6 Utilities and Infrastructure

6.1 INTRODUCTION

This chapter describes the backbone utility and infrastructure systems needed for the redevelopment of the Plan Area. The existing water, sewer and storm drainage systems were built by the Navy about 60 years ago and have been maintained and operated by the local utility providers since the former NAS Alameda was decommissioned in 1997. All of these systems are deteriorated, do not meet today's construction or performance standards and are in various states of disrepair. New development cannot rely on the existing infrastructure without updating the systems to current code requirements. Additionally, the locations of the existing utility facilities generally are not in alignment with the proposed new roadway framework, which has been redesigned as an urban grid system with smaller blocks to serve a tight knit, pedestrian oriented development. For all of these reasons, new systems for storm drainage, sewage removal, potable and recycled water, energy transmission, and telecommunications are needed. All of these proposed systems will be constructed to current standards while integrating sustainable development and green infrastructure strategies when feasible.

To accomplish this, most of the aging existing systems must be excavated and removed or abandoned in place and new planned infrastructure components installed in the new rights-of-way or roadway alignments as required to serve each phase of the development. Bay mud and other soil stability issues will need to be addressed prior to installation of the new infrastructure, and in some cases subsurface infrastructure will require special facilities to protect maintenance workers from existing soil or ground water contamination. Also, some new elevations for the Plan Area must be established to provide flood protection, so grading is explained in this chapter as well.

6.2 GRADING

As described in *Chapter 2: Plan Background*, the Plan Area is encumbered by various geotechnical and flooding conditions. The existing geotechnical conditions affecting portions of the Plan Area include subsidence of young Bay Mud, liquefiable soils and shoreline stability. Additionally, the Plan Area has areas subject to flooding, associated with high tidal events, wind/wave run-up and stormwater run-off, which will be increased should the sea level rise due to climate change. Base flood elevation ("BFE") as defined in this Plan takes into account tidal elevations, wind and wave run-up, sea level rise due to climate change assumptions and stormwater run-off.

6.2.1. Preliminary Grading Concepts

A number of grading concepts may be implemented to ensure that (a) ground floors of buildings are elevated above the BFE, (b) development areas are removed from the flood zone and/or (c) buildings must meet flood insurance minimum grade requirements. Grading solutions may vary from area to area and may differ for existing buildings and new construction. Final grading plan(s) shall meet the Federal Emergency Management Agency standards for flood protection, and meet all other applicable City standards not inconsistent with this Specific Plan.
The preliminary grading concept proposes the addition of soil to raise new

construction development areas in order to address the geotechnical and flooding conditions. These areas will require fill material to raise elevations to or above the BFE. Fill material may be generated from a variety of sources, ranging from off-site sources to the reuse of on-site pavement and base rock, but all fill and fill compaction will meet geotechnical and environmental standards by the various permitting agencies with jurisdiction.

For historic resources, a field survey of the lowest floor elevations was conducted for the majority of the existing buildings. A number of these structures were found to have lowest floors above the current BFE and would not need to be raised for flood protection. While some roadways in the Historic District are below BFE, in order to maintain the integrity of the core area in the Historic District, roadways within the AP-PMU are not proposed to be raised, unless they are adjacent to new construction areas. Raising the profiles and reconstructing these roadways north of Midway Avenue (see *Figure 1-2: Plan Area*) is considered infeasible due to the underlying geotechnical conditions compounded by potential impact to the existing contributing historic buildings and the Historic District. Emergency access to these areas in a severe flooding event will be provided.

6.2.2 Phasing of Plan Area Grading

The mass grading operations will be phased as closely as possible to coincide with the phasing of the Project. Each phase of the mass grading operation will consider the following items:

- Earthwork balance
- Required timing of corrective geotechnical operations
- Required timing of abandoning of existing infrastructure and construction of new infrastructure that presents phasing considerations for the grading operation, such as maintaining access and utility service to surrounding existing buildings
- Hauling routes
- Surcharge of the stored material
- Clean Water Program Best Management Practices
- Noise and dust control

6.3 STORM DRAINAGE AND WATER QUALITY

6.3.1 Existing Conditions

The Navy installed a majority of the existing storm drainage system at Alameda Point about 60 years ago. Since former NAS Alameda's closure in 1997, the City of Alameda has been responsible for the maintenance of the existing storm drain system. The existing pipes range in size from 4" to 48" with varying degrees of deterioration. Alameda Point has a total of 33 existing storm drain outfalls to the surrounding waters, 20 of which are located along Plan Area's shorelines discharging to the Oakland Estuary, the Seaplane Lagoon and the San Francisco Bay. The existing flap gates on the outfalls are in various states of disrepair. Some outfalls have broken or missing flap gates and are therefore ineffective.

The existing storm drain system is mainly a gravity system. A pump station was more recently installed adjacent to Main Street near the Big Whites. The pump station was installed to reduce nuisance flooding on low areas of Main Street adjoining the Plan Area.

The Plan Area is nearly flat and mostly impervious. Flooding problems do exist in the Plan Area. As discussed in the Plan Area Grading section of this plan, above, high tide conditions inundate the low lying areas. Specifically, the areas directly adjacent to the Seaplane Lagoon and the areas surrounding the Main Gate flood in high tide conditions. The existing storm drain system does not provide any water quality treatment prior to discharging.

6.3.2 Proposed Facilities

The proposed stormwater management concept for Alameda Point is the construction of a new storm drainage system. The proposed system integrates new pipelines, structures and outfalls designed to meet City of Alameda Flood Control standards along with water quality features designed to provide stormwater treatment consistent with the Alameda Countywide Clean Water Program.

6.3.2.1 Flood Control System

A new storm drain system is proposed at Alameda Point. This system will replace the existing system of pipelines and outfalls. The design criteria for the proposed storm drainage system comply with the City of Alameda Standard Subdivision and Design Criteria (April 1965) and Hydrology and Hydraulics Criteria Summary for Western Alameda County. The major components of the storm drain system for the Plan Area are depicted on *Figure 6-1: Proposed Storm Drainage System*.

The proposed system is designed to efficiently collect and convey stormwater flows to the nearest outfall. The majority of the proposed outfalls will utilize the same existing outfall locations, but in most cases will have a larger discharge pipe with a new flap gate. New outfalls have also been proposed where necessary for the stormwater volumes. The proposed outfall flow line depths are anticipated to range approximately 8-11 feet below the proposed finish ground. The proposed Project will reduce the amount of impervious surface based on existing conditions and thus reduce the historic flow into the San Francisco Bay and the Oakland Estuary. The goal of the Plan Area grading and storm drain design is to maintain finish ground elevations at a minimum while ensuring the Plan Area is above the Base Flood Elevation. The Plan Area is generally divided into four Drainage Management Areas (DMA) as briefly described below:

DMA 1 – Seaplane Lagoon Watershed

This DMA includes the areas that drain into the Seaplane Lagoon. Generally, this includes the development areas directly east and north of the Seaplane Lagoon and south of Midway Avenue. These areas will be collected and conveyed by a new system of gravity pipelines ranging in size from 12 to 72 inches in diameter, which will outlet to the Seaplane Lagoon.

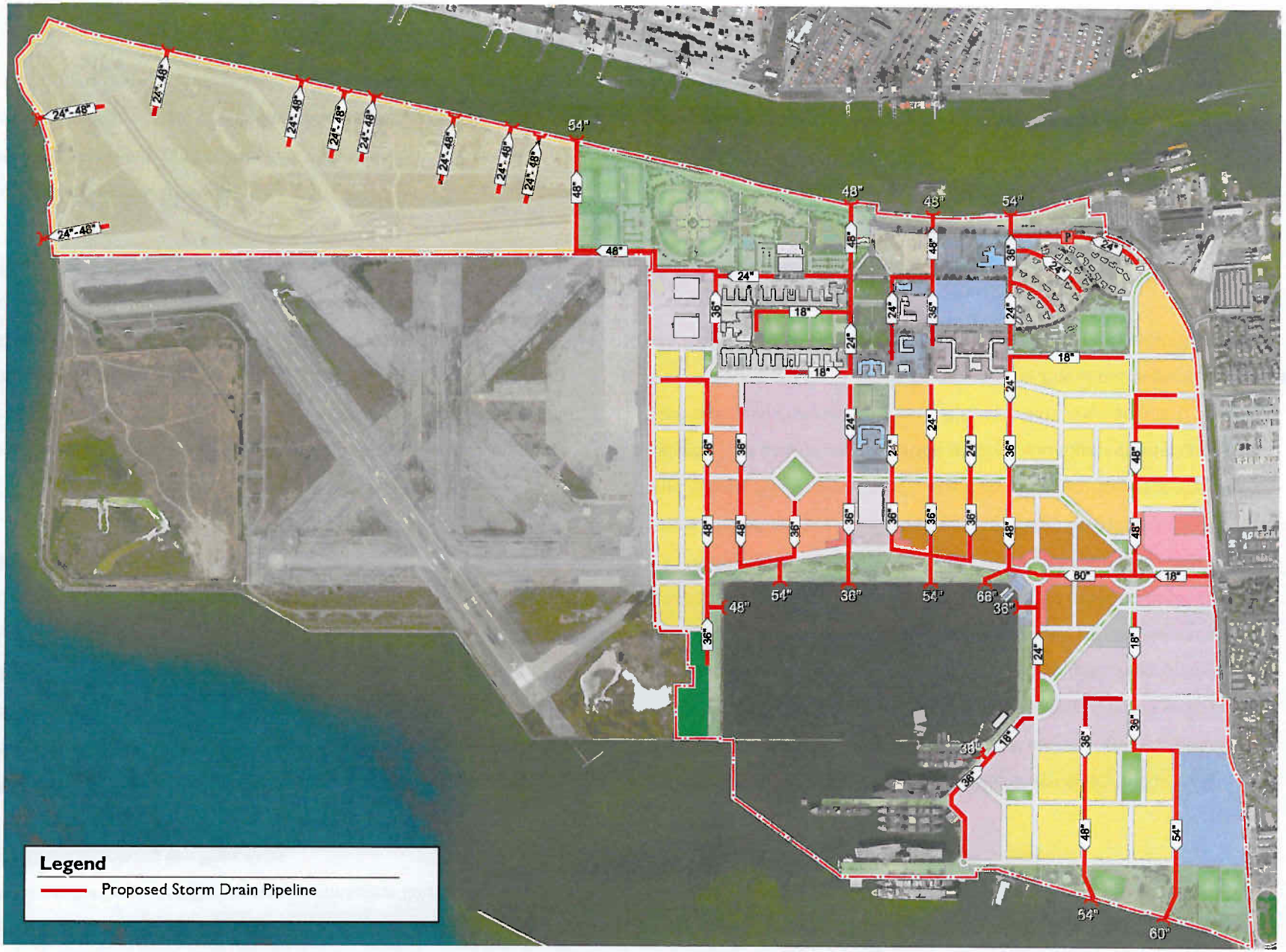

Figure 6-1: Storm Drainage System

DMA 2 – Oakland Inner Harbor Watershed

This DMA includes the AP-PMU District north of Midway Avenue which currently drains into the Oakland Inner Harbor. The existing storm drain system within this DMA is proposed to be replaced with a new system of pipelines ranging in size from 12 to 48 inches in diameter discharging to the Oakland Inner Harbor.

DMA 3 – Southeastern Watershed

This DMA includes development and open space areas in the southeast portion of the Project. These areas will be collected and conveyed by a new system of gravity pipelines ranging in size from 12 to 48 inches in diameter to the San Francisco Bay.

DMA 4 –Northwest Territories

This DMA includes development and open space areas in the Northwest Territories. Storm waters in these areas will be collected and conveyed by a new system of gravity pipelines ranging in size from 12 to 48 inches in diameter discharging into the Oakland Inner Harbor and San Francisco Bay.

6.3.2.2 Water Quality

Stormwater run-off is a significant source of pollutants throughout the San Francisco Bay watershed. Alameda County has established the Alameda Countywide Clean Water Program (ACCWP) as required by Provision C.3 of the countywide municipal stormwater National Pollutant Discharge Elimination System (NPDES) permit. The C.3 Stormwater Technical Guidance handbook provides prescriptive requirements for incorporating post-construction stormwater control measures into new development and redevelopment projects. Similarly, as a result of the City of Alameda's maritime assets, the City places a high priority on water quality issues.

Alameda Point will implement a network of water quality Integrated Management Practices ("IMP's") including Plan Area design practices and post-construction water quality control measures. A range of practices and measures may be implemented to mitigate the potential post-construction impacts from the Project on the surrounding beneficial uses of the San Francisco Bay. These enhancements are intended to improve post-construction stormwater quality.

The design practices for reducing stormwater pollutants and increases in run-off include:

- Reduce the amount of existing impervious surfaces. The existing Plan Area is roughly 95% impervious surface. The proposed Project will reduce the amount of the impervious surface to approximately 70%. The Project includes approximately 145 acres of new parks and open space areas, in addition to landscape strips on the roadways and front and backyard landscaping;
- The compact urban design of the Project proposes to cluster the development in the areas surrounding the Seaplane Lagoon;
- Incorporating narrow streets, driveways and sidewalks consistent with this Specific Plan; and
- The development footprint and roadways will employ water quality IMP's to enhance stormwater runoff to the maximum extent practicable.

Development within the Plan Area will implement a variety of source

control and stormwater treatment measures to prevent pollutant discharge at the source. Such measures will meet or exceed the Alameda Countywide Clean Water Program standards. These facilities will be sized and designed to comply with the hydraulic design criteria presented in the municipal stormwater permit's Provision C.3d. Stormwater treatment measures may include, but are not limited to, the following, as defined by Provision C.3:

- Vegetated Swales
- Bio-Swales
- Media Filters
- Tree Well Filters
- Flow-through Planter Boxes
- Pervious Pavement
- Bio-Retention Areas

6.4 SANITARY SEWER

6.4.1 Existing Conditions

6.4.1.1 Existing On-Site Sewer System

The Navy began the installation of the existing sanitary sewer facilities for Alameda Point approximately 60 years ago. Since the closure of the former NAS Alameda, the City has been responsible for maintaining the existing sanitary sewer system to serve the existing uses. The existing on-site sewer facilities include pipelines, structures, pump and lift stations. The system still remains functional, but in many places there are service concerns, such as locations where the deteriorated condition of the sanitary sewer pipes allows flow from groundwater infiltration. Also, portions of the system have grease build-up. Sewers are located under buildings and outside of proposed rights-of-way. The majority of the existing system is not built to City standards.

6.4.1.2 Existing Off-Site Sewer Facilities

EBMUD has constructed off-site infrastructure that conveys wastewater from Alameda Point to the EBMUD Wastewater Treatment Plant at the eastern landing of the Bay Bridge. See *Figure 6-2: Existing Off-Site Sanitary Sewer Systems.* The existing Pump Station 1 at the Main Gate of Alameda Point is the main discharge terminus of the on-site sanitary sewer system for the Plan Area. From Pump Station 1, a 20-inch force main conveys the wastewater to a series of 3 siphons that cross under the Oakland Estuary. These siphons then connect to a large trunk main that flows to the EBMUD Wastewater Treatment Plant. Based upon the EBMUD design reports, these off-site facilities have varying available existing capacities for Alameda Point as shown on *Table 6-1: Wastewater Facility Capacity*.

6.4.1.3 Existing Wastewater Treatment

EBMUD is responsible for the wastewater treatment system for the City, including Alameda Point. The Plan Area is located within the EBMUD NAS

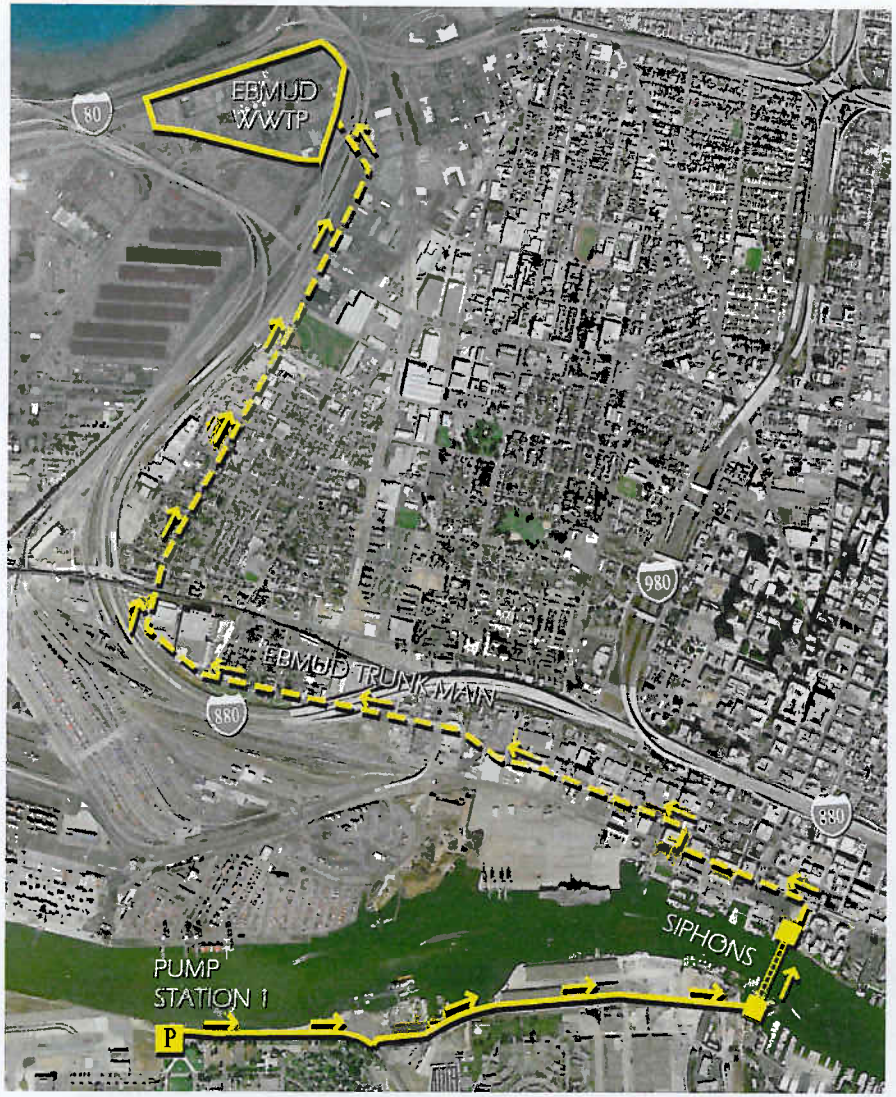

Figure 6-2: Existing Off-Site Sanitary Sewer Systems

TABLE 6-1 : WASTEWATER FACILITY CAPACITY, ALAMEDA POINT	
Off-Plan Area Wastewater Conveyance Facility	Available Capacity for Alameda Point
Pump Station 1 (at Main Gate)	7.5 MGD
20-inch Force Main	12.1 MGD
Oakland Estuary Crossing – 3rd Siphon	8.0 MGD

Alameda sub-basin. In March 2000, EBMUD, the City, and the Port of Oakland signed the Wastewater Interceptor Agreement. This agreement established a wastewater treatment allocation of 9.53 million gallons per day (MGD) to the NAS Alameda sub-basin. The allocation is sufficient to meet the flows generated by the Project proposed by this Specific Plan, as described below.

6.4.2 Sewer Flow Generation

Using the City's current calculation methodologies, the projected wastewater flows from the Plan Area at build out are shown in *Table 6-2: Projected Wastewater Flows*. Further reductions to both non-residential and residential uses will be pursued through the implementation of sustainable technologies and water conservation, as more particularly described in *Chapter 7: Development Standards*.

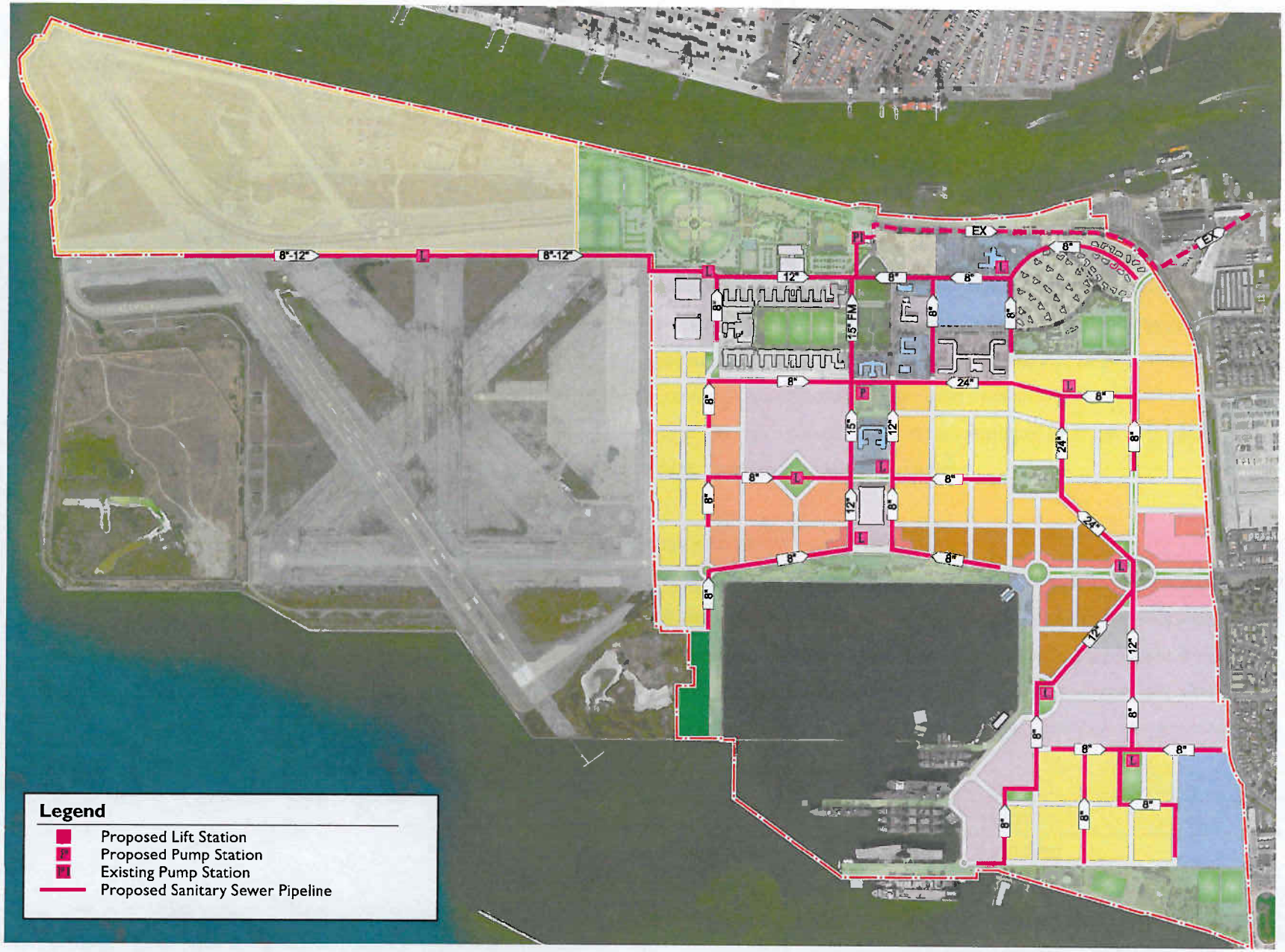

Figure 6-3: Sanitary Sewer System

TABLE 6-2 : PROJECTED WASTEWATER FLOWS, ALAMEDA POINT	
Land Use	Wastewater Flow
Residential	3.3 MGD
Non-Residential	3.0 MGD
Total	6.3 MGD

6.4.3 Proposed Facilities

6.4.3.1 Proposed Plan Area Sewer System

This Plan proposes to replace the existing sanitary sewer facilities with new pipelines, pump and lift stations on a phased basis. The proposed sanitary sewer system will be a public system. The sewer mains will be located within the public right-of-way and range in size from 8 to 36 inches in diameter and will meet City minimum pipeline slope requirements. Aside from Pump Station 1, the existing pump stations and lift stations will not be incorporated into the proposed system. These stations do not fit into the current land plan and do not meet the required needs of capacity and sizing. New pump stations and lift stations are proposed in suitable locations. The proposed sanitary sewer system schematic is depicted on *Figure 6-3: Proposed Sanitary Sewer System*.

For the AP-PMU District, where the roadways are within areas of inundation, the proposed sanitary sewer system will be constructed to the extent feasible within the existing roadway and in a manner that reduces the potential for floodwaters to infiltrate into the manholes. This will likely include water tight manhole covers to be installed in these areas. Additionally, Pump Station 1 will need to be retrofitted for flood proofing.

6.4.3.2 Off-Site Sewer Facilities & Treatment

The Project will not require an upsizing of the existing Pump Station 1 to accommodate the Plan Area. Additionally, based on available capacities for the Plan Area indicated by EBMUD, all other off-site facilities and the wastewater treatment allocation have adequate capacities.

6.5 WATER SUPPLY AND DISTRIBUTION

6.5.1 Existing Conditions

EBMUD is responsible for operating and maintaining the existing potable water system at the Plan Area through an agreement with the City. EBMUD has supplied water service to the Plan Area since 1941. There were two distinct existing water systems at former NAS Alameda, a potable water system and a dedicated fire protection system. The dedicated fire protection system was designed to provide a very large fire flow in a very short time period. Two elevated storage tanks, used to supply the dedicated fire flow, have since been removed from the Plan Area. The Alameda Fire Department has determined that the existing potable water system provides adequate fire flows for the current uses at Alameda Point. Therefore, the dedicated fire protection system has already been placed out of service and will be completely abandoned as Alameda Point is

redeveloped.

Water is supplied to Alameda Point by EBMUD. Alameda Point historically received water from EBMUD via three existing metering stations located on Main Street. The City of Alameda has since installed meters to specific buildings. The existing potable water system still remains functional, however in some places there are service concerns. Also, existing water mains are located under buildings and outside of proposed right of ways. Most of the existing system is not built to City or EBMUD standards.

6.5.2 Supply and Demand

6.5.2.1 Potable Water

EBMUD will continue to serve the site in accordance with regulations governing municipal utility districts and EBMUD's regulations. The Plan Area does not constitute a new area to be served, but rather a change in use of an existing service. According to the NAS Alameda Community Base Reuse Plan, previous studies by the Navy indicate that the former NAS Alameda was consuming approximately 2.8 million gallons per day (MGD) as an average daily demand for potable water. The estimated water demand projection at buildout of the Project is approximately 2.3 MGD, less than the Navy's prior use within the Plan Area. This Plan proposes a range of sustainable strategies to achieve reductions in water consumption, from the use of recycled water for irrigation to the building methods described in *Chapter 7: Development Standards*. The water demand for the Project proposed by this Specific Plan will be calculated by EBMUD, taking into consideration sustainable strategies to reduce water consumption. See *Chapter 7: Development Standards* for a discussion of water conservation strategies.

6.5.2.2 Recycled Water

Currently, there is not a source of recycled water near Alameda Point. EBMUD is planning and implementing the East Bayshore Recycled Water Project. This multi-phased project is planned to supply an annual average of 2.5 MGD of recycled water from EBMUD's waste water recycling plant to portions of Alameda. Construction of such facilities is planned within the next 5 to 10 years. Therefore, the recycled water may not be immediately available for the initial phases of the Specific Plan but will be available for distribution prior to the Plan Area's build-out.

6.5.3 Proposed Facilities

6.5.3.1 Potable Water System

A new system of pipelines and appurtenances is proposed at Alameda Point. Distribution pipelines will connect to and extend from the existing water facilities at Main Street. The proposed distribution pipelines will be constructed within the proposed right of ways and will range in size from 8 to 16 inches. To protect the historic resources in the AP-PMU district, the proposed facilities shall be located in the existing roadway areas to the extent feasible. Final design and sizing of the proposed system will be implemented with EBMUD. The proposed potable water system schematic

is depicted on *Figure 6-4: Proposed Potable Water System.*

6.5.3.2 Recycled Water System

All Alameda Point recycled water facilities (pipeline and related appurtenances) shall be installed within the newly constructed roadways. The recycled water system schematic is depicted on Figure 6-5: Proposed Recycled Water System. To protect the historic resources in the AP-PMU district, the facilities shall be located in the existing roadways to the extent feasible.

6.6 ENERGY

6.6.1 Existing Conditions

Alameda Municipal Power and Pacific Gas & Electric (PG&E) are currently responsible for the existing electrical and gas systems, respectively, serving the existing uses. Electricity and gas are currently provided by facilities located adjacent to Main Street and Atlantic Avenue. There is a large existing overhead electric transmission line on the east side of Main Street. This pole line connects to the existing sub-station at the Alameda Point East Gate. The electrical and gas distribution facilities within Alameda Point do not meet current standards or codes. The telephone and communication systems do not meet current standards or codes and are located outside the proposed rights-of-way.

6.6.2 Proposed Facilities

The conceptual electrical, gas, telephone and communication designs for Alameda Point incorporate entirely new underground systems within the Plan Area. An entirely new electrical system will connect to the existing sub-station, which is proposed to remain at the East Gate of former NAS Alameda. All of the proposed facilities will be constructed underground within proposed rights-of-way in a common trench. Additionally, there will likely be redundant communication facilities installed due to multiple potential service providers. To protect the historic resources in the AP-PMU district, the proposed facilities shall be located in the existing roadway areas to the extent feasible.

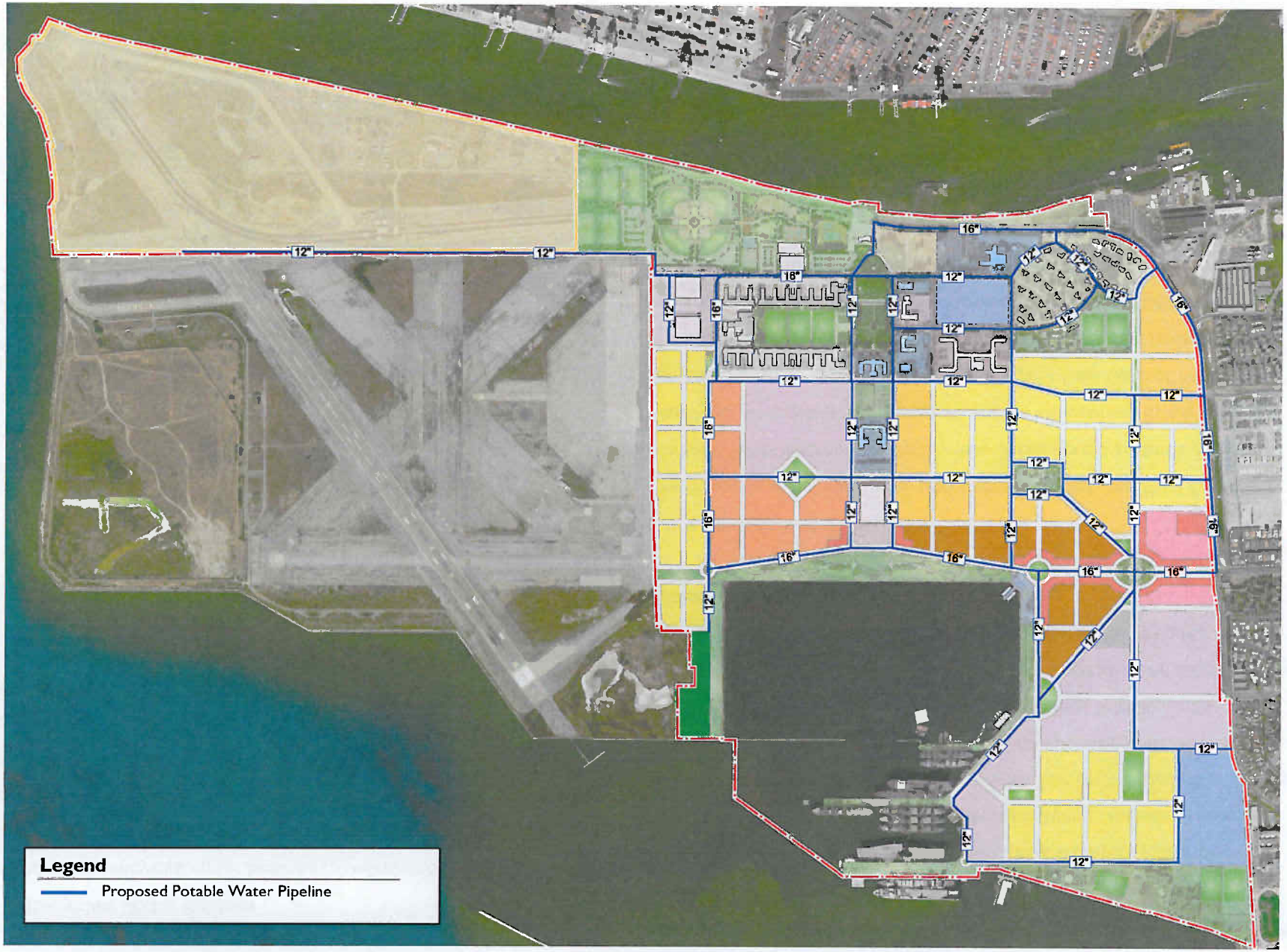

Figure 6-4: Potable Water System

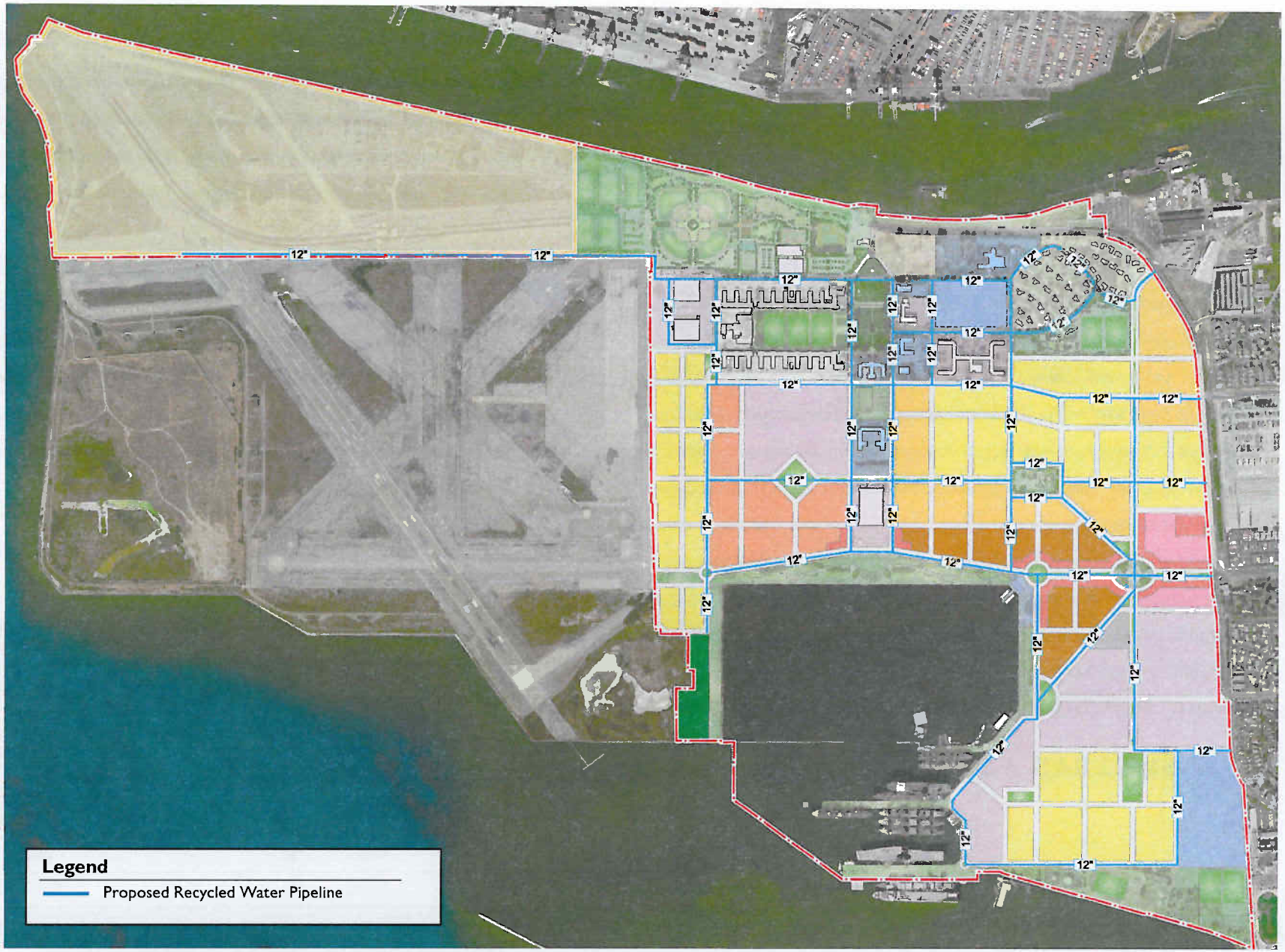

Figure 6-5: Recycled Water System

TABLE 6-3 : SOLID WASTE PROJECTIONS, ALAMEDA POINT	
Residential	
Diverted	4,970
Landfill	2,919
Total	7,889 Tons Per Year
Commercial	
Diverted	38,213
Landfill	22,443
Total	60,656 Tons Per Year
OVERALL TOTAL	**68,545 Tons Per Year**

6.7 SOLID WASTE DISPOSAL

Non-recyclable, non-hazardous waste is primarily collected and taken from the City to the Davis Street transfer station, before it is disposed at the Altamont Landfill. Disposal of solid waste and recycled materials generated by Alameda Point is currently provided through a franchise agreement. It is the intent of the City to continue agreements of that type in the future for solid waste disposal and recycling services at Alameda Point.

The solid waste generation calculations include two components, construction and demolition waste and municipal solid waste generated by residences and businesses. The waste generation calculations in *Table 6-3* are based upon factors provided by the California Integrated Waste Management Board and the federal Environmental Protection Agency. Each household is assumed to have 2.35 persons and commercial waste is calculated on a square footage basis. It is a goal of the Project to comply with Measure D, as described in *Chapter 7: Development Standards.*

6.8 PHASING OF UTILITY SYSTEMS

The capacities of all proposed utility systems, including storm drainage, sanitary sewer, potable water, recycled water and dry utility systems will be designed for the entire Plan Area. These systems will be built in phases, but a design capacity that accommodates the ultimate residential and non-residential build out will be maintained. The construction of the new system will be phased in a manner that closely coincides with the phasing of the development. Due to the phased nature of the Project, existing usages will be kept in service during construction of the new infrastructure systems. Temporary connections of the existing system to the proposed system will be required as the construction of the entire Project is built out. The utility and infrastructure requirement for the Northwest Territories will be further developed once the particular land uses for that area are confirmed.