Basis of Design Report
SF Bay WETA - Vallejo Ferry Terminal Reconfiguration



Water Emergency Transportation Authority

Vallejo Ferry Terminal

September 2026

Project ID: 25S001.00

Solving our clients' toughest science and engineering challenges.

SF Bay WETA

Vallejo Ferry Terminal Reconfiguration

Project ID: 25S001

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Volume 3 References

Volume 3 – Attachment 1: Vallejo Permanent Passenger Float Dry Dock Plan
Volume 3 – Attachment 2: Preliminary Geotechnical Investigation Vallejo Ferry Terminal
Volume 3 – Attachment 3: WETA Electrification 95% Float Drawings_VFT Redline
Volume 3 – Attachment 4: WETA Standard Float – Gap Analysis Memorandum

1. Introduction

This Basis of Design (BOD) document provides design parameters and assumptions used to evaluate the Water Emergency Transportation Authority (WETA) – Vallejo Ferry Terminal (VFT) Reconfiguration located in Vallejo, CA. The BOD considers existing data, recently collected field data, historical information, information provided by WETA, and experience from previous terminal design and construction projects performed by Foth & Van Dyke and Associates, Inc. (Foth).

This document shall be used by the Design-Builder, in conjunction with the other Technical Reference Documents, throughout the design process. The criteria, requirements, assumptions, and performance standards established in this BOD shall serve as the minimum design requirements for the project and identify WETA's design intent. This BOD shall serve as the basis for the Design-Builder's final design. The Design-Builder shall be responsible for developing and advancing the design in accordance with the criteria and requirements outlined in this BOD and for providing all engineering, analyses, details, and documentation necessary to deliver a complete and functional facility.

1.1 Project Location and Limits

The Vallejo Ferry Terminal (VFT) is located at 289 Mare Island Way, on the east shore of the Mare Island Strait in Vallejo, CA. The existing ferry terminal is situated in a man-made basin and includes an 88-foot long by 50-foot-wide float, anchored by stake piles and chains. The shoreline at the project site consists of a steel sheet pile bulkhead, which extends along the shoreline in both directions, away from the site.

A pedestrian gangway, approximately 90-feet long, provides access between the terminal float and the shore. This pedestrian gangway is a combination of steel and concrete, 11-feet wide, and supported by four (4) HP14x117 piles on the landward side. The existing ferry float allows berthing on both the north and south sides. The existing float is anchored via chains running from the float bottom to four (4) wide flange steel stake piles outside of the berthing areas. The upland area surrounding the site consists of the WETA ticket office, several parking lots, a parking garage, and various mixed use commercial sites. A concrete sidewalk runs parallel to the shoreline around the project site providing access to and along the waterfront in collaboration with the San Francisco Bay Trail.



Figure 1 - Aerial view of Vallejo Ferry Terminal.

1.2 Scope of Work

The goal of the VFT Reconfiguration project is to improve terminal operations and reduce the required frequency of dredge events. The project design will situate the ferry loading/unloading float further offshore and allow the natural currents of the Mare Island Strait to prevent accretion of sediment under the ferry loading float.

The existing ferry landing float and access structures will be removed and replaced with a new, approximately 330-foot-long approach. This approach will be supported by four (4) new pile supported dolphins along its length. A new WETA Standard Float, based on the Universal Charging Float, will be located at the end of the approach, oriented to allow for parallel berthing of ferry vessels.

Foth has advanced design and engineering to the 30% design stage, including but not limited to the following deliverables: preliminary design calculation package, project phasing plan, and conceptual design plans.

2. General Analysis Criteria

2.1 Unit System

Analysis for this project will be completed using U.S. customary units unless specified otherwise.

2.2 Analysis Methodology

The analysis methodology will use both Limit State Design and Service Limit State Design.

2.2.1 Strength Limit State

Limit states relating to strength and stability shall follow Load and Resistance Factor Design (LRFD) methodology, as applicable. The steel-framed platform and the connections to the steel pipe pile in addition to the structural capacity of the pile will use this method.

2.2.2 Service Limit State

Limit states relating to stress and deformation, as applicable shall follow Allowable Stress Design (ASD) methodology. The Service Limit State shall be used to develop design forces for pile and foundation elements.

2.3 Codes and Standards

The following codes and standards will be used in the analysis/design of the structures.

1. American Association of State Highway and Transportation Officials (AASHTO), LRFD Bridge Design Specifications, Ninth Edition, 2020.
2. American Concrete Institute (ACI), Building Code Requirements for Structural Concrete, ACI 318-19(22).
3. American Institute of Steel Construction (AISC), Specification for Structural Steel Buildings, ANSI/AISC 360-22.
4. American Society of Civil Engineers (ASCE), Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE/SEI 7-22.
5. American Society of Civil Engineers (ASCE), Seismic Design of Piers and Wharves, ASCE/COPRI 61-14.
6. California Building Standards Commission, California Building Code (CBC), 2025 Edition.
7. U.S. Department of Transportation, Geotechnical Engineering Circular No. 5, Geotechnical Site Characterization, Publication No. FHWA NHI-16-072, April 2017.
8. International Navigation Association (PIANC), Guidelines for the Design of Fenders Systems: 2002.
9. United Facilities Criteria (UFC), Design: Piers and Wharves, UFC 4-152-01, 24 January 2017.

10. United Facilities Criteria (UFC), General Criteria for Waterfront Construction, UFC 4-151-10, 1 September 2012.

11. United Facilities Criteria (UFC), Geotechnical Engineering, UFC 3-20-01, 3 November 2021.

12. United Facilities Criteria (UFC), Moorings, UFC 4-159-03, 12 March 2020.

2.4 Project Datums

2.4.1 Horizontal Datum

The horizontal datum shall be the California Zone III - State Plane Coordinate System (SPCS) on the North American Datum of 1983 (NAD83).

The units of length for northings and eastings shall be the US Survey Feet.

2.4.2 Vertical Datum

The vertical datum shall be the Mean Lower Low Water Datum (MLLW).

Elevations will be given in units of feet rounded to the nearest tenth of a foot.

2.5 Service Life

The new structures will be designed for a minimum service life of 50 years, unless otherwise requested by the Owner.

2.6 Structure Risk Category

The new structure will comply with Risk Category IV in accordance with ASCE 7-22, as it is considered an essential facility, for which failure could pose a substantial hazard to the community.

3. Geotechnical Design Criteria

3.1 Subsurface Conditions

Foth was contracted by WETA to perform a preliminary subsurface investigation, consisting of geotechnical Cone Penetration Testing (CPT) at two upland locations. Foth contracted Miller Pacific Engineering Group (MPEG) to provide testing services. MPEG completed two CPTs in February and March of 2025.

The geotechnical investigation reports are included in Volume 3 – Technical Reference Documents.

Two (2) additional in-water soil borings were performed in September of 2026. Foth will use these borings to generate additional soil parameters and validate the pile design criteria. A geotechnical memorandum, boring logs, lab testing results and updated design criterial will be provided via an addendum.

3.2 Soil Parameters

MPEG also provided preliminary soil parameters for lateral loading of steel pipe piles. These soil parameters are also included in Volume 3 – Technical Reference Documents.

3.3 Seismic Parameters

Seismic parameters were obtained from the ASCE Hazard Tool website for Risk Category IV, with E-Soft Clay Soil, at Latitude 38.1002547, Longitude -122.262367.

Table 3-1 Basis Seismic Parameters

Parameter	Value	Description
S_S	2.31	MCE_R ground motion (period=0.2s)
S_1	0.88	MCE_R ground motion (period=1.0s)
S_{MS}	1.7	Site-modified spectral acceleration value
S_{M1}	3.02	Site-modified spectral acceleration value
S_{DS}	1.14	Numeric seismic design value at 0.2s SA
S_{D1}	2.01	Numeric seismic design value at 1.0s SA
PGA_M	0.58	MCE_G peak ground acceleration

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Seismic design shall be performed in accordance with ASCE/SEI 7-22. For purposes of establishing seismic design demands, the Equivalent Lateral Force Procedure and the seismic design parameters provided herein shall be utilized. For preliminary design purposes, the seismic

design category for this site is E. The seismic design category will be validated during the geotechnical investigation and subsequent geotechnical memorandum, issued via addendum.

3.4 Foundation Design Criteria

The proposed new dolphin structures will have a deep foundation that will use steel pipe piles.

Steel piles will be driven to rock.

3.5 Soil-Structure Interaction

Soil structure interaction (SSI) will be evaluated using AllPile. AllPile is software by Civiltech.

3.6 Pile Driving Criteria

Steel pipe piles shall be initially vibrated and then driven with an impact hammer, having sufficient energy and energy transfer characteristics to drive the piles to the required capacity and tip elevation.

All piles will be driven to practical refusal. At least two pipe piles shall be tested for axial capacity using PDA.

4. Metocean Design Criteria

4.1 Site Bathymetry

Foth performs regular bathymetric surveys of the Vallejo Ferry Terminal. The most recent survey occurred on September 25, 2024.

4.2 Tidal Datum

Tidal datum information is taken from Online Vertical Datum Transformation, by the National Oceanic and Atmospheric Administration for Latitude 38.1002547, Longitude -122.262367. A comparison of the tidal datum is provided in Table 4-1.

Table 4-1: Tidal Datums

WATER LEVELS	MLLW DATUM (FT)	NAVD88 DATUM (FT)
MHHW	6.0	6.2
MHW	5.4	5.6
MLW	1.0	1.2
MLLW	0.0	0.2
NAVD88	-0.2	0.0

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4.3 Sea Level Rise and Resiliency Considerations

The relative seal level trend is 1.98 millimeters/year with a 95% confidence interval of +/-0.17 mm/yr based on monthly mean sea level data from 1897-2024, which is equivalent to a change of 0.65 feet in 100 years, taken from the benchmark sheet for station ID 9414290 San Francisco, CA.

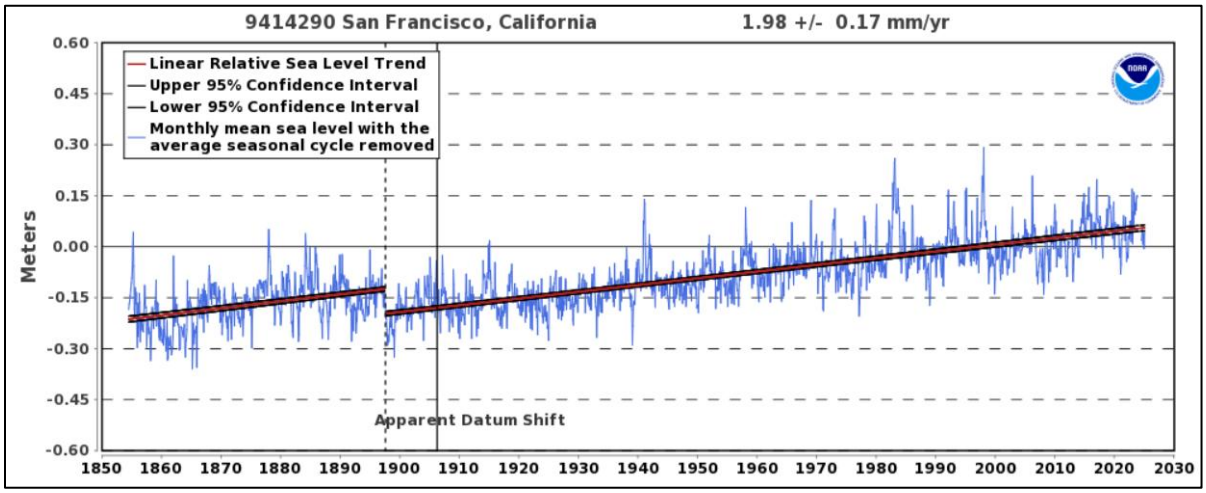


Figure 2 - Relative Sea Level Trend

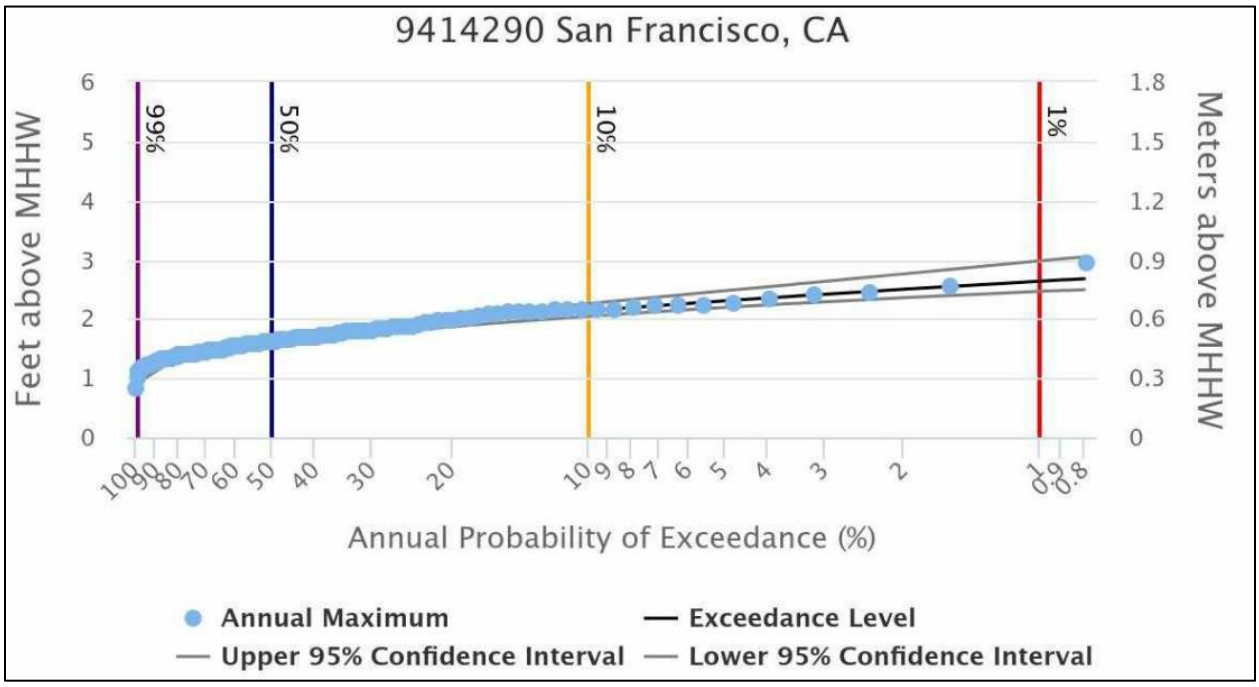


Figure 3 - Annual Exceedance Probability

The 1% annual exceedance probability levels are 0.79 meters (2.59 feet) above MHHW.

4.4 Tidal Current

The tidal current at the Vallejo Ferry Terminal is assumed at 1 meter per second (2.0 knot), per the parameters for Mooring Service Type IIB – Storm Mooring.

4.5 Extreme Water Levels

The following information comes from Flood Insurance Study for Solano County, CA, prepared by FEMA, dated August 3, 2016 (FIS #06095CV002D), for transect 14.

Table 4-2: Coastal Transect Parameters

Flood Source	Coastal Transect	Zone	BFE	Stillwater Elevations (ft-NAVD88)			
				10% Annual Chance (ft)	2% Annual Chance (ft)	1% Annual Chance (ft)	0.2% Annual Chance (ft)
SF Bay	13	VE AE	12 10-12	8.6	9.4	9.8	11.0
SF Bay	14	VE AE	12 10-12	8.6	9.4	9.8	10.9

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4.6 Wind

Wind on structures comes from the ASCE Hazard Tool website for Risk Category III, at Latitude 38.100247, Longitude -122.262367.

Table 4-3: Wind Speed

Risk Category	Wind Speed (mph)
IV	103

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Per provisions of ASCE/SEI 7-22, the wind exposure will be Exposure C.

4.7 Waves

Structures and systems shall be designed to withstand lateral loads due to breaking wave forces on the piles.

4.8 Temperature

The yearly average temperature in Vallejo, CA varies between 43F to 74F. Information taken from usclimatedata.com.

5. Mooring and Berthing Design Criteria

5.1 Berth Configuration and Characteristics

The berth consists of an offshore floating dock barge with a monopile and donut fender on three sides of the barge to provide fendering.

5.2 Design Vessel

The design vessel will be a Pyxis class ferry vessel with the following characteristics:

Length overall:	43.5 meters
Length at waterline:	38.9 meters
Beam overall:	12 meters
Beam waterline, one demihull:	2.9 meters
Depth to main deck:	3.9 meters
Draft, fully loaded design waterline:	1.7 meters
Spacing between demihull centerlines:	8.5 meters
Vessel Displacement (fully loaded):	236.2 metric tons
Berthing Point on Vessel:	Quarter Point

5.3 Mooring Analysis

Foth will perform a quasi-static mooring analysis based on UFC publication Moorings, UFC 4-159-03, dated 12 March 2020.

The mooring service type (MST) is IIB, Storm Mooring. MST IIB covers mooring in winds of 64 knots or less in broadside currents of 2 knots or less. The mooring analysis will assume that there are no ferry vessels present at the berth and the anchor piles resist the load from the WETA standard barge only, which is approximately 134.5 feet x 42 feet.

5.4 Berthing Analysis

Foth will perform a berthing energy analysis based on PIANC Guidelines for the Design of Fenders Systems: 2002. The design vessel characteristics will be used in generating a berthing energy that will assist in the analysis and design of new monopile donut fenders. The following parameters shall be used:

Vessel Approach Speed:	0.7 knots
Berthing Angle:	15 degrees
Abnormal Berthing Factor:	2.0
Eccentricity Factor:	0.5
Virtual Mass Factor:	1.1
Softness Factor:	1.0
Berth Configuration Factor:	1.0
Accidental Factor:	1.0

6. Civil Design Criteria

6.1 Site Utilities

6.1.1 General

The scope of work for this project includes new utility services for the gangway and WETA Standard Float to properly service the requirements of this terminal. Utilities shall be routed on the WETA Standard Float to avoid penetrations through the central trunk.

6.2 Electrical and Lighting

6.2.1 General

The scope of work pertaining to the electrical systems shall include modifications to the existing 100 amp, 3-phase shore power connections. The existing electrical systems shall be disconnected and removed from the shore end of the facility.

New 100 amp, 3-phase electrical service shall be provided from the shore end of the facility to the new ferry landing float. The following items shall also be provided:

- New LED rail lighting along the new approach structure, gangway, and float boarding ramps with emergency backup power driver.
    - The WETA Standard float will be delivered to the facility with handrails furnished and installed which will have mounts for adding LED lighting.
    - Emergency egress lighting shall be provided by battery-backed emergency drivers integral to the lighting fixtures where required by code.
- Provided dedicated power circuit to Clipper card readers and gate actuators with ADA door assist button;
    - Security gates at head of approach ramp and at end of approach ramp, on dolphin 4 shall conform to the following minimum requirements:
    - Doors shall be motorized, heavy duty commercial grade, roll up style.
    - Doors shall be ADA compliant.
    - Doors shall have a means for manual opening/closing operations in the event of a loss of power.
    - Doors shall be composed of corrosion resistant materials, suitable for use in a marine environment.
    - A remote push button shall be located on dolphin 4 capable of opening/closing both doors.
    - A remote push button shall be located on the float capable of opening/closing the door on dolphin 4.

  - Both doors shall be remotely operable from either side using an AMAG access card key.
  - Remote operation of either door, at all locations, shall require AMAG card key.
  - Contractor shall submit proposed gate details to WETA for review and approval.
  - Coordinate with WETA for technical details of AMAG system as required.

- Provide two (2) navigation lights with hardwire power on corners of the WETA Standard Float;
- Provide four (4) solar powered navigation lights on the tops of the sacrificial marker piles. Color of lighting shall be blue;
- Provide overhead LED lighting compatible with the canopy columns on the float deck;
- Provide new PVC coated rigid conduit and junction boxes for electrical distribution;
- Provide convenient GFCI with weatherproof cover power outlets on float.

The Contractor shall coordinate with WETA and WETA's electrical consultant for approval of all electrical components.

6.2.2 Existing Conditions

Existing electrical service is a 100A, 120/240V,3-phase, on each side of the existing ferry landing float, plus a welding receptacle. A disconnect point is located at the head of the gangway, located at the shore end of the existing approach ramp, adjacent to the gate and labeled as "Existing Electrical Panel "B"" on sheet E-101 of the project plans. Electrical Panel "B" will serve as the connection point for the temporary ferry landing utilities and is to be relocated from the existing approach way to allow for usage at the temporary landing upon removal of the existing approach way.

The existing load center with lighting timer control has a main 100A breaker and 20-20A branch circuits feeding terminal lighting, gangway lighting, CCTV, clipper pedestals, gate access, distribution panels, etc.

The existing electrical equipment has reached the service life span and shall be replaced as part of the scope of work. The scope shall include replacement of the electrical panel "B" service panel, distribution panels, lighting control panel, and timers as well as considerations for the future float electrification project. Additionally, the PA system with local microphone input and call-in capacity is to be expanded for the larger terminal footprint.

Coordinate with WETA and WETA's Electrician Consultant.

6.2.3 Codes and Standards

The electrical installation and design shall comply with the following codes and standard codes, latest edition:

1. NFPA 72
2. National Electrical Code (NEC)
3. National Electrical Manufacturers Association (NEMA)
4. Telecommunications Industries Association (TIA)
5. Illuminating Engineering Handbook
6. National Fire Protection Association (NFPA)
7. Illuminating Engineering Society of North America (IES)
8. California Building Standards Commission
9. California Administrative Code (CAC)
10. California Code of Regulation (CCR), Title 24 Energy Regulations
11. California Building Code (CBC)
12. California Electrical Code (CEC)
13. California Fire Code (CFC)
14. City of Vallejo Electrical Code
15. City of Vallejo Building Code
16. City of Vallejo Fire Code
17. Water Emergency Transportation Agency Standards and Guidelines

6.2.4 Electrical and Lighting on Temporary Ferry Landing Float

The Contractor shall install the new WETA-standard float in the temporary landing float location to allow for un-interrupted ferry service during the duration of the work. Prior to the disconnection and removal of the existing ferry float, temporary electrical utilities shall be installed for the WETA-standard float in the temporary landing float location. This scope of work shall include the installation of temporary conduit from the relocated shoreside connection point, Panel “B”, to the temporary landing float location. New ¾” diameter schedule 40 PVC with three (3) #6, 1/10 ground (THHN, 2 circuits) shall be installed to provide power to the temporary landing float. Temporary conduit shall be installed along and attached to the existing railing.

The Contractor shall feed power to the lighting system on the temporary gangway and float as well as install a temporary power feed to the temporary float power panel. All utility work shall include coordination with all utility disconnects and connections with WETA and respective utility companies in advance of work.

6.2.5 Electrical and Lighting on New Structures

The electrical shall be upgraded to a 100 amp, 3-phase system. Spacing for future conduit shall be left along the approach way to accommodate future float electrification. Consult with WETA for electrification requirements, however the conduit is expected to consist of (12) 5" OD cables.

Approach Access Structures: The new ferry float will be accessed by a total of three (3) new approach ramps. New electrical and lighting conduit shall be run under the new approach structures. PVC coated rigid steel conduit and junction boxes, appropriate for a marine environment shall be utilized. Flexible conduit shall be installed across all moving joints. Dedicated 120-volt circuits for the clipper card readers, communications cabinet, digital signage, and access control systems. Two (2) gate controllers shall be provided. Clipper card reader units will be installed by others. Power shall also be supplied for a motor-operated gate at the head of the access ramp on the landward side of the facility, with key-card activation locally from both sides of the gate and remotely from the float and for new CCTV security cameras located to provide a full view of the facility.

LED lighting shall be integrated in the railing along the pathway to provide a minimum of 5-footcandle (FC) lighting, level along the length of the approach way floor. Lighting shall be controlled by a new electronic timer. The existing PA system with local call-in shall also be expanded to serve the new approach access structures.

Overhead lighting shall be provided which uses the canopy columns on the float deck as light posts. A canopy will not be installed on the float.

Gangway: A new gangway structure will be installed at the end of the new fixed approach to provide access to the ferry float. New continuous electrical and lighting conduit shall be installed from the approach structure with flexible conduit at the crossing between the two. Power shall also be supplied for a motor-operated gate at the top of the gangway, with key-card activation locally from both sides of the gate and remotely from the float and for new CCTV security cameras located to provide a full view of the facility.

The lighting requirements for the Gangway Access Structures shall also apply to the Gangway. The existing PA system with local call-in shall also be expanded to serve the gangway.

Float Walkway and Boarding Ramp: The new ferry landing float will utilize a WETA-Standard float, which is being procured, built, and delivered under separate contract.

New rail lighting shall be continued along the walkway and the boarding ramp for 5 FC lighting level in average. Lighting shall be controlled by the new electronic timer. A new PA system with local call-in shall be installed to serve the new float walkway and boarding ramps.

New WETA-Standard Float: On the new float structure, a total of five (5) new convenient outdoor GFCI receptacles with weatherproof covers shall be installed on each side of the new float to provide convenient power receptacles for maintenance work.

Shore power shall be provided on both sides of the central trunk providing 208 volt, 100 amp service. Considerations shall be made for generator back-up power including a transfer switch. Coordinate with WETA for potential generator specifications and requirements.

Additionally, power shall be supplied to the three (3) adjustable ramp lifting devices on the float. The devices themselves will be furnished by JT Marine as part of WETA's float procurement contract.

Power shall also be supplied for new CCTV security cameras located to provide a full view of the ferry float and for the clipper readers located on the float, at the base of the gangway. A new PA system with local call-in shall be installed to serve the WETA-standard float. Power shall also be supplied to the new ramp lifts on the WETA Standard Float.

New navigation lights with solar power shall be provided on top of the new sacrificial piles. Solar lights shall be Carmanah 650 Solar Lantern or approved equal. Color of lighting shall be coordinated with WETA.

6.3 Telecommunications

6.3.1 General

The scope of work for telecom services will consist of new radio antenna equipment, and conduit runs from the float, along the gangway and necessary connections to the adjacent WETA facilities.

6.3.2 Existing Conditions

The existing site telecommunications are served by radio antenna at the main WETA building adjacent to the project site. This existing condition is to be removed and replaced by new equipment at the project site.

6.3.3 Codes and Standards

6.3.4 Proposed Telecommunications

The scope of the new telecom equipment includes the installation of a new radio antenna at the head of the proposed gangway, installation of new public address microphones/call boxes and speakers along the approach way, installation of two (2) new Wi-Fi access points, new CCTV cameras, new TV displays, new LED scrolling signs, a communications cabinet and an access control system consisting of a main controller board for cardkey readers.

The antenna shall be installed behind the gangway's signage to obscure it from the approaching view. The new antenna shall be a Ubiquiti Wave Pro model or approved equal. The alignment and signal of the antenna shall be coordinated with WETA to ensure that the line of sight and transmission capability meets WETA's requirements.

The new public address microphones/call boxes and speakers shall be installed at locations dictated by WETA, but at a minimum, shall provide the same level of audibility as the existing system. Microphones, call box, and speaker models and quantities shall be approved by WETA.

Wi-Fi access points shall be installed on the new WETA Standard Float and at the landside end of the approach way. The final location of Wi-Fi access points shall be approved by WETA.

CCTV cameras shall be Verkada brand. Final location, quantity and camera model shall be approved by WETA. TV displays shall be Samsung PHA-S Series 55", model #OH55A-S and include a 5-year Fast Track with White Glove Service Plan. TV displays shall be installed with

pivoting arms, which allow for maintenance. Pivoting arms shall be 316 stainless steel. Location of new TV displays shall be coordinated with WETA. LED Scrolling signs shall be CDP series from Sunrise Transit. Location, size, and model number shall be coordinated with WETA.

The contractor shall be responsible for installing necessary conduits and cables for the equipment. Final locations of the communications cabinet and access control system shall be coordinated with WETA.

6.4 Plumbing

6.4.1 General

The scope of work pertaining to the plumbing systems will consist of providing piping for new potable domestic water service for supplying the vessel with potable water and wash down at the bow and stern of the ferry vessel.

6.4.2 Existing Conditions

The existing facility is served by a 2” PVC potable domestic service water line at the landward side of the approach ramp. Potable water lines run down the existing approach ramp to the existing ferry float.

6.4.3 Codes and Standards

The plumbing installation and design shall comply with the following codes and standard codes, latest edition:

1. California Building Code (CBC)
2. California Plumbing Code (CPC)
3. City of Vallejo Plumbing Code
4. City of Vallejo Building Code
5. NSF International / ANSI 61
6. Water Emergency Transportation Agency Standards and Guidelines

The potable water service at the facility is provided by the City of Vallejo. All modifications and upgrades to the water service shall follow City of Vallejo water standards.

Water lines must maintain clearances as dictated by other trades and project specifications.

Water lines shall not be located under foundations, walls or other areas where access is limited.

6.4.4 Potable Water on Temporary Ferry Landing Float

The Contractor shall install the new WETA-standard float, in the temporary landing float location to allow for un-interrupted ferry service during the duration of the work. Prior to the disconnection and removal of the existing ferry float, temporary potable water lines shall be installed for the WETA-standard float in the temporary landing float location. This scope of work shall include the installation of temporary conduit from the shoreside connection point to the temporary landing

float location. New ¾" diameter schedule 80 PVC shall be installed to provide potable water to the temporary landing float. Temporary conduit shall be installed along and attached to the existing railing.

Prior to disconnection of the existing temporary ferry landing float, the temporary water lines shall be tested by the City of Vallejo Health Department for human consumption in accordance with the City of Vallejo Requirements. All utility work shall include coordination with all utility disconnects and connections with WETA and respective utility companies in advance of work.

6.4.5 Potable Water on New Structures

The scope of the plumbing upgrades will consist of furnishing and installing piping to supply two (2) wash down areas on the bow and stern of the ferry vessel and a potable water connection for the bow of the vessel.

The wash down areas will include a hose bib at each location and be vandal-proof loose key type. Each shall include ¾" hose thread, a built-in vacuum breaker and recessed hose bib boxes with corrosion resistant covers.

The potable water shall consist of a minimum 1 ¼" diameter domestic cold-water supply line from the landward connection point to the new ferry landing float. Potable water shall connect to the existing City of Vallejo potable water line at the landward connection point and include a dedicated reduced pressure zone backflow preventer (City of Vallejo Standard) with a vandal-proof cage installed above ground for the wash down supply before any water distribution to the float to protect the potable water source. A domestic water meter (City of Vallejo Standard) shall be installed in a concrete valve box with a cover.

The potable water pipes shall be installed underneath the approach way and the gangway, supported and seismically restrained with stainless steel rigid pipe clamps. All piping shall be located to avoid submergence at any point during the tide cycle. All stainless steel shall be type 316.

The underground potable water distribution piping shall be AWWA Standard C900 Class 200 DR-14 per the city of Vallejo specifications. Piping along the side of the pier and ramps shall be type 316 stainless NPT piping. At connection points of dissimilar metals, a dieletric joint fitting shall be used. Piping within the float and at joints shall be NSF approved flexible hose.

Prior to acceptance of the work, water lines shall be tested by the City of Vallejo Health Department for human consumption in accordance with the City of Vallejo Requirements.

6.5 Fire Suppression System

6.5.1 General

The scope of work pertaining to the fire suppression systems will consist of providing new fire protection dry-pipe water service for the fire department hose connection at the ramp entrance and the new ferry landing float, as well as the associated piping.

6.5.2 Existing Conditions

The existing facility is served by a 2" PVC potable domestic service/fire suppression water line at the landward side of the approach ramp.

6.5.3 Codes and Standards

The plumbing installation and design shall comply with the following codes and standard codes, latest edition:

1. California Building Code (CBC)
2. California Fire Code (CEC)
3. NFPA 307, Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves
4. NFPA 13, Standard for the Installation of Sprinkler Systems
5. NFPA 14, Standard for the Installation of Standpipe and Hose Systems
6. Water Emergency Transportation Agency Standards and Guidelines

The potable water service at the facility is provided by the City of Vallejo. All modifications and upgrades to the water service shall follow City of Vallejo Water and Fire Suppression Standards and be approved by the City of Vallejo Fire Marshall, including any evacuation provisions requested.

6.5.4 Fire Suppression on New Structures

The scope of the fire suppression system upgrades on new structures shall consist of a new Class I standpipe and 2 ½ inch shore fire department connection. Piping shall be AWWA Standard C900 Class 200 DR-14 per the city of Vallejo specifications installed along the underside of the approach way and gangway to a new Class I standpipe and fire department connection on the new ferry float.

The shore standpipe and fire department connection is to be installed with concrete base and signage, and at accessible space and at height in accordance with NFPA 14. All piping shall be seismically designed and restrained close to the underside of the approach way and gangway with 316 stainless steel clamps, rigid hangers and seismic bracing in accordance with NFPA 13.

All piping shall be located to avoid submergence including during the tide cycle. A Class I 2 ½ inch standpipe and fire protection water supply connection are to be provided on the float near the gangway exit with accessible space and at height in accordance with NFPA 14. Flexible fire protection water service hose shall be utilized at all joints. All hoses and connectors shall be rated for the appropriate working and test pressures, including non-leakage, for fire suppression systems.

The fire department connections shall be in accordance with NFPA 14 and provided with an integral shutoff valve. The standpipe is to be rigidly mounted with 316 stainless steel channel supports and pipe clamps in accordance with NFPA 13 and NFPA 14.

Automatic sprinklers are not to be installed at the bridge, gangway or float, as the structures and substructures are non-combustible as defined in NFPA 307.

Fire suppression lines must maintain clearances as dictated by other trades and project specifications. Fire suppression lines shall not be located under foundations, walls or other areas where access is limited.

Final fire suppression plans shall be submitted to the Vallejo Fire Prevention Division for review and approval prior to system installation. Refer to City of Vallejo Development Permit PLN26-0075 for additional requirements of the Vallejo Fire Prevention Division.

6.6 Sanitary Sewer

6.6.1 General

The scope of work for sanitary sewer service shall provide a level of service that has existed at the previous dock float and the temporary dock float.

6.6.2 Existing Conditions

The gangway location and matching position of the proposed scope of work shall utilize the existing sanitary sewer lateral connection. The condition of the existing sanitary sewer lateral connection requires inspection, including televising, to determine the extent of replacement needed.

6.6.3 Proposed Sanitary Sewer

The Ferry Vessels are equipped with a Barnes Model 3SE2094L 2-HP sewage pump with a 6.5” impeller. Preliminary calculations by Foth indicate that the on-board sewage pumps have sufficient capacity to pump sewage from the Ferry Landing Float to the existing landside sanitary sewer connection.

Final design of the sanitary sewer system shall confirm that the vessel pumps are sufficient. If booster pumps are required, booster pumps shall be installed on the WETA Standard Float and shall be sized to provide sufficient pump-out from the ferry vessels to the landside connection. This utility routing shall be coordinated with the other utilities being conveyed landside. The sizing of the pumped force main and booster pumps shall be designed by the Contractor. Location and placement of pumps shall be coordinated with WETA.

The sanitary sewer piping shall consist of ductile iron pipe conforming to ANSI/AWWA C600 and the City of Vallejo standard specifications. Refer to City of Vallejo Development Permit PLN26-0075 for additional requirements of the Vallejo Flood and Wastewater District.

Determination of the extent that existing landside sanitary sewer lateral needs to be replaced shall be determined by onsite investigations. At a minimum, the sanitary sewer line shall be inspected from the proposed connection point to the nearest connecting manhole.

6.7 Site Furnishing

Site Furnishing is not in the scope of this work.

7. Structural Design Criteria

7.1 Design Loads

7.1.1 Vertical Loads

7.1.1.1 Dead Loads

The dead load of the structure is the self-weight of the structural members. In addition, the dead loads on the structure account for non-structural components such as curbs, handrails or any other equipment permanently attached to the structure. The following material unit weights shall be used in the calculations.

Table 7-1: Material Unit Weights per UFC 4-152-01

MATERIAL	UNIT WEIGHT (PCF)
Steel or Cast Steel	490
Cast Iron	450
Aluminum Alloys	175
Timber (untreated)	40 to 50
Timber (treated)	45 to 60
Concrete, reinforced (normalweight)	145 to 160
Concrete, reinforced (lightweight)	90 to 120
Compacted sand, earth, gravel, or ballast	150
Asphalt paving	135 to 150

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Reviewed by Alex I. Mora

7.1.1.2 Live Load

The dolphin platform will receive 100 pounds per square foot uniform live load surcharge, representative of pedestrian traffic loading.

Catwalks, dolphin platforms, and access stairs will be subjected to 100 pounds per square foot uniform live load surcharge.

7.1.1.3 Buoyancy Load (B)

Buoyancy load accounts for the effect of the structural element being underwater at a rate of 64 pcf.

7.1.2 Horizontal Loads

7.1.2.1 Earth Load (H)

Earth loads account for loads due to lateral earth, groundwater, or pressure of bulk material or lateral pressure from vehicles and/or equipment. There will be no earth loads applied to the proposed structures.

7.1.2.2 Mooring Load (M)

Mooring load will be applied perpendicular to the mooring piles, at designated mooring points. Mooring loads may also induce a vertical uplift component on the structure.

7.1.2.3 Berthing Load (Be)

Berthing load will be applied to the donut fender piles.

7.1.2.4 Current Load (C)

The current load will be applied to the piles. The highest recorded reference current is 2.4 knots during the ebb on 8/27/2021, per tidesnear.me. The current load is shown on the reference plans "Water Emergency Transportation Authority Passenger Float," drawings at 3.5 knots. The design current will use the higher value of 3.5 knots to determine current loading on the piles.

The mooring analysis will use a current speed of 2 knots, as prescribed by MST IIB.

7.1.2.5 Earthquake Load (EQ)

Earthquake load will be applied to the structures following the recommendations of ASCE/Structural Engineering Institute's (SEI) ASCE/SEI 7-22 and ASCE/COPRI 61-14, utilizing displacement-based methods. The Ferry Terminal is considered an "Essential" facility which requires continuation of operations after a seismic event. The performance criteria for each earthquake intensity is listed in Table 7-2, based on Table 2-1 of ASCE/COPRI 61-14.

Table 7-2: Seismic Performance Criteria

Seismic Hazard Level and Performance Criteria							
Operating level earthquake (OLE)		**Contingency level earthquake (CLE)**		**Design earthquake (DE)**		**Maximum Considered Earthquake (MCE)**	
Ground motion probability of exceedance	**Performance level**	**Ground motion probability of exceedance**	**Performance level**	**Seismic hazard level**	**Performance level**	**Ground motion probability of exceedance**	**Performance level**
50% in 50 years (72-year return period)	Remains Elastic	10% in 50 years (475-year return period)	Minimum Damage	2/3 MCE Developed according to ASCE 7	Minimal Damage	2% in 50 years (2475-year return period).	Controlled and repairable damage

7.1.2.5.1 Operating Level Earthquake (OLE)

The Operating Level Earthquake has a ground motion probability of exceedance of 50% in 50 years, or a return period of 72 years. Therefore the OLE can be expected to occur at least one or more times during the design life of the Ferry Terminal. Ground Motion parameters shall be developed for the OLE using one of the prescribed probabilistic seismic hazard analysis methods provided in ASCE/COPRI 61-14, Section 4.3.2.

The performance level for the Ferry Terminal structures under the OLE are to remain elastic.

7.1.2.5.2 Contingency Level Earthquake (CLE)

The Contingency Level Earthquake has a ground motion probability of exceedance of 10% in 50 years, or a return period of 475 years. Ground Motion parameters shall be developed for the CLE using one of the prescribed probabilistic seismic hazard analysis methods provided in ASCE/COPRI 61-14, Section 4.3.2.

The performance level for the Ferry Terminal structures under the CLE are to withstand Minimal Damage per ASCE 61-14. A structure is classified as having achieved “Minimal Damage” when it exhibits near-elastic structural response with minor or no residual deformation, there is no loss of serviceability of the structure, and there is no loss of containment of materials in a manner that would pose a public hazard.

7.1.2.5.3 Design Earthquake (DE)

The Design Earthquake will be based on 2/3 of the Maximum Considered Earthquake, further defined in Section 7.1.2.5.4.

The performance level for the Ferry Terminal structures under the DE are to withstand Minimal Damage per ASCE 61-14.

7.1.2.5.4 Maximum Considered Earthquake (MCE)

The Maximum Considered Earthquake has a ground motion probability of exceedance of 2% in 50 years, or a return period of 2475 years, with an empirical cap. The MCE shall be developed according to the procedures prescribed in ASCE 7.

The performance criteria for the Ferry Terminal structures under the MCE are to withstand “Controlled and Repairable Damage per ASCE 61-14. A structure is classified as having achieved “controlled and repairable damage” when the structure response in a controlled and ductile manner, experiencing limited inelastic deformations at locations where repair is possible, the required repairs result in a loss of serviceability for no more than several months, and there is no loss of containment of materials in a manner that would pose a public hazard.

7.1.2.5.5 Strain Limits

The maximum plastic hinge zone strains for the OLE, CLE, DE, and MCE events shall be calculated per Section 6.6.3 of ASCE/COPRI 61-14 using the moment-curvature methods described in conjunction with the plastic hinge lengths provided in Table 6.1 of ASCE/COPRI 61-14 and compared to the maximum strain limits per the performance level.

7.1.2.5.6 Lateral Loadings for Soil-Structure Interaction

The Ferry Terminal structures shall be designed for inertial loading and kinematic loading caused by lateral ground deformations as prescribed by ASCE/COPRI 61-14. The preliminary geotechnical report, prepared by Miller Pacific indicates that there are several liquefiable sandy soil layers of various thickness within the Bay Mud Layer. Liquefaction risks will be mitigated by installing the piles through the Bay Mud layer to bearing on sound rock.

7.1.3 Wind or Wave Load (W)

Wind and wave load will be applied to the structures in accordance with load combinations prescribed by UFC 4-152-01.

7.1.4 Creep/Rib Shortening, Shrinkage, Temperature (RST)

The effects of thermal forces due to fluctuations in temperature shall be considered. The temperature range for the site shall be determined in accordance with AASHTO Standard Specifications for Highway Bridges.

7.1.5 Ice Load (ICE)

Ice floes at this site will not be considered.

7.2 Load Combinations

Load combination shall comply with Unified Facilities Criteria (UFC), Design: Piers and Wharves, UFC 4-152-01, dated 24 January 2017.

Table 7-2: LRFD Load Combinations Per UFC 4-152-01

	U0	U1	U2	U3	U4	U5	U6	U7	U8	U9
D[a]	1.4	1.2	1.2	1.2	1.2	1.2	1.0+k	1.0-k	1.2	1.2
(Lc+l)|Lu	-	1.6[b]	-	1.6[b]	-	1.6[b]	0.1	-	1.6[b]	1.0
B	1.4	1.2	1.2	1.2	1.2	1.2	1.2	0.9	1.2	1.2
Be	-	-	1.6[c]	-	-	-	-	-	-	-
C	-	-	1.2	1.2	1.2	1.2	-	-	-	1.2
H[d]	-	1.6	1.6	1.6	1.6	1.6	1.0	1.0	1.6	1.6
Eq	-	-	-	-	-	-	1.0	1.0	-	-
W	-	-	-	-	1.0	-	-	-	-	1.0
M	-	-	-	-	-	1.6	-	-	-	-
R+S+T	-	-	-	1.2	-	-	-	-	-	-
Ice		-	-	0.5	-	-	-	-	1.0	1.0

Source: Unified Facilities Criteria (UFC), 2017. *Piers and Wharves* (UFC-4-152-01), Change 1, Table 3-7, "Load Combinations – Load and Resistance Factor Design (LRFD)." 28 August 2024.

Table 7-3: Service Load Combinations Per UFC 4-152-01

	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
D[a]	1.0	1.0	1.0	1.0	1.0	1.0	1+k'	1-k'	1.0	1.0
(Lc+l)|Lu	-	1.0	-	1.0	-	1.0	0.1	-	1.0	0.75
B	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.6	1.0	1.0
Be	-	-	1.0	-	-	-	-	-	-	-
C	-	-	1.0	1.0	1.0	1.0	-	-	1.0	1.0
H[d]	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Eq	-	-	-	-	-	-	0.7	0.7	-	-
W	-	-	-	-	0.6	-	-	-	-	0.6
M	-	-	-	-	-	1.0	-	-	-	-
R+S+T	-	-	-	1.0	-	-	-	-	-	-
Ice	-	-	-	0.2	-	-	-	-	0.7	0.7

Source: Unified Facilities Criteria (UFC), 2017. *Piers and Wharves* (UFC-4-152-01), Change 1, Table 3-8, "Load Combinations – Allowable Stress Design (ASD)." 28 August 2024.

7.3 Corrosion Protection

7.3.1 Protective Coating

Steel members shall be coated with a marine grade epoxy coating, such as Bar Rust 235, to a minimum dry film thickness of 15 mils or as specified by product manufacturers.

7.3.2 Sacrificial Steel

The structural members shall be designed to have a minimum sacrificial steel thickness of 0.125-inch to allow the structure to have a demand/capacity ratio of 0.9 at the end of 50 years.

The corrosion rate for the steel materials comes from Caltrans *Corrosion Guidelines* Version 3.2 2021:

Soil Embedded Zone – 1 mil/year
Atmospheric Zone – 2 mil/year
Immersed Zone – 4 mil/year
Splash Zone – 6 mil/year

The corrosion rate for this structure would be 6 mils per year (mils/year or MPY) for exposure to seawater in temperate climate in the zone of high attack (low water and splash zones) and 4 mils/year for exposure to seawater in temperate climate in the zone of permanent immersion or in the intertidal zone.

7.3.3 Cathodic Protection

Cathodic protection system for steel structures is recommended to be installed at the end of the service life of the protective coating. To facilitate installation of future anodes, all steel pipe piles shall be fitted with brackets to accommodate bolt-on anodes, welded to the piles prior to installation. Brackets shall be located to be positioned above the mudline and remain fully submerged throughout the tide cycle.

7.3.4 Concrete Durability Requirements

Foth will design waterfront concrete structures in compliance with ACI 318 Design and Durability Requirements to account for the exposure to aggressive environments it will be subjected to and extend its service life.

8. Terminal Operations Requirements

8.1 Approach Way

- The approach way shall be fabricated from structural aluminum sections (aluminum) and conform to the spans and dimensions shown on the project plans.
- The top walking surface of the approach way shall be + 9.68' MLLW.
- The approach way shall be level from the landward end to Dolphin 4.
- The walking surface for the approach way shall be slip resistant fiberglass micromesh decking.
- Handrails along the approach way shall be aluminum pipe and conform to ADA requirements.
- Long term deflection of the aluminum approach way floor framing shall be limited to L/360 and shall include all deflection due to the effects of creep and shrinkage, including the weight of all accessories, utilities, and non-structural components.
- The approach way shall be ADA compliant with the following standards:
    - Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1196, Passenger Vessels Accessibility Guidelines, 2013.
- The approach way shall have an aluminum canopy to provide protection from the elements for queuing passengers.

8.2 Gangway

- The gangway shall be fabricated from structural aluminum sections (aluminum) and conform to the spans and dimensions shown on the project plans. The gangway shall be supplied by Topper Industries Inc. or by an equally qualified supplier.
- The walking surface for the gangway shall be slip resistant fiberglass micromesh decking.
- The gangway shall be ADA compliant with the following standards:
    - Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1196, Passenger Vessels Accessibility Guidelines, 2013.
        - Maximum gangway slope shall not exceed 1H:20V between MLLW and MHHW tidal elevations.
- The gangway shall have an aluminum canopy to provide protection from the elements for queuing passengers.

8.3 WETA Standard Float

8.3.1 General

The float to be utilized for the new ferry landing float at the Vallejo Ferry Terminal will be a modified version of the WETA Universal Charging Float (UCF) fabricated and delivered to the site by others. This float will also be used to support the temporary landing facility during the construction phase of the project, located on the south side of the Vallejo Ferry Terminal and shown on the project plans. A canopy on the WETA standard float is not included in the scope of work.

The WETA standard float is 135’ long x 42’ wide, as shown on the Float Plans included in Volume 3 – Technical Reference Documents. For a breakdown on the responsibilities regarding the float between the shipyard and the VFT Design-Builder, see the Gap Analysis Memorandum in Volume 3.

8.3.2 Sequence of Work

The scope and general sequence of work for the WETA standard float are below:

1. Coordination with WETA for delivery of the new WETA Standard Float. Upon receipt of the float at the Vallejo Ferry Terminal, conduct a joint inspection by the Contractor, the Port of San Francisco, and WETA of the condition of the new WETA Standard Float.

2. Installation and removal of temporary electrical and data services at the Vallejo Ferry Terminal, in preparation of installation of the WETA Standard Float at the temporary landing location.

3. Complete installation of the gangway support dolphin at the temporary landing location including all pile driving and work required for the landing to support the 10x90' gangway including the pile cap and gangway hinge and plate.

4. The existing railing at the new temporary landing location will require modifications to allow for passenger access. Upon completion of modifications the Contractor shall install the WETA provided portable promenade railings and gates.

5. Installation of new 10-foot wide x 90-foot long gangway.

6. Contractor shall coordinate with WETA to retrieve the six (6) WETA-supplied 24” diameter × 80’ long temporary steel pipe piles from WETA possession at CS Marine Constructor’s Inc. yard at Mare Island Berth 19 in Vallejo, CA.

7. Required pile driving of the six (6) WETA-supplied piles to secure the WETA Standard Float at the temporary landing location. The WETA Standard Float will be furnished by JT Marine with shim-packs to accept the 24” diameter temporary steel pipe piles.

8. Complete installation of the temporary portal and gate assembly, railing structures, transfer spans, plates, et cetera to complete the shore to temporary gangway to temporary float connections.

9. Utilities shall be installed at the temporary location in accordance with Section 6 and the Project Plans and Specifications.

10. Float shall be ballasted in accordance with the As-built plans to be provided by JT Marine.

11. Coordinate with WETA for inspection of WETA Standard Float at the temporary landing location readiness to be placed into service and transfer ferry operations from the permanent gangway to the temporary gangway. Obtain WETA authorization to begin Work on removal of permanent boarding facility before dismantling.

12. After WETA approval of temporary boarding facility, disconnect and cap all existing utility lines between existing permanent boarding gangway and float.

13. Upon completion the installation of the new approach way structures, the WETA Standard Float shall be removed from the temporary location and transferred to the new permanent float location.

14. Transport and relocation of the six (6) WETA-supplied temporary steel piles to WETA's possession at CS Marine Constructor's Inc. yard at Mare Island Berth 19 in Vallejo, CA. The shim packs on the pile guides shall be removed and be transferred to WETA for future use.

15. Install all new utilities in accordance with Section 6 and the Project Plans and Specifications.

16. Prior to commencement of ferry landings at the new location for the WETA Standard Float, conduct a joint inspection by the Contractor and WETA to obtain approval of the WETA Standard Float. Test landings shall be conducted as part of these inspections.

8.3.3 Float Fenders

The new WETA standard float will be delivered with fendering furnished and installed.

8.3.4 Mooring Fittings

The new WETA standard float will be delivered with mooring fittings furnished and installed.

8.3.5 Gangway Landing Platform

The Contractor shall design, furnish, and install the gangway support structures which will be mounted to the WETA Standard Float. This structure shall be designed to attach to the landing rails installed on the WETA Standard Float and will require coordination with WETA and their float supplier. All communications shall be addressed to WETA as the primary point of contact.

8.3.6 Walkways/Ramps

The new WETA Standard Float will be delivered with walkways and ramps furnished and installed.

8.3.7 Steel Pipe Piles

Steel pipe piles will be used to anchor the Ferry Barge, for the donut fenders and to support the approach system.

Steel pipe piles will be driven to a minimum capacity and embedded length as indicated on the contract drawings; whichever is greater.

At a minimum, the piles shall be designed for the following forces:

- Approach Way Piles (Vertical Load):
  - 2-Pile Bent: Service Load = 300 kip Ultimate Load = 900 kip
  - 4-Pile Bent: Service Load = 400 kip Ultimate Load = 1,200 kip
- Float Anchor Piles:
  - 80 kips Maximum Lateral Load

Steel pipe piles exterior surface shall be coated down to 10 feet below mudline. All pipe pile fabrication welds must be ground smooth prior coating.

Coating for pipe piles shall consist of Bar-Rust 235 Multi-Purpose Epoxy Coating as manufactured by Devoe Coatings with a minimum dry-film thickness of 15 mils. This coating is expected to last a minimum of 10 years in service.

The steel piles must be designed using the following corrosion rates (Corrosion rates from Caltrans Corrosion Guidelines Version 3.2 2021):

Soil Embedded Zone – 1 mil/year
Atmospheric Zone – 2 mil/year
Immersed Zone – 4 mil/year
Splash Zone – 6 mil/year

Anode studs will be welded to the pipe piles for future anode installation. The anodes themselves will be installed by others at a later date after the coating life expectancy is reached.

Foth recommends the use of a steel plate to cap the piles at top. The pipe pile cap plate should be flush with the pipe surface and welded to the pipe pile. Welds shall be cleaned and coated. Foth recommends the use of round fiberglass caps with a minimum thickness of 1/8” wall to fit the 36” diameter guide piles and donut fender piles, in addition to the steel pile cap plate.

8.3.8 Donut Fenders

Donut Fenders are placed strategically to protect the Ferry Barge. The donut fenders will be mounted to steel piles sized for the abnormal berthing energy reaction.

The donut fender will comply with the following:

- Type – Foam Filled Donut
- Fender Size – 8.2 ft
- Pile Diameter – 36 inches
- Energy – 6.3 ft-kip per foot
- Reaction – 15.7 kip per foot
- Minimum contact length – 5 feet

The donut fender must be free to rotate and displace vertically along the pipe pile to accommodate the tidal range.

8.4 Canopies

The approach way and gangway shall be provided with aluminum truss canopies to match the existing canopies at the Vallejo Ferry Terminal in style, construction, and color. Color of canopies

shall be blue to match standard WETA canopy scheme. Final color samples shall be submitted to WETA for approval.

Canopies will not be installed on the WETA Standard Float.

Canopies shall be designed to support the Roof Live Loads and Wind Loads prescribed by ASCE/SEI 7-22.

9. Construction Materials

9.1 Concrete

Concrete shall have a compressive strength of 5000 pounds per square inch at 28 days as specified in Volume 2 of the RFP Documents.

9.2 Reinforcing Steel

Reinforcing steel shall conform to ASTM Standard (ASTM) A615 grade 60 and shall be fusion-bonded epoxy-coated in accordance with ASTM A775.

9.3 Structural Steel

9.3.1 Structural Steel Sections

Structural steel sections shall comply with ASTM A572 Grade 50.

9.3.2 Steel Pipe Piles

Steel pipe piles shall comply with ASTM A252 Grade 3 (modified for 60 ksi yield).

9.4 Aluminum Alloy

Standard structural profiles shall comply with ASTM B308 and shall be Alloy type 6061-T6 or 6063-T6.

Bars, Rods, Wires, Profiles and Tubes shall comply with ASTM B221 and shall be Alloy type 6061-T6 or 6063-T6.

Structural Pipe and Tubes shall comply with ASTM B429 and shall be Alloy type 6061-T6 or 6063-T6.

Fabrication shall be in accordance with the AA specifications for aluminum structures. Welding shall conform to the AWS using filler alloy 5356. Prequalified welding procedures shall conform to ANSI/AWS D1.2 and ANSI/AWS D1.1.

9.5 Composite Piles

Composite piles shall be manufactured by Tangent or Trelleborg or approved equal.

Piles shall include certification that the material was produced in accordance with the manufacturer's Quality Control Plan in an ISO 9001 compliant manufacturing facility.

Material certification indicating that all material properties have been characterized in accordance with ASTM D7290.

Material certification indicating that the material being received by the Contractor is in accordance with the geometric and material requirements outlined in the Contract Documents.

Composite piles shall be designed to withstand impact from the design vessels and shall be positioned offset from the gangway to allow for deflection during impact.

10. Constructability

10.1 Site Access

The Contractor shall coordinate access to the work site with WETA. All work is to be staged from the Contractor's floating barge.

If an upland staging, parking, or laydown area is required, for execution of the project, the Contractor shall be responsible for securing permission, including all required permits, temporary licenses, etc. from the City of Vallejo and any other affected property owners or agencies. One potential location which may be available is the parking area located along Mare Island Way between Georgia Street and Capitol Street. Availability of this area is not guaranteed and shall be independently verified by the Contractor.

10.2 Site Utilization Plan

The contractor shall provide a site utilization plan to WETA for review and acceptance.

The contractor shall comply with WETA's rules and regulations while onsite at the facility.

11. Regulatory Compliance

WETA has secured environmental permits for the project from the following agencies:

- San Francisco Bay Conservation and Development Commission (BCDC)
  - Pending
- California Department of Fish and Wildlife (CDFW)
- City of Vallejo
- National Marine Fisheries Service
- San Francisco Bay Regional Water Quality Control Board (RWQCB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service

These permits are included in Volume 4 of the RFP Bridging Documents. The VFT Reconfiguration contractor shall review and become familiar with all permits and shall be responsible for compliance with all regulatory requirements including but not limited to those identified in the Permit Requirement Summary Table which is also included in Volume 4. The Contractor shall incorporate all permit requirements into the final design and construction of the Work and shall be responsible for obtaining any additional permits, approvals, licenses, or authorizations required for its means, methods, staging, sequencing, and construction operations.