The Utility systems included as part of this Sub-Phase Application 2 are consistent with previous entitlement documents and the Treasure Island/Yerba Buena Island Master Utility Plans, which are currently being reviewed by applicable City Agencies. The Utilities section of this Sub-Phase Application 2 includes 50% Construction Documents for all Utilities on Yerba Buena Island. Further information regarding phasing and interim utility improvements will be provided as part of subsequent improvement plan submittals.
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5.1 STORMWATER TREATMENT

All watershed areas will include centralized treatment areas where a single treatment feature treats storm water from the entire watershed including private parcels, city rights-of-way and TICD controlled property. The Marina Plaza, Cultural Park and the Ferry Plaza will provide private on-site treatment areas. Private vertical development and TIDA controlled property will not be required to implement any storm water treatment measures on their parcels because the storm water treatment is provided in designated off-parcel centralized treatment areas as approved by the SFPUC.

Storm drainage outfall C on Treasure Island will have treatment areas located in an area upstream and adjacent to the outfall. Centralized storm water treatment areas shown are conceptual only and will be further documented in the Project’s Preliminary and Final Storm Water Control Plans. The Preliminary Stormwater Control Plan is included in this application as Appendix G.

The centralized treatment facilities will consist of a “treatment train” strategy in an urban park setting. The treatment train will consist of a swirl separator, a forebay, a vegetated swale, extended detention, and dispersed biotreatment areas. Landscaping will be selected for stormwater treatment, biological habitat benefits and aesthetics, while providing screening of the structural elements (primarily, the pump discharge location and the bioretention outlet structure).
### 5.2 STORM DRAIN

The proposed storm drain mains will be located in the street right-of-way except for the storm drain outfalls that pass through the parks and open spaces.

Existing storm drain mains will be demolished and removed as needed with Sub-Phases 1B, 1C and 1E. New outfalls will be constructed for the storm drain system for Sub-Phases 1B, 1C and 1E. Existing outfalls will be reconstructed as part of the shoreline protection.

The existing Job Corps stormwater system crosses their property line at several locations along their western and southern property line and connects to the existing TI system. The Project will coordinate with the Job Corps and re-connect their system at one location along Avenue C. The Project will then provide one of the following two alternatives for connecting the Job Corps stormwater system to the existing outfall along the western shoreline that currently serves the Job Corps site:

1. Install a new gravity line from the Job Corps connection point on Avenue C to the existing outfall. Installation of a stormwater lift station would be required to pump the drainage into the gravity line. The gravity line would be sized to match the existing drainage conditions on the Job Corps campus.
2. Install a new pump station at the connection point and provide a dedicated force main to a new San Francisco Bay Outfall. The pump station and force main would be designed to match the existing drainage conditions on the Job Corps campus.

Shared public ways are public streets which are designed as walking corridors with minimal vehicular traffic. The proposed storm drain lines through the shared public ways will only convey local drainage to storm drain mains located on the other public streets. No storm drain mains will convey drainage through the shared public ways.

Treatment pump stations will be provided during Sub-Phases 1B, 1C and 1E at:
- Clipper Cove and Avenue C,
- At the west end of 5th Street in Cityside Park.

Treatment pump stations will pump pre-treatment stormwater flows to centralized bioretention areas located in the open space areas.

The following location will require a storm drain easement:
- 4th Street between the Shared Public Way and Palm Drive. This portion of 4th Street will be private until dedicated to PUC.
- West end of 5th Street in Cityside Park towards the outfall (Outfall C)
- West end of Treasure Island Road and the Ferry Plaza toward the outfall (Outfall A)

Proposed Changes to the 2011 Infrastructure Plan

- Section 12.3.1 – Treasure Island Stormwater Treatment Areas
  - The stormwater treatment areas have been updated per the Master Utility Plans.
- Figure 12.1. 4 – Proposed Stormwater Collection System
  - The system layout and stormwater treatment areas have been updated per the Master Utility Plans.
STORM DRAIN

FIGURE 5.2     SUB-PHASE STORM DRAIN

LEGEND

Centralized Treatment Site
Existing Storm Drain
Proposed Storm Drain
Proposed Force Main (Job Corps)
Proposed Pump Station (Job Corps)
Connection Point
Sub-phase Boundary

SUB-PHASE APPLICATION 2: SUB-PHASES 1B, 1C & 1E
The proposed sanitary sewer (SS) system will serve the sewer demands for the development. The existing SS mains and laterals within Sub-Phases 1B, 1C and 1E will be demolished.

The proposed SS system will allow for connection of select existing sewer facilities at the following locations:

- Connect to existing lateral from Island Center parcel in proposed California Avenue
- Connect to existing lateral from Building B1 in proposed California Avenue
- Connect to existing lateral from Job Corps in proposed Avenue F

Proposed lift stations will be located at the following locations:

- Intersection of proposed Cityside Avenue and proposed 5th Street

Proposed pump stations will be located at the following locations:

- In proposed 4th Street at the northeast area of the existing Chapel

An interim sewer force main will connect to the Sub-Phase force main on California Avenue and Avenue C and will be routed to the Wastewater Treatment Facility.

The following location will require an easement:

- 4th Street between the Shared Public Way and Palm Drive. This portion of 4th Street will be private until dedicated to PUC.

Proposed Changes to the 2011 Infrastructure Plan

- Section 10.2.2.2 – Wastewater System Design Criteria
  - The design criteria has been updated based on requests from the SFPUC
    - Velocity: Wastewater system velocity will be 2 feet per second during average dry weather flows.
    - Minimum Depth of Cover: Minimum depth of cover shall be 5 feet.

- Section 10.5
  - The proposed Sub-Phases 1B, 1C and 1E development will not utilize the existing Navy sewer system. A new interim force main will be constructed out to existing waste water treatment plant that will serve the proposed development.
  - The SFPUC will not be responsible for the existing Navy water mains that will remain after Sub-Phases 1B, 1C and 1E. TICD will coordinate with TIDA to determine what studies, if any, are required for the existing condition assessment of the existing water mains.

- Section 10.3 and Section 11.2.1 – Wastewater Treatment Wetlands
  - There are currently no plans to utilize wastewater treatment wetlands.

- Figure 10.1 – Proposed Wastewater Collection Systems
  - Based on continued conversations with SFPUC, the sanitary sewer system and pump station layouts have been updated per the Master Utility Plans.
SANITARY SEWER

FIGURE 5.3  SUB-PHASE SANITARY SEWER

LEGEND
- Existing Sanitary Sewer
- Proposed Sanitary Sewer
- Interim Sanitary Sewer Force Main
- Proposed Force Main
- Proposed Lift Station
- Proposed Pump Station
- Connection Point
- Sub-phase Boundary

SUB-PHASE APPLICATION 2: SUB-PHASES 1B, 1C & 1E

TO TREATMENT PLANT
5.4 LOW PRESSURE WATER

The proposed low pressure water (LPW) system will serve the potable water demands and the fire flow demands for the development. LPW includes water tanks on YBI for service and fire protection on TI & YBI, and pumping facilities to serve YBI.

The existing LPW mains within Sub-Phases 1B, 1C and 1E will be demolished. A new private water main will be constructed on Job Corps property to continue water service for the existing buildings during construction and development of Treasure Island.

LPW facilities will be located within public right-of-way to allow for access and maintenance of facilities unless an alternative design is approved by SFPUC under the Subdivision Regulations for Treasure Island and Yerba Buena Island. In every location where a SFPUC low pressure water main is located outside the public right-of-way, an easement will be dedicated for that low pressure water main. The SFPUC will only consent to such water main easement if the SFPUC determines that the proposed alignment and easement are appropriate based on the SFPUC policy.

The following locations will require an easement:

- 4th Street between the Shared Public Way and Palm Drive. This portion of 4th Street will be private until dedicated to PUC.

The proposed LPW system will allow for the connection of the existing LPW system at the following locations:

- Connect to the existing main on California Avenue and Avenue C
- Connect to the existing main on Clipper Cove and Avenue C
- Connect to the existing main on 6th Street and Cityside Avenue
- Connect to existing water lateral that provides water service to existing building B1 and Chapel

Connection of existing water system to the new LPW system will include meters and backflow devices.

Proposed Changes to the 2011 Infrastructure Plan

- Section 9.2.2.2 – Emergency Water Supply
  - The PUC had determined they do not need an emergency water supply from EBMUD and has removed the secondary line from the project.

- Section 9.2.3 – Proposed Potable Water Storage
  - The locations and configuration of the water storage tanks have been modified in coordination with the SFPUC due to seismic concerns at the existing water tank location on Macalla Road and separating the larger tank into three tanks for maintenance purposes.

- Section 9.5 – Phases for Potable Water System Construction
  - The current plan is to build the new development water storage tanks before Sub-Phases 1B, 1C and 1E development is complete.
  - The SFPUC will not be responsible for the existing Navy water mains that will remain after Sub-Phase 1B, 1C and 1E. TICD will coordinate with TIDA to determine what studies, if any, are required for the existing condition assessment of the existing water mains.

- Figure 9.1 - The potable water distribution system has been updated per the Master Utility Plans
5.5 RECYCLED WATER

The proposed recycled water (RW) system will be used on Treasure Island primarily for irrigation and toilet flushing.

The layout of the proposed RW system is generally within the proposed street right-of-way. Treasure Island has several different street sections, and RW mains will typically be located under street parking and occasionally under bulb-outs.

The City currently does not have an existing RW system to supply the Project with recycled water. The proposed RW Treatment Facility is subject to future negotiation and agreement between the SFPUC and TIDA.

Since the recycled water supply will not be available during the first phases of project development, the RW system will be served from interim connections to the new LPW system. A backflow device will be installed at each connection point to prevent backflow from the RW system to the LPW system.

The proposed RW system will include temporary connections to the new LPW system at the following locations:

- Connect at the intersection of proposed Cityside Avenue and proposed 5th Street
- Connect at the intersection of proposed California Avenue and proposed Palm Drive

Proposed Changes to the 2011 Infrastructure Plan

- Section 11.2.2 – Supplemental Source for Fire Protection
  - The recycled water system will no longer be used as the source of supplemental fire water. The current plan requested by the SFFD is to use a wet standpipe system that will be charged using two fire boat manifolds that will pump sea water into the system.

- The recycled water storage tanks will only be sized for 1 day of average daily demand. The tanks will no longer need to accommodate the 4-hours of fire flow.

- Section 11.2.5 – Proposed Recycled Water Distribution
  - The recycled water distribution system will no longer be sized using coincident fire flow demands or required fire flow pressures.

- Section 11.3 – Recycled Water Fire Protection
  - Recycled water will no longer be used for supplemental fire protection.

- Figure 11.1 – Proposed Recycled Water Distribution System
  - The recycled water fire hydrants have been removed from the project. The system layout has been updated per the Master Utility Plan.
RECYCLED WATER

LEGEND
- Proposed Recycled Water
- Connection Point (to new Low Pressure Water)
- Sub-phase Boundary

FIGURE 5.5  SUB-PHASE RECYCLED WATER

SUB-PHASE APPLICATION 2: SUB-PHASES 1B, 1C & 1E
Emergency water supply system for Treasure Island will be supplied from a Wet Standpipe system. A fire boat will dock at the Ferry Plaza on Treasure Island and will connect to a fire boat manifold that will pressurize the standpipe system. They system will include five hydrants, placed one hydrant at each block along Avenue C and California Avenue, that will be identified as non-potable water.

Fire Boat Manifold will be located on the west end of California Avenue within the geotechnically improved portion of the shoreline. Design of the manifold will be coordinated with SFPUC and SFFD.

Proposed Changes to the 2011 Infrastructure Plan

- Section 9.2.2.2 – Emergency Water Supply
  - It is not intended to receive emergency water supply from EBMUD.
5.7 JOINT TRENCH

A joint utility trench system is planned for the project and will include the following dry utilities: electric, gas, telephone, cable TV and other ancillary communication facilities required by SFPUC.

Joint utilities on site shall be placed in a common trench located in the franchised area, under the sidewalk for mechanical protection and will be installed to maintain utility standard clearances from wet utilities and other improvements. Vaults, boxes, manholes and enclosures housing equipment will be installed in the franchised area as well; their locations will be coordinated with wet utilities, other civil and architectural improvements and street lights. Joint utilities will be installed in Shared Public Ways.

The joint trench exhibit illustrates the general location of proposed joint trench facilities, an overhead line relocation and new switch gear at the eastern shore and identifies other joint utility source locations. General system elements for each dry utility are described briefly below.

Treasure Island is served by existing submarine cable from Oakland. These lines connect to existing switchgear in existing Building 3. This switchgear then feeds distribution on Treasure Island and a submarine cable to feed distribution facilities on Yerba Buena Island. As part of Sub-Phases 1B, 1C and 1E, new 15kV switchgear will be provided on the east side of the island to feed the new 12kV, 600 and 200 amp distribution system in the new development. This new switchgear will be fed from the existing submarine cable from Oakland. This new switchgear will remain until the next Sub-phase can be reviewed.

Electric facilities provided by either PG&E or SFPUC will include conduits, boxes, vaults, cables and devices including, but not limited to, switches, transformers, capacitor banks and metering. The electric distribution system will consist of 600 and 200 amp 12 kV underground primary distribution circuits throughout the project. Transformers placed in strategic locations will supply residential, commercial and support facilities with secondary voltage below 600V.

Where feasible, equipment will be placed subsurface. In some areas, subsurface transformers may not be allowed due to water table and soil characteristics. This will be determined by the electric utility on a case by case basis. Transformers supplying electricity to residential and commercial customers may be located either in the franchise area or on private property assuming that adequate operating clearance and access is provided. In areas where subsurface transformers are not feasible pad mounted equipment may be necessary.

Existing natural gas service comes to Treasure Island through an existing 10-inch submarine gas pipeline from Oakland. This line terminates at a large PG&E meter and service lines radiate out from this meter to serve existing uses on TI and YBI. New gas distribution will be provided to serve the proposed development.

Gas facilities provided by PG&E will consist of steel or plastic gas pipe, fittings, appurtenances and metering equipment.

Telephone and cable TV facilities provided by AT&T and Comcast will consist of conduits, boxes, vaults and amplifiers to facilitate the installation and operation of copper and fiber optic cables as proposed by the communication providers.

Joint Trench will be provided in streets and will be adjacent to proposed pump station locations. It is assumed that each pump station will connect to power available in joint trench and will have its own service point with a meter. Communication facilities will also be available adjacent to pump stations to allow for connection to the internet.

Street lighting systems will consist of steel conduits, boxes, wiring and lighting units. A lighting unit will consist of a foundation, pole, mast arm, luminaire(s) and photocell. The street lighting system will utilize LED type lighting and provide photometric and lighting characteristics that are defined in the Treasure Island & Yerba Buena Island Streetscape Master Plan.
Treasure Island and the causeway connecting Treasure Island to Yerba Buena Island was constructed in the late 1930s by placing dredged sand fill over a sand shoal located north of Yerba Buena Island. From a geotechnical perspective, there are three primary issues for any new development at Treasure Island: liquefaction, settlement, and seismic stability.

**Liquefaction of Sand Layers**

The combined thickness of the sand shoal and the dredged sand fill ranges from about 30 to 45 feet. These sands are generally loose to medium dense and are susceptible to liquefaction and seismic recompression settlement.

**Settlement of Young Bay Mud**

Beneath the sands are layers of compressible Young Bay Mud that ranges in thickness across the site from approximately 20 to 140 feet. The Young Bay Mud is generally normally consolidated and the settlement rate due to the weight of the dredged sand fill is now small. However, increases in loads due to placement of new fill or the construction of buildings will initiate a new cycle of consolidation settlements. The Young Bay Mud is underlain by dense to very dense sands and stiff to hard clays, which extend to bedrock at depths of 180 to 270 feet.

**Seismic Stability of Perimeter and Causeway**

As discussed previously, the shoreline may be susceptible to earthquake-induced deformation and, possibly, deep seated slope failures in areas of deep Young Bay Mud. Lateral spreading of the island perimeter will be mitigated using vibro replacement methods, or deep soil mixing to improve a zone around the island perimeter.

**Causeway Stabilization**

The issues potentially affecting the causeway are generally similar to those impacting the island perimeter. Lateral spreading will be mitigated using deep soil mixing to strengthen the causeway foundation soils. The causeway embankment soil will be removed approximately to Mean High Water (MHW) elevation and will placed back as engineered fill.

Based on historic and recent geotechnical field investigation, a conceptual geotechnical mitigation plan for Treasure Island Sub-Phase 1 is illustrated in Figure 5.8.

**TREASURE ISLAND GEOTECHNICAL PHASING**

The anticipated staging of the geotechnical mitigation techniques is generally described in the following sections and illustrated on the figures include in Appendix K.

**Stage 1**

Deep soil mixing will be performed along the western shoreline of the causeway and deep soil mixing with vibro-compaction will be performed along the western shore of Treasure Island. The deep soil mixing, along the western shoreline of the causeway, will require temporary excavation and shoring.

**Stage 2**

Deep soil mixing with vibro-compaction will be performed along portions of Clipper Cover and Palm Drives. Stone column construction will be performed along the western shoreline of Treasure Island, north of the Stage 1 area.

**Stage 3**

Vibro-compaction and placement of surcharge fill will be performed along the future 5th Avenue alignment and across the development area north of 5th Avenue. Deep soil mixing will be performed along the eastern shoreline of the causeway. The deep soil mixing, along the eastern shoreline of the causeway, will require temporary excavation and shoring.
Stage 4
Vibro-compaction and placement of surcharge fill will be performed across the development area south of 5th Avenue, east of Building 1, along California Avenue, and along the remaining portion of Palm Drive.

CONSTRUCTION STAGING

Construction staging areas will generally be located within the boundaries of the following two stages of geotechnical mitigation (e.g. construction staging for Stage 1 will generally occur within the Stage 2 and Stage 3 areas). Construction staging for Stage 4 will occur within the Stage 3 area.

TEMPORARY PARKING

Temporary parking will generally be located within the boundaries of the subsequent two stages of geotechnical mitigation (e.g. temporary parking for Stage 4 will generally occur within the Stage 3 and Stage 2 areas), as needed. Temporary parking for Stage 1 will occur within the Stage 3 area.

FIGURE 5.8 SUB-PHASE PRELIMINARY MITIGATION PLAN