLE 4.11-8A MODELED ISOPLETH DISTANCES FOR UNDERWATER SOUND LEVELS FROM IMPACT PILE DRIVING

<u>Modeling Scenario</u>	<u>Isopleth Distance (Feet) to FHWG Interim Thresholds for Fish</u>		
	<u>Peak SPL Threshold</u> <u>206 dB</u>	<u>Cumulative SEL Threshold</u>	
		<u>187 dB</u> <u>(for fish size of</u> <u>2 grams or greater)</u>	<u>183 dB</u> <u>(for fish size of less</u> <u>than 2 grams)</u>
<u>24-inch AZ Steel Sheet</u>			
<u>Impact Hammer</u>	<u>28 feet</u>	<u>130 feet</u>	<u>241 feet</u>

Source: Appendix E.

As shown in Table 4.11-8a, impact pile driving activities for the project could exceed the peak SPL threshold (206 dB) for injury to fish of all sizes within 28 feet of the pile driving. In addition, fish with a size of 2 grams or greater and fish less than 2 grams in size may be exposed to sound levels above the applicable cSEL thresholds within 130 feet and 241 feet, respectively. According to the Caltrans Technical Guidance for Assessment of the Hydroacoustic Effects of Pile Driving on Fish (Caltrans, 2020b), the best available science demonstrates that no physical injuries associated with the cSEL are anticipated, and exceedance of the cSEL thresholds is unlikely to cause injury or mortality to fish, including state-listed species such as coho salmon, chinook salmon, or longfin smelt.

It should be noted that the isopleth distances presented in Table 4.11-8a are very conservative, based on the following reasons. Firstly, as mentioned in Section 4.3, Biological Resources, installation of sheet piles along Beach Road would occur during the low tide period—when the bay waters have receded, and the base of the existing seawall is exposed.

The modeled buffer distances for underwater sound levels for the project are very conservative because the sound attenuation rates for pile driving on land near the water (or in shallow water with a depth of 2 feet or less) are expected to be greater than the sound attenuation rates used in the model for deeper water. In other words, the actual isopleth distances would be shorter as installation of the sheet piles would occur during the low tide period when the sheet piles would not be in direct contact with water. Secondly, as discussed in Section 4.3, Biological Resources, a turbidity curtain would be used as part of the sheet pile installation, which would separate the construction zone from the open waters of the bay and prevent aquatic life from entering the construction zone. The turbidity curtain would extend an average of 7.5 feet bayward of the sheet pile footprint. As a sealed continuous barrier, the turbidity curtain could provide for additional attenuation of construction-generated underwater sound levels but there are no data available in estimating this, and it would depend on the material used and other variables that cannot be predicted or defined for modeling purposes. Thirdly, fish are not expected to be present in close proximity during impact pile driving, in part because of the shallow waters during the low-tide construction window and also because the sound produced by other construction activities (e.g., vibratory pile driving) would cause the fish to instinctively move away from the construction area. It should also be noted that adequate water depths and habitat exist elsewhere throughout Belvedere Cove and the adjacent San Francisco Bay to provide sufficient area for fish to disperse and forage with no substantial disruption or adverse impact on their movement patterns and foraging behaviors. Fourthly, as discussed above, the impact hammer would only be used when the vibratory hammer is not able to complete the installation. Therefore, underwater sound levels generated by the impact hammer would be limited and would only occur over a very short period of time.

Based on the above analysis, the effects of elevated underwater sound levels during sheet pile driving for the project are anticipated to be less than significant, assuming adequate controls and construction restrictions are implemented as required by Mitigation Measures BIO-1a through BIO-1c in Section 4.3, Biological Resources.

The following revisions have been made to the references on pages 4.11-21 and 8-8 through 8-9 of the DEIR to include citations of additional noise studies (see also Chapter III):

BK Cooper and City of Belvedere, 2022. Personal communication with Baseline Environmental Consulting, September 26, 2022.

California Office of Planning and Research (OPR), 2017. State of California General Plan Guidelines.

California Code of Regulations (CCR), Title 24, Part 2, Vol. 1, Section 1206.4.

California Code of Regulations (CCR), Title 24, Part 11, Section 5.507.

California Department of Transportation (Caltrans), 2020a. Transportation and Construction Vibration Guidance Manual.

California Department of Transportation (Caltrans). 2020b. Technical Guidance for Assessment of the Hydroacoustic Effects of Pile Driving on Fish. Final Report, October.

Charles M. Salter Associates, Inc., 1998. Acoustics – Architecture, Engineering, the Environment, William Stout Publishers.

City of Belvedere, 2010. City of Belvedere General Plan 2030.

City of Belvedere, 2022. Municipal Code, Chapter 8.10.

Federal Highway Administration (FHWA), 2018. Techniques for Reviewing Noise Analyses and Associated Noise Reports.

Federal Transit Administration (FTA), 2018. Transit Noise and Vibration Impact Assessment Manual, FTA Report No.0123.

Fisheries Hydroacoustic Working Group (FHWG), 2008. Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities, June 12.

National Marine Fisheries Service (NMFS), 2022. Optional Multi-species pile driving calculator, version 1.2-multi-species:2022. Website: <https://www.fisheries.noaa.gov/southeast/consultations/section-7-consultation-guidance>, accessed August 9, 2023.

Appendix E of the DEIR has been revised to include new data. The revision is shown at the end of Chapter III, DEIR Text Changes.

- B1-5 The comment refers to the importance of eelgrass beds and their protection as called for in Section 35630 of the California Public Resources Code. The comment states that the DEIR does not describe impacts of the project on eelgrass beds known from Belvedere Cove and recommends an additional mitigation measure. However, as discussed under *Regulated Waters* on page 4.3-16 of the DEIR, based on a review of field conditions, wetlands including coastal salt marsh, brackish water marsh, and special aquatic habitats such as eelgrass beds dominated by eelgrass (*Zostera marina*) are absent from the site. The shoreline to the tidal zone along Belvedere Cove is formed by the existing seawall that borders the east side of Beach Road through the site. Sheet pile and concrete footings are located within the tidal zone at the base of the existing seawall where emergency repairs were installed in 2019; these footings are similar to what is proposed as part of the project. The tidal zone through this area is composed of gravels and sand, with no emergent vegetation such as eelgrass beds or coastal salt marsh vegetation.

The absence of any emergent vegetation including eelgrass beds along the existing seawall along Beach Road was confirmed during a follow-up survey conducted on August 10, 2023. The survey was conducted during the late morning low tide where the seawall and substrate extending 100 feet into the bay were inspected. Elevations of the bay shoreline within the area of proposed construction become exposed during low tides and are too shallow to support eelgrass beds.

Because eelgrass beds are absent from the vicinity of proposed construction, no direct impacts on this special aquatic habitat are anticipated. In addition, careful controls would be implemented to prevent adverse impacts on aquatic habitat and water quality, as required under Mitigation Measures BIO-1a through BIO-1c, which would prevent any substantial adverse impacts on the existing eelgrass beds known from Belvedere Cove.

- The additional eelgrass mitigation suggested by CDFW is not warranted as existing conditions are unsuitable for presence of this special aquatic habitat along the shallow shoreline of the site. These unsuitable habitat conditions are not anticipated to change in advance of project implementation, making a pre-construction survey for eelgrass unnecessary.
- B1-6 The comment refers to the conclusion in the DEIR that compensatory mitigation must be provided for the permanent loss of an estimated 1,200 square feet (0.03 acre) of benthic habitat at the base of the existing seawall, provided at a minimum 1:1 ratio or as negotiated with the regulatory agencies, as called for in Mitigation Measure BIO-1c. The recommendation by CDFW that the City initiate early consultation and that a range of options be considered is noted. The City has already initiated this early consultation process, obtaining input from CDFW and other regulatory agencies during a Marin Project Coordination meeting on January 7, 2021, and will continue to seek input from these agencies if the project moves forward. No additional mitigation is considered necessary in response to the comment.
- B1-7 The comment refers to the status of white-tailed kite and its potential for nesting in the site vicinity. As described on page 4.3-3 of the DEIR, a habitat suitability analysis was conducted by the EIR biologist as part of the background review and field reconnaissance surveys, to determine the potential for presence of special-status species on the project site and in the vicinity. This included the conclusion in Table 4.3-2 that suitable habitat for white-tailed kite is absent from the project site and vicinity. This part of Belvedere is so developed with structures, pavement, and ornamental landscaping, and has such a high intensity of human activity, that the only possible presence by white-tailed kite was considered to be an occasional fly-over in search of suitable habitat and foraging opportunities. However, Mitigation Measure BIO-2, which requires pre-construction surveys, would nevertheless serve to identify the presence of any nesting by raptors such as white-tailed kite and other native birds in advance of construction, in the remote instance that a nest was established in advance of initiating vegetation removal and other construction activities.

The comment also includes recommended changes to Mitigation Measure BIO-2. Specifying a survey distance of 500 feet as recommended in the comment was not considered necessary because white-tailed kites are very conspicuous, especially during nesting season, and would be readily detected during the pre-construction surveys called for in Mitigation Measure BIO-2. Decreasing the pre-construction survey window from 14 to 7 days and requiring a follow-up survey if construction activities are curtailed for more than 7 days would serve to reinforce the active nest avoidance provisions and prevent inadvertent take. In response to the comment, Mitigation Measure BIO-2 on DEIR pages 4.3-26 through 4.3-27 has been revised as follows (see also Chapter III):

Mitigation Measure BIO-2: Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act and California Fish and Game Code when nests are in active use. This shall be accomplished by taking the following steps:

- If construction is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 7 14 days prior to the onset of vegetation removal or construction, in order to identify any active nests on the project site and in the vicinity of proposed construction.

- If construction is curtailed for more than 7 days, another focused survey shall be conducted during the nesting season to confirm that no new nests have been established in the vicinity of proposed construction.

B1-8 The comment refers to the potential presence of coastal triquetrella (*Triquetrella californica*) on the existing seawall or in other locations on the site. As described on page 4.3-3 of the DEIR, a habitat suitability analysis was conducted by the EIR biologist as part of the background review and field reconnaissance surveys, to determine the potential for presence of special-status species on the project site and in the vicinity. This included the conclusion in Table 4.3-1 that suitable habitat for coastal triquetrella is absent from the project site and vicinity. Coastal triquetrella is a fairly conspicuous and distinctive moss species found in a variety of conditions, including roadsides, hillsides, rocky slopes, fields, coastal scrub and chaparral habitats. It was not observed during field surveys of the site conducted on August 10, 2021, and May 31, 2022, during preparation of the DEIR. In response to the comment, a subsequent survey was conducted on August 10, 2023, inspecting the existing seawall along the Beach Road frontage, sidewalk, and roadway, and areas of riprap, pathway, and landscaping along San Rafael Avenue. No mosses of any kind were observed during the ground survey, and coastal triquetrella would have been easily detected, if present. This species is not believed to be present on the project site and no impacts on coastal triquetrella are anticipated, consistent with the conclusion on page 4.3-6 of the DEIR. Because the site and surrounding area are intensively urbanized and maintained, there is no potential for coastal triquetrella to establish a new occurrence in this area of Belvedere in advance of construction, and the pre-construction survey and other mitigation measure provisions recommended by CDFW as Mitigation Measure BIO-5: Pre-Project Special-Status Plant Surveys in the comment are not considered necessary. These would only be warranted if there were in fact some potential for occurrence of coastal triquetrella in the site vicinity, which is not the case. No additional mitigation measures or modifications to the DEIR are considered necessary in response to the comment.

B1-9 The concerns of the commenter over including scientific names of species referenced in Section 4.3, *Biological Resources*, of the DEIR are noted. Scientific names were used for all plant species and special-status plant and animal species referenced in the section. However, including scientific names for common wildlife species is not required under the CEQA Guidelines or warranted given that there is seldom any confusion over their identification. The species listing for white-tailed kite in Table 4.3-2 on page 4.3-11 of the DEIR correctly identifies the scientific name as *Elanus leucurus*, but the scientific name of *Elanus caeruleus* on page 4.3-15 is incorrect and should be revised. In addition, the typos regarding the misspelling of some of the common names of wildlife species listed in the DEIR are noted. In response to the comment, the following revisions are made in Section 4.3, *Biological Resources*, of the DEIR.

The spelling of common names of wildlife species on page 4.3-2 of the DEIR is revised as follows (see also Chapter III):

... Typical terrestrial species found in Belvedere are habitat generalists, such as the black tailed deer, raccoon, opossum, gray fox, red fox, fox squirrel, Botta's ~~Botta's~~ pocket gopher, Norway rat, house mouse, and numerous species of birds. Native and ornamental trees, shrubs, and structures provide nesting opportunities for native and non-native birds such as house finch, English sparrow, scrub jay, California ~~brown~~ towhee, America robin, bush ~~bush~~ tit, and mourning dove.

The spelling of the scientific name of white-tailed kite on page 4.3-15 of the DEIR is revised as follows (see also Chapter III):

... Species considered to have some potential for nesting in the site vicinity include Cooper's hawk (*Accipiter cooperi*), sharp-shinned hawk (*Accipiter striatus*), and white-tailed kite (*Elanus leucurus caeruleus*), as well as more common raptor species such as great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*), and more common passerine species such as California scrub jay (*Aphelocoma californica*), California towhee (*Melospiza crissalis*), and American robin (*Turdus migratorius*).

- B1-10 The comment states that CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a data base that may be used to make subsequent or supplemental environmental determinations, and requests that any special-status species and sensitive natural communities detected during project surveys be reported to the California Natural Diversity Database (CNDDDB). No special-status species or sensitive natural communities were detected as part of the field surveys conducted during preparation of the DEIR and this FEIR, so there is nothing to report to the CNDDDB.
- B1-11 The comment refers to impact fees assessed by CDFW, which are due and payable upon filing of the Notice of Determination by the City of Belvedere. The comment is noted.
- B1-12 The comment expresses appreciation by CDFW for the opportunity to comment on the DEIR and includes contact information if there are any questions regarding the CDFW comment letter. The comment is noted.

C. PUBLIC AND PUBLIC INTEREST GROUP COMMENTS AND RESPONSES

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**From: William Rothman
14 Cliff Road
Belvedere, Ca 94920**

**To: Robert Zadnik (rzadnik@cityofbelvedere.org)
Amy Skewes-Cox (amysc@rtasc.com)**

Please acknowledge receipt of these comments on, and these challenges to the Draft EIR.

Comments/challenges to elements of draft EIR.

1)

2) The Draft EIR is deficient with respect to mitigation measures involving asking utilities to replace current piping with flexible piping. This is incorrectly described as a mitigation measure the city should undertake to prevent construction activities from breaking utility infrastructure, because it carries no assurance that utilities would be willing to do what city asked. A wish is not a mitigation. It is only a wish.

C1-1

3) The Draft EIR is deficient in stating that the “no project alternative” would result in seismic activity breaking water and sewer mains. As shown in this email (below) from MMWD’s Chief engineer.

C1-2

September 7, 2021. Email From MMWD Director of Engineering Stating that Water Mains in the area of the project are State of the Art, and would not Break in an Earthquake

From: Alex Anaya
Sent: Tuesday, September 07, 2021 8:15 AM
To: Robert Zadnik - Public Works Director
Subject: RE: meeting to discuss

Good morning Robert,

I can meet with you over zoom to discuss this if you would like. Paul Morrison officially retired as of last Friday September 3rd.

Regarding your questions, I'm assuming you are talking about strike slip fault movement during a seismic event correct. I'm not aware of any study of this phenomenon involving welded steel pipe in the Bay area. This would be interesting to find out how welded steel pipe would react to such movement. What I can tell you is that welded pipe will hold up better than our bell and spigot cast iron pipe or C900 PVC. If ground shaking were to cause liquefaction then both the welded steel pipe and fused HDPE pipe would provide the best resiliency since there wouldn't be any joint's to separate from the pipe section. The pipe might sink but it shouldn't shear.

At this time I'm open today, tomorrow between 8am to 10am and 2:30pm to 3:30pm, or any time

C1-3

4) The Draft EIR is deficient in repeatedly claiming that a justification for thf project is that Beach Road and San Rafael Avenue weakness is demonstrated by claiming that both have sunk 4 feet since 1940. As the photos below, and their descriptions show, that has not taken place, And, therefore, the draft EIR's claim of faults with the "no project" is invalid in that respect.

C1-4

**The Henny-Penny Myth: "Henny Penny,
The Streets are Falling!"**

Despite the Draft EIRs' repeated contentions that that San Rafael Avenue has sunken at least 4 ft, since 1943, this photo, of a typical, 80 year old San Rafael Avenue home, shows that San Rafael Avenue is significantly above the home's entrance. Since the light wood frame house is obviously, much lighter than the roadway,



C1-4

<p>so, if any subsidence had occurred, the road would be below the house level. This shows clearly, the fallacy of the Draft EIR's repeatedly claimed-justification for the project, that it is necessary because significant sinking of San Rafael Avenue shows that is weak, and would collapse in an earthquake</p>	
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C1-4

Despite the Raft EIR's repeatedly stated contention that Beach Road has sunken 4 ft in the past 40 years, this photo shows that that claim is untrue. The photo shows that the the Beach Road sidewalk is exactly level with the entrance to the 100 year-old Boat House apartment building. The building has pilings going down



C1-4

to bed rock, so it has not sunken, nor has the road, as one sees from it being level with the building entrance.

This shows clearly, the fallacy of the Draft EIR's repeatedly claimed-justification for the project, that it is necessary because significant sinking of Beach Road shows that is weak, and would collapse in

C1-4

<p>an earthquake .</p>	

↑
C1-4

5. The Draft Eir document is defective in that it does not recognize the seismic danger inherent at the ends of the proposed sheet piling walls. The “end effect” danger involves, in the event of an earthquake, a multiplication of ground shifts in the areas adjacent to the ends of sheet piling walls. This extra force-ground shifting can damage road, utility and building structures in such areas.

C1-5

6. The Draft EIR is defective in claiming that the “no project” alternative would lead to the danger of Beach Road and San Rafael Avenue becoming, in the event of an earthquake, impassible to emergency vehicles. This danger-claim is shown to be invalid, because there has never been a Bay Area earthquake which has led any ground level roads, such as Beach Road or San Rafael Avenue to become impassible to emergency vehicles.

C1-6

7. The Draft EIR is defective in claiming the danger of sewer line breaks, in the event of an earthquake. As the Sanitary district has said, in emails to the city, and to inquiring residents, and, as we have all seen, over the last several years, the Sanitary District has undertaken an ongoing program of replacing its sewer mains with flexible plastic ones that will not break in an earthquake.

C1-7

It is my understanding that it is legally required, before a final EIR can be completed and certified, that all challenges to, and comments upon, elements of the draft EIR must be responded to satisfactorily.

C1-8

Thank you for your attention.

Sincerely,

William Rothman

LETTER C1**William Rothman**

- C1-1 This comment indicates that asking utilities to replace current piping with flexible piping is incorrectly described as a mitigation measure that the City should undertake to prevent construction activities from breaking utility infrastructure, because it carries no assurance that utility agencies would be willing to do what the City asked.

Having utility agencies perform utility work as part of construction projects is common practice. Many new construction or redevelopment projects involve utility work by utility agencies such as relocation of utilities in street/sidewalk areas and/or construction of new utility connections. For example, the project would require utility agencies to relocate utilities and temporarily disconnect and then reconnect utility service connections along Beach Road. Mitigation Measure GEO-1 requires the City to ensure that installation of flexible utility connections would occur during construction of the project, as described in Response to Comment A1-11 above. The City can ensure that installation of flexible utility connections would occur during construction of the project by coordinating with utility agencies and providing funding for the installation of flexible connections as necessary.

- C1-2 This comment indicates that the DEIR states that the No Project Alternative would result in seismic activity breaking water and sewer mains, and that an email from the Marin Municipal Water District (MMWD) states that water mains in the area of the project are state of the art and would not break in an earthquake.

The DEIR does not indicate that the No Project Alternative would result in seismic activity breaking water and sewer mains. On page 5-3, the DEIR states that "...the No Project Alternative would not allow the opportunity for the implementation of seismic upgrades for roadways and utilities that are susceptible to damage from seismic activity."

The email referenced in this comment is from Mr. Alex Anaya of MMWD and refers to strike slip fault movement during a seismic event. The email indicates that Mr. Anaya "...is not aware of any study of this phenomenon involving welded steel pipe in the Bay area." In the email, Mr. Anaya also indicates: "This would be interesting to find out how welded pipe would react to such movement. What I can tell you is that welded pipe will hold up better than our bell and spigot cast iron pipe or C900 PVC. If ground shaking were to cause liquefaction then both welded steel pipe and fused HDPE pipe would provide the best resiliency since there wouldn't be any joint's [sic] to separate from the pipe section. The pipe might sink but it wouldn't shear."

The degree of vertical and lateral deformations that could occur in the project area due to seismic slope instability and liquefaction-induced lateral spreading was estimated by the project Geotechnical Engineer to be up to several feet under existing conditions (Miller Pacific Engineering Group, 2022), as discussed on page 4.6-6 of the DEIR. As discussed on pages 4.6-14 to 4.6-15 of the DEIR, the Geotechnical Investigation indicates that the estimated seismically induced lateral displacements would be approximately 59 inches at the east end of the Beach Road segment and approximately 43 inches at the west end of the Beach Road segment under existing conditions. With the recommended installation of sheet piles along the Beach Road segment, the estimated seismically induced deformations would be 12 inches or less along the length of the Beach Road

segment where sheet piles would be installed. As discussed in Response to Comment A1-11, the proposed design of the project does not include ground stabilization measures beyond the ends of the proposed sheet piles, which could create locations near the east and west ends of the proposed sheet piles on the Beach Road segment where there could be a sudden change in seismically induced lateral displacements over a short distance.

The email from Mr. Anaya does not indicate whether the existing water pipes could withstand the shear stress from such sudden change in seismically induced lateral displacements over a short distance. The possibility for damage to utilities from a sudden change in seismically induced lateral displacements exists and was appropriately identified as a potential impact of the project that requires mitigation.

C1-3 See Response to Comment C1-2 above.

C1-4 This comment indicates that the DEIR claims that a justification for the project is that weaknesses in Beach Road and San Rafael Avenue are demonstrated by the fact that both roads have sunk 4 feet since 1940. The comment provides photos of streets and adjacent properties and indicates that since a light wood frame house on San Rafael Avenue is lighter than the roadway, if any subsidence had occurred, the road would be below the house level. The comment also indicates that the Beach Road sidewalk is level with the entrance to the 100-year-old "Boat House apartment building" which has pilings going down to bedrock, so it has not sunk, nor has the road.

As discussed on page 4.6-7 of the DEIR, fill material used to construct the existing levees on the project site has induced consolidation of the soft, compressible Bay Mud and in turn has caused settlement of the ground surface. The total amount of settlement depends on the amount of surface loading, thickness, and compression properties of the Bay Mud. The rate at which settlement occurs depends on the thickness of the Bay Mud deposit, the distance to a drainage layer, and the vertical permeability of the Bay Mud. In general, the Bay Mud consolidates quicker following initial loading and slows over time. The Geotechnical Investigation calculated the estimated settlement that has occurred to date and the rate of future settlement that could occur for varying thicknesses of Bay Mud by using typical Bay Mud consolidation properties and laboratory results. The Geotechnical Investigation found that most of the expected settlement from the original construction of the levees has already occurred (Miller Pacific Engineering Group, 2022).

The Geotechnical Investigation indicates that calculated settlement of San Rafael Avenue and Beach Road to date varies from approximately 3 to 5 feet, and that actual settlements may vary from the predicted amounts due to variations in the thickness of fill, interpreted Bay Mud thickness contours, Bay Mud consolidation characteristics, and subsurface drainage characteristics (Miller Pacific Engineering Group, 2022).

The wood frame house that is photographed and mentioned in this comment is located on fill material, as is San Rafael Avenue. San Rafael Avenue is at a higher elevation than the house, which is due to placement of more fill material beneath San Rafael Avenue than beneath the house when they were constructed. The settlement caused by the weight of the wood frame house is minor compared to the settlement caused by the fill material beneath the house and beneath San Rafael Avenue. Different amounts of settlement may have occurred beneath the house and San Rafael Avenue based on the differing amounts of fill; however, settlement from placement of fill material on compressible soil does not occur only beneath the area of fill placement, but also

occurs beneath adjacent areas, as the effects of soil compression extend horizontally outward from source loads, in addition to vertically. Thus, abrupt differential settlement is not expected to occur.

The street and sidewalk areas along Beach Road have undergone various improvements and repairs over time. The foundation of the “Boat House apartment building” does not appear to be the original foundation as it is on concrete piles, while the original foundation was likely constructed on wooden piles. The fact that Beach Road and the “Boat House apartment building” are currently at a similar elevation does not indicate that settlement of compressible soil has not occurred in the area.

The DEIR does not indicate that past settlement of compressible soil is the justification for the project. As discussed on page 4.6-6 of the DEIR, under existing conditions significant vertical and lateral deformations could occur in the project area due to seismic slope instability and liquefaction induced lateral spreading. As discussed on page 3-6 of the DEIR, an earthquake could damage San Rafael Avenue and Beach Road, which are the location of critical underground utilities, and result in blockage of emergency vehicle access. The project would significantly reduce the potential for seismically induced vertical and lateral deformations of these roadways.

C1-5 This comment indicates that the DEIR does not recognize the seismic danger inherent at the ends of the proposed sheet pile walls, and indicates that in the event of an earthquake a multiplication of ground shifts in the area adjacent to the ends of the sheet pile walls can damage road, utility, and building structures in such areas. The installation of sheet piles would not multiply ground-shifting forces near the ends of the sheet piles; however, as discussed in Responses to Comments A1-11 and C1-2 above, the DEIR recognizes that there could be a sudden change in seismically induced lateral displacements over a short distance at the end of the proposed sheet pile walls on Beach Road, which would be addressed through installation of flexible utility connections during construction as required by Mitigation Measure GEO-1. There are no structures located adjacent to the proposed sheet pile walls that straddle the ends of the proposed sheet pile walls; therefore, structures would not be affected by the potential sudden change in seismically induced lateral displacements over a short distance. While roadways adjacent to the ends of the proposed sheet pile walls could be damaged by a sudden change in seismically induced lateral displacements over a short distance, these segments of roadway are not critical for emergency evacuation/access as these segments of roadway can easily be navigated around, if necessary; and seismically induced damage to these segments of roadway and more critical roadway segments could occur without the project.

C1-6 This comment states that the DEIR is defective in claiming that the No Project Alternative “would lead to the danger of Beach Road and San Rafael Avenue becoming, in the event of an earthquake, impassible to emergency vehicles.” The DEIR does not make this statement. The DEIR (pages 5-3 and 5-4) states that “the No Project Alternative would not allow the opportunity for the implementation of seismic upgrades for roadways and utilities that are susceptible to damage from seismic activity” and “the No Project Alternative would not allow the opportunity for the implementation of seismic upgrades for roadways and utilities that are susceptible to damage from seismic activity and are critical for emergency response and evacuation purposes in case of a fire or other emergency.”

The comment states that there is no danger of Beach Road or San Rafael Avenue becoming impassable with a seismic event, and that there has never been a Bay Area earthquake that has

led to ground-level roads becoming impassable to emergency vehicles. No justification for this statement has been provided, and past earthquakes have shown roads to become impassable. In Oakland in 1989, for example, the Cypress Freeway collapsed during a magnitude 6.9 earthquake. The 1989 Loma Prieta earthquake also resulted in extensive sidewalk, road, and pipeline damage in the Marina District of San Francisco. Much of the Bay Area, including Marin County, has not been subjected to very strong seismic ground shaking since 1906. Thus, Beach Road and San Rafael have not yet experienced very strong seismic ground shaking that is expected to occur in the future.

- C1-7 This comment indicates that the DEIR claims that there is the danger of sewer line breaks in the event of an earthquake, and that the Sanitary District has undertaken an ongoing program of replacing its sewer mains with flexible plastic ones that will not break in an earthquake.

As discussed on page 3-1 of the DEIR, seismic activity could damage utilities located beneath San Rafael Avenue and Beach Road, including wastewater pipelines. As indicated on pages 4.6-14 to 4.6-15 of the DEIR and discussed in Response to Comment A1-11 above, the project could create locations near the east and west ends of the proposed sheet piles on the Beach Road segment where there could be a sudden change in seismically induced lateral displacements over a short distance, which could damage utilities. Some existing sanitary sewer pipes that could be affected by the project may not be constructed of flexible pipe. Implementation of Mitigation Measure GEO-1, as discussed in Responses to Comments A1-11 and C1-1 above, would ensure that flexible utility connections would be installed on any non-flexible sewer pipes that could be affected by the project.

- C1-8 This comment indicates that before a Final EIR can be completed and certified, it is legally required that all challenges to, and comments upon, elements of the DEIR must be responded to satisfactorily. Responses to all comments received on the DEIR are provided in this document.

Subject: Re: Comment on draft EIR - cluff

Date: Friday, November 11, 2022 at 2:44:41 PM Pacific Standard Time

From: Robert Zadnik - City Manager <rzadnik@cityofbelvedere.org>

To: Susan Cluff <susancluff@mac.com>, EIR comments <EIRcomments@cityofbelvedere.org>

Hello Susan,

Thank you for taking the time to review the DEIR. Your comments have been received and will be addressed in the Final EIR document.

Regards,
Robert

From: Susan Cluff <susancluff@mac.com>

Date: Friday, November 11, 2022 at 1:39 PM

To: EIR comments <EIRcomments@cityofbelvedere.org>

Cc: Robert Zadnik - City Manager <rzadnik@cityofbelvedere.org>

Subject: Comment on draft EIR - cluff

I was unable to attend the special meeting on the draft EIR for the infrastructure project this week, so thought I would comment by email. We live on Peninsula Road, a short distance from the project, in one of the original lagoon homes (1955) and have some concerns and questions.

1. **Vibration effect on nearby buildings. (4.6.1)**

Since older houses on unstable soils are particularly vulnerable to damage from vibration from heavy construction equipment and pile drivers, seems the area of potential effects (APE) should be defined on the basis of good science. This report states that is 42 feet and 52 feet from pile driving activities. But Caltrans and NAHCP (“Current Practices to Address Construction Vibration and Potential Effects to Historic Buildings Adjacent to

C2-1



Transportation Projects,” 2012) recommend an APE screening radius from pile drivers of 200 feet and up to 500-1,000 feet depending on site conditions. So how is that calculated and monitored?

C2-1

2. **Fill/geology concerns** (4.6.7) The report says the road fill was placed in 1940, but historical news sources indicate it began much earlier when the cove and yacht harbor were deepened. (Lagoon Fill actually begins Belvedere Land Installs Dredger” Mill Valley Record 19 February 1927). Mud was then pumped up from the bottom of the Bay to fill in piles of big rocks and allowed to dry. So would those types of dredged materials perform differently during construction and/or in earthquakes, flooding, tsunamis from what’s described?

C2-2

3. **Protecting historic properties** (4.4.11). China Cabin (1867), Farr Cottages (1905), Belvedere Land Company Building (1901) and other historic residential properties close to the project site are well over 100 years old and built on pilings over the bay or on unstable sinking soils. So how can those buildings be better protected and preserved during this project? (BMC Title 21.) And how will they be surveyed, inspected and monitored before, during and after construction?

C2-3

4. **Water quality and emergency**

C2-4

considerations (4.6.2, 4.9) Seems the potential effects of a seawall breach, earthquake, flooding or road failure during construction should be considered as well. In 2020, contractors working on Beach Road replacing a 12 inch storm drain found several buried creosote wood piles and piers requiring removal, an approximate 20 feet trench of deep fill consisting of large, hard rip rap stones that had to be jack hammered, and some black stained fill which needed special disposal. (Sani5 2/9/21 board packet). So wouldn't that all impact water quality, wildlife, construction, scheduling, etc. etc.?

C2-4

5. **Future utility improvements** (3-16). While utility improvements aren't part of the proposed project, City staff is recommending local utility agencies install flexible utility mainlines and couplings in certain areas to make service lines for water, wastewater, and gas lines more resilient in earthquakes and determine if construction schedules can be aligned to limit disruption. So when will that be decided? And how would that effect the estimated construction period?

C2-5

6. **Traffic/emergency access** (4.14.7) This says that construction would be staged so traffic patterns will not be significantly impacted, emergency access to Belvedere Island (and presumably our lagoon neighborhoods) maintained and no sidewalks

C2-6

closed. This was sadly not the case during recent construction projects in 2019-2020 and with two phases overlapping, seems difficult to guarantee. I also wildly disagree with the consultant's conclusion that if the proposed Mallard Pointe project was constructed simultaneously, with the hundreds of truck trips for demolition, fill, grading, and construction that would generate, the cumulative impact would be less than significant. It would be the opposite.

C2-6

Lastly I would urge the City to do significant outreach and communicate openly to neighbors and the community about this project before and after it gets started since invariably these old infrastructure repairs run into surprises that result in delays, frustration and misunderstandings.

C2-7

Thank you for your time and attention,

Susan Cluff
Belvedere resident

LETTER C2
Susan Cluff

C2-1 The comment raises questions about how the area of potential effects is defined for evaluating vibration impacts on nearby buildings. The term “Historic Building” as it is used in the Caltrans and NAHCP “Current Practices to Address Construction Vibration and Potential Effects to Historic Buildings Adjacent to Transportation Projects” refers only to those buildings that are eligible for, or listed on, the National Register of Historic Places. It does not refer to buildings that are simply old. The China Cabin is listed on the National Register Historic Places, which is why this building was considered in more detail in the analysis. The China Cabin is subject to increased vibration thresholds and monitoring requirements, as outlined in Mitigation Measure CULT-1a. Besides the China Cabin, *Section 4.11, Noise*, of the DEIR also analyzed the vibration impacts for the residential buildings adjoining the project site and the San Francisco Yacht Club, and mitigation measures were established and detailed in Mitigation Measure NOISE-2.

The comment also asks how the 42-foot and 52-foot buffer distances for construction vibration impacts were calculated and monitored. In accordance with guidance from Caltrans (2020), the vibration analysis on page 4.11-15 of the DEIR applied vibration thresholds that are recommended for historic structures (0.25 inches per second) and older residential buildings (0.3 inches per second). The 45 feet and 52 feet of buffer distance were calculated based on the typical vibration level generated by an impact pile driver (FTA, 2018) and the Caltrans structure damage vibration thresholds. The reference vibration levels for the primary types of equipment that would generate ground vibration during project construction and the associated vibration calculations are included in Appendix E of the DEIR. Mitigation Measures CULT-1a and NOISE-2 describe specific protocols that would be implemented during construction to reduce the potential for construction-generated vibration to cause damage to nearby buildings to a less-than-significant level.

C2-2 This comment indicates that, while the DEIR states that road fill was placed in 1940, historical news sources indicate that road fill was placed prior to 1940 when the cove and yacht harbor were deepened, and that mud was pumped up from the bottom of the Bay to fill in piles of big rocks and allowed to dry. The comment asks if those types of dredged materials would perform differently during construction and/or in earthquakes, flooding, tsunamis from what is described in the DEIR.

As discussed in Response to Comment A1-24 above, the DEIR acknowledges that there were roadways in the area of Beach Road and San Rafael Avenue prior to 1930, additional dredged fill material was placed in the areas of these roadways in the 1940s, and it is known that fill materials include larger cobbles and boulders. The project Geotechnical Investigation (Miller Pacific Engineering Group, 2022) included analysis of information and testing of soil from many borings to characterize the various fill materials and underlying soil at the project site. The findings and recommendations of the Geotechnical Investigation, the project design, and the DEIR account for the fill materials that have been placed at the project site over different periods of time.

C2-3 This comment asks how historic buildings near the project site would be surveyed, inspected, and monitored before, during, and after construction. The City determined that the measures dictated in Mitigation Measure NOISE-2 would be sufficient to prevent impacts on older buildings. These measures include establishing vibration thresholds, preparing vibration plans, and using monitoring requirements to minimize or eliminate impacts on buildings. As the China Cabin is currently listed

on the National Register of Historic Places, the City recommended that this building undergo additional consideration for construction vibration effects, which are addressed in Mitigation Measure CULT-1a. These measures include increased vibration thresholds and monitoring by a qualified historic architect or preservation professional, if thresholds are exceeded. Mitigation Measure NOISE-2 details the process of how the project would handle vibration effects for nearby buildings.

- C2-4 This comment indicates that the potential effects of a seawall breach, earthquake, flooding, or road failure during construction should be considered and that, in 2020, contractors working on Beach Road replacing a 12-inch storm drain found several buried creosote wood piles and piers requiring removal; an approximate 20-foot trench of deep fill consisting of large, hard riprap stones that had to be jack hammered; and some black stained fill that needed special disposal. The comment asks whether these conditions would affect water quality, wildlife, construction, or scheduling.

The likelihood that a significant earthquake or flooding would occur during the relatively short construction window for the project would be low. Construction of the project would include excavation ahead of sheet pile installation to clear obstructions and re-route utilities, but any deeper excavations that would have the potential to reduce the strength of the levees would require shoring, which would ensure that the excavation would not increase the likelihood of earthquake-induced damage including road failure or seawall breach. In addition, only relatively small areas of excavation would occur at any one time. It is common to encounter buried creosote-treated wood piles and riprap during construction along shorelines, and therefore this would be anticipated and appropriately dealt with during construction. Creosote-treated wood must be properly disposed of at an appropriately permitted landfill. If creosote-treated wood or contaminated soil were encountered during excavation, they would be managed in accordance with the project's Stormwater Pollution Prevention Plan (SWPPP) to ensure that their removal and storage would not affect water quality or wildlife. Soil excavated from the project site would be transported to a landfill for disposal, and all landfills require that soil be tested prior to accepting the soil to ensure that the landfill is permitted to accept the waste. Therefore, if creosote-treated wood or contaminated soil are encountered during construction, they would be appropriately managed and disposed of at a permitted landfill as required by existing regulations.

- C2-5 The comment asks when decisions about installation of flexible utility lines would be made and how these decisions would affect the estimated construction period. The need for the installation of flexible utility lines depends on the type and age of material being used by utility agencies. This evaluation would be made during the final planning stages of the project and would include coordination with private and public utility providers. Flexible couplings could be installed in concurrence with other construction activities and would not likely have a significant effect on project timelines.

- C2-6 This comment questions the DEIR's conclusions about project and cumulative impacts on traffic patterns and emergency access. Please see Response to Comment A1-21. The mitigation measures recommended for the project would reduce the project's contribution to any potential cumulative effects. Also, the timing of the Mallard Pointe project may not overlap with the proposed project.

- C2-7 The comment urges the City to do significant outreach and communicate openly with neighbors and the community about the project before and during construction. The comment is noted. The City would keep neighbors and interested parties informed about the project as it proceeds.

Subject: Comments from today's EIR meeting

Date: Wednesday, October 12, 2022 at 2:53:23 PM Pacific Daylight Time

From: Susan Cluff <susancluff@mac.com>

To: Robert Zadnik - City Manager <rzadnik@cityofbelvedere.org>

CC: Peter Mark <pmark@mac.com>

Here are my comments from today's subcommittee meeting:

1. Please, please do a better job at notification and posting documents and meeting dates. This project will impact not only "nearby" residents but all City residents, businesses and property owners. "Public engagement" and "outreach" is not simply publishing dates and docs on website. Face to face meetings do make a difference.

C3-1

2. It would be useful to see local utility maps for water, sewer, storm drainage, PG& E and communications to see where they are, what facilities exist and if/when upgrades scheduled. Also look at evacuation and walk to school routes and designated emergency centers (City Hall and SFYC) to see how those might be impacted during construction.

C3-2

3. Protecting the China Cabin as a historical resource is important (pre and post survey), believe some repair work was done recently. But other properties should also be looked at – Belvedere Land building and Farr cottages are 1900s, SFYC building is 1930s. Most lagoon homes built in 1950s are also "historic", including mine on Peninsula on concrete slab foundations. Road and pipes have settled considerably.

C3-3

4. Vibration levels/noise impacts are quite different with different types of drilling equipment and types of soils/rocks encountered. So who makes those decisions and when? For noise, EPA says anything over 75 db over prolonged period can create hearing damage. So ?

C3-4

5. How can City incorporate some lessons learned/best practices from 2019 seawall repair project, eg: staging, traffic, parking? How do we avoid snafus, report problems? (Call the contractor?) Public safety/FD access must be maintained to all homes and areas 24/7.

C3-5

Thank you for your time and attention,

Susan Cluff
Peninsula Road resident

LETTER C3
Susan Cluff

- C3-1 This comment asks the City to “do a better job at notification and posting documents and meeting dates.” The comment is noted. The City realizes that sharing of information related to this project is critical.
- C3-2 This comment asks for information on (1) locations and scheduled upgrades of water, sewer, storm drainage, PG&E, and communications utilities; and (2) project impacts on evacuation and walk-to-school routes and designated emergency centers. Utility lines were shown on Stetson’s Phase 1 – Sheet Piling Plan Set, dated July 7, 2022. However, utility upgrades are not part of the project description. The City has not been notified of definitive locations or schedules for upgrading utilities at this time. The City will work with the various utility providers to develop programs for these upgrades, including locations and schedules as the project moves into final design.

Evacuation routes and areas are described on pages 4.8-2 through 4.8-4 of the DEIR. As discussed on page 4.8-12 of the DEIR, the only potentially significant impact of the project related to emergency evacuation routes would be the proposed use of Belvedere Way for construction staging, which could physically interfere with the use of this evacuation route. As discussed on pages 4.8-12 to 4.8-13 of the DEIR, implementation of Mitigation Measure HAZ-1 would ensure that this potential impact would be less than significant by ensuring that the use of Belvedere Way for construction staging would not physically restrict public access to Belvedere Way and would allow for the safe passage of pedestrians along Belvedere Way at all times.

- C3-3 This comment indicates that the DEIR should evaluate impacts on properties other than the China Cabin, including the Belvedere Land Building, Farr cottages, San Francisco Yacht Club, and houses along the lagoon. As discussed in Response to Comment A1-2 above, the EIR evaluated potential impacts on all potentially affected buildings and concluded that implementation of the measures set forth in Mitigation Measures GEO-2 and NOISE-2 would be sufficient to reduce impacts on potentially affected buildings to less-than-significant levels. These measures include establishing vibration thresholds, preparing vibration plans, and using monitoring requirements to minimize or eliminate impacts on buildings. As the China Cabin is currently listed on the National Register of Historic Places, the City recommended that this building undergo additional consideration for construction vibration effects, which are addressed in Mitigation Measure CULT-1a. These measures include increased vibration thresholds and monitoring by a qualified historic architect or preservation professional, if thresholds are exceeded.
- C3-4 This comment asks: “Vibration levels/noise impacts are quite different with different types of drilling equipment and types of soils/rocks encountered. So who makes those decisions and when?” The types of construction equipment that would be used on the project site were provided by the project design team. Typical noise and vibration levels from these types of construction equipment were obtained from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (FTA, 2018).

The comment indicates that the EPA states exposure to noise levels of 75 db or higher over prolonged period could cause hearing damage. The 75 dBA exposure limit for environmental noise

was recommended in a 1974 U.S. Environmental Protection Agency report,³ which was based on an 8-hour average over long periods of time (i.e., years). The 1974 report was explicit in stating that it should not be constituted as a standard, specification, or regulation. It should be noted that the FTA 90 dBA construction noise criterion used in the DEIR is a 1-hour average, which is better for evaluating exposure to peak noise levels, and it applies to exterior noise levels. Standard building structures provide approximately 12 dBA to 15 dBA noise attenuation with windows open, and an average of 20 dBA attenuation with windows closed. The interior noise levels would be less than the exterior noise levels. In addition, due to the nature of construction activities, any increases in ambient noise levels in the project vicinity would be intermittent, short term, and temporary.

- C3-5 The comment asks how the City can incorporate lessons learned and best practices from the 2019 seawall repair project, and indicates that public safety and emergency access must be maintained at all times. The 2019 Emergency Seawall Repair Project provided real-world experience on pricing, construction techniques, staging, permitting, and other valuable lessons. Those lessons and data have already been incorporated into the project scope, cost, and construction plan.

³ U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March.

Subject: submission pf Comments and challenges to Draft EIR

Date: Wednesday, November 16, 2022 at 9:32:13 PM Pacific Standard Time

From: w1rothman@gmail.com <w1rothman@gmail.com>

To: rzadnik@cityofbelvedere.org <rzadnik@cityofbelvedere.org>, amysc@rtasc.com <amysc@rtasc.com>

CC: swilkinson@cityofbelvedere.org <swilkinson@cityofbelvedere.org>, jlynch@cityofbelvedere.org <jlynch@cityofbelvedere.org>, pmark@cityofbelvedere.org <pmark@cityofbelvedere.org>, janecoop@gmail.com <janecoop@gmail.com>, kmartine@thearknewspaper.com <kmartine@thearknewspaper.com>, editor@thearknewspaper.com <editor@thearknewspaper.com>, 'David Flaherty' <DAVID@nestorypark.com>, 'Suzanne Du Molin' <sdumolin@drs1.com>, greg_wood@comcast.net <greg_wood@comcast.net>, 'Jerry Butler' <jerrybutler@aol.com>, gricapito@marinij.com <gricapito@marinij.com>

From William Rothman

To Robert Zadnik and Amy Skewes-Cox

Please acknowledge receipt of this email, and its attachment.

C4-1

Letter C4
William Rothman

- C4-1 This comment requests that the City and EIR consultant acknowledge receipt of the commentor's email and its attachment. The City and EIR consultant received the email. The attachment is addressed in the responses to Letter C1.

D. PUBLIC HEARING COMMENTS AND RESPONSES

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INTRODUCTION

A public hearing on the DEIR was held online via Zoom before the Belvedere City Council on November 9, 2022. The meeting began with an overview of the EIR process. Impacts identified as potentially significant in the DEIR were discussed. It was stated that all comments on the DEIR were due by November 28, 2022, and next steps in the process were identified.

COMMENTS AND RESPONSES

The following is a summary of comments from the November 9, 2022, public hearing. Responses to each comment follow immediately after the comment.

Comment D1: A council member asked about the shelf life after filing of the Notice of Determination.

Response D1: Amy Skewes-Cox, EIR Project Manager, responded that the shelf life of a CEQA document can vary based on changed conditions. The document may remain adequate and relevant for 5, 10, or more years depending on the conditions and the possibility of new or increased environmental impacts.

CEQA requires subsequent or supplemental review only in limited circumstances set forth in Public Resources Code Section 21166. In the event implementation of the project is significantly delayed, the EIR would be reviewed to ensure that its impact analyses remain adequate considering any new information or changes that may have occurred.

Comment D2: A council member mentioned that the City's approval does not include approvals required from the U.S. Army Corps of Engineers, the San Francisco Bay Conservation and Development Commission, or other permitting agencies.

Response D2: Ms. Skewes-Cox responded that the City's approval would include approving the project and certifying the EIR and that required permits from other agencies would be a separate process. See Response to Comment D3 below.

Comment D3: A council member asked if the City could work with permitting agencies without certifying the EIR.

Response D3: The City's attorney, Ms. Tiffany Wright, responded that the City is the lead agency and that other agencies would use the EIR information in their permitting process. The City could start the applications for the required permits but the City would still need to certify the EIR.

Under CEQA, other state and local agencies with permitting authority or approval power over some aspect of the project are considered responsible agencies. A responsible agency relies on the lead agency's environmental document in acting on the aspect of the project that requires the responsible agency's approval.

Comment D4: Mr. Rothman wanted to know about submitting information for the EIR and raised concerns about pipes breaking, such as Marin Municipal Water District pipes. He also shared concerns about the sinking of San Rafael Avenue and Beach Road.

Response D4: Mr. Rothman's comments are similar to those raised in Comment Letter C-1 in Section C of this Final EIR. Please see Responses to Comments C1-1, C1-2, C1-4, and C1-7.

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Chapter III DEIR TEXT CHANGES



This chapter identifies the text changes to the DEIR, which are made for clarification purposes or in response to comments on the DEIR.

The following figures in Chapter III, Project Description, of the DEIR have had minor adjustments/corrections.

Figure 3-1	Regional and Project Location	page 3-2
Figure 3-2	Underground Utilities	page 3-3
Figure 3-5	City of Belvedere General Plan	page 3-7
Figure 3-6	City of Belvedere Zoning	page 3-8

The following revision is made to the discussion on page 4.3-2 of the DEIR:

...Typical terrestrial species found in Belvedere are habitat generalists, such as the black tailed deer, raccoon, opossum, gray fox, red fox, fox squirrel, Botta's ~~Botta's~~ pocket gopher, Norway rat, house mouse, and numerous species of birds. Native and ornamental trees, shrubs, and structures provide nesting opportunities for native and non-native birds such as house finch, English sparrow, scrub jay, California ~~brown~~ towhee, America robin, bush ~~bush~~ tit, and mourning dove.

The following revision is made to Table 4.3-2 on page 4.3-10 of the DEIR.

Tidewater goby <i>Eucyclogobius newberryi</i>	FE SSC	Brackish shallow lagoons and lower stream reaches where water is fairly still but not stagnant	None – No suitable habitat present
<u>White sturgeon</u> <i>Acipenser transmontanus</i>	SSC	Ranges from Baja California to Alaska; resides in large rivers and estuaries, including Sacramento-San Joaquin system.	Low – May migrate through vicinity but essential habitat absent.

The following revision is made to the discussion on page 4.3-15 of the DEIR:

...Species considered to have some potential for nesting in the site vicinity include Cooper's hawk (*Accipiter cooperi*), sharp-shinned hawk (*Accipiter striatus*), and white-tailed kite (*Elanus leucurus caeruleus*), as well as more common raptor species such as great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*), and more common passerine species such as California scrub jay (*Aphelocoma californica*), California towhee (*Melospiza crissalis*), and American robin (*Turdus migratorius*).



Figure 3-1

REGIONAL AND PROJECT LOCATION

SOURCE: Stetson Engineers, 2022



SOURCE: City of Belvedere, 2022

Figure 3-2
UNDERGROUND UTILITIES



AMY SKEWES-COX
ENVIRONMENTAL PLANNING

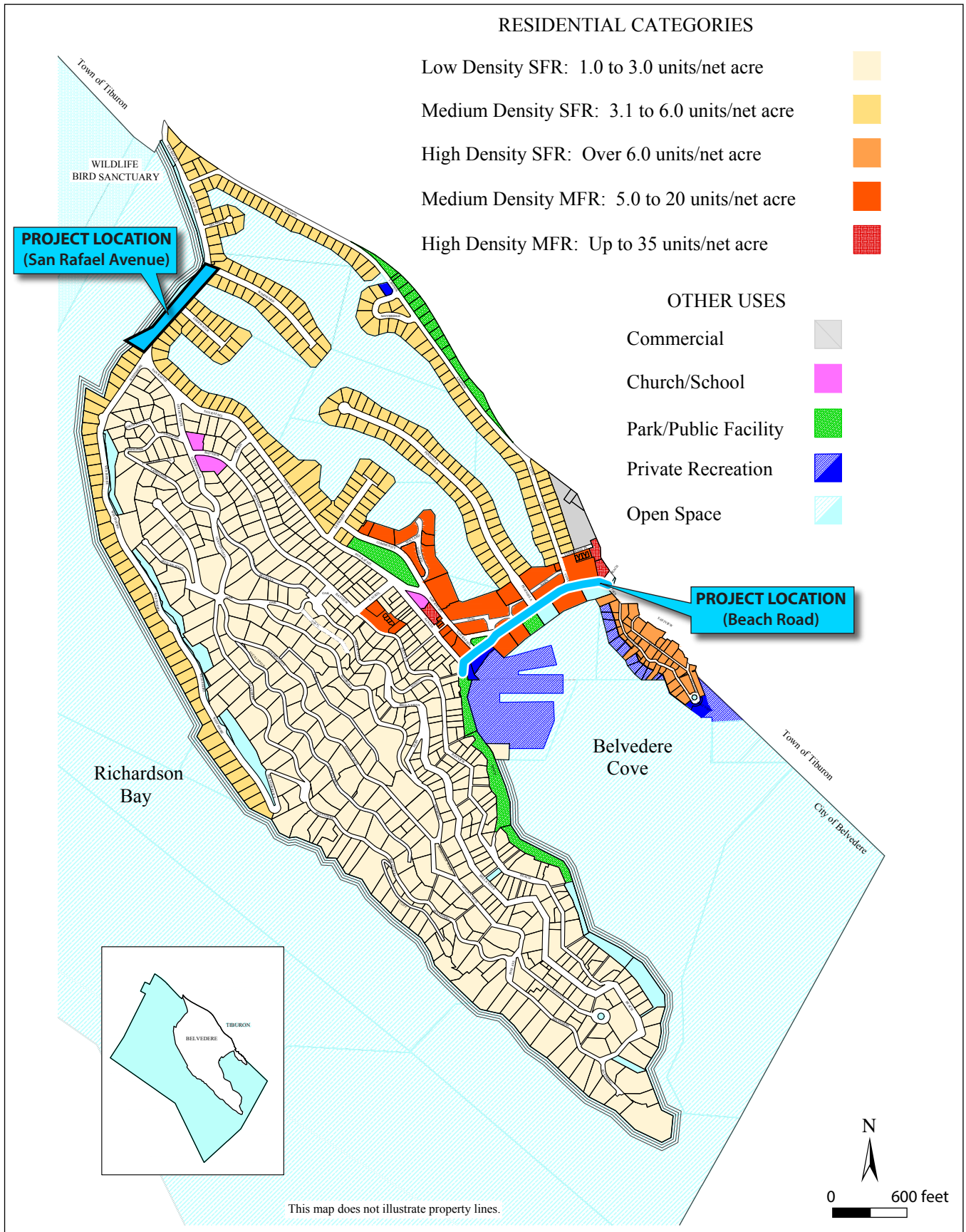


Figure 3-5

SOURCE: City of Belvedere, 2022

CITY OF BELVEDERE GENERAL PLAN

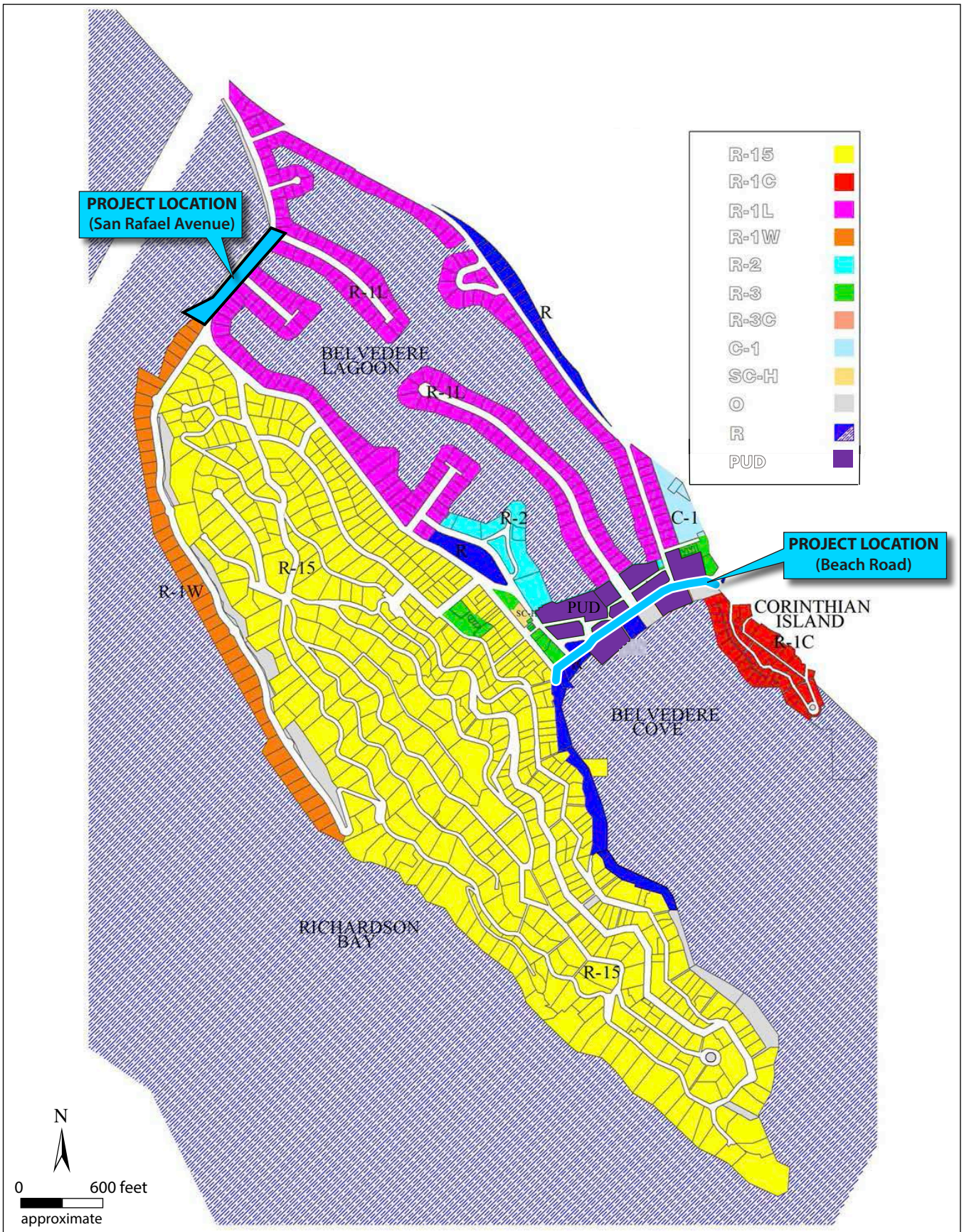


Figure 3-6

SOURCE: City of Belvedere, 2022

CITY OF BELVEDERE ZONING

The following revision is made to Mitigation Measure BIO-2 on pages 4.3-26 through 4.3-27 of the DEIR:

Mitigation Measure BIO-2: Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act and California Fish and Game Code when nests are in active use. This shall be accomplished by taking the following steps:

- If construction is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 7 44 days prior to the onset of vegetation removal or construction, in order to identify any active nests on the project site and in the vicinity of proposed construction.
- If construction is curtailed for more than 7 days, another focused survey shall be conducted during the nesting season to confirm that no new nests have been established in the vicinity of proposed construction.

The following revision is made to the discussion on page 4.8-11 of the DEIR:

Belvedere Nursery School, a private preschool at 15 Cove Road Place, is located within one-quarter mile (approximately 275 feet to the north) of the east end of the Beach Road segment of the project. Reed Elementary School, a public elementary school at 1199 Tiburon Boulevard in Tiburon, is located within one-quarter mile (approximately 800 feet north) of the proposed staging area at the City Corporation Yard. ...

The following revision is made to Mitigation Measure HYDRO-1a on pages 4.9-17 through 4.9-18 of the DEIR:

Mitigation Measure HYDRO-1a: The following measures shall be implemented to reduce the risk of disturbed soils and spills/releases from affecting water quality in nearby surface waters during construction activities near or below the waterline of San Francisco Bay and the Belvedere Lagoon:

- The contractor(s) shall avoid sheet piling installation in the Bay along the exterior side of the Beach Road levee during tidal periods when the tidal water level is at 2.5 feet mean lower low water (MLLW) or higher.
- The contractor(s) shall install a turbidity curtain in the Bay to hydraulically isolate the narrow, approximately 400-foot-long strip of the bay where sheet pile installation occurs from the rest of the Bay. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out and concrete has fully cured.
- The contractor(s) shall install a turbidity curtain in the lagoon to hydraulically isolate the portion of the lagoon where sheet pile installation occurs from the rest of the lagoon. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out.
- The contractor(s) shall coordinate with the City of Belvedere Public Works Department and the Belvedere Lagoon Property Owners Association (BLPOA) to ensure that the lagoon is drawn down to the winter operating level prior to and for the duration of sheet pile installation activities in the lagoon and BLPOA's culverts and other water control facilities along San Rafael Avenue are shut off from the Bay for the duration of sheet piling installation and thereafter while the turbidity curtain remains installed, and further coordinate with BLPOA to ensure that interference with BLPOA's critical water control operations is avoided or minimized to the extent practical.

The following figures in Chapter 4.10 of the DEIR have had minor adjustments/corrections.

Figure 4.10-1 City of Belvedere General Plan page 4.10-2
 Figure 4.10-2 City of Belvedere Zoning page 4.10-5

The following revision is made to Table 4.11-1 on page 4.11-2 of the DEIR:

TABLE 4.11-1 DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
Decibel (dB)	A unit describing the amplitude of sound on a logarithmic scale. Sound described in decibels is usually referred to as sound or noise “level.” <u>Decibel is a unit that describes the amplitude of sound, which is determined based on the pressure of the sound measured and the reference pressure. The reference pressure for water is 1 micro-Pascal (µPa), and for air is 20 micro-Pascals. In this analysis, underwater sound pressure levels are expressed in decibels.</u> This unit is not used for airborne sound pressure levels in this analysis because it includes frequencies that the human ear cannot detect.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All <u>airborne</u> sound levels in this report are A-weighted.
Maximum Sound Levels (L _{max})	The maximum sound level measured during a given measurement period. <u>In this analysis, this term is used to describe airborne sound levels.</u>
Equivalent Noise Level (L _{eq})	The average A-weighted noise level during the measurement period. For this CEQA evaluation, L _{eq} refers to a 1-hour period unless otherwise stated.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels during the evening from 7:00 AM to 10:00 PM and after addition of 10 decibels to sound levels during the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level (L _{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to sound levels during the night between 10:00 PM and 7:00 AM.
Ambient Noise Level	The existing level of environmental noise at a given location from all sources near and far.
Sound Exposure Level (SEL)	<u>The time integral of frequency-weighted squared instantaneous sound pressures, which are measured in decibels referenced to 1 µPa² sec. SEL is used to characterize sound energy associated with a pile driving pulse or series of pulses.</u>
Cumulative Sound Exposure Level (cSEL)	<u>Cumulative SEL can be estimated from the single-strike SEL and the number of strikes that likely would be required to place the pile at its final depth using the following equation: cSEL = single-strike SEL + 10 log (# of pile strikes).</u>
Peak Sound Pressure Level (Peak SPL)	<u>In this analysis, this term is used to describe underwater sound levels. Sound pressure is the sound force per unit area expressed in decibels. Peak SPL is the largest absolute value of the instantaneous sound pressure.</u>
Vibration Decibel (VdB)	A unit describing the amplitude of vibration on a logarithmic scale.
Peak Particle Velocity (PPV)	The maximum instantaneous peak of a vibration signal.
Root Mean Square (RMS) Velocity	The average of the squared amplitude of a vibration signal.

Source: Charles M. Salter Associates, Inc., 1998; FTA, 2018; Caltrans, 2020b.

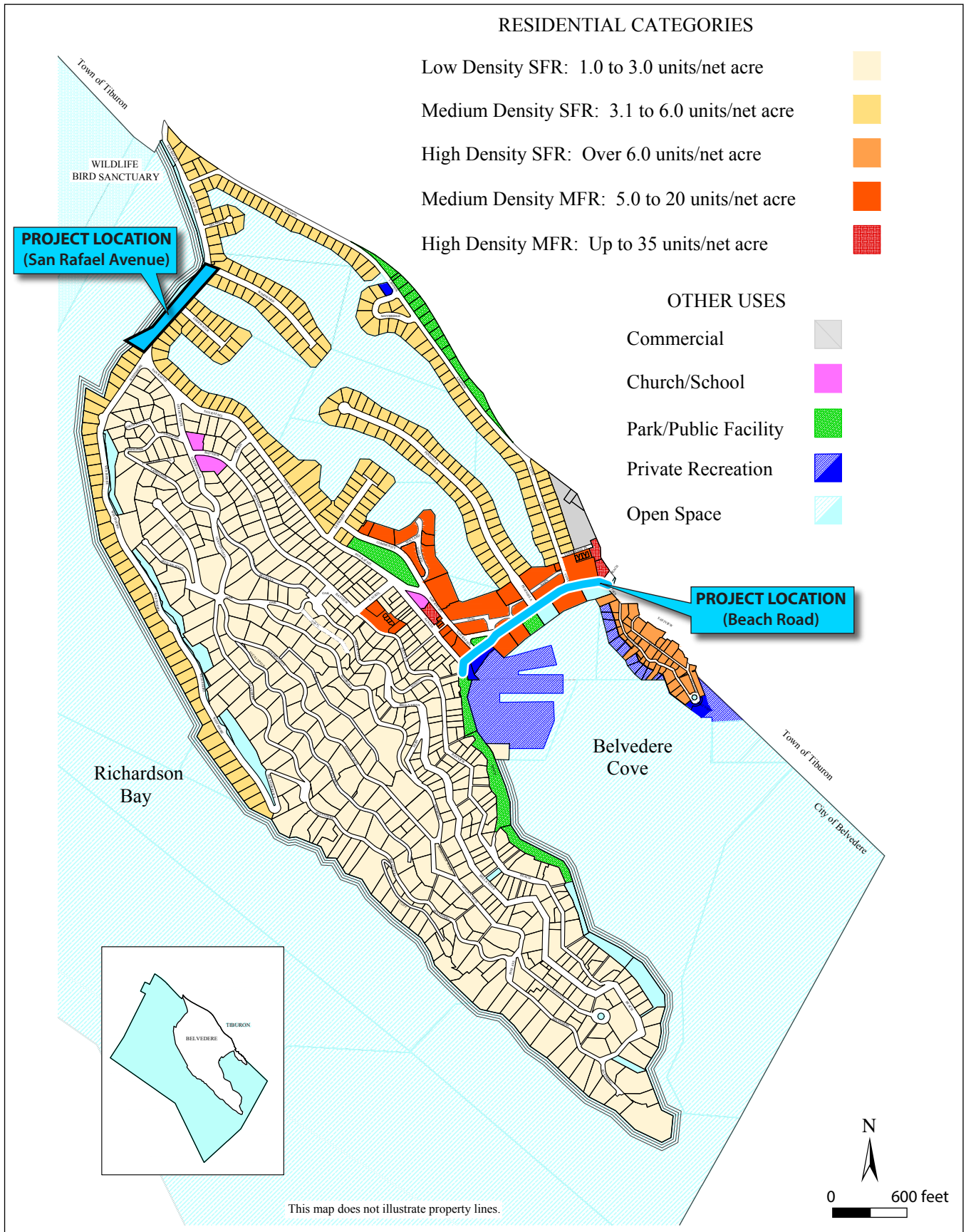


Figure 4.10-1

SOURCE: City of Belvedere, 2022

CITY OF BELVEDERE GENERAL PLAN

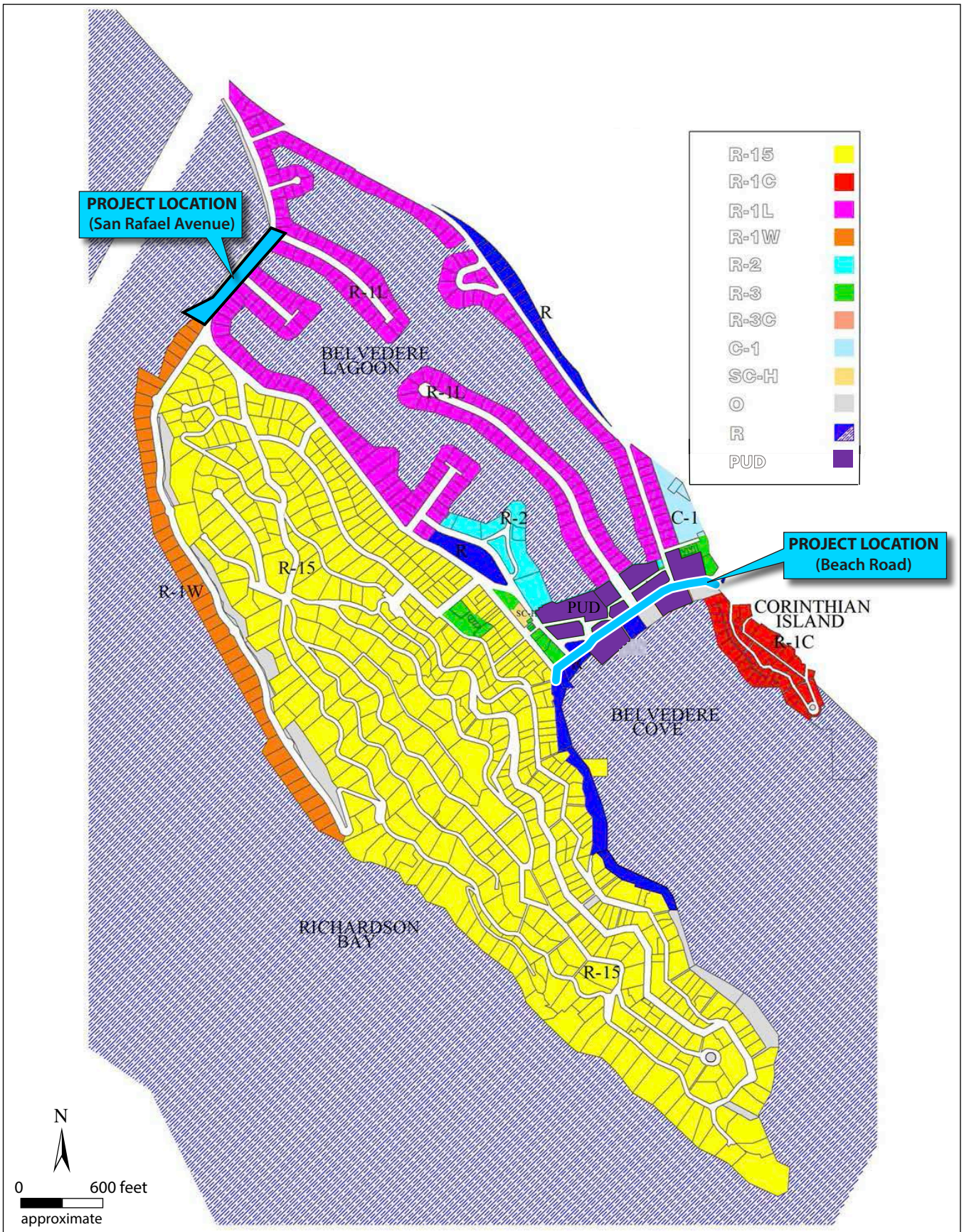


Figure 4.10-2

SOURCE: City of Belvedere, 2022

CITY OF BELVEDERE ZONING

The following revision is made to the discussion on page 4.11-4 of the DEIR:

Noise-sensitive receptors are defined as land uses where noise-sensitive people may be present or where noise-sensitive activities may occur. Noise-sensitive receptors include ..., and (4) the Belvedere Nursery School located 275 feet to the north of the proposed installation of sheet piles along Beach Road. As discussed in Section 4.3, Biological Resources, special-status fish species may occur in the bay waters in the vicinity of the project site and are considered as noise-sensitive receptors. Potential noise impacts on protected fish species and marine mammals are discussed in Section 4.3, Biological Resources, of this EIR and therefore are not addressed in this section.

The following revision is made to the discussion on page 4.11-9 of the DEIR, following Table 4.11-5:

Fisheries Hydroacoustic Working Group (FHWG)

In 2008, the Fisheries Hydroacoustic Working Group (FHWG), including the Federal Highway Administration, NOAA Fisheries Northwest and Southwest Regions, U.S. Fish and Wildlife Service, the Department of Transportation from California, Oregon, and Washington, and California Department of Fish and Game, issued an agreement in principle for interim criteria for injury to fish from impact pile driving activities (FHWG, 2008), as presented in Table 4.11-6a. The criteria were established for the underwater noise levels at which physiological effects of impact pile driving on fish could be expected. There is no current vibratory pile driving threshold for fish because vibratory driving generates lower sound levels and different sound wave forms that result in reduced adverse effects on fish as compared to impact pile driving.

TABLE 4.11-6A INTERIM IMPACT PILE DRIVING UNDERWATER NOISE CRITERIA FOR FISH

<u>Type</u>	<u>Interim Criteria for Injury</u>
<u>Peak Sound Pressure Level (SPL)</u>	<u>206 dB for all sizes of fish</u>
<u>Cumulative Sound Exposure Level (cSEL)</u>	<u>187 dB for fish size of 2 grams or greater</u>
	<u>183 dB for fish size of less than 2 grams</u>

Notes: dB = decibels. Underwater peak SPL decibel levels are referenced to 1 μ Pa, and the SEL is referenced to 1 μ Pa²-sec. Source: FHWG, 2008.

The following revision is made to the discussion on page 4.11-10 of the DEIR after the first paragraph and before the Noise from Construction-Related Traffic subsection:

Underwater Noise from Pile Driving

Construction activities, specifically pile driving, can generate noise levels that have the potential to cause adverse effects on sensitive biological resources such as fish unless appropriate controls are implemented as is currently proposed as part of the project. Typical underwater sound levels from impact and vibratory pile driving in the Bay Area are summarized in Table 4.11-7a. As shown in the table, the peak sound pressure level (SPL) measured at 10 meters (32.8 feet) from an impact hammer used to install sheet piles for similar projects in the Bay Area was lower than the interim peak SPL criteria of 206 dB shown in Table 4.11-6a. In addition, underwater sound levels generated using a vibratory hammer were substantially lower than the impact pile driver. As discussed in Section 4.3, Biological Resources, vibratory hammers that would be used as part of the sheet pile installation for the

proposed project generate different sound wave forms from impact hammers and would not cause physical injury or mortality to fish.

TABLE 4.11-7A UNDERWATER SOUND LEVELS MEASURED FOR SIMILAR PROJECTS IN SAN FRANCISCO BAY AREA

<u>Pile Type</u>	<u>Peak SPL (dB)</u>	<u>Single-Strike SEL (dB)</u>	<u>Project and Location</u>
<u>Impact Hammer</u>			
24-inch AZ Steel Sheet	205	179	Berth 23, Port of Oakland (Vortex) Oakland, CA – San Francisco Bay
<u>Vibratory Hammer</u>			
	177	162	Berth 23, Port of Oakland (Vortex) Oakland, CA – San Francisco Bay
24-inch AZ Steel Sheet	175	162	Berth 30, Port of Oakland Oakland, CA – San Francisco Bay
	177	163	Berth 35/37, Port of Oakland (Dutra) Oakland, CA – San Francisco Bay

Notes: SPL = sound pressure level; SEL = sound exposure level; dB = decibels. Underwater peak SPL decibel levels are referenced to 1 µPa, and the SEL is referenced to 1 µPa²-sec. Sound levels were measured 10 meters (32.8 feet) from the pile with a water depth of about 15 meters (49.2 feet). Source: California Department of Transportation (Caltrans). 2020b.

The isopleth distance, which is defined as the distance within which a specific sound pressure level is anticipated to extend from the source, was estimated for each FHWG pile driving interim criterion sound pressure level using the multi-species pile driving calculator developed by the National Marine Fisheries Service (NMFS, 2022), as included in Appendix E. The isopleth distance was estimated based on the underwater sound pressure level produced by the sound source (impact pile driving), the threshold underwater sound pressure level, and the underwater sound attenuation rate. Regarding source sound pressure levels, the peak SPL and sound exposure level (SEL) measurements collected during impact pile driving for a similar project at the Port of Oakland (see Table 4.11-7a) were used in this analysis. The cumulative sound exposure level (cSEL) was calculated based on the single-strike SEL reported in Table 4.11-7a and the estimated number of pile strikes. As mentioned in Chapter 3, Project Description, sheet piles would predominantly be driven using vibratory hammers, and impact hammers would only need to be used when the vibratory hammer is not able to complete the installation. It is estimated that up to 50 strikes with an impact hammer might occur per day if refusal is encountered and an impact hammer is needed. Regarding the sound attenuation rate, an in-water sound attenuation rate of 4.5 dB per doubling of distance was conservatively applied in the absence of a site-specific attenuation rate, in accordance with Caltrans guidance (Caltrans, 2020b). The estimated isopleth distances to the FHWG pile driving criteria for fish are summarized in Table 4.11-8a.

TABLE 4.11-8A MODELED ISOPLETH DISTANCES FOR UNDERWATER SOUND LEVELS FROM IMPACT PILE DRIVING

Modeling Scenario	Isopleth Distance (Feet) to FHWG Interim Thresholds for Fish		
	Peak SPL Threshold 206 dB	Cumulative SEL Threshold	
		187 dB (For fish size of 2 grams or greater)	183 dB (For fish size of less than 2 grams)
24-inch AZ Steel Sheet			
Impact Hammer	28 feet	130 feet	241 feet

Source: Appendix E.

As shown in Table 4.11-8a, impact pile driving activities for the project could exceed the peak SPL threshold (206 dB) for injury to fish of all sizes within 28 feet of the pile driving. In addition, fish with a size of 2 grams or greater and fish less than 2 grams in size may be exposed to sound levels above the applicable cSEL thresholds within 130 feet and 241 feet, respectively. According to the Caltrans Technical Guidance for Assessment of the Hydroacoustic Effects of Pile Driving on Fish (Caltrans, 2020b), the best available science demonstrates that no physical injuries associated with the cSEL are anticipated, and exceedance of the cSEL thresholds is unlikely to cause injury or mortality to fish, including state-listed species such as coho salmon, chinook salmon, or longfin smelt.

It should be noted that the isopleth distances presented in Table 4.11-8a are very conservative, based on the following reasons. Firstly, as mentioned in Section 4.3, *Biological Resources*, installation of sheet piles along Beach Road would occur during the low tide period—when the bay waters have receded, and the base of the existing seawall is exposed. The modeled buffer distances for underwater sound levels for the project are very conservative because the sound attenuation rates for pile driving on land near the water (or in shallow water with a depth of 2 feet or less) are expected to be greater than the sound attenuation rates used in the model for deeper water. In other words, the actual isopleth distances would be shorter as installation of the sheet piles would occur during the low tide period when the sheet piles would not be in direct contact with water. Secondly, as discussed in Section 4.3, *Biological Resources*, a turbidity curtain would be used as part of the sheet pile installation, which would separate the construction zone from the open waters of the bay and prevent aquatic life from entering the construction zone. The turbidity curtain would extend an average of 7.5 feet bayward of the sheet pile footprint. As a sealed continuous barrier, the turbidity curtain could provide for additional attenuation of construction-generated underwater sound levels but there are no data available in estimating this, and it would depend on the material used and other variables that cannot be predicted or defined for modeling purposes. Thirdly, fish are not expected to be present in close proximity during impact pile driving, in part because of the shallow waters during the low-tide construction window and also because the sound produced by other construction activities (e.g., vibratory pile driving) would cause the fish to instinctively move away from the construction area. It should also be noted that adequate water depths and habitat exist elsewhere throughout Belvedere Cove and the adjacent San Francisco Bay to provide sufficient area for fish to disperse and forage with no substantial disruption or adverse impact on their movement patterns and foraging behaviors. Fourthly, as discussed above, the impact hammer would only be used when the vibratory hammer is not able to complete the installation. Therefore, underwater sound levels generated by the impact hammer would be limited and would only occur over a very short period of time.

Based on the above analysis, the effects of elevated underwater sound levels during sheet pile driving for the project are anticipated to be less than significant, assuming adequate controls and construction restrictions are implemented as required in Mitigation Measures BIO-1a through BIO-1c in Section 4.3, Biological Resources.

The following revisions are made to the discussion on pages 4.11-21 and 8-8 through 8-9 of the DEIR:

BK Cooper and City of Belvedere, 2022. Personal communication with Baseline Environmental Consulting, September 26, 2022.

California Office of Planning and Research (OPR), 2017. State of California General Plan Guidelines.

California Code of Regulations (CCR), Title 24, Part 2, Vol. 1, Section 1206.4.

California Code of Regulations (CCR), Title 24, Part 11, Section 5.507.

California Department of Transportation (Caltrans), 2020a. Transportation and Construction Vibration Guidance Manual.

California Department of Transportation (Caltrans). 2020b. Technical Guidance for Assessment of the Hydroacoustic Effects of Pile Driving on Fish. Final Report, October.

Charles M. Salter Associates, Inc., 1998. Acoustics – Architecture, Engineering, the Environment, William Stout Publishers.

City of Belvedere, 2010. City of Belvedere General Plan 2030.

City of Belvedere, 2022. Municipal Code, Chapter 8.10.

Federal Highway Administration (FHWA), 2018. Techniques for Reviewing Noise Analyses and Associated Noise Reports.

Federal Transit Administration (FTA), 2018. Transit Noise and Vibration Impact Assessment Manual, FTA Report No.0123.

Fisheries Hydroacoustic Working Group (FHWG), 2008. Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities, June 12.

National Marine Fisheries Service (NMFS), 2022. Optional Multi-species pile driving calculator, version 1.2-multi-species:2022. Website: <https://www.fisheries.noaa.gov/southeast/consultations/section-7-consultation-guidance>, accessed August 9, 2023.

Appendix E is revised to include new data.

APPENDIX E
NOISE DATA

Construction Noise Calculations - San Rafael Avenue

Construction Phase	Equipment ¹	No. Equipment ¹	Usage Factor ²	Maximum Noise Level @ 50 feet (Lmax) ^{2,3}	Typical Noise Level @ 50 feet (dBA ₁)	Reference Distance (D ₁)	Distance to Receptor (D ₂)	Ground Absorption Constant (G)	Noise Level at Receptor (dBA ₂)	Two Noisiest Equipment at Receptor	Buffer Distance to 90 dBA Threshold
Unit			%	dBA Lmax	dBA Leq	feet	feet	unitless	dBA Leq	dBA Leq	feet
Demolition	Excavator	2	40	85	81	50	23	0	88	91	25
	Loader	1	40	80	76	50	23	0	83		
	Air Compressor	1	40	80	76	50	23	0	83		
Excavation	Excavator	2	40	85	81	50	23	0	88	91	25
	Loader	1	40	80	76	50	23	0	83		
	Vacuum Excavator (Vac-Truck)	1	40	85	81	50	23	0	88		
	Air Compressor	1	40	80	76	50	23	0	83		
Sheet piling (impact)	Pile-driver (Impact)	1	20	101	94	50	18	0	103	103	81
	Excavator	1	40	85	81	50	18	0	90		
Sheet piling (vibratory)	Pile-driver (Sonic)	1	20	95	88	50	18	0	97	98	44
	Excavator	1	40	85	81	50	18	0	90		
	Crane	1	16	88	80	50	18	0	89		
Cap and Backfill	Concrete Mixer Truck	1	40	85	81	50	23	0	88	89	20
	Compactor	1	20	82	75	50	23	0	82		
	Loader	1	40	80	76	50	23	0	83		
Paving	Paver	1	50	85	82	50	23	0	89	90	24
	Roller	1	20	85	78	50	23	0	85		

Notes:
Noise level at the receptor calculated based on the following equation:⁴

$$dBA_2 = dBA_1 + 10 * \log_{10}(D_1/D_2)^{2+G}$$

Where:

dBA₂ = Noise level at receptor

dBA₁ = Noise level at reference distance

D₁ = Reference distance

D₂ = Receptor distance

G = Ground absorption constant (0 for hard surface, 0.5 for soft surface)

Combined noise levels at receptor calculated for two noisiest equipment using decibel addition:

$$L = 10 * \log_{10} (10^{(L_1/10)} + 10^{(L_2/10)})$$

L = Combined noise level

L₁ = Noise level for first noisiest piece of equipment

L₂ = Noise level for second noisiest piece of equipment

Buffer distance to noise threshold calculated based on the following equation:

$$D_2 = D_1 / (10^{((dBA_2 - dBA_1)/10 * (2+G))})$$

Where:

dBA₁ = Noise level at reference distance

dBA₂ = Noise threshold for construction

D₁ = Reference distance

D₂ = Buffer distance to construction noise threshold

G = Ground absorption constant (0 for hard surface, 0.5 for soft surface)

¹ The type of construction equipment is based on construction equipment list provided by the applicant.

² U.S. Department of Transportation, 2006. FHWA Highway Construction Noise Handbook, Table 9.1. August.

³ Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual, Table 7-1. September.

⁴ California Department of Transportation, 1998. Technical Noise Supplement (TeNS). Equation N-2141.2. October.

Construction Noise Calculations - Beach Road

Construction Phase	Equipment ¹	No. Equipment ¹	Usage Factor ²	Maximum Noise Level @ 50 feet (Lmax) ^{2,3}	Typical Noise Level @ 50 feet (dBA ₁)	Reference Distance (D ₁)	Distance to Receptor (D ₂)	Ground Absorption Constant (G)	Noise Level at Receptor (dBA ₂)	Two Noisiest Equipment at Receptor	Buffer Distance to 90 dBA Threshold
Unit			%	dBA Lmax	dBA Leq	feet	feet	unitless	dBA Leq	dBA Leq	feet
Demolition	Excavator	2	40	85	81	50	10	0	95	98	25
	Loader	1	40	80	76	50	10	0	90		
	Air Compressor	1	40	80	76	50	10	0	90		
Excavation	Excavator	2	40	85	81	50	10	0	95	98	25
	Loader	1	40	80	76	50	10	0	90		
	Vacuum Excavator (Vac-Truck)	1	40	85	81	50	10	0	95		
	Air Compressor	1	40	80	76	50	10	0	90		
Sheet piling (impact)	Pile-driver (Impact)	1	20	101	94	50	10	0	108	108	81
	Excavator	1	40	85	81	50	10	0	95		
Sheet piling (vibratory)	Pile-driver (Sonic)	1	20	95	88	50	10	0	102	103	44
	Excavator	1	40	85	81	50	10	0	95		
	Crane	1	16	88	80	50	10	0	94		
Cap and Backfill	Concrete Mixer Truck	1	40	85	81	50	10	0	95	96	20
	Compactor	1	20	82	75	50	10	0	89		
	Loader	1	40	80	76	50	10	0	90		
Paving	Paver	1	50	85	82	50	10	0	96	97	24
	Roller	1	20	85	78	50	10	0	92		

Notes:
Noise level at the receptor calculated based on the following equation:⁴

$$dBA_2 = dBA_1 + 10 * \log_{10}(D_1/D_2)^{2+G}$$

Where:

dBA₂ = Noise level at receptor

dBA₁ = Noise level at reference distance

D₁ = Reference distance

D₂ = Receptor distance

G = Ground absorption constant (0 for hard surface, 0.5 for soft surface)

Combined noise levels at receptor calculated for two noisiest equipment using decibel addition:

$$L = 10 * \log_{10} (10^{L_1/10} + 10^{L_2/10})$$

L = Combined noise level

L₁ = Noise level for first noisiest piece of equipment

L₂ = Noise level for second noisiest piece of equipment

Buffer distance to noise threshold of 90 dBA calculated based on the following equation:

$$D_2 = D_1 / (10^{(dBA_2 - dBA_1)/10} * (2+G))$$

Where:

dBA₁ = Noise level at reference level

dBA₂ = Noise threshold for construction

D₁ = Reference distance

D₂ = Buffer distance to construction noise threshold

G = Ground absorption constant (0 for hard surface, 0.5 for soft surface)

¹ The type of construction equipment is based on construction equipment list provided by the applicant.

² U.S. Department of Transportation, 2006. FHWA Highway Construction Noise Handbook, Table 9.1. August.

³ Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual, Table 7-1. September.

⁴ California Department of Transportation, 1998. Technical Noise Supplement (TeNS). Equation N-2141.2. October.

Construction Vibration Calculations for Potential Building Damage

Equipment	Typical Vibration Level @ 25 Feet ¹ (PPV ₁)	Reference Distance (D ₁)	Residential/Commercial Buildings		Historical Buildings	
			Building Damage Vibration Threshold (PPV ₂)	Buffer Distance to Damage Threshold (D ₂)	Building Damage Vibration Threshold (PPV ₃)	Buffer Distance to Damage Threshold (D ₃)
Unit	in/sec	feet	in/sec	feet	in/sec	feet
Pile Driver (impact) typical	0.644	25	0.3	45	0.25	52
Pile Driver (sonic) typical	0.170	25	0.3	16	0.25	19
Vibratory Roller	0.210	25	0.3	19	0.25	22
Loaded trucks	0.076	25	0.3	9	0.25	10

Notes:

Buffer distance to vibration threshold for building damage calculated based on the following equation:²

$$D_2 = (PPV_1 / PPV_2)^{(1 / 1.3)} * D_1$$

Where:

PPV₁ = Vibration level at reference distance

PPV₂ = Vibration threshold for building damage

D₁ = Reference distance

D₂ = Buffer distance to vibration threshold for building damage

Construction Vibration Calculations for Potential Annoyance

Equipment	Typical Vibration Level @ 25 Feet ¹ (RMS ₁)	Reference Distance (D ₁)	Residential Land Use		Institutional Land Use	
			Annoyance Vibration Threshold (RMS ₂)	Buffer Distance to Annoyance Threshold (D ₂)	Annoyance Vibration Threshold (RMS ₂)	Buffer Distance to Annoyance Threshold (D ₂)
Unit	VdB	feet	VdB	feet	VdB	feet
Pile Driver (impact) typical	104	25	80	158	83	125
Pile Driver (sonic) typical	93	25	80	68	83	54
Vibratory Roller	94	25	80	73	83	58
Loaded trucks	86	25	80	40	83	31

Notes:

Buffer distance to vibration threshold for human annoyance calculated based on the following equation:²

$$D_2 = D_1 * 10^{((RMS_1 - RMS_2) / 30)}$$

Where:

RMS₁ = Vibration level at reference distance

RMS₂ = Vibration threshold for human annoyance

D₁ = Reference distance

D₂ = Buffer distance to vibration threshold for human annoyance

¹ Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual, Table 7-4. September.

² Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual, Equations 7-2 and 7-3. September.

***** CASE INFORMATION *****

***** Results calculated with TNM Version 2.5 *****

Construction truck trips (3 trips per day)

***** TRAFFIC VOLUME/SPEED INFORMATION *****

Automobile volume (v/h):	0.0
Average automobile speed (mph):	0.0
Medium truck volume (v/h):	0.0
Average medium truck speed (mph):	0.0
Heavy truck volume (v/h):	1.0
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

***** TERRAIN SURFACE INFORMATION *****

Terrain surface: hard

***** RECEIVER INFORMATION *****

DESCRIPTION OF RECEIVER # 1

Distance from center of 12-ft wide, single lane roadway (ft): 50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA): 45.9

IMPACT PILE DRIVING

Use check boxes for Taxa present

Fishes

Sea Turtles

Phocid

VERSION 1.2-Multi-Species: 2022

LF Cet.

MF Cet.

HF Cet.

Otariid

KEY

	User Provided Information <i>Default values are in bold, italics turquoise (can be changed by user if project-specific information is available).</i>
	Preset NMFS Provided Information (cannot be altered by user). NMFS thresholds/default weighting value are in bold red.
	OUTPUT: Resultant Isopleth/range to effects (cannot be altered by user); Note: isopleths are presented in meters and feet
	Automatically Calculated Values Based on User Provided Information (only weighting adjustment (-dB) can be altered by user, Row 67, if spectrum is available)

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE and CONTACT	BELVEDERE SEISMIC UPGRADE PROJECT
PROJECT/SOURCE INFORMATION (size, material, number, pile strikes, etc.)	Steel sheet piles from 1/4 to 1 inch in thickness. Sheet piles would predominantly be driven using vibratory hammers. Impact hammers will only be used when the vibratory hammer is not sufficient to complete the installation.

Notes (Please include all assumptions)

It was conservatively assumed that up to 1 pile will need to be installed per day using impact hammer (instead of vibratory) with up to 50 strikes per pile.

STEP 2: QUANTITATIVE PROJECT-SPECIFIC INFORMATION

	METRICS			WEIGHTING (WFA in kHz)	
	Peak	SELss	RMS	Effective Quiet (Fish Only)	Marine Mammal Default WFA (kHz)
Unattenuated Single strike level (dB) (see Proxy Level Tab for surrogate values; Copy, ONLY Paste Values (123), not formulas)	205	179	189		
Attenuated Single strike level (dB)* (calculation done automatically)	205	179	189	150	0.16
Distance associated with single strike level/Measurement distance from pile (meters); Typically, 10-m but please double check data being used	10	10	10		
Transmission loss constant (NMFS recommends: 15 if unknown)	15				
Number of piles per day (best estimate based on previous experience)	1	Attenuation assumed (e.g., bubble curtain) (enter positive number)	0		
Number of strikes per pile (best estimate based on previous experience)	50				
Number of strikes per day	50				
Cumulative SEL at measured distance	196				

WFA: Weighting Factor Adjustment

RESULTANT ISOPLETHS[†]

[†]Impulsive sounds have dual metric thresholds for injury (SEL_{cum} & PK).

(Range to Effects)

Metric producing largest isopleth should be used.

Fishes present

FISHES				
	ONSET OF	PHYSICAL	INJURY	BEHAVIOR
	Peak (PK) Threshold (dB)	SEL _{cum} Threshold (dB)**		RMS Threshold (dB)
		Fish ≥ 2 g	Fish < 2 g	
	206	187	183	150
Isopleths (meters)	8.6	39.7	73.4	3,981.1
Isopleth (feet)	28.1	130.4	241.0	13,061.3

**This calculation accounts for single strike SEL < 150 dB do not accumulate to cause injury (Effective Quiet)

NO SEA TURTLES

SEA TURTLES			
	PTS ONSET		BEHAVIOR
	Peak (PK) Threshold (dB)	SEL _{cum} Threshold (dB)	RMS Threshold (dB)
	232	204	175
Isopleths (meters)	0.2	2.9	85.8
Isopleth (feet)	0.5	9.6	281.4

MARINE MAMMALS

Hearing Group

	PTS ONSET				
	LF Cetacean PTS Peak (PK) Threshold (dB)	MF Cetacean Peak (PK) Threshold (dB)	HF Cetacean PTS Peak (PK) Threshold (dB)	PW Pinniped PTS Peak (PK) Threshold (dB)	OW Pinniped PTS Peak (PK) Threshold (dB)
	219	230	202	218	232
Isopleths (meters)	1.2	0.2	15.8	1.4	0.2
Isopleth (feet)	3.8	0.7	52.0	4.5	0.5
	LF Cetacean PTS SEL _{cum} Threshold (dB)	MF Cetacean PTS SEL _{cum} Threshold (dB)	HF Cetacean PTS SEL _{cum} Threshold (dB)	PW Pinniped PTS SEL _{cum} Threshold (dB)	OW Pinniped PTS SEL _{cum} Threshold (dB)
	183	185	155	185	203
Isopleths (meters)	73.3	2.6	87.4	39.3	2.9
Isopleth (feet)	240.6	8.6	286.6	128.8	9.4

ALL MARINE MAMMALS

BEHAVIOR	
RMS Threshold (dB)	160
Isopleths (meters)	857.7
Isopleth (feet)	2,814.0

NO LF CET.
NO MF CET.
NO HF CET.
NO PHOCIDS
NO OTARIIDS

Marine Mammal Hearing Group
Low-frequency (LF) cetaceans: baleen whales
Mid-frequency (MF) cetaceans: dolphins, toothed whales, beaked whales, bottlenose whales
High-frequency (HF) cetaceans: true porpoises, <i>Kogia</i> , river dolphins, cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>
Phocid pinnipeds (PW): true seals
Otariid pinnipeds (OW): sea lions and fur seals

WEIGHTING FUNCTION CALCULATIONS (Sea Turtles and Marine Mammals Only)

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	Sea Turtles
a	1	1.6	1.8	1	2	1.4
b	2	2	2	2	2	2

f_1	0.2	8.8	12	1.9	0.94	0.077
f_2	19	110	140	30	25	0.44
C	0.13	1.2	1.36	0.75	0.64	2.35
Adjustment (-dB)†	-0.01	-19.74	-26.87	-2.08	-1.15	0.00

$$H(f) = C + 10 \log_{10} \left\{ \frac{(f/f_1)^{2n}}{[1 + (f/f_1)^2]^m [1 + (f/f_2)^2]^p} \right\}$$

IMPACT PILE DRIVING REPORT

VERSION 1.2-Multi-Species: 2022

BELVEDERE SEISMIC UPGRADE PROJECT

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SEL _{ss}	RMS
Single strike level (dB)	205	179	189
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	1		
Number of strikes per pile	50		
Number of strikes per day	50		
Cumulative SEL at measured distance	196		

OTHER INFO Steel sheet piles from 1/4 to 1 inch in thickness. Sheet piles would predominantly be driven using vibratory hammers. Impact hammers will only be used when the vibratory hammer is not sufficient to complete the installation.

NOTES It was conservatively assumed that up to 1 pile will need to be installed per day using impact hammer (instead of vibratory) with up to 50 strikes per pile.

Attenuation 0

RESULTANT ISOPLETHS (Range to Effects)		FISHES				
		ONSET OF		PHYSICAL INJURY		BEHAVIOR
		Peak	SEL _{cum} Isopleth		RMS	
		Isopleth	Fish ≥ 2 g	Fish < 2 g	Isopleth	
ISOPLETHS (meters)		8.6	39.7	73.4	3,981.1	
Isopleth (feet)		28.1	130.4	241.0	13,061.3	
SEA TURTLES						
		PTS ONSET		BEHAVIOR		
		Peak Isopleth	SEL _{cum} Isopleth	RMS Isopleth		
ISOPLETHS (meters)		0.2	2.9	85.8		
Isopleth (feet)		0.5	9.6	281.4		
MARINE MAMMALS						
		LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
PTS ONSET (Peak isopleth, meters)		1.2	0.2	15.8	1.4	0.2
PTS ONSET (Peak isopleth, feet)		3.8	0.7	52.0	4.5	0.5
PTS ONSET (SEL _{cum} isopleth, meters)		73.3	2.6	87.4	39.3	2.9
PTS ONSET (SEL _{cum} isopleth, feet)		240.6	8.6	286.6	128.8	9.4
		ALL MM	NO MF CET.	NO HF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)		857.7	NO LF CET.			
Behavior (RMS isopleth, feet)		2,814.0				

Fishes present

NO SEA TURTLES

Chapter IV

MITIGATION MONITORING AND REPORTING PROGRAM



This MMRP (see Table IV-1) has been prepared to comply with the requirements of State of California law (Public Resources Code Section 21081.6). State law requires the adoption of a mitigation monitoring program when mitigation measures are required to avoid significant impacts. The monitoring program is intended to ensure compliance during implementation of the project.

This MMRP has been formulated based upon the findings of the DEIR and the comments received on the DEIR and addressed herein. This MMRP identifies mitigation measures recommended in the DEIR to avoid or reduce identified impacts, and specifies the agencies/parties responsible for implementation and monitoring of the measure.

The first column identifies the mitigation measure. The second column, entitled "Party Responsible for Ensuring Implementation," lists the person or agency that would undertake the mitigation measures. The third column, entitled "Party Responsible for Monitoring," lists the person or agency responsible for ensuring that the mitigation measure has been implemented and recorded. The fourth column, entitled "Monitoring Timing," identifies when and/or for how long the monitoring shall occur. If an impact was found to be less than significant and did not require mitigation, no monitoring would be required.

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
Air Quality						
<p><u>AIR-1:</u> During project construction, the contractor shall implement a dust control program that includes the following measures recommended by the Bay Area Air Quality Management District (BAAQMD) and these measures shall be included in contract specifications for construction of the project:</p> <ul style="list-style-type: none"> ▪ All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph). ▪ All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. ▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ A publicly visible sign shall be posted with the telephone number and person to contact at the City of Belvedere regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD’s phone number shall also be visible to ensure compliance with applicable regulations. <p>Implementation of these measures would ensure that emissions of coarse particulate matter (PM₁₀) and fine particulate matter (PM_{2.5}) from dust generated during project construction activities would not result in a cumulatively considerable net increase in criteria air pollutants for which the region is in nonattainment, and this impact would be less than significant.</p>	City of Belvedere Public Works Dept. and contractor	City of Belvedere Public Works Dept.	During construction			
Biological Resources						
<p><u>BIO-1a:</u> Appropriate construction controls and restrictions shall be taken to prevent inadvertent loss of special-status fish species and other aquatic life as a result of construction activities within or near areas of tidal influence and open water habitat of San Francisco Bay to avoid possible inadvertent take of Central California Coastal steelhead, green sturgeon,</p>	City of Belvedere Public Works Dept. working with biological	City of Belvedere Public Works Dept.	Prior to and during construction			

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<p>Central Valley spring-run chinook salmon, and longfin smelt, if present in the area during the time of construction. This shall be accomplished through implementation of the following provisions:</p> <ul style="list-style-type: none"> ▪ Adequate measures shall be taken to minimize disturbance and sedimentation in aquatic habitat of the bay and Belvedere Lagoon. These measures shall include installing turbidity curtains around in-water construction zones, restricting in-water operations to low tide periods, lowering surface water elevations in the Belvedere Lagoon during sheet pile installation, and timing restrictions for in-water construction, among other possible controls and restrictions. ▪ Preconstruction clearance surveys shall be conducted by a qualified biologist for any in-water construction as called for in Mitigation Measure BIO-1b. ▪ Any pumping as part of dewatering construction areas shall be adequately screened according to the latest screening guidelines of the California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) to prevent entrainment of special-status fish and other aquatic life during the pumping operation. ▪ Any in-water construction activities shall be restricted to the period from June 1 through October 31, when stray or dispersing special-status fish species would most likely not be expected within the affected areas. ▪ All construction work within regulated waters shall be restricted to daylight hours to avoid disturbing aquatic habitat with artificial light source that could attract fish and other wildlife into the construction zone. 	consultant and contractor					
<p><u>BIO-1b</u>: Prior to initiation of grading or vegetation removal, a qualified biologist shall be retained to train workers on the regulations related to jurisdictional waters, special-status species, and the possible risk of inadvertent take in advance of construction. The qualified biologist shall be someone knowledgeable about the biology and regulations regarding jurisdictional waters, as well as protected species known or with the potential to occur in or adjacent to the project site, including steelhead, Chinook salmon, green sturgeon, and longfin smelt. The following provisions shall apply:</p> <ul style="list-style-type: none"> ▪ The qualified biologist shall oversee installation of turbidity curtains, conduct preconstruction surveys for nesting birds as required in Mitigation Measure BIO-2, and inspect the construction zone in tidal areas, as necessary. ▪ The worker training shall be conducted prior to starting work on the project and upon the arrival of any new worker into the tidal zone. The training program shall include a description of protected species and their habitat needs, any known occurrences in the site vicinity, an explanation of the status of these species and their protection under state and 	City of Belvedere Public Works Dept. working with biological consultant and contractor	City of Belvedere Public Works Dept.	Prior to and during construction			

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<p>federal legislation, a description of regulated waters and the need to follow all regulatory authorizations, a list of measures being taken to avoid and minimize impacts to protected species during the work, and procedures to follow if a protected species is discovered to be present in the work area.</p> <ul style="list-style-type: none"> Fact sheets containing the information presented during the worker training program shall be provided to the Project Foreman and kept on-site for the duration of construction. The qualified biologist shall train the Project Foreman to serve as an Environmental Monitor who will make sure workers are following all required controls, inspect the construction zone and condition of turbidity curtains to confirm they are functioning, and check for any signs of protected species. A record of all personnel trained during the project shall be maintained for compliance verification. 						
<p>BIO-1c: The City of Belvedere shall obtain all necessary authorizations from the CDFW, NMFS, and USFWS as required by federal and state law for potential harm to special-status fish species. Such authorization would be obtained through interagency coordination in accordance with the U.S. Army Corps of Engineers Section 404 consultation and the CDFW Section 2081 Incidental Take Permit process. The project shall adhere to any additional conditions and restrictions required as part of the authorizations from regulatory agencies. This shall include any required compensatory mitigation for the permanent loss of an estimated 1,200 square feet (0.03 acre) of benthic habitat at the base of the existing seawall, provided at a minimum 1:1 ratio or as negotiated with the regulatory agencies.</p> <p>The combination of the above measures would reduce this potential impact to less than significant.</p>	City of Belvedere Public Works Dept. working with biological consultant	City of Belvedere Public Works Dept.	Prior to construction			
<p>BIO-2: Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act and California Fish and Game Code when nests are in active use. This shall be accomplished by taking the following steps.</p> <ul style="list-style-type: none"> If construction is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 7 days prior to the onset of vegetation removal or construction, in order to identify any active nests on the project site and in the vicinity of proposed construction. If construction is curtailed for more than 7 days, another focused survey shall be conducted during the nesting season to confirm that no new nests have been established in the vicinity of proposed construction. 	City of Belvedere Public Works Dept. working with biological consultant and contractor	City of Belvedere Public Works Dept.	Prior to and during construction			

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Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<ul style="list-style-type: none"> If no active nests are identified during the survey period, or if development is initiated during the non-breeding season (September through January), construction may proceed with no restrictions. If active nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the California Department of Fish and Wildlife (CDFW) and may vary depending on species and sensitivity to disturbance. The no-disturbance zone shall be fenced with temporary orange construction fencing or other conspicuous demarcation such as signage and flagging if construction is to be initiated on the remainder of the development site. A report of findings shall be prepared by the qualified biologist and submitted to the City of Belvedere for review and approval prior to initiation of construction within the no-disturbance zone during the nesting season (February through August). The report shall either confirm absence of any active nests or confirm that any young birds have fledged within a designated no-disturbance zone and construction can proceed. <p>The combination of the above measures would reduce this potential impact to less than significant</p>						
<p><u>BIO-3:</u> A compensatory mitigation program shall be developed and implemented to provide adequate mitigation for jurisdictional waters affected by proposed improvements. A jurisdictional wetland delineation shall be prepared by a qualified wetland specialist and submitted for verification by the U.S. Army Corps of Engineers (Corps). A Regulated Waters Protection and Replacement Program (RWPRP) shall be prepared by the qualified wetland specialist and implemented to provide compensatory mitigation where jurisdictional waters are affected, shall minimize disturbance to unvegetated waters, and shall be reviewed and approved by regulatory agencies. The RWPRP shall contain the following components:</p> <ul style="list-style-type: none"> The RWPRP shall include appropriate implementation measures to prevent inadvertent loss and degradation of jurisdictional waters to be protected and shall provide for replacement of the estimated 1,200 square feet (0.03 acre) of regulated waters eliminated by sheet pile construction at a minimum 1:1 replacement ratio. Where verified waters of the U.S. are present and cannot be avoided, authorization for modifications to these features shall be obtained from regulatory agencies with jurisdiction. These agencies include the Corps under Section 404 permitting process where waters of the United States are affected by the project and the Regional Water Quality Control Board (RWQCB) as part of the Section 401 Certification process. All conditions required as part 	City of Belvedere Public Works Dept. working with biological consultant	City of Belvedere Public Works Dept.	Prior to and during construction			

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<p>of the authorizations by the Corps and RWQCB shall be implemented as part of the project.</p> <ul style="list-style-type: none"> ▪ Consultation or incidental take permits may be required under the California Endangered Species Act and Federal Endangered Species Act. The City of Belvedere shall obtain all legally required permits or other authorizations from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and California Department of Fish and Wildlife (CDFW) under the Endangered Species Acts. ▪ Temporary fencing or another system shall be installed to demarcate the limits of proposed construction in jurisdictional waters. The turbidity curtain may serve as the temporary construction containment fencing. ▪ Grading, construction, and restoration work within the jurisdictional waters shall be conducted in a way that avoids or minimizes disturbance of existing aquatic habitat as called for in Mitigation Measure BIO-1a. <p>The combination of the above measures would reduce this potential impact to less than significant.</p>						
Cultural Resources						
<p><u>CULT-1a:</u> To minimize architectural and structural damage to the China Cabin, no more than a peak particle velocity (PPV) of 0.25 inches per second (in/sec) is recommended at the structure. Furthermore, if a 0.25 PPV level or lower is maintained, project construction activities would not affect character-defining features, the structural integrity, and interior architectural features, resulting in no impact on the integrity or significance of the China Cabin building, meaning the proposed project would have a less-than-significant impact on this historical resource as defined by CEQA. The following measures to minimize architectural and structural damage to the China Cabin building from construction-related ground vibrations shall be implemented:</p> <ol style="list-style-type: none"> 1. A preconstruction survey and structural integrity inspection shall be conducted at the potentially affected historic buildings. The preconstruction survey shall include descriptions and photographs of both the exterior and interior of the buildings that could potentially be damaged during construction, including documentation of existing damage such as cracks and loose or damaged features. 2. Vibration levels at the China Cabin shall be monitored during construction activities with appropriate equipment such as a seismograph (monitor) and geophone (sensor). 3. Construction vibration specifications shall be included as part of the construction contract documents (e.g., "The contractor shall not exceed the construction vibration criterion of 0.25 in/sec PPV, at the historic structures, within the established critical distance for each construction activity. If at any time the ground vibration level exceeds the specified 	<p>City of Belvedere Public Works Dept. working with Contractor, qualified historic preservation professional or historic architect, and qualified archaeologist</p>	<p>City of Belvedere Public Works Dept.</p>	<p>Prior to and during construction</p>			

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
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<p>criterion of 0.25 in/sec PPV due to any construction activity, then the construction operation shall stop. Construction shall not recommence until the source of vibration is determined and replaced by an alternative construction technique or equipment.”)</p> <p>4. In the event the project exceeds the construction vibration criterion of 0.25 in/sec PPV, a historic architect or qualified historic preservation professional shall inspect the China Cabin and proceed as follows:</p> <ul style="list-style-type: none"> ▪ If no damage has occurred to the China Cabin, the historic architect or qualified historic preservation professional shall submit a monthly report to the City of Belvedere for review. This report shall identify and summarize the vibration level exceedances and describe the actions taken to reduce vibration. ▪ If no damage has occurred to the China Cabin, the historic architect or qualified historic preservation professional shall submit a monthly report to the City of Belvedere for review. This report shall identify and summarize the vibration level exceedances and describe the actions taken to reduce vibration. ▪ If vibration has damaged the China Cabin, the historic architect or qualified historic preservation professional shall immediately notify the City and prepare a damage report documenting the features of the China Cabin that has been damaged. ▪ Should damage occur to the China Cabin due to construction-related vibration, the China Cabin shall be restored to its pre-construction condition in consultation with the historic architect or qualified historic preservation professional and the City. • After construction is complete, the City shall receive a final report from the historic architect or qualified historic preservation professional. The report shall include, at minimum, collected monitoring records, building condition summaries, descriptions of all instances of vibration level exceedance, identification of damage incurred due to vibration, and corrective actions taken to restore the China Cabin to its pre-construction condition. <p><u>CULT-1b</u>: The City of Belvedere shall retain a qualified professional archaeologist to monitor ground-disturbing activities. The archaeologist shall meet the Secretary of the Interior’s professional qualifications standards for archaeology. The archaeologist shall have the authority to stop grading or construction work within 50 feet of any discovery of potential historical or archaeological resources in order to implement the procedures in Mitigation Measure CULT-3 and make a finding of significance under Section 15064.5 of the California Environmental Quality Act (CEQA) Guidelines.</p> <p><u>CULT-1c</u>: If subsurface deposits believed to be cultural or human in origin are discovered during construction by the monitor, all work must halt within a 50-foot radius of the discovery. A qualified professional archaeologist, who will evaluate the significance of the find, shall have</p>						

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<p>the authority to modify the no-work radius as appropriate, using professional judgment. The following notifications shall apply, depending on the nature of the find:</p> <ul style="list-style-type: none"> ▪ If the professional archaeologist determines that the find does not represent a cultural resource, work may resume immediately, and no agency notifications are required. ▪ If the professional archaeologist determines that the find does represent a cultural resource from any time period or cultural affiliation, they shall immediately notify the City of Belvedere and the United States Army Corps of Engineers (Corps), which shall consult on a finding of eligibility. If the find is determined to be a historical resource under the California Environmental Quality Act (CEQA) or a historic property under National Historic Preservation Act Section 106, then, appropriate treatment measures would be implemented. Work may not resume within the no-work radius until the City of Belvedere and the Corps, through consultation as appropriate, determine either that (1) the site is not a historical resource under CEQA or a historic property under Section 106, or (2) the treatment measures have been completed to their satisfaction. The preferred treatment would be avoidance and preservation in place. ▪ If the find includes human remains, or remains that are potentially human, Mitigation Measure CULT-3 shall apply. <p>With the incorporation of Mitigation Measure CULT-1a, CULT-1b, and CULT-1c, the impacts on the China Cabin and the archaeological historical resource would be less than significant.</p>						
<p><u>CULT-2:</u> With the implementation of Mitigation Measures CULT-1b and CULT-1c, the impact on known and unknown archaeological resources would be less than significant.</p>	Refer to CULT-1b and CULT-1c above.	Refer to CULT-1b and CULT-1c above.	Refer to CULT-1b and CULT-1c above.			
<p><u>CULT-3:</u> If human remains, or remains that are potentially human, are encountered, the City of Belvedere shall ensure reasonable protection measures are taken to protect the discovery from disturbance (in accordance with Assembly Bill [AB] 2641). The qualified professional archaeologist retained by the City (see Mitigation Measure CULT-1b) shall notify the Marin County Coroner (per Section 7050.5 of the California Health and Safety Code). The provisions of Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the California Public Resources Code (PRC), and AB 2641 shall be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner shall notify the Native American Heritage Commission (NAHC), which then would designate a Native American Most Likely Descendant (MLD) for the project (Section 5097.98 of the PRC). The designated MLD would have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the PRC). If no agreement is reached, the landowner must rebury the remains where they would not be</p>	City of Belvedere Public Works Dept. working with qualified professional archaeologist and the Marin County Coroner, if needed	City of Belvedere Public Works Dept.	During construction			

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Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
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<p>further disturbed (Section 5097.98 of the PRC). This shall also include either recording the site with the NAHC or the appropriate California Historical Resources Information System Information Center; using an open space or conservation zoning designation or easement; or recording a reinterment document with the county in which the property is located (AB 2641). Work may not resume within the no-work radius until the City of Belvedere, through consultation with the MLD as appropriate, determines that the treatment measures have been completed to its satisfaction.</p> <p>Implementation of Mitigation Measure CULT-3 would reduce impacts on human remains and dedicated cemeteries to less than significant.</p>						
Geology and Soils						
<p><u>GEO-1:</u> City of Belvedere staff shall work with utility agencies to find an effective means to install flexible utility connections on utilities that have non-flexible pipes (including water, wastewater, and gas lines) that are located near the eastern and western ends of the proposed sheet piles along Beach Road and new utility laterals that would cross the proposed sheet piles along Beach Road to ensure that utilities would be capable of withstanding expected ground movements during seismic events and future settlement. The City shall retain a qualified geotechnical engineer to assist in the design of the improved utility connections. The installation of the new flexible connections shall occur prior to the conclusion of construction.</p>	<p>City of Belvedere Public Works Dept. working with utility agencies and geotechnical engineer</p>	<p>City of Belvedere Public Works Dept.</p>	<p>Prior to and during construction</p>			
<p><u>GEO-2:</u> A geotechnical report shall be prepared by a qualified geotechnical engineer and shall evaluate the potential for vibration-induced settlement from proposed sheet pile installation and the potential for damage to existing improvements (e.g., structures, utilities, fences, walls, guardrails, walkways, and patios) from vibration-induced settlement. If the geotechnical report identifies existing improvements that could potentially be damaged by vibration-induced settlement, a preconstruction survey of the potentially affected improvements shall be performed, allowable settlement amounts shall be estimated for the potentially affected improvements, and the allowable settlement amounts shall account for estimated future settlement amounts that are expected to occur due to the construction of the existing levees and placement of fill materials that previously occurred in the project area. Settlement monitoring shall be performed during construction activities. If the geotechnical report identifies any existing improvements that are very likely to experience damage due to vibration-induced settlement, measures shall be implemented to prevent such damage prior to the start of sheet pile installation near the existing improvements. Such measures may include relocation of utilities, installation of flexible connections on utilities, temporary shoring/bracing</p>	<p>City of Belvedere Public Works Dept. working with geotechnical engineer and utility agencies as needed</p>	<p>City of Belvedere Public Works Dept.</p>	<p>Prior to and during construction</p>			

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Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<p>of the existing improvements, or use of alternative methods for sheet pile installation near the existing improvements, such as use of a silent pile driver.</p> <p>If settlement monitoring indicates that construction activities have caused unacceptable levels of settlement or observable damage to existing improvements, or that construction activities would be expected to cause unacceptable levels of settlement if construction activities continue using the same methods, the vibration-causing activities shall cease and measures shall be implemented to prevent further settlement or damage to existing improvements. Such measures may include relocation of utilities, installation of flexible connections on utilities, temporary shoring/bracing of existing improvements, or use of alternative methods for sheet pile installation such as use of a silent pile driver. If any damage is caused to existing improvements as a result of vibration-induced settlement during sheet pile installation, the City of Belvedere shall repair the damage following the completion of project construction activities near the area of damage.</p>						
<p><u>GEO-3</u>: Implement Mitigation Measures GEO-1 and GEO-2.</p> <p>Implementation of these measures would reduce the project’s contribution to the cumulative impact to less than significant.</p>	Refer to GEO-1 and GEO-2	Refer to GEO-1 and GEO-2	Refer to GEO-1 and GEO-2			
Hazards and Hazardous Materials						
<p><u>HAZ-1</u>: The use of Belvedere Way for construction staging shall not include the storage of combustible or flammable materials on Belvedere Way. The use of Belvedere Way for construction staging may include the posting of signs indicating that the area is restricted from public access except for emergency evacuation purposes; however, the use of Belvedere Way for construction staging shall not physically restrict public access to Belvedere Way and shall allow for the safe passage of pedestrians along Belvedere Way at all times. The proposed construction staging uses of Belvedere Way shall be outlined in a Construction Staging Plan to be prepared by the project contractor and submitted to the City of Belvedere and the Tiburon Fire Protection District for review and approval to ensure that construction staging activities would not interfere with the use of Belvedere Way as a pedestrian evacuation route. The Construction Staging Plan shall designate the materials and equipment that would be stored along Belvedere Way and the areas where they would be stored and shall describe the safety measures (e.g., placement of barricades, cones, and caution tape) to ensure that the storage of materials and equipment would not pose a safety hazard to pedestrians using Belvedere Way.</p>	City of Belvedere Public Works Dept. working with contractor and Tiburon Fire Protection District	City of Belvedere Public Works Dept.	Prior to and during construction			

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Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
Hydrology and Water Quality						
<p><u>HYDRO-1a:</u> The following measures shall be implemented to reduce the risk of disturbed soils and spills/releases from affecting water quality in nearby surface waters during construction activities near or below the waterline of San Francisco Bay and the Belvedere Lagoon:</p> <ul style="list-style-type: none"> ▪ The contractor(s) shall avoid sheet piling installation in the Bay along the exterior side of the Beach Road levee during tidal periods when the tidal water level is at 2.5 feet mean lower low water (MLLW) or higher. ▪ The contractor(s) shall install a turbidity curtain in the Bay to hydraulically isolate the narrow, approximately 400-foot-long strip of the bay where sheet pile installation occurs from the rest of the Bay. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out and concrete has fully cured. ▪ The contractor(s) shall install a turbidity curtain in the lagoon to hydraulically isolate the portion of the lagoon where sheet pile installation occurs from the rest of the lagoon. The turbidity curtain shall remain in place for the duration of installation activities and thereafter until such time that any increased turbidity has settled out. ▪ The contractor(s) shall coordinate with the City of Belvedere Public Works Department and the Belvedere Lagoon Property Owners Association (BLPOA) to ensure that the lagoon is drawn down to the winter operating level prior to and for the duration of sheet pile installation activities in the lagoon and BLPOA's culverts and other water control facilities along San Rafael Avenue are shut off from the Bay for the duration of sheet piling installation and thereafter while the turbidity curtain remains installed, and further coordinate with BLPOA to ensure that interference with BLPOA's critical water control operations is avoided or minimized to the extent practical. 	City of Belvedere Public Works Dept. working with contractor and Belvedere Lagoon Property Owners Association	City of Belvedere Public Works Dept.	Prior to and during construction			
<p><u>HYDRO-1b:</u> The following measures shall be implemented to reduce the risk of spills, releases, and disturbed soils affecting water quality in nearby surface waters during construction activities:</p> <ul style="list-style-type: none"> ▪ The contractor(s) shall designate storage areas suitable for material delivery, storage, and waste collection for disposal. Waste shall be disposed of off-site in a manner that complies with applicable regulations for waste disposal. These locations shall be as far away from catch basins, gutters, drainage courses, and water bodies as possible. All hazardous materials and wastes used or generated during project site development activities shall be labeled and stored in accordance with applicable local, state, and federal regulations. In addition, an accurate up-to-date inventory, including Material Safety Data Sheets (MSDSs), shall be maintained on-site to assist emergency response personnel in the event of a hazardous materials incident. 	City of Belvedere Public Works Dept. working with contractor and Qualified SWPPP Developer and Practitioner	City of Belvedere Public Works Dept.	Prior to and during construction			

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<ul style="list-style-type: none"> ▪ All maintenance and fueling of construction vehicles and equipment shall be performed in a designated bermed area, or over a drip pan that would not allow runoff of spills. Vehicles and equipment shall be regularly checked and have leaks repaired promptly at an off-site location. Secondary containment shall be used to catch leaks or spills any time vehicle or equipment fluids are dispensed, changed, or poured. ▪ The contractor shall implement a Storm Water Pollution Prevention Plan (SWPPP) prepared by a Qualified SWPPP Developer (QSD) and designed to reduce potential adverse impacts on surface water quality during the construction period. The SWPPP shall include the minimum BMPs required for the identified risk level. BMP implementation shall be consistent with the BMP requirements in the most recent version of the California Stormwater Quality Association Stormwater Best Management Handbook-Construction. The SWPPP shall be designed to address the following objectives: <ol style="list-style-type: none"> 1) All pollutants and their sources, including sources of sediment associated with construction activity, are controlled. 2) Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated. 3) Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity. 4) Stabilization BMPs installed to reduce or eliminate pollutants and erosion of exposed soil after construction are completed. Stabilization BMPs, may include but would not be limited to: hydroseeding, planting of vegetation, installation of jute/burlap netting, and installation of swales in graded areas. 5) BMPs shall be designed to mitigate construction-related pollutants and at a minimum, include the following: <ol style="list-style-type: none"> a. Practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, and adhesives) with stormwater shall be included. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain. b. Practices to reduce erosion of exposed soil, which may include but are not limited to soil stabilization controls, watering for dust control, perimeter silt fences, placement of hay bales, and sediment basins, shall be included. c. If grading or other ground-disturbing activities must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control (i.e., keeping sediment on the site). End-of-pipe sediment control measures (e.g., basins and traps) shall be used only as secondary measures. Ingress and egress from the 						

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
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<p>construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be designed to be accessible and functional during both dry and wet conditions.</p> <p>6) The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor and shall include both dry and wet weather inspections. Monitoring shall be required during the construction period for pollutants that may be present in the runoff that are "not visually detectable in the runoff."</p> <ul style="list-style-type: none"> ▪ Site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendancelist shall be specified in the SWPPP. ▪ A Qualified SWPPP Practitioner (QSP), hired by the contractor, shall be responsible for overseeing implementation of BMPs at the site. The QSP shall be a qualified professional that has the required professional credentials and has passed specific training courses in accordance with the Construction General Permit. The QSP shall also be responsible for performing all required monitoring, and BMP inspection, maintenance, and repair activities. The QSP shall retain an independent monitor to conduct weekly inspections and provide written weekly reports to the City of Belvedere Public Works Department and/or the project team to ensure compliance with the SWPPP. 						
<p><u>HYDRO-1c:</u> Contractor(s) shall obtain applicable resource agency permits and approvals and comply with permit requirements to prevent impacts on water quality and demonstrate that water quality standards and/or waste discharge requirements are not violated. Permit requirements and avoidance measures that may be required by the U.S. Army Corps of Engineers and/or the San Francisco Bay Regional Water Quality Control Board (RWQCB) may include but not be limited to the following:</p> <ul style="list-style-type: none"> ▪ Installation of physical barriers (e.g., silt curtains, turbidity curtains) to prevent potential localized impacts on water quality (e.g., increase in turbidity) from spreading to surrounding surface waters; ▪ Installation of physical barriers or use of tanks to contain wastewater generated during construction and prevent potential localized impacts to water quality of surrounding surface waters; and ▪ Performance of water quality monitoring, including sampling and analysis for turbidity and total suspended solids. <p>At the direction of the applicable resource agency, the results of the water quality monitoring shall be compared to established performance standards. If water quality monitoring indicates that performance standards are not being achieved, additional avoidance measures (e.g., installation of additional silt curtains) shall be implemented until water quality monitoring</p>	City of Belvedere Public Works Dept. working with contractor and applicable agencies	City of Belvedere Public Works Dept.	Prior to and during construction			

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Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
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<p>indicates that performance standards are being achieved, which would mitigate the potential impacts on water quality to a less-than-significant level.</p> <p>Compliance with the Construction General Permit and implementation of Mitigation Measures HYDRO-1a, HYDRO-1b, and HYDRO-1c would ensure that potential impacts on water quality would be less than significant.</p>						
Noise						
<p><u>NOISE-1</u>: Noise reduction measures shall be implemented to reduce noise impacts related to project construction. Noise reduction measures shall include but are not limited to the following:</p> <ul style="list-style-type: none"> ▪ The contractor shall implement a site-specific noise reduction plan prepared by a qualified acoustical consultant to reduce construction noise impacts to the maximum extent feasible, subject to review and approval by the City of Belvedere. The plan shall identify site-specific pile driving noise reduction measures that must be implemented prior to and during all construction activities to ensure noise levels would not exceed the 90 dBA L_{eq} threshold at nearby residences. ▪ Temporary noise barriers shall be placed between the proposed construction activities and nearby receptors when feasible. A sound blanket system hung on scaffolding, or other noise reduction materials that result in an equivalent or greater noise reduction than plywood, may also be used. The composition, location, height, and width of the barriers during different phases of construction shall be determined by a qualified acoustical consultant and incorporated into the site-specific noise reduction plan for the project. ▪ Avoid impact pile-driving where feasible in noise-sensitive areas. Pre-drilling or the use of a vibratory pile driver or silent pile driver are quieter alternatives where the geological conditions permit their use. ▪ Noise-generating construction and demolition activities, including material and equipment deliveries, shall be limited to between the hours of 8:00 AM and 5:00 PM Monday through Friday. Occasionally, Saturday construction could occur with prior approval from the City. ▪ All construction equipment powered by internal combustion engines shall be properly muffled. ▪ Unnecessary idling of combustion engines shall be prohibited. Haul trucks shall not be allowed to idle for periods greater than 5 minutes, except as needed to perform a specified function such as concrete mixing. ▪ All stationary noise-generating construction equipment shall be located as far as practical from existing nearby residences and other noise-sensitive land uses. Such equipment shall also be acoustically shielded. 	<p>City of Belvedere Public Works Dept. working with contractor and noise disturbance coordinator</p>	<p>City of Belvedere Public Works Dept.</p>	<p>Prior to and during construction</p>			

TABLE IV-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Party Responsible for Ensuring Implementation	Party Responsible for Monitoring	Monitoring Timing	Compliance Verification		
				Initial	Date	Project/ Comments
<ul style="list-style-type: none"> Quiet construction equipment and technologies shall be selected whenever feasible. Motorized equipment shall be fitted with proper mufflers in good working order. Businesses and residents adjacent to the project site shall be notified in writing in advance of the proposed construction schedule before construction activities commence. The project contractor shall designate a “noise disturbance coordinator” responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of any noise complaint (e.g., starting too early, bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem (potentially including erection of a temporary noise barrier/wall). A telephone number for the disturbance coordinator shall be posted at the construction site. All of the above measures shall be required to be included in contract specifications. <p>Implementation of Mitigation Measure NOISE-1 would reduce this impact to less than significant.</p>						
<p><u>NOISE-2:</u> The following measures shall be implemented to reduce vibration impacts related to project construction:</p> <ul style="list-style-type: none"> Pre-Construction Survey. Prior to the start of any vibration-generating construction activity, the City of Belvedere shall engage a consultant to undertake a pre-construction survey of potentially affected buildings within 45 feet of the proposed sheet pile alignment, provided that the property owner approves of the survey. All pre-construction surveys of potentially affected buildings and/or structures shall be prepared by a structural engineer or other professional with similar qualifications. The pre-construction surveys shall include descriptions and photographs of both the exterior and interior of the buildings that could potentially be damaged during construction, including documentation of existing damage such as cracks and loose or damaged features. The pre-construction surveys shall be submitted to the City for review and approval prior to the start of vibration-generating construction activity. Avoid Impact Pile Driving Where Feasible. The use of impact pile driving equipment shall be limited to situations where the target depth cannot be reached using other pile driving equipment. The use of impact pile driving shall be prohibited within 45 feet of residential/commercial buildings to avoid potential vibration damage. When necessary, alternative methods, such as pre-drilling or excavation of soil to depths of up to approximately 10 feet, shall be performed prior to sheet pile installation to remove potential obstructions (e.g., large rocks) in the fill material of the levees to ensure that vibratory or silent pile driving methods will reach the target depth. Limited Use of Vibratory Pile Driving. The use of vibratory pile driving shall be prohibited within 16 feet of residential/commercial buildings to avoid potential vibration damage. 	City of Belvedere Public Works Dept. working with noise/vibration consultant, structural engineer, and contractor as well as qualified architect or historic preservation professional	City of Belvedere Public Works Dept.	Prior to and during construction			

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<p>When necessary, alternative methods, such as a silent pile driver, shall be used to ensure that construction vibration levels do not exceed the established standard. The silent pile driving method requires the use of vibratory pile driving to install the first few piles of a continuous sheet pile segment; therefore, the use of the vibratory pile driving to install the first few piles shall be performed in areas that are as far away as possible from the potentially affected buildings and/or structures.</p> <ul style="list-style-type: none"> ▪ Limited Use of Vibratory Roller. The use of a vibratory roller shall be prohibited within 19 feet of residential/commercial buildings to avoid potential vibration damage. When necessary, alternative methods, such non-vibratory rollers or plate compactors, shall be used to ensure that construction vibration levels do not exceed the established standard. ▪ Vibration Management and Monitoring Plan. The contractor shall implement a monitoring plan prepared by a qualified engineer to avoid or reduce project-related construction vibration damage to adjacent buildings and/or structures and to ensure that any such damage is documented and repaired. The vibration management and monitoring plan shall apply to all potentially affected buildings and/or structures. The plan shall be submitted to the City for review and approval prior to the start of vibration-generating construction activity. The vibration management and monitoring plan shall include, but not be limited to, the following components: <ul style="list-style-type: none"> ◦ Maximum Vibration Level. The plan shall establish a maximum vibration level that shall not be exceeded at each building/structure on adjacent properties. The maximum vibration levels shall be based on existing conditions, character-defining features, soil conditions, and anticipated construction practices (common standards are a peak particle velocity [PPV] of 0.25 inch per second for historic buildings, 0.3 inch per second for older residential structures, and 0.5 inch per second for new residential structures and modern industrial/commercial buildings). ◦ Buffer Distances. The plan shall identify the buffer distances to be maintained based on vibration levels and site constraints between the operation of vibration-generating construction equipment and the potentially affected building and/or structure, as presented in Table 4.11-9 of the Environmental Impact Report (EIR), to avoid damage to the extent possible. ◦ Vibration Monitoring and Reporting. The plan shall lay out the method and equipment for vibration monitoring and develop reporting protocol for City review. To ensure that construction vibration levels do not exceed the established standard, the contractor shall monitor vibration levels at each affected building and/or structure on adjacent properties and prohibit vibratory construction activities that generate vibration levels in excess of the standard. 						

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<ul style="list-style-type: none"> ◦ Alternative Construction Equipment and Techniques. The plan shall identify potential alternative equipment and techniques that could be implemented if construction vibration levels are observed in excess of the established threshold. Alternative construction equipment and techniques that can be used to reduce the vibration impact include, but are not limited to, the following: <ul style="list-style-type: none"> ▪ Pre-drilling or excavation of soil to depths of up to approximately 10 feet. ▪ Use of a static load piling system such as a silent pile driver. ▪ Avoidance of vibratory rollers and packers near sensitive areas. ▪ Use of smaller, lighter equipment. ◦ Repairing Damage. The plan shall identify provisions to be followed should damage to any building and/or structure occur due to construction-related vibration. The building(s) and/or structure(s) shall be remediated by the City to their pre-construction condition at the conclusion of vibration-generating activity on the project site, provided that the property owner approves of the repair. ▪ Halting of Construction. Should construction vibration levels be observed in excess of those established in the plan, the contractor(s) shall halt construction and implement alternative construction techniques identified in the plan. ▪ Inspections and Damage Notifications. Any inspections of buildings and/or structures for potential damage shall be performed by a qualified engineer. If vibration has damaged nearby buildings and/or structures, the qualified engineer shall immediately notify the City. ▪ Vibration Monitoring Results Report. After construction is complete, the City shall receive a final report from the professionally registered historic architect or qualified historic preservation professional (for effects on historic buildings and/or structures) and/or structural engineer (for effects on historic and non-historic buildings and/or structures). The report shall include, at minimum, collected monitoring records, building and/or structure condition summaries, descriptions of all instances of vibration level exceedance, identification of damage incurred due to vibration, and corrective actions taken to restore damaged buildings and structures. ▪ For potential impacts to the historic China Cabin, implement Mitigation Measure CULT-1a. <p>Implementation of Mitigation Measure NOISE-2 would reduce the potential of construction-generated vibration to cause damage to adjacent buildings to a less-than-significant level.</p>						
<p>Transportation/Traffic</p> <p><u>TRANS-1a:</u> The contractor shall produce a Traffic Control Plan (TCP) for construction activities that abides by the City of Belvedere’s provisions regarding transportation and parking management during construction activities. The TCP shall be consistent with the latest edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD).</p>	City of Belvedere Public Works Dept. working with	City of Belvedere Public Works Dept.	Prior to and during construction			

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<p>The TCP developed for the project shall coordinate construction activities in the area to maintain shuttle access to the off-site parking areas; maintain vehicle, pedestrian, and bicyclist access; and provide detours, as appropriate, for drivers, pedestrians and bicyclists.</p> <p><u>TRANS-1b</u>: The TCP shall be prepared by the contractor and approved prior to the issuance of an encroachment permit by the Police Chief or City of Belvedere Public Works Manager.</p> <p><u>TRANS-1c</u>: The TCP shall, at a minimum, include the following provisions:</p> <ul style="list-style-type: none"> ▪ Based on the daily volume of on-haul, the timing of trucks shall be adjusted to limit/minimize hauling activities during peak traffic hours. ▪ Whenever the contractor’s operations affect normal conditions for traffic or for public access, the contractor shall furnish, erect, and maintain, at its expense, all fences, barricades, lights, signs, and other devices necessary to prevent collisions or damage or injury to the public. ▪ Construction area signs shall be furnished, installed, maintained, and removed when no longer required, in accordance with the provisions of Caltrans’ Section 12 of the “State Specifications for Temporary Traffic Control” and any requirements of the special provisions. ▪ The contractor shall furnish flaggers and guards necessary to give adequate warning to traffic and to the public of construction conditions. Flaggers and guards assigned to direct traffic or to warn the public of construction conditions shall perform their duties, and shall be provided with the necessary equipment, in accordance with the current edition of the Caltrans publication “Instructions to Flaggers.” The equipment shall be furnished and kept clean and in good repair by the contractor. Signs, lights, flags, and other warning and safety devices shall conform to the requirements set forth in the current Caltrans “Manual of Traffic Controls for Construction and Maintenance Work Zones.” ▪ No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, including in pedestrian walkways, and at the end of each day and at other times when construction operations are suspended for any reason, the contractor shall remove all equipment and other obstructions from that portion of the roadway open for use by public traffic. ▪ Construction activity shall not result in the closure of existing pedestrian sidewalks/ walkways, bicycle facilities, or public transit facilities. The contractor shall provide safe, clearly identifiable and separated pedestrian pathways, per the California Manual on Uniform Traffic Control Devices (CA MUTCD). Signs and barricades shall be required to direct pedestrians through or around the construction work zones and shall be shown on 	contractor and Police Chief					

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<p>the TCP. More specifically, any sidewalk or walkway closure, or any other work that does not provide a continuous 4-foot-wide clear path of travel on the same side of the street, shall result in the identification of a marked detour route for pedestrians. Detours shall include pedestrian separation from moving vehicles by cones, k-rails, or another form of physical separation. The barriers must be provided and maintained at all times. Sidewalks and walkways shall not be closed in the middle of the block as this generally results in pedestrians having to walk around the work site, usually into the street, to continue down the sidewalk. The contractor shall be required to post and maintain the appropriate pedestrian signs, including "SIDEWALK CLOSED AHEAD / USE OTHER SIDE," "SIDEWALK CLOSED," "NO PEDESTRIAN CROSSING," and "USE CROSSWALK."</p> <p><u>TRANS-1d</u>: The contractor shall obtain authorization from Marin Transit and Golden Gate Transit if construction requires the temporary closure of any existing bus stops. If required by the transit agencies, the contractor shall establish temporary bus stops with appropriate passenger amenities during the construction period.</p> <p><u>TRANS-1e</u>: The contractor shall maintain all existing bicycle routes. During construction, temporary bike facilities may be delineated by cones, but the contractor shall maintain a clear and clean path of travel for bicyclists at all times. A bike route detour may be provided pending approval from the City. Signs such as "Bicyclists Allowed Full Use of Lane" or "Bicycle Route Detour" signs shall be posted.</p> <p>Implementation of Mitigation Measures TRANS-1a through TRANS-1e would ensure that the potential impact related to conflict with Belvedere General Plan Policy TC-1.3 would be less than significant.</p>						
Tribal Cultural Resources						
<p><u>TCR-1a</u>: One tribal monitor shall be retained to monitor all vegetation clearing and removal, surface grading, excavation, and trenching within the project site. The tribal monitor shall have the authority to temporarily pause ground disturbance within 50 feet of the discovery for a duration long enough to examine potential tribal cultural resources (TCRs) that may become unearthed during the activity. If no TCRs are identified, then construction activities may proceed, and no agency notifications are required. In the event that a TCR is identified, the monitor shall flag off the discovery location and notify the City of Belvedere immediately to implement Mitigation Measure TCR-1b. Work can continue in other areas of the project during implementation of Mitigation Measure TCR-1b, as long as it is monitored if required.</p>	<p>City of Belvedere Public Works Dept. working with Tribal Representative and qualified cultural resources specialist</p>	<p>City of Belvedere Public Works Dept.</p>	<p>During construction</p>			

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<p><u>TCR-1b:</u> If any suspected tribal cultural resources (TCRs) are discovered during ground-disturbing construction activities, all work shall cease within 100 feet of the find, or an agreed-upon distance based on the project area and nature of the find. A Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with the geographic area shall be immediately notified and shall determine if the find is a TCR (see Public Resources Code [PRC] Section 21074). The Tribal Representative shall make recommendations for further evaluation and culturally appropriate treatment as necessary. If deemed necessary by the City of Belvedere, a qualified cultural resources specialist meeting the Secretary of Interior’s Standards and Qualifications for Archeology may also assess the significance of the find in joint consultation with Native American Representatives to ensure that Tribal values are considered. Work at the discovery location may not resume until the City, in consultation as appropriate and in good faith, determines that all necessary investigation and treatment of the discovery under the requirements of the California Environmental Quality Act (CEQA), including Assembly Bill (AB) 52, have been satisfied.</p>						
<p><u>TCR-1c:</u> The City of Belvedere shall require the project contractor to provide a cultural resource and tribal cultural resource (TCR) sensitivity and awareness training program (Worker Environmental Awareness Program [WEAP]) for all personnel involved in project construction, including field consultants and construction workers. The WEAP shall be developed in coordination with an archaeologist meeting the Secretary of the Interior’s Professional Qualifications Standards for Archeology, as well as culturally affiliated Native American tribes. The City shall invite a Native American representative from interested culturally affiliated Native American tribes to participate. The WEAP shall be conducted before any project-related construction activities begin at the project site. The WEAP shall include relevant information regarding sensitive cultural resources and TCRs, including applicable regulations, protocols for avoidance, and consequences of violating state laws and regulations. The WEAP shall also describe appropriate avoidance and impact minimization measures for cultural resources and TCRs that could be located at the project site and shall outline what to do and whom to contact if any potential cultural resources or TCRs are encountered. The WEAP shall emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native Americans and shall discuss appropriate behaviors and responsive actions, consistent with Native American tribal values.</p>						
<p>The combination of Mitigation Measures TCR-1a, TCR-1b, and TCR-1c would reduce this impact to less than significant.</p>						