

3.9 Hydrology and Water Quality

This section addresses hydrology and water quality impacts that may result from implementation of the Build Alternatives for the proposed Larkspur Ferry Service Expansion and Parking Project (Project). This section examines the current hydrological and drainage characteristics of the Project site and adjacent areas, evaluates relevant objectives and regulations, assesses and examines environmental effects, and proposes mitigation strategies to minimize or prevent potential adverse consequences resulting from Project execution, where appropriate. Impacts associated with the No-Project Alternative are discussed in Chapter 5, Alternatives to the Project.

3.9.1 Existing Conditions

3.9.1.1 Regulatory Setting

The Golden Gate Bridge, Highway and Transportation District (District), as the owner of the Larkspur Ferry Terminal (LFT), is the California Environmental Quality Act Lead Agency for the Project and has prepared this Draft Environmental Impact Report to evaluate potential impacts and identify required mitigation to avoid or reduce potentially significant impacts. The federal, state, and regional and local regulations applicable to the Project are provided in this section.

Federal

Federal Clean Water Act

The Project is subject to federal permitting requirements under the Clean Water Act (CWA), which is the foundational federal statute governing water quality protection across the United States. The CWA's overarching objective is to maintain and restore the chemical, physical, and biological health of the nation's waters, with the goal of making all surface waters safe for fishing and swimming. This law establishes the framework for regulating water quality and controlling pollution discharges through programs such as the National Pollutant Discharge Elimination System (NPDES), effluent limitations, water quality standards, pretreatment requirements, anti-degradation provisions, nonpoint-source management programs, and wetlands protection. The U.S. Environmental Protection Agency (EPA) administers the CWA at the federal level and has delegated implementation responsibilities to state and regional agencies. In California, the State Water Resources Control Board (SWRCB) oversees NPDES permitting and develops associated requirements, operating in coordination with the Regional Water Quality Control Boards (RWQCBs) to protect and improve the quality of state waters.

Through the NPDES program, EPA establishes requirements for stormwater discharges from municipal and industrial facilities and construction operations. Section 402 of the CWA prohibits the discharge of any pollutant from a point source into waters of the United States unless the discharge is authorized by a valid NPDES permit.

The Anti-Degradation Policy, codified in EPA's Water Quality Standards Regulations (40 Code of Federal Regulations 131.12), requires states and tribes to adopt and maintain a three-tiered program designed to prevent backsliding in water quality protections, described as follows:

- Tier 1 applies to all surface waters and requires protection of existing uses and the water quality conditions necessary to sustain those uses.

- Tier 2 applies to high-quality waters where conditions already exceed the fishable/swimmable threshold. Water quality may be lowered in these waters only to the extent that existing and designated uses are not impaired.
- Tier 3 protects outstanding national resource waters from any reduction in water quality, except for certain limited temporary changes.

Anti-degradation requirements were formally incorporated into the CWA through the 1987 amendments and codified at Section 303(d)(4)(B), requiring that these standards be met before certain modifications to NPDES permits can take effect.

Section 303(d) of the CWA directs the SWRCB to identify and list waterbodies that do not meet applicable water quality standards, prioritize those impaired waters, and develop Total Maximum Daily Loads to guide restoration efforts.

Section 404 of the CWA, administered by the U.S. Army Corps of Engineers, establishes a permit program governing the discharge of dredged or fill material into waters of the United States, including wetlands and coastal waters below the mean high-tide line. U.S. Army Corps of Engineers reviews permit applications, makes jurisdictional determinations, provides policy and guidance, and enforces Section 404 requirements.

Under CWA Section 401, any applicant seeking a federal Section 404 permit for activities that may result in a discharge to navigable waters must first obtain a water quality certification from the applicable RWQCB, confirming that the discharge will comply with applicable state water quality standards.

National Flood Insurance Program

Federal Emergency Management Agency's (FEMA's) primary mission includes reducing risks to life and property from all hazards, including flooding. FEMA administers the National Flood Insurance Program (NFIP), which allows property owners in participating communities to purchase insurance against flood losses. In exchange, communities adopt floodplain management ordinances aimed at reducing future flood damage. Within NFIP-participating communities, property owners in Zone A—areas subject to the 1% annual chance (100-year) flood event—are required to carry flood insurance. In addition to providing insurance, the NFIP maps flood hazard areas through the production of Flood Insurance Rate Maps.

State

California Porter-Cologne Water Quality Control Act

In California, water quality is regulated primarily through the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) (California Water Code Section 13000 et seq.), which provides the comprehensive state framework for managing discharges to surface waters and groundwater. The Porter-Cologne Act establishes a program to protect the beneficial uses of water and applies to both point and nonpoint sources of pollution. Under the act, state water quality policy is guided by the following three foundational principles:

- The quality of all state waters shall be protected.
- All activities and factors that affect water quality shall be regulated to achieve the highest reasonably attainable water quality.
- The state shall use its full authority to protect state waters from degradation.

The Porter-Cologne Act established nine RWQCBs under the oversight of the SWRCB, each responsible for implementing the Act's provisions within their respective hydrologic regions. The SWRCB provides statewide policy guidance, funding, and review of RWQCB actions, while the RWQCBs conduct permitting, inspections, and enforcement at the regional and local level. The SWRCB also oversees statewide nonpoint-source pollution management, including monitoring, planning, and financial assistance activities. The Porter-Cologne Act provides multiple avenues for enforcing waste discharge requirements and other regulatory orders.¹

A central objective of the Porter-Cologne Act is the protection of beneficial uses of state waters. California Water Code Section 13050(f) defines beneficial uses eligible for protection from degradation as including, but not limited to, domestic and municipal supply, industrial and agricultural supply, power generation, recreation, aesthetic enjoyment, navigation, and the preservation and enhancement of fish, wildlife, and other aquatic resources. Waterbodies with evidence of supporting rare, threatened, or endangered species may receive a RARE designation. Twenty-three beneficial use categories are currently defined at the statewide level.

San Francisco Bay Water Quality Control Plan

The San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan) (RWQCB 2021) is the master planning document governing water quality management throughout the San Francisco Bay Basin, prepared by the San Francisco Bay RWQCB. The Basin Plan designates beneficial uses and establishes water quality objectives for all waters of the State within the region—including both surface water and groundwater, and contains programs of implementation to achieve those objectives. Water quality objectives for total dissolved solids, mineral constituents, and turbidity are set on a watershed-by-watershed basis, while region-wide objectives address total and fecal coliform bacteria, nutrients, pH, dissolved oxygen, and un-ionized ammonia.

The turbidity objective, which is most relevant to the analysis in this section, is presented in Section 3.3.19 of the Basin Plan:

3.3.19 Turbidity: Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

Phase II Small Municipal Separate Storm Sewer System Program

The Municipal Stormwater Permitting Program governs stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s). Permits are typically issued to groups of co-permittees across an entire metropolitan area and require each permittee to develop and implement a Stormwater Management Plan or Program aimed at reducing pollutant discharges to the maximum extent practicable—the performance standard established by CWA Section 402(p). Required program elements include public education and outreach, illicit discharge detection and elimination, construction and post-construction stormwater controls, and good housekeeping practices for municipal operations.

The NPDES stormwater program is structured in two phases. Phase I covers medium and large municipalities and counties with populations exceeding 100,000. Phase II extends permit requirements to smaller MS4s within urbanized areas and other small MS4s outside urbanized areas that are designated by

¹ According to EPA, “NPS (nonpoint source) pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification.” National Park Service (NPS) pollution has many diffuse sources whereas point source pollution has a single, identified source (EPA 2020).

the permitting authority. The District is classified as a non-traditional small MS4 permittee and holds coverage under the Phase II small MS4 statewide permit (Order WQ 2013-0001-DWQ, NPDES No. CAS000004, as amended [SWRCB 2013]). As a Phase II permittee, the District is required to develop and implement a Stormwater Management Plan that incorporates both pre- and post-construction best management practices (BMPs).

The RWQCB regulates point-source discharges through the issuance of NPDES permits and addresses nonpoint-source discharges through waste discharge requirements. Any entity that discharges or proposes to discharge materials that could affect water quality—other than to a municipal sanitary sewer system covered by an NPDES permit—must file a report of waste discharge. The SWRCB and RWQCBs retain authority to conduct their own investigations or to require dischargers to undertake water quality studies and provide reports.

NPDES General Permit for Construction Activities

The SWRCB issues and periodically renews the statewide General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit Order 2022-0057-DWQ (adopted September 8, 2022) [SWRCB 2022]). Construction permitting is administered by the SWRCB, while post-construction permitting falls under RWQCB jurisdiction. Projects that involve soil disturbance are generally required to obtain coverage under the Construction General Permit, which applies to sites disturbing 1 or more acres.

Any construction project involving the clearing, grading, or excavation of one or more acres of land must comply with the Construction General Permit by preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include a site map showing the construction perimeter, existing and proposed features, roadways, drainage points, pre- and post-construction topography, and drainage patterns. It must also identify BMPs—such as temporary vegetation, silt fences, and vegetated filter strips—to control stormwater and protect water quality, along with a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges to a 303(d)-listed waterbody. Applicants must submit a Notice of Intent to the SWRCB before beginning construction and a Notice of Termination upon project completion.

For projects disturbing 1 or more acres, permittees must develop a program that includes measures to prevent illicit discharges, structural and non-structural BMPs to reduce pollutants in construction stormwater runoff, and safeguards to prevent discharges from causing or contributing to violations of water quality standards.

Permittees are also required to review construction site plans to evaluate potential water quality impacts and verify the adequacy of proposed BMPs. This includes submission of an Erosion and Sediment Control Plan containing SWPPP elements before the issuance of building or grading permits.

NPDES Municipal Regional Permit Post-Construction Stormwater Quality Requirements

The project proponent may hold permittee status under the NPDES Municipal Regional Permit, which includes provisions for administering post-construction stormwater quality requirements under Section E.12. These provisions require installation of post-construction BMPs for new development that creates or replaces more than 10,000 square feet of impervious area (or 5,000 square feet at high water quality risk sites). The intent is to ensure that stormwater runoff from new development does not adversely affect downstream receiving waters.

Qualifying projects must install stormwater quality BMPs capable of treating runoff generated by storms up to approximately the 85th percentile event (roughly equivalent to a 1-inch storm). Projects must capture and treat 100% of runoff from new impervious surfaces and implement Low Impact Development

(LID) techniques, such as stormwater harvesting and reuse, infiltration, evapotranspiration, and bioretention.

Industrial General Permit

The SWRCB has also issued a statewide General Industrial Activities Stormwater Permit (IGP) (Order No. 2014-0057-DWQ [SWRCB 2014]) applicable to industrial facilities not otherwise covered by an individual construction permit. The IGP requires covered facilities to develop and implement a SWPPP to minimize pollutants in stormwater discharges, eliminate unauthorized non-stormwater discharges, and conduct both visual and analytical monitoring to verify SWPPP effectiveness, with findings reported annually. Facility types typically covered include manufacturers, landfills, mining operations, steam-based power generators, hazardous waste facilities, transportation facilities with vehicle maintenance programs, larger wastewater treatment plants, and recycling operations.

California Fish and Game Code Sections 1602

The California Department of Fish and Wildlife (CDFW) serves as a public trustee agency with responsibilities for protecting water quality as it relates to fish and wildlife resources, including under California Fish and Game Code Section 1602. CDFW coordinates with the SWRCB on water quality policy development and participates in permitting processes that affect the natural environment. Under Section 1602, CDFW is authorized to regulate any project that would divert, obstruct, or alter the natural flow or physical attributes of any river, stream, or lake that supports fish or wildlife resources.

Local

Bay Conservation and Development Commission

The Bay Conservation and Development Commission (BCDC) exercises permitting authority over most projects occurring in San Francisco Bay and within the 100-foot shoreline band, which is defined under the McAteer-Petris Act as the area within 100 feet landward of the mean high water line of San Francisco Bay. Any agency or individual proposing to place fill, dredged material, or other material in San Francisco Bay or certain designated tributaries within BCDC jurisdiction must secure a BCDC permit. Activities proposed within the 100-foot shoreline band are also generally subject to BCDC permitting. The applicable permit type depends on the nature and scope of the proposed work. Project components falling within BCDC jurisdiction would require a Major Permit under the McAteer-Petris Act.

The City of Larkspur 2040 General Plan

The City of Larkspur 2040 General Plan contains the following goals and policies that are applicable to the proposed Project (City of Larkspur 2024).

Natural Environment and Resources Element

Goal ENV-2. Protected Water and Riparian Resources. Protect and enhance the quality of water resources, riparian habitat, and natural drainage systems within and adjacent to Larkspur.

Policy ENV-2.4. Water Resource Protection. Prioritize protection of water resources for development projects within or adjacent to shoreline, wetland, and riparian areas.

Policy ENV-2.5. Stormwater Runoff Pollution. Minimize stormwater runoff pollution and retain natural hydrological characteristics. Action Program ENV-2.5.b requires compliance with the NPDES Construction General Permit for construction within required setbacks to shoreline, wetland, and riparian areas. Action Program ENV-2.8.c requires use of LID techniques and BMPs consistent with Marin County Stormwater

Pollution Prevention Program (MCSTOPPP) guidelines during development review, construction, and site operation.

Policy ENV-2.7. Permeable Surfaces. Encourage use of permeable materials in projects adjacent to water resources.

Policy ENV-2.8. Drainage Plans. Require drainage plans to produce no net increase in peak runoff rate and volume compared to pre-project conditions (Action Program ENV-2.8.a).

Safety Element

Goal SAF-4. Flood Damage Prevention. Protect life and property of City of Larkspur residents from the risk of flood damage.

Policy SAF-4.2. Flood Zone Development. Require site plans to locate structures outside or above the 100-year flood zone and sea-level rise vulnerability area to the extent feasible (Action Program SAF-4.2.f), and direct use of current FEMA flood hazard maps when evaluating development proposals in flood hazard zones (Action Program SAF-4.2.a).

Policy SAF-4.4. Sea Level Rise. Require consideration of sea-level rise impacts when designing capital improvements, including designing storm drain improvements to avoid backflow intrusion in areas vulnerable to flooding and sea-level rise (Action Program SAF-4.4.a).

Policy SAF-4.6. Natural Flow Capacity. Retain natural conditions by maintaining flow capacity in stream channels and floodplains.

Policy SAF-4.7. Pollutant Release. Minimize release of hazardous pollutants from sites inundated by sea-level rise.

Marin County Flood Control and Water Conservation District

The Marin County Flood Control and Water Conservation District was established in 1955 through state legislation (Chapter 68 of the State Water Code). The Marin County Board of Supervisors serves as the District's governing board, with District operations carried out by the Department of Public Works. The District operates across the entire County of Marin within eight zones, each with an advisory board that reviews zone budgets and master plans. District activities include maintaining precipitation and stream monitoring infrastructure, publishing Corte Madera Creek Rating Tables, and administering the MCSTOPPP and FEMA Flood Insurance programs.

Marin County Stormwater Pollution Program

The City of Larkspur is a member agency of the MCSTOPPP, whose mission is to prevent stormwater pollution, protect and enhance water quality in local waterways and wetlands, preserve beneficial uses of waterways, and maintain compliance with applicable state and federal requirements. Member agencies implement stormwater BMPs, land development standards, and permitting requirements consistent with applicable local stormwater ordinances, including the City of Larkspur Urban Runoff Pollution Prevention Ordinance (Larkspur Municipal Code Section 15.48), which establishes requirements to ensure compliance with applicable regulations (City of Larkspur 2024).

The Central Marin Sanitation Agency provides wastewater collection and treatment services to the City of Larkspur and surrounding communities. Central Marin Sanitation Agency operates under waste discharge requirements issued by the San Francisco Bay RWQCB and implements a Sewer System Management Plan to ensure compliance with RWQCB and SWRCB requirements, reduce and mitigate impacts from sanitary sewer overflows, and ensure timely reporting of any overflows that may affect water quality.

3.9.1.2 Environmental Setting

Surface Water, Groundwater, and Water Quality

The LFT and associated facilities is along the central San Francisco Bay near Sir Francis Drake Boulevard in Marin County, California, at latitude 37°56'40.2"N and longitude 122°30'31.4"W. The study area is within the San Rafael U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle and within the City of Larkspur city limits. The terminal is adjacent to San Francisco Bay wetlands and tidal areas and is bordered by a mix of transportation, commercial, and open-space land uses.

The Project site consists of the terminal (Main Lot), and a satellite parking lot north of Sir Francis Drake Boulevard (North Lot). The Main Lot is accessed from Sir Francis Drake Boulevard and has 1,751 parking spaces. The North Lot is to the north of the Main Lot and is accessed from Larkspur Landing Circle, with 185 parking spaces. Together, these surface lots provide 2,023 spaces, inclusive of accessible parking spaces.

The Project site falls within the jurisdiction of the San Francisco Bay RWQCB. The Golden Gate LFT facility covers approximately 14.5 acres and is approximately 98% impervious (District 2026). The District maintains a Stormwater Management Program at the facility and associated properties, established in 2017 in response to regulatory requirements from the California SWRCB and EPA (District 2026). The program is administered under the state Small and Non-Traditional MS4 Permit and is intended to reduce urban runoff pollution and protect local water bodies from water quality impairment.

The existing LFT facility contains multiple stormwater drainage areas. Drainage Area A, which covers the fuel tanks area, and Drainage Area B, which encompasses the shipping and receiving area east of the fuel tanks; both discharge southward into Corte Madera Creek (District 2026). Drainage Area C encompasses the over-water portions of the facility, including ferry berths, gangways, the passenger terminal, and the service building; because of the over-water configuration of this area, stormwater discharges to the Bay through numerous individual and sheet-flow locations (District 2026). Drainage Areas D through J are non-industrial use areas containing employee and public parking lots. The District's Stormwater Management Program includes public outreach and education, industrial facility inspections, illicit discharge detection and enforcement, construction site management, and maintenance of the facility drainage system.

A geotechnical investigation in August 2023 (Jacobs 2026b) involved borings at three sites, MR-1 (17 borings), MR-2 (22 borings), and MR-4 (14 borings) and located groundwater at a depth of 5 feet at the first two sites (Figure 3.9-1).

During ferry departure maneuvering, Corte Madera Bay water quality is affected when bottom sediment in the turning basin is disturbed by water jet propulsion and is resuspended. The disturbance is confined to an approximately 0.6-acre footprint and lasts about 30 seconds. Ferry departure maneuvering raises turbidity within the turning basin briefly, locally and repetitively. For the existing fleet, the increase within the 0.6-acre footprint is 62 to 91 Formazin nephelometric units (FNU), lasting a few minutes, 21 times per day. Because departures follow a fixed schedule rather than the tidal cycle, the resuspended sediment is released into flood and ebb tides in roughly equal measure and carries no upstream bias; and the berths and turning basin themselves remain depositional and must be dredged periodically to maintain navigable depth (USACE 2022). The disturbed water leaves the footprint in about 2.5 to 5 minutes, well before the next departure, so successive disturbances do not overlap, and the elevated turbidity does not accumulate from one departure to the next. Set against the wind waves and tidal currents that act daily on the Bay's 590-acre mudflat and that supply the sediment that shoals the channel, the turning basin and the lower reach of the Corte Madera Creek (van der Wegen & Jaffe 2012), the ongoing ferry contribution to the sediment budget of the system is negligible in both area and duration.

Floodplain

As shown on Figure 3.9-2, the LFT and associated parking areas are within FEMA Special Flood Hazard Area Zone AE (FEMA 2018). Zone AE is classified as an area subject to inundation by the 1% annual chance (100-year) flood event, for which base flood elevations (BFEs) have been determined. The Flood Insurance Rate Map (FIRM) panel covering the Project site (Panel 0459, Map Number 06041C0459F, effective March 16, 2018) shows BFEs ranging from approximately 9 to 11 feet (North American Vertical Datum of 1988) across some portions of the Project area, especially around the fringe of the Project site most proximate to the Bay, with some parking lot areas falling within Zone AE at BFE 10 feet (FEMA 2018). Areas of minimal flood hazard (Zone X) are present in the interior of the Project site and areas to the north, including the North Lot area. It is anticipated that flooding and storm surges will become more intense in the coming years because of climate change, and it is possible that FEMA's figures may underestimate future flood conditions. Flooding frequency is expected to increase as climate change influences sea-level rise. The Project site was assessed for projected changes in inundation potential resulting from sea-level rise using the Our Coast Our Future visualization tool, which displays data from the Coastal Storm Modeling System (Point Blue Conservation Science and USGS 2017). This model presents projected flood conditions under various sea-level rise elevation scenarios, including 0.8 foot, 1.6 feet, 2.5 feet, 3.3 feet, and 4.1 feet. Under existing conditions, the Our Coast Our Future model shows that the Project site may begin to experience partial, intermittent inundation along the southern edge of the Project site for 100-year storm events with 50 centimeters of sea-level rise (Point Blue Conservation Science and USGS 2017). With 100 centimeters of sea-level rise, a significant portion of the interior parking lot is inundated.

The alternatives vary in susceptibility to flooding based on their location and proposed site elevations. Under Alternatives 1 and 2, the Main Lot parking garage would be elevated above projected sea-level rise, reducing inundation risk relative to existing conditions. The North Lot, north of Sir Francis Drake Boulevard, is at a slightly higher elevation and would have a lower risk of inundation.



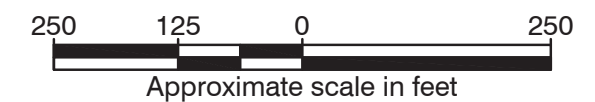
© 2023 Microsoft Corporation, © 2023 Maxar, © CNES (2023) Distribution Airbus DS, © 2023 TomTom. Annotation by Jacobs, 2023.

Figure 2-1
Boring and CPT Location Map
 Larkspur Ferry Terminal
 Larkspur, California

Legend

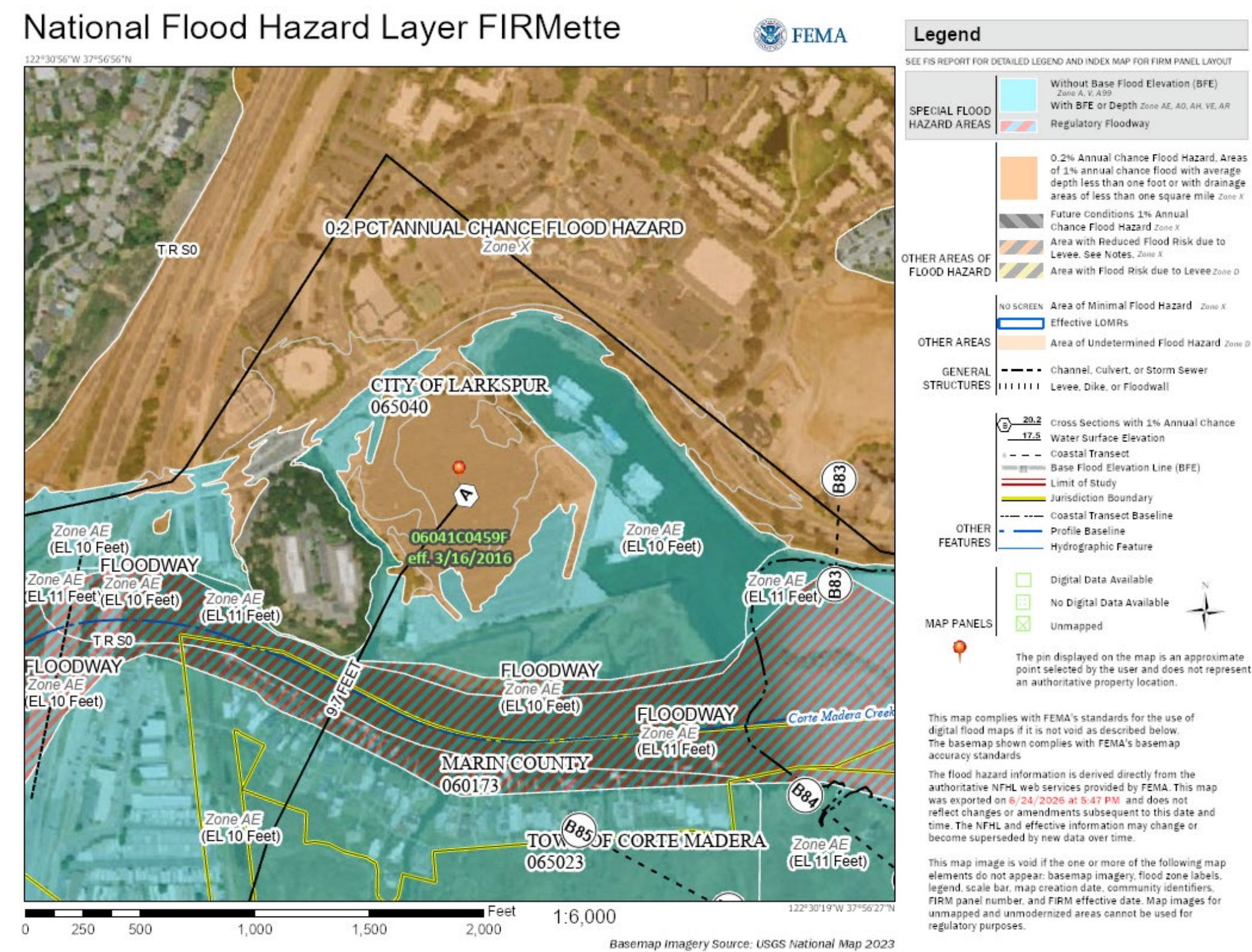
-  CPT
-  Proposed Boring (Depth)
-  Soil Profile Cross-Section Alignments

-  Historical Boring from HARDING-LAWSON Associates (1973)
-  Historical Boring from WINZLER & KELLY (1997)
-  Historical Boring from STIMAC Associates, INC. (2008)



Jacobs

Figure 3.9-2. FEMA Floodplain Map



3.9.2 Environmental Impacts

The Draft Environmental Impact Report analyzes two Build Alternatives. The alternatives include increases in ferry service to 2050 beyond, parking garages in the North and Main Lots, and enhanced access and connectivity. Alternative 2 includes enhanced transportation demand management measures to meet forecast ferry ridership with one less parking level in the Main Lot garage.

Information for this section was obtained from the Project description in Chapter 2, the District's Stormwater Management Program (District 2026), and applicable regulatory and planning documents.

3.9.2.1 Methodology

The evaluation of possible impacts concerning hydrology and water quality relied on comparing existing and proposed stormwater drainage infrastructure and Project components against baseline conditions, as outlined in Section 3.9.1.2, Environmental Setting, relative to conditions anticipated during the construction and operational phases of the proposed Project. The study area of this analysis encompassed the Project footprint, including the North Lot and proposed pedestrian crossing from the North Lot across Larkspur Landing Circle and the LFT.

3.9.2.2 Thresholds of Significance

The significance criteria outlined in California Environmental Quality Act Guidelines Appendix G thresholds establish the standards for evaluating whether a project could have significant impacts related to hydrology and water quality.

Would the proposed Project do the following:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:
 - Result in substantial erosion or siltation on- or offsite?
 - Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite?
 - Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
 - Impede or redirect flood flows?
 - Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding because of the failure of a levee or dam?
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map?

3.9.2.3 Impacts

Project water quality and hydrology impacts are substantively the same for both Build Alternatives. Within this section, impacts for Alternative 1 and Alternative 2 are discussed together as the Build Alternatives.

Violate Any Water Quality Standards or Waste Discharge Requirements or Otherwise Substantially Degrade Surface or Ground Water Quality

Construction

Build Alternatives

The Build Alternatives would construct new parking garages on both the North and Main Lots. The Project improvements proposed for the North Lot are the same for both Build Alternatives and include construction disturbance area of approximately 1.0 acre. Similarly, proposed disturbance areas for the Build Alternatives for the Main Lot are also the same and consist of approximately 5.5 acres of soil disturbance for the Main Lot and restriping of the remaining areas within the surface lot. The only difference in Main Lot garages between the Build Alternatives would be the total levels. Alternative 1 includes a five-level garage, and Alternative 2 would include a four-level garage on the Main Lot. The Main Lot garages for both Build Alternatives would also be elevated so that the ground floor level is higher than the predicted sea-level rise in year 2100. Additionally, the Main Lot garage would be constructed outside of the BCDC 100-foot shoreline band. Outside of the parking garage, restriping of the existing surface lot to accommodate the new circulation pattern and surface parking (Figure 3.9-1) and modifications to landscape areas and drainage tie-ins would be required. Modifications within the remaining areas of the existing surface lot would not change the existing site drainage pattern or involve grading. Project components within the shoreline band would be coordinated with the BCDC and, as applicable, amendment to the Districts BCDC permit would be obtained.

MM-HYD-CNST-1 would include the preparation and implementation of a SWPPP and participation with the Construction General Permit. The SWPPP would contain site-specific BMPs implemented during construction to control pollutants in stormwater discharge.

In addition, the City of Larkspur Municipal Code contains requirements regulating grading, drainage, erosion, and construction site stormwater runoff control.

Although small amounts of construction-related dewatering are covered under the Construction General Permit, the San Francisco Bay RWQCB has regulations specific to dewatering activities that typically involve reporting and monitoring requirements. In the event of dewatering during construction activities or before dewatering to surface water via a storm drain, the contractor would obtain coverage under the NPDES Construction General Permit from the San Francisco Bay RWQCB for those releases. Coverage under the Construction General Permit typically includes dewatering activities as authorized non-stormwater discharges, provided that dischargers prove the quality of water to be adequate and not likely to affect beneficial uses. All requirements of dewatering would be met to ensure water quality is not affected.

In the event groundwater is encountered during construction, dewatering discharge methods would include options for discharge to surface water via a storm drain in compliance with waste discharge requirements to ensure that any discharges would be within the capacity of existing facilities and would not require the construction or expansion of existing facilities. Waste discharge requirements also include regulations specific to dewatering activities requirements. If it is found that the groundwater does not meet water quality standards, it must either be treated as required before discharge so that all applicable water quality objectives (as designated in the Basin Plan [RWQCB 2021]) are met or hauled offsite instead for treatment and disposal at an appropriate waste treatment facility that is permitted to receive such

water. For water to be discharged to San Francisco Bay, the contractor would be required to notify the San Francisco Bay RWQCB and comply with the board's requirements related to the quality of water and discharges.

Construction activities could result in significant impacts if discharges violate water quality or degrade surface or groundwater quality. Implementation of MM-HYD-CNST-1 would mitigate construction-related impacts and prevent violations and degradation of surface and groundwater quality, and impacts would be ***less than significant with mitigation***. Compliance with the City of Larkspur Municipal Code and applicable Marin Municipal Water District (MMWD) requirements would further minimize the potential impacts of Project construction effects on water quality.

Operation

Build Alternatives

No substantial change in the amount of impervious surface associated with the new parking garages is being created. The new parking garages would result in the same acreage of impervious surfaces compared to the existing parking lots. It is anticipated that stormwater from the garages would be captured and treated onsite before discharge through the existing drainage systems. Drainage for remaining surface lot would be the same as existing and would comply with City of Larkspur, District, RWQCB, SWRCB, MCSTOPP, and BCDC stormwater management requirements. Operational changes associated with the Build Alternatives could result in significant impacts resulting in water quality violations or degradation of surface or groundwater if not addressed within the District's IGP. Implementation of MM-HYD-OP-1 requires the District to amend IGP SWPPP to incorporate the new parking garages into the facility's operational stormwater BMPs.

The applicable standard for evaluating operational effects on turbidity is the Basin Plan turbidity objective (Section 3.3.19; RWQCB 2021). It requires that waters be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. It also limits increases in turbidity relatable to waste discharge to no more than 10% where natural turbidity is greater than 50 Nephelometric Turbidity units (NTU). Natural turbidity in the turning basin and Corte Madera Bay is about 50 FNU (FNU is equivalent to NTU), so a 10% increase corresponds to 5 FNU above background. The following analysis evaluates departure maneuvering against this threshold in two places: within the ferry turning footprint during a departure, and across the Corte Madera Creek and Corte Madera Bay after mixing.

Future operations would be conducted with the Liwa-class vessels, scheduled to replace the legacy fleet in 2033. The new design has a shallower 20-degree jet angle, there are six waterjets per ferry rather than four, and the distance the jets must travel to reach the bottom is increased. Together, these changes reduce the disturbance per departure to about 0.36 of the existing value in bottom-directed momentum and to about 5.5% in peak bottom shear stress, a reduction by a factor of roughly 18. As shown in Table 3.9-1, even with 81% more departures (that is, up to 76 daily revenue crossings), the momentum delivered to the bottom over a full day under the Liwa class falls to by about two-thirds compared to that of the legacy fleet. This would result in a decrease in the turbidity within the footprint to 54 to 65 FNUs compared to 62 to 91 FNU for the legacy fleet, and the turbidity in the Corte Madera Bay would fall to 0.2 to 0.7 FNU from 0.3 to 1.0 FNU. The future condition is accordingly an improvement over the existing condition in both the intensity of a single event and the daily total, and the transition to the future fleet does not constitute a new or an increased impact.

Table 3.9-1. Comparison of Parameters During Departure Maneuvering for the Legacy and Liwa-Class Vessels

Quantity	Existing Fleet	Future Fleet
Departure trips per day	21	38
Waterjets per ferry and jet angle	4 at 45 degrees	6 at 20 degrees
Bottom-directed momentum per departure (relative)	1.00	0.36
Peak bottom shear stress per departure (relative)	1.00	0.055
Turbidity in the turning basin during the turn	62 to 91 FNU	54 to 65 FNU
Increase above the 50 FNU background	12 to 41 FNU	4 to 15 FNU
Water disturbed per departure	9 acre-feet	9 acre-feet
Water disturbed per day	189 acre-feet	342 acre-feet
Share of the daily tidal exchange of the Corte Madera Bay	2.4%	4.3%
Increase in the Corte Madera Bay if fully mixed	0.3 to 1.0 FNU	0.2 to 0.7 FNU
Increase as percent of background	less than 2%	about 1%

Note: the same 0.6-acre footprint, and therefore the same 9 acre-feet of disturbed water per departure, is assumed for both fleets. The future footprint is expected to be somewhat larger and more diffuse; spreading the same resuspended sediment through a larger volume would lower the turbidity within the footprint. Holding the footprint constant therefore overstates the turbidity of the future disturbance and is conservative for the turbidity rows. The water disturbed per day and the share of the daily tidal exchange would rise in proportion to a larger footprint, while the fully mixed increase across the Corte Madera Bay, which depends on the sediment supplied rather than on the volume through which it is spread, would not.

Regarding operational impacts outside the turning basin, neither fleet produces a measurable increase in turbidity. The fully mixed increase in the Corte Madera Bay is less than 2% of background under the existing fleet and about 1% under the Liwa class, well below the 10% limit. The water that floods the lower reach of the Corte Madera Creek is drawn from the channel and the Corte Madera Bay after mixing has taken place. Sediment delivered upstream is a fraction of one FNU and would occur only on flood tides. Because departures are not timed to the tide, roughly half of the disturbances are released on ebb tides and carried toward the Corte Madera Bay instead. These increments cannot be distinguished from natural variation of 5 to 25 FNU through an ordinary tidal cycle or from the several hundred FNU reached during storm runoff in the Corte Madera Creek and winter wind-wave events in the Corte Madera Bay (USGS 2026a; USGS 2026b).

Within the footprint, the localized increase during a departure (4 to 15 FNU under the future fleet) is brief and dissipates as the plume mixes. It is also smaller than the 12 to 41 FNU increase produced by the existing fleet. Resuspension of bottom sediment by vessel propulsion is not a waste discharge, which is the source of turbidity to which the 10% limit applies, and the short-lived, localized increase would not cause nuisance or adversely affect beneficial uses. The future condition is therefore an improvement over the existing condition in both the intensity of a single event and the daily total, and the transition to the future fleet does not constitute a new or increased impact.

The impact of ferry departure maneuvering on upstream sedimentation and flooding hazard in the lower reach of Corte Madera Creek, and on water turbidity in that reach and in Corte Madera Bay, is negligible under both existing and future conditions. The future fleet would disturb the bottom and the water column less than the existing fleet despite the proposed increase in service. Construction and operation of the proposed Project would therefore not violate the Basin Plan turbidity objective or any other water quality standard or waste discharge requirement and would not otherwise substantially degrade surface or

groundwater quality. Potential impacts from construction and operational activities would ***be less than significant***.

Mitigation Measures

MM-HYD-CNST-1: Prepare and Implement a Stormwater Pollution Prevention Plan

The proposed Project will be required to implement a site-specific construction SWPPP that complies with and is consistent with the Construction General Permit (SWRCB 2022). The SWPPP will include Project construction features designed to protect the quality of stormwater runoff. The SWPPP will be prepared by the contractor and approved by the District for implementation during construction. Some of the primary issues that the contractors SWPPP would address are the following:

- Minimization of disturbed areas to the portion of the Project site necessary for construction
- Stabilization of exposed or stockpiled soils and cleared or graded slopes
- Establishment of permanent revegetation or landscaping as early as is feasible
- Removal of sediment from surface runoff before it leaves the Project site by silt fences or other similar devices around the site perimeter
- Protection of all storm drain inlets onsite or downstream of the Project site to eliminate entry of sediment
- Prevention of tracking soils and debris off site through use of a gravel strip or wash facilities, which would be at all construction exits from the Project site
- Proper storage, use, and disposal of construction materials, such as solvents, wood, and gypsum
- Continual inspection and maintenance of all BMPs through the duration of construction
- Treatment requirements and operating procedures to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from material storage

The SWPPP will also contain a site map(s) showing the construction perimeter, existing and proposed buildings, stormwater collection and discharge points, general pre- and post- construction topography, drainage patterns across the site, and adjacent roadways; a visual monitoring program; a chemical monitoring program for “non-visible” pollutants; and a sediment monitoring plan, should the site discharge directly into a waterbody listed on the 303(d) list for sediment. Section A of the Construction General Permit (SWRCB 2022) lists all elements that must be contained in a SWPPP. Once grading begins, the SWPPP must be kept onsite and updated as needed while construction progresses.

MM-HYD-OP-1: Amend Existing District IGP

The existing IGP SWPPP will be amended to account for the new operational stormwater conditions at the North and Main Lots to control pollutants in stormwater discharge in accordance with state and federal requirements.

Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge Such that the Project May Impede Sustainable Groundwater Management of the Basin

Construction and Operation

Build Alternatives

The proposed Project would not introduce new impervious surfaces on undeveloped land that would adversely affect groundwater recharge. The Project site is developed with existing urban land use types

and does not include vegetative cover that allows groundwater recharge onsite. Accordingly, groundwater recharge would remain similar to existing conditions.

Preliminary geotechnical investigations indicate that the Build Alternatives would require excavation to remove unsuitable material within the foundation locations, utility trenches and pile installation for the proposed parking garages. The LFT is on bayfront fill adjacent to tidal wetlands, and groundwater was found at a depth of 5 feet at two boring sites (MR-1 and MR-2) and not found at a third site (MR-4) (Figure 3.9-1). As groundwater levels fluctuate seasonally, excavations for utility trenches may encounter groundwater and may require dewatering, shoring, and other ground-stabilizing measures. The Alternatives Summary Report (Jacobs 2026a) notes that the Main Lot parking garage would require deep pile foundations and that fill material would be imported to raise the site before pile driving. If construction-related dewatering is required, it would occur on a temporary basis and would not result in a loss of water that would substantially deplete groundwater supplies.

The MMWD provides water service to the City. MMWD's primary water supply comes from seven rain-fed reservoirs, and groundwater is not currently or planned to be used as a municipal water source supply by the MMWD. Groundwater resources would not be used for Project construction or operation. Accordingly, Project implementation would not result in impacts on groundwater supplies within the City or MMWD. Therefore, construction and operation of the proposed Project would result in *less than significant* impacts on groundwater supplies, recharge or management. No mitigation required.

Mitigation Measures

No mitigation required.

Substantially Alter the Existing Drainage Pattern of the Site or Area, Including through the Alternation of the Course of a Stream or River or through the Addition of Impervious Surfaces, in a Manner that Would Result in Substantial Erosion or Siltation On or Off Site, Substantially Increase the Rate or Amount of Surface Runoff in a Manner that Would Result in Flooding On or Off Site, Create or Contribute Runoff Water that Would Exceed the Capacity of Existing or Planned Stormwater Drainage Systems or Provide Substantial Additional Sources of Polluted Runoff, or Impede or Redirect Flood Flows?

Construction and Operation

Build Alternatives

The Main Lot and the North Lot are largely impervious surfaces. There are no natural drainage features (streams, creeks, swales, or rivers) that would be affected by construction and operation of the Build Alternatives. The North Lot drains to the City stormwater drainage system. The Main Lot site drains to an existing stormwater system, which conveys surface runoff to San Francisco Bay via outfalls near the site perimeter.

During Project construction, stormwater drainage patterns could be temporarily altered. However, as discussed, implementation of BMPs in compliance with MM-HYD-CNST-1, as required in the Project SWPPP during construction, would minimize the potential for erosion or siltation in nearby storm drains and temporary changes in drainage patterns during construction. The Project will comply with the established regulatory framework, and therefore, potential erosion or siltation impacts during and following construction would be reduced to less than significant.

The proposed parking garages on the North Lot and Main Lot would be constructed on existing impervious surface parking lots. The Main Lot parking garage would be elevated so that the ground level is higher than the potential future near term (Year 2100) sea level rise (refer to Appendix E, Larkspur Ferry

Terminal Sea Level Rise Impact Assessment). New stormwater conveyance systems would be incorporated into the parking garages. Proposed stormwater infrastructure would include onsite treatment before connection to the existing storm drain system and discharged to the Corte Madera Bay through existing outfalls. An amendment would be obtained to the existing IGP and implement approved operational BMPs in compliance with MM-HYD-OP-1. Stormwater management would be designed in compliance with IGP amendment, local and regional regulations to minimize discharge from future operations and storm events.

The proposed Project would not substantially increase runoff quantities, result in substantial erosion or siltation on- or offsite, or increase the rate of flooding on- or offsite. Runoff volumes would be similar to existing conditions, and the Project would not exceed the capacity of existing or planned stormwater drainage systems. As discussed, the Project applicant would be required to apply for coverage under the NPDES Construction General Permit (SWRCB 2022) and prepare a SWPPP. Given the particular configuration of the Project, including the existing impervious surfaces, following compliance with San Francisco Bay RWQCB, MS4 permit, NPDES, MCSTOPPP, and applicable City of Larkspur and District requirements, including the amendment to the IGP. With the implementation of MM-HYD-CNST-1 and MM-HYD-OP-1, project implementation would not result in substantial erosion or siltation on- or offsite, increase the rate or amount of surface runoff resulting in flooding on- or offsite, or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. Impacts would therefore be *less than significant with mitigation*.

Mitigation Measures

MM-HYD-CNST-1: Prepare and Implement a Stormwater Pollution Prevention Plan

The proposed Project will be required to implement a site-specific construction SWPPP that complies with and is consistent with the Construction General Permit (SWRCB 2022). The SWPPP will include Project construction features designed to protect the quality of stormwater runoff. The SWPPP will be prepared by the contractor and approved by the District for implementation during construction. Some of the primary issues that the contractor's SWPPP would address are the following:

- Minimization of disturbed areas to the portion of the Project site necessary for construction
- Stabilization of exposed or stockpiled soils and cleared or graded slopes
- Establishment of permanent revegetation or landscaping as early as is feasible
- Removal of sediment from surface runoff before it leaves the Project site by silt fences or other similar devices around the site perimeter
- Protection of all storm drain inlets onsite or downstream of the Project site to eliminate entry of sediment
- Prevention of tracking soils and debris off site through use of a gravel strip or wash facilities, which would be at all construction exits from the Project site
- Proper storage, use, and disposal of construction materials, such as solvents, wood, and gypsum
- Continual inspection and maintenance of all BMPs through the duration of construction
- Treatment requirements and operating procedures to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from material storage

The SWPPP will also contain a site map(s) showing the construction perimeter, existing and proposed buildings, stormwater collection and discharge points, general pre- and post- construction topography, drainage patterns across the site, and adjacent roadways; a visual monitoring program; a chemical

monitoring program for “non-visible” pollutants; and a sediment monitoring plan, should the site discharge directly into a waterbody listed on the 303(d) list for sediment. Section A of the Construction General Permit (SWRCB 2022) lists all elements that must be contained in a SWPPP. Once grading begins, the SWPPP must be kept onsite and updated as needed while construction progresses.

MM-HYD-OP-1: Amend Existing District IGP

The existing IGP SWPPP will be amended to account for the new operational stormwater conditions at the North and Main Lots to control pollutants in stormwater discharge in accordance with state and federal requirements.

In Flood Hazard, Tsunami, or Seiche Zones, Risk Release of Pollutants Due to Project Inundation

Construction and Operation

Build Alternatives

The LFT site is within FEMA Zone AE, a Special Flood Hazard Area subject to 1% annual chance flooding with BFEs of approximately 9 to 11 feet North American Vertical Datum of 1988 (FEMA 2018). The Project site is therefore within a flood hazard zone. However, under the Build Alternatives, the Main Lot parking garage would be elevated so that the ground floor is higher than the potential future sea level. This design feature would substantially reduce the risk of pollutant release because of flood inundation during Project operations.

The Project site is within the tsunami inundation zone as shown in the Tsunami Inundation Map for the San Rafael/San Quentin Quadrangle (California Emergency Management Agency et al. 2009). However, the potential for significant damage from tsunami or seiche is considered very low, given variable tides, the distance from the Corte Madera Bay front, and the short duration of a tsunami or seiche event.

Furthermore, as discussed, construction-related stormwater BMPs would be implemented to minimize degradation of water quality associated with stormwater runoff or construction-related pollutants. In addition, construction and maintenance activities would comply with local stormwater ordinances, stormwater requirements established by MS4 requirements, and regional waste discharge requirements. Operation would comply with stormwater requirements established by MS4 requirements and MCSTOPPP. Accordingly, particularly given that the design, the flood, tsunami and seiche risks are minimal, the construction and operation impacts pertaining to risk of release of pollutants because of Project inundation would be *less than significant*. No mitigation required.

Mitigation Measures

No mitigation required.

Conflict with or Obstruct Implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan

Construction and Operation

Build Alternatives

MMWD relies on surface water reservoirs rather than groundwater, and the Project site does not fall within a recognized groundwater basin subject to a sustainable groundwater management plan. The site is fully developed with impervious surfaces and does not provide meaningful groundwater recharge.

During construction, stormwater management BMPs would be implemented under the Project's Construction General Permit coverage and SWPPP to control construction site runoff and reduce the

discharge of pollutants to storm drain systems from stormwater and other nonpoint-source runoff, as required by MM-HYD-CNST-1. Compliance with permit requirements and implementation of water quality control measures and BMPs would ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the Basin Plan (RWQCB 2021).

Construction runoff would also comply with the appropriate water quality objectives for the region. The NPDES Construction General Permit (SWRCB 2022) also requires stormwater discharges not to contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards, including designated beneficial uses. Project design incorporates post-construction stormwater management vaults and filters to treat the site's water before discharge into exiting storm drain infrastructure.

Project design would incorporate post-construction stormwater management features to capture and treat stormwater from the parking garages before discharging through the exiting storm drain infrastructure. Stormwater drainage areas outside of the garages within the remaining surface lot would continue to follow existing drainage patterns and discharge through the existing surface drains and outfalls. Treatment of stormwater discharge from the 5.5-acre parking garage would substantially reduce potential for pollutants to the Corte Madera Bay. Therefore, the proposed Project would not be a substantial source of pollutants that would result in significant impacts on surface water or groundwater quality. The proposed Project would implement and comply with the amended IGP SWPPP governing long-term operational stormwater discharges (MM-HYD-OP-1), in addition to the new Construction General Permit SWPPP governing construction-phase discharges (MM-HYD-CNST-1) and the NPDES permit. The Basin Plan's water quality objectives are implemented through these permit programs; compliance with both, as described previously, is therefore the mechanism by which the Project achieves consistency with the Basin Plan. Therefore, the proposed Project would not conflict with a water quality control plan or groundwater management plan, and ***no impact*** would occur.

Mitigation Measures

No mitigation required.

Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Construction and Operation

Build Alternatives

The proposed Project does not include construction of housing. Construction and operation of the Build Alternatives would result in ***no impacts*** associated with the construction of housing within flood areas.

Mitigation Measures

No mitigation required.