I. ELEMENTS OF THE OPTIONAL CLEARWATER BEACH WATER TAXI /FERRY LANDING include the following:

A. Concrete Floating Docks with guide piles
B. Mooring Piles
C. Aluminum Gangway(s) and/or fixed pile supported ramp(s)
D. Safety Ladders and Life rings
E. Canopies/coverings docks, gangways and ramps for passenger protection against inclement weather
F. Metered electric and metered water at each berth
G. Cable and Wi-Fi capabilities at each berth
H. Security access gates, lighting and signage
I. Upland utilities servicing the water taxi /ferry landing
J. Upland improvements including cover queueing/ticketing area

II. CODES AND DESIGN STANDARDS

All project design documentation to comply with all applicable local, state and federal regulations. The technical references listed below is a minimum partial list of references and must be supplemented with other references applicable to the type of work to be designed and constructed under this project.

A. Codes

1. 29 CFR 1917 – Marine Terminals
2. 36 CFR Part 1192 - Americans With Disabilities Act (ADA) Accessibility Guidelines for Transportation Vehicles
3. IBC 2018 International Building Code
4. FBC 2020 International Code Council, Florida Building Code (7th Edition)

B. Standards

1. ACI Applicable Publications by American Concrete Institute
2. AISC American Institute of Steel Construction
3. ASCE Manual No. 50 American Society of Civil Engineers Planning and Design Guidelines for Small Craft Harbors, ASCE Manual and Reports on Engineering Practice No. 50
4. ASCE 7-16 American Society of Civil Engineers Minimum Design Loads for Buildings and Other Construction (2016 Edition)
5. PCI Precast Concrete Institute

C. Unified Facilities Criteria (UFC)

1. UFC 4-152-07 Design Small Craft Berthing Facilities, Change 1

D. Engineer Manuals (EM)

1. EM 1110-2-1100 U.S. Army Corps of Engineers Coastal Engineering Manual (CEM)

III. STRUCTURAL DESIGN CRITERIA

A. Design Vessel: Design water taxi/ferry docks to accommodate two (2) vessels simultaneously with the following characteristics:

Length overall: 54 feet
Beam: 17 feet.
Maximum Draft: 3.8 feet
Displacement = 55 tons.(fully laden)
Freeboard = 2.6 to 2.8ft. Light 2.9 to 3.2ft Laden
Maximum number of passengers; 49

The Engineer of Record (EOR) is responsible for the vessel layout and calculation of berthing energy and mooring forces in accordance with ASCE Manual 50 and specifying appropriate mooring and berthing hardware (i.e. cleats, fenders, rubs-strips, etc.) that do not cause damage to the design vessel(s) or dock structures during either Service or Extreme loading conditions.

B. Design Life: The design life of all the structural concrete, precast concrete, precast piling and steel components of the structures must be a minimum of 50 years. The design life must ensure continued use of the structural component with no reduction of strength, function and use during design life. The design life of fender rub strips must be a minimum of 25 years prior to the need for reconditioning or replacement. For submerged steel elements, if used, a cathodic protection system with a minimum useful life of 20 years must be installed.

C. Design Loads: Loads listed below are the minimum design loads and may be increased by the EOR as deemed necessary to ensure continued use and function of the facility or to provide adequate strength to support construction loads. If a load is not specifically noted below, use minimum design loads listed in ASCE 7-16:

1. Live Loads:

a) Floating piers and gangway = 100 psf or a 400 lb concentrated load applied over a six inch by six-inch area anywhere on the dock.

2. Wind Loads:

b) Minimum Wind Speed on structures (without vessel at berth) per FBC

c) Exposure Category C

d) Wind Borne Debris requirements per the FBC.

e) Maximum wind speed on structures including vessels at berth) = 50 knots but not less than 15 psf.

2. Berthing and Mooring Loads:

a) Determine Berthing and Mooring Loads in accordance with ASCE Manual No. 50. Design floating dock, guide piles and fender systems for berthing and mooring loads based on the design vessel.

3. Wave and Current Loads

a) Wave loads and hydrostatic forces on piers and pile-supported structures must be in accordance with ASCE Manual No. 50.

D. Design Elevations

1. Design the gangways, docks, platforms, brows, and utility connections to accommodate a tidal range from extreme astronomical low tide to extreme astronomical high tide + 2.5 feet which includes a 1.5-foot allowance for sea level rise (SLR). Design the guide piles and gangways to accommodate the docks floating at the FEMA 100-year flood level plus a 1.5-foot allowance for SLR over the facilities design life.

IV. STRUCTURAL SYSTEMS CHARACTERISTICS

A. Floating Docks

1. Provide a system of precast concrete floating pier modules either held together by structural wales or posttensioning bars/cables complying with design guidance provided in UFGS 35 51 13.00 20 Concrete Floating Pier for Small Craft design requirements. Docks must be anchored by guide piles as specified elsewhere. All waterfront fasteners, cleats and cleat fasteners must be 18-8 austenitic stainless-steel type 316 (or equal) and assemblies must be of compatible material or properly insulated otherwise.

2. Docks must have a minimum 4’-0” clear distance between the edge of walking surface to any obstruction of the walking path (e.g. pile guides, shore-power / life-safety equipment, etc.) and an overall width not less than 8’-0”. Freeboard under dead load must not be less than 2’-6” nor less than 20” under maximum allowable live load.

3. Design docks outfitted with a vessel landing brow at passenger embarkment points to allow final adjustment of brow to match vessel freeboard with step and meeting ADA requirements. Brow must be raised or lowered with an electric motor/hydraulic pistons allowing manual hand adjustment

4. Service loading conditions must consider the worst-case loading of dead load, live load, berthing, wind, and wave on dock/vessel for design. Extreme loading must consider a worst-case loading effect of dead load plus wind/wave

on dock with live and vessel load excluded.

B. Gangways/Ramps

1. Provide prefabricated aluminum (6061-T6) gangway/ramps conforming to the requirements of UFGS 35 51 13.00 20 complete with handrails, rollers, mounting brackets, transition plates, and utility carriages with the following requirements:

a) minimum walking width: 60 inches clear

b) decking material: high-grip, open grating or plank

c) hinges that permit lateral movement of lower end of gangway when floating docks movelaterally without unduly stressing hinges.

d) equipped with safety restraint chains at both end to prevent collapse in event of hinge failure or excessive wheel lateral movement

2. Slope and Length may not exceed ADA requirements under the design water levels specified.

C. Existing Seawall

1. The gangway(s) and/or fixed ramps may be designed as structures independent of the existing seawall. Alternatively, the design may include utilization of the seawall for structural support. If the existing seawall is used for structural support, evaluate the condition of the seawall and design improvements accordingly. The EOR must determine modifications and repairs to the seawall in accordance with the Structural Design Criteria herein.

D. Fender System:

1. Provide rubber fenders along the outboard exposed faces of surfaces exposed to vessel impact. Design fender systems for the mooring and berthing loads of the design vessel.

E. Mooring Hardware

1. Provide a minimum of four 15-inch cleats equally spaced along each slip. Cleats and anchorage must be adequate to moor the design vessels at the piers at 125 miles per hour winds with only two cleats, one at each end of the boat.

F. Waterfront Utilities

1. Equip each berth with one power pedestal designed to accommodate the electrical service including outlets for charging of hybrid or all electronic ferries, and cable/wifi for the design vessel and to include hose bibb, one life ring and one safety ladder.

G. Exterior Lighting

1. Provide overhead floodlights for illumination. Design lighting in accordance with FBC.

H. Security Gates, Fencing and Signage

1. Provide security fencing and gates to prevent access to the docks when not

in use.

2. Provide signage to identify the ferry landing from the shore, as well as directional signage for queueing, exit routes and other signs to provide wayfinding for ferry passengers.

v. ACCEPTABLE MATERIALS AND REQUIREMENTS FOR STRUCTURAL COMPONENTS

A. Materials: The following materials are preapproved for use in the design and construction of the facility. The EOR may select alternative materials for final construction with written approval from the City.

1. Guide Piles for floating docks and Bearing Piles for gangways and fixed ramps: Prestressed concrete or steel pipe piles. Timber piles are not permitted. Equip guide piles with UHMWPE rubbing stripes for the full travel length of the guide fastened with stainless steel Type 316 counter sunk mounting hardware.

2. Mooring Piles: Concrete or composite FRP piles. Timber piles may not be used. Equip mooring piles with UHMWPE rubbing stripe.

3. Concrete. Provide crack control for concrete elements to minimize corrosion of reinforcing in accordance with ACI 350.

4. Deck: Provide slip-resistant finished surface.

5. Fenders: D shaped extruded rubber fenders on edges and corners of floating docks .

6. Mooring Fittings: Galvanized or stainless-steel cleats.

7. Fasteners to attach components: Type 316 Stainless steel including all inserts, washer, and fasteners in concrete exposed to marine environment.

8. Inserts, Bolts, and Washers: If not exposed to marine environment, but exposed to view, must be galvanized. Bolts and washers that are not exposed to marine environment, and not exposed to view, may be uncoated. .

9. Corrosion Protection System: Provide galvanic system corrosion protection for all steel piles used.

10. Steel Piles Corrosion Coating System: Inorganic zinc (4 to 5 mil thick) shop coating system from 5 feet below mudline to top of piles. Provide pile wrap protection or jacket system around steel piles within the splash and tidal zones. Extend wrap protection 5 feet below MLLW. For guide piles a rigid jacket must be provided beneath rub strips noted above.