UPDATED DRAFT
Master Infrastructure Plan

Alameda Point
ALAMEDA, CALIFORNIA

October 31, 2013

Prepared For:

SEAL OF THE CITY OF ALAMEDA, CA
PROSPERITAS TERRA MARIQUE
INCORPORATED 1854

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I. EXECUTIVE SUMMARY

The Master Infrastructure Plan (MIP) establishes the requirements and standards for the backbone infrastructure to support the redevelopment and reuse of Alameda Point. The backbone infrastructure is the major framework of streets and utilities. This framework establishes organization of the site and defines corridors necessary to be reserved for infrastructure improvements and ensure the successful phased implementation of the MIP. The land uses analyzed by the MIP are consistent with the NAS Alameda Community Reuse Plan.

The existing infrastructure within Alameda Point was installed by the Navy, mostly over 70 years ago, and is beyond its service life. Components of the existing infrastructure are currently operable and service the existing tenants at Alameda Point. However, the existing infrastructure is deteriorated, generally unreliable and does not meet current codes or standards. The MIP recommends that the existing infrastructure be incrementally replaced with new systems.

The MIP distinguishes the Project Site as two main areas: Development Areas and Reuse Areas. The infrastructure needs and requirements for each of these areas are unique. Accordingly, the MIP describes the planned backbone infrastructure specific for each of the areas. The Development Areas are those areas within the Project Site that are anticipated to consist of mostly all new construction. New infrastructure will be installed to support the proposed uses within the Development Areas. The Reuse Areas include the historic areas within the Project Site that are largely intended to be preserved and adaptively reused to the extent feasible. The preservation of the historic buildings and landscapes require specific infrastructure considerations and requirements. A sequenced implementation of interim rehabilitation improvements and eventual replacements of the existing street and utility systems is discussed in the MIP. This sequenced implementation will allow development within the Reuse Areas to proceed in the near term without being over-burdened with lengthy extensions of infrastructure replacements, while establishing a program to ensure that the ultimate infrastructure replacements are orderly implemented.

The proposed backbone infrastructure improvements will create a seismically stable site that can adapt to the potential impacts of climate change. The MIP outlines the required corrective geotechnical and flood protection improvements for Alameda Point. Corrective geotechnical measures are necessary to provide seismic stability of the Project's shorelines and underlying soils. Additionally, flood protection improvements are described which include site grading, perimeter improvements and establishing future adaptive measures that are necessary to protect the site from the 100-year tidal event and provide long-term protection for sea-level rise due to climate change.

For Alameda Point, the MIP recommends an Adaptive Management Plan for the flood protection system. The flood protection measures constructed in the near term, with initial development, shall be constructed with built-in protection against 18-inches of sea level rise above the 100-year tidal event. 18-inches of sea level rise is within the range of sea level rise projected to occur by the end of century. The current sea level rise projections by the California Climate Action Team and the Intergovernmental Panel on Climate Change were referenced for the preparation of the MIP. If future sea level rise amounts exceed 18-inches, additional flood protection measures will be implemented. The flood protection system will be adaptively designed to address sea level rise in excess of 18-inches. The adaptive measures will include preserving inland land and right of way along the perimeter of the site such that existing shorelines and floodwalls could be elevated to manage sea level rise. The perimeter improvements shall be designed to allow for the future flood protection measures to be widened and support additional height such that no fill is placed in the Bay. Other adaptive measures that may be implemented include a flexible perimeter protection measure that shifts inland and allows the out board land to be converted to tidal wetlands. A sea level rise monitoring and funding mechanism will be established for the Alameda Point area to ensure the future adaptive measures will be implemented when necessary.

The proposed utility systems described in the MIP include stormwater, wastewater, potable water, recycled water, electrical, natural gas and telecommunication utility systems. Each of these systems will connect to reliable existing facilities surrounding the Project Site. New outfalls will be constructed to the surrounding waters to convey stormwater runoff from Alameda Point. The amount of outfalls surrounding Alameda Point will be reduced and the site runoff will be treated consistent with the Alameda County Clean Water Program prior to discharge to the San Francisco Bay. The new wastewater system will consist of series of pipelines and lift stations that connect to existing transmission facilities along the northwestern waterfront of Alameda. These transmission facilities convey the site wastewater to the EBMUD Main Wastewater Treatment Plant. The proposed potable water, recycled water, natural gas and telecommunications facilities will connect to existing reliable facilities within Main Street, along the eastern edge of the Project Site. The proposed electrical system will connect to the Cartwright Substation, which is intended to be preserved and is located within Alameda Point near the W. Atlantic Ave and Main St intersection.

Additionally, the MIP describes a “complete streets” transportation network to support a variety of modes of transportation. The proposed street system at Alameda Point will de-emphasize the automobile, provide protective bikeways and provide direct, convenient access to high quality transit options, such as bus rapid transit and water-oriented transit (i.e., ferries and water taxis). Proposed street sections for the backbone streets are provided in the MIP, demonstrating the integration of all the various modes of transportation. The proposed street system facilitates bicycles being a viable mode of transportation, providing an extensive network of protected bikeways, cycle tracks, buffered bike lanes and other bike facilities that extend into other areas of Alameda, creating cross-island bicycle access to Alameda Point. The proposed bike facility network is complemented by the proposed parks and open space system. The MIP outlines the proposed open space framework, which includes Nature Reserve Areas, Primary Open Spaces and Secondary Open Spaces. The organization of these components provides an extensive network of parks, open spaces, trails and community facilities proposed at Alameda Point.

The MIP establishes a practical yet comprehensive approach to implementing the proposed backbone infrastructure. The MIP outlines phasing and implementation principles for each proposed infrastructure system. A phased implementation of the backbone infrastructure is critical to maintaining financial feasibility. The improvements required for the redevelopment of Alameda Point will be phased to match the development phases as closely as possible. The required improvements for each phase will include demolition, flood protection, corrective geotechnical measures, site grading, utilities, streets and transit improvements. Each phase will construct the portion of infrastructure required to support the proposed uses and surrounding existing uses, while being balanced to maintain feasibility of the project.

The MIP also includes a cost estimate for backbone infrastructure and City facilities envisioned for the development at Alameda Point. This cost estimate will be updated and refined as development proposals are approved by the City Council and implemented by developers. Additionally, the City is in the process of updating its development impact / infrastructure fee, which will create a fee specific to Alameda Point based primarily on the data included in the MIP. This impact / infrastructure fee process will provide an opportunity for the City Council to evaluate and prioritize the funding of certain public improvements assumed in the MIP.

II. INTRODUCTION AND PURPOSE

A. Purpose

The Master Infrastructure Plan (MIP) establishes the requirements and standards for the backbone infrastructure to support the redevelopment and reuse of Alameda Point, the Project Site. The backbone infrastructure is the major framework of streets and utilities. Additional internal streets and local utility systems, "in-tract" and "on-site" improvements, will connect to and be supported by the backbone infrastructure. The MIP describes the required replacement and/or rehabilitation of existing backbone utility systems, streets and open spaces at the Project Site. The MIP includes information regarding the stormwater, wastewater, potable water, recycled water, electrical, natural gas and telecommunication utility systems. Additionally, the MIP describes a "complete streets" transportation network to support a variety of modes of transportation.

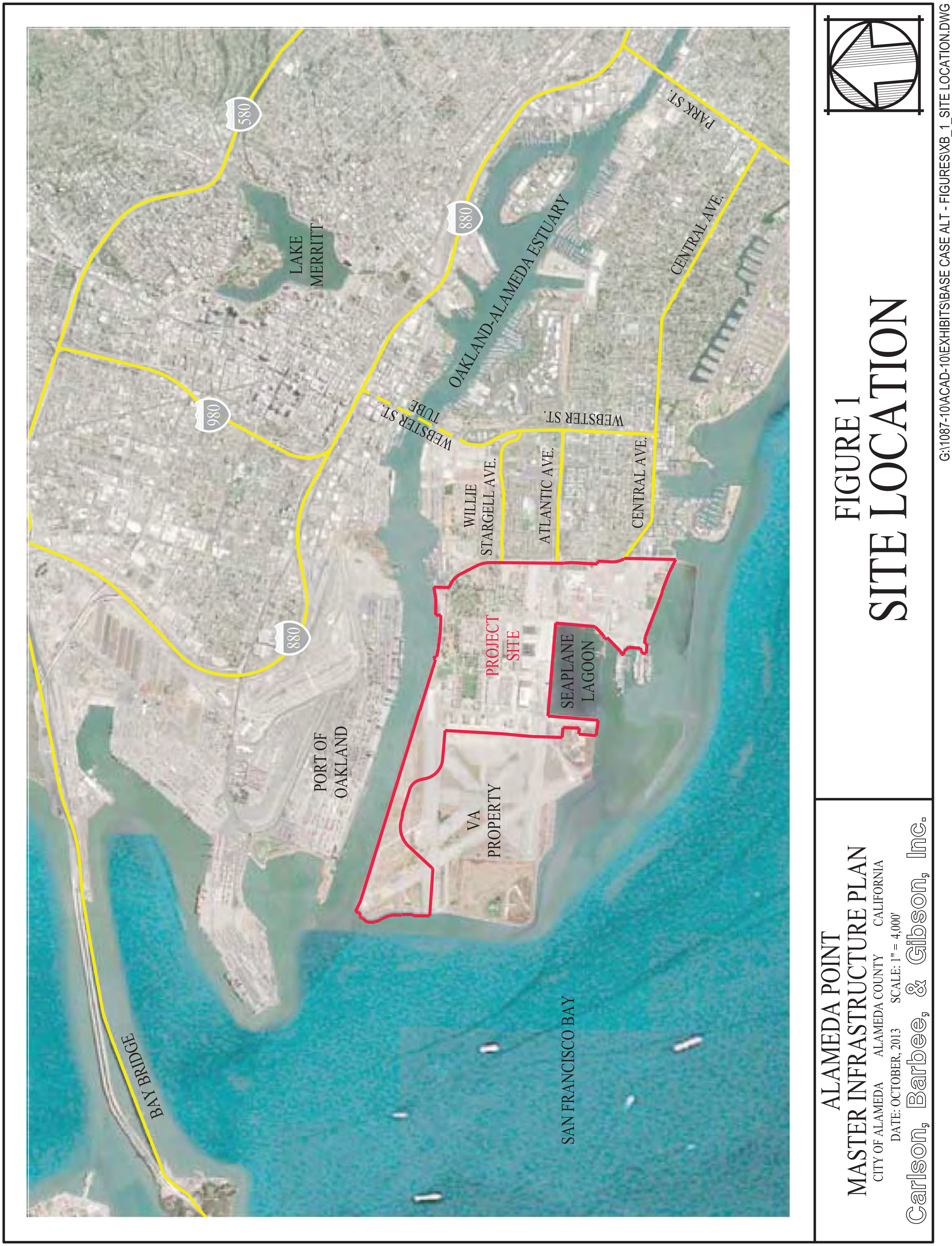
The MIP also outlines the required corrective geotechnical and flood protection improvements for the Project Site. Corrective geotechnical measures are necessary to provide seismic stability of the Project's shorelines and underlying soils. Flood protection improvements including site grading, perimeter improvements and establishing future adaptive measures are necessary to protect the site from the 100-year tidal event and provide long-term protection for sea-level rise due to climate change.

The MIP summarizes the parks and open space system within the Project Site based on the detailed assessment included in the City of Alameda's Urban Greening Plan. Additionally, the MIP summarizes the proposed off-site street improvements and transit systems that are proposed as part of the Project. This summary is largely based on the City of Alameda's Regional Transit Access Study and traffic studies prepared as part of the Environmental Impact Report (EIR). The summary information regarding these elements of the Project is consolidated in the MIP to provide a comprehensive overview of the major improvements and framework at the Project Site. The detailed analysis of these elements is provided in the other referenced reports and plans.

B. Project Description and Land Use Program

Alameda Point is the former Naval Air Station Alameda located west of Main Street at the northwest end of the City of Alameda, California. The Project Site includes approximately 878 acres of unsubmerged lands and 1,229 acres of submerged lands, a total of 2,107 acres. It is bound by the Oakland-Alameda Estuary to the north, Main Street to the east, and the San Francisco Bay to the south and west. Certain portions of the Project Site are bound to the south and west by a 624-acre area including former airplane runways that are intended to be transferred from the Navy to the United States Department of Veteran Affairs (VA Property) and are not a part of the Project Site. Conservatively, the infrastructure demands associated with the proposed development within the VA Property are included in the MIP. Currently, the proposed development within the VA Property includes the construction of a VA Outpatient Clinic, Columbarium Cemetery and associated improvements. See Figure 1, Project Site Location.

The Land Use Program analyzed by the MIP is generally based upon the NAS Alameda Community Reuse Plan (Reuse Plan), prepared in 1996. The Project is designed to accommodate a mix of land uses, including a combination of newly constructed buildings and adaptive reuse of existing buildings. A Zoning Ordinance Amendment is concurrently being processed by the City of Alameda. This document establishes and organizes the Project Site into various Sub-Districts, Enterprise, Adaptive Reuse, Waterfront Town Center, Main Street Neighborhood and Open Space generally consistent with the Zoning Ordinance Amendment. Table 1 outlines the proposed Land Use Program for each Sub-District. See Figure 2, Alameda Point Sub-Districts.


580
LAKE MERRITT
880
980
OAKLAND-ALAMEDA ESTUARY
PARK ST.
CENTRAL AVE.
WEBSTER ST. TUBE
WEBSTER ST.
WILLIE STARGELL AVE.
ATLANTIC AVE.
CENTRAL AVE.
PROJECT SITE
SEAPLANE LAGOON
PORT OF OAKLAND
VA PROPERTY
BAY BRIDGE
SAN FRANCISCO BAY
FIGURE 1
SITE LOCATION
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 4,000'
Carlson, Barbee, & Gibson, Inc.
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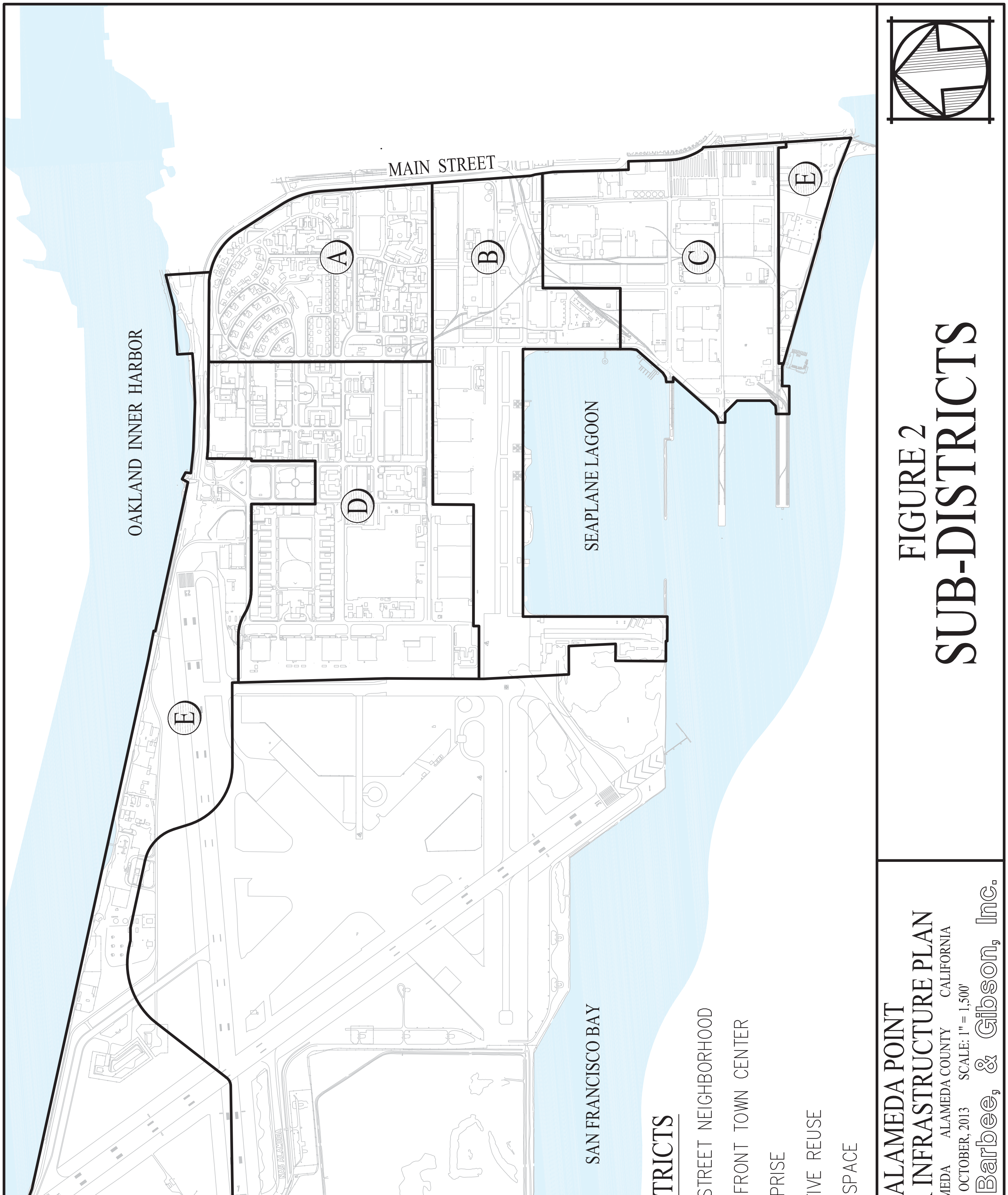
MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
A
B
C
D
E
E
SUB-DISTRICTS
A MAIN STREET NEIGHBORHOOD
B WATERFRONT TOWN CENTER
C ENTERPRISE
D ADAPTIVE REUSE
E OPEN SPACE
FIGURE 2
SUB-DISTRICTS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
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Table 1 - Land Use Program (1996 Community Reuse Plan)

	Sub-District					
Land Use	**A**	**B**	**C**	**D**	**E**	**Total**
Residential (Units)	563	575	70	217	-	**1,425**
Commercial						
Office / Manufacturing (SF)	-	644,000	1,890,000	2,154,000	-	**4,688,000**
Retail and Service (SF)	-	374,500	135,500	302,000	-	**812,000**
Subtotal Commercial	**-**	**1,018,500**	**2,025,500**	**2,456,000**	**-**	**5,500,000**
Open Space (Acres)	3	24	16	8	258	**309**

The Enterprise uses include a mix of retail, commercial recreation, commercial office, business park, industrial, and institutional. The Main Street Neighborhood uses may include single family and multi-family housing units. The Main Street Neighborhood uses also include the 200 existing supportive housing units managed by the Alameda Point Collaborative, Building Futures for Women and Children, and Operation Dignity (Supportive Housing Providers). The MIP assumes these supportive housing units will be relocated to a new facility located in the northeast corner of the Main Street Neighborhood Sub-District. The Waterfront Town Center Sub-District will include transit-oriented design standards to create a mixed-use, transit-oriented, and walkable waterfront. The MIP assumes the Project will include the construction of a 530-slip marina in the Seaplane Lagoon. The Open Space uses include parks, open space, waterfront promenade, a continuous Bay Trail, historic open spaces and parade grounds, neighborhood parks and recreation facilities, such as on-site parks, walking and bike trails, and on-street sidewalks and bike paths.

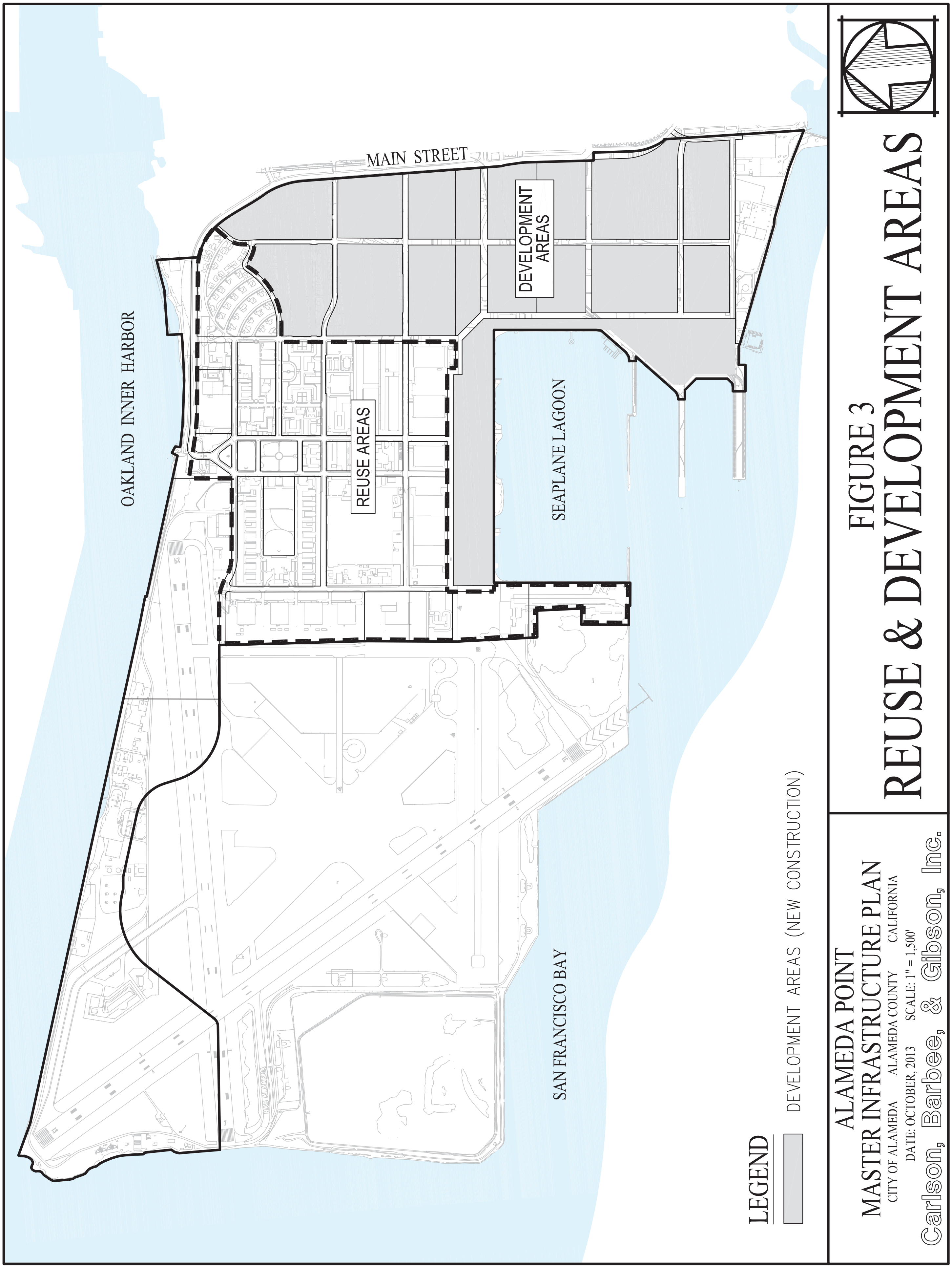
C. Development and Reuse Areas

For purposes of the infrastructure planning and MIP, it is important to distinguish the Project Site as two main areas: Development Areas and Reuse Areas. The infrastructure needs and requirements for each of these areas are unique. Accordingly, the MIP describes the planned backbone infrastructure specific for each of the areas.

The Development Areas are those areas within the Project Site that are anticipated to consist of all new construction. The existing structures, streets and utilities within these areas will be demolished. New infrastructure will be installed to support the proposed uses within the Development Areas. It is anticipated that development within the Development Areas will occur in cohesive areas and will be orderly implemented. The Development Areas encompass the majority of the Enterprise, Main Street Neighborhood and Waterfront Town Center Sub-Districts.

The Reuse Areas include the historic areas within the Project Site that are largely intended to be preserved and adaptively reused to the extent feasible. The preservation of the historic buildings and landscapes require specific infrastructure considerations and requirements. It is likely that development within Reuse Areas will be fragmented. The MIP presents the infrastructure systems and flood protections measures required to support the development of the Reuse Areas. A sequenced implementation of interim rehabilitation improvements and eventual replacements of the existing street and utility systems is discussed in the MIP. This sequenced implementation is necessary to allow development within the Reuse Areas to proceed in the near term without being over-burdened with lengthy extensions of infrastructure replacements, all the while establishing a program to ensure that the ultimate infrastructure replacements are orderly implemented within Reuse Areas.

See Figure 3 depicting the limits of the Reuse and Development Areas assumed for the MIP, excluding new open space and park areas.


MAIN STREET
DEVELOPMENT AREAS
REUSE AREAS
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
DEVELOPMENT AREAS (NEW CONSTRUCTION)
FIGURE 3
REUSE & DEVELOPMENT AREAS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
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D. Existing Infrastructure

The existing infrastructure within Alameda Point was installed by the Navy. The majority of the infrastructure was constructed over 70 years ago, and is beyond its service life. The Navy installed, maintained and improved the existing infrastructure on an as-needed basis. The active existing utility systems include wastewater, stormwater, potable water, electrical, natural gas and telecommunications. The inactive existing utility systems include industrial waste, steam and fuel. Many of the existing utility pipelines and associated facilities are located outside of the existing streets, within future development areas. The active existing infrastructure is currently operable and services the existing tenants at Alameda Point. However, it is deteriorated and generally unreliable. Additionally, the existing infrastructure does not meet current codes or standards.

There are numerous issues with the existing infrastructure. It cannot support the redevelopment of Alameda Point without rehabilitation or replacement. Some of the documented major issues with the existing systems include:

- The existing stormwater system allows high tide waters to enter the system and flood low lying areas within the Project Site.
- The existing flood protection measures and stormwater system do not provide protection of the Project Site from sea level rise.
- The sanitary sewer system allows infiltration and inflow into the downstream transmission system during wet weather conditions.
- The water system has been subject to breaks and repairs that are costly and sometimes require that tenants be without water service for up to several days.
- The telecommunications systems are unreliable and existing tenants have experienced breaks in service for multiple days.
- The natural gas system does not provide service to many areas within the site.
- The sidewalks range from good to poor condition throughout the site and many locations do not meet accessibility standards and require replacement.

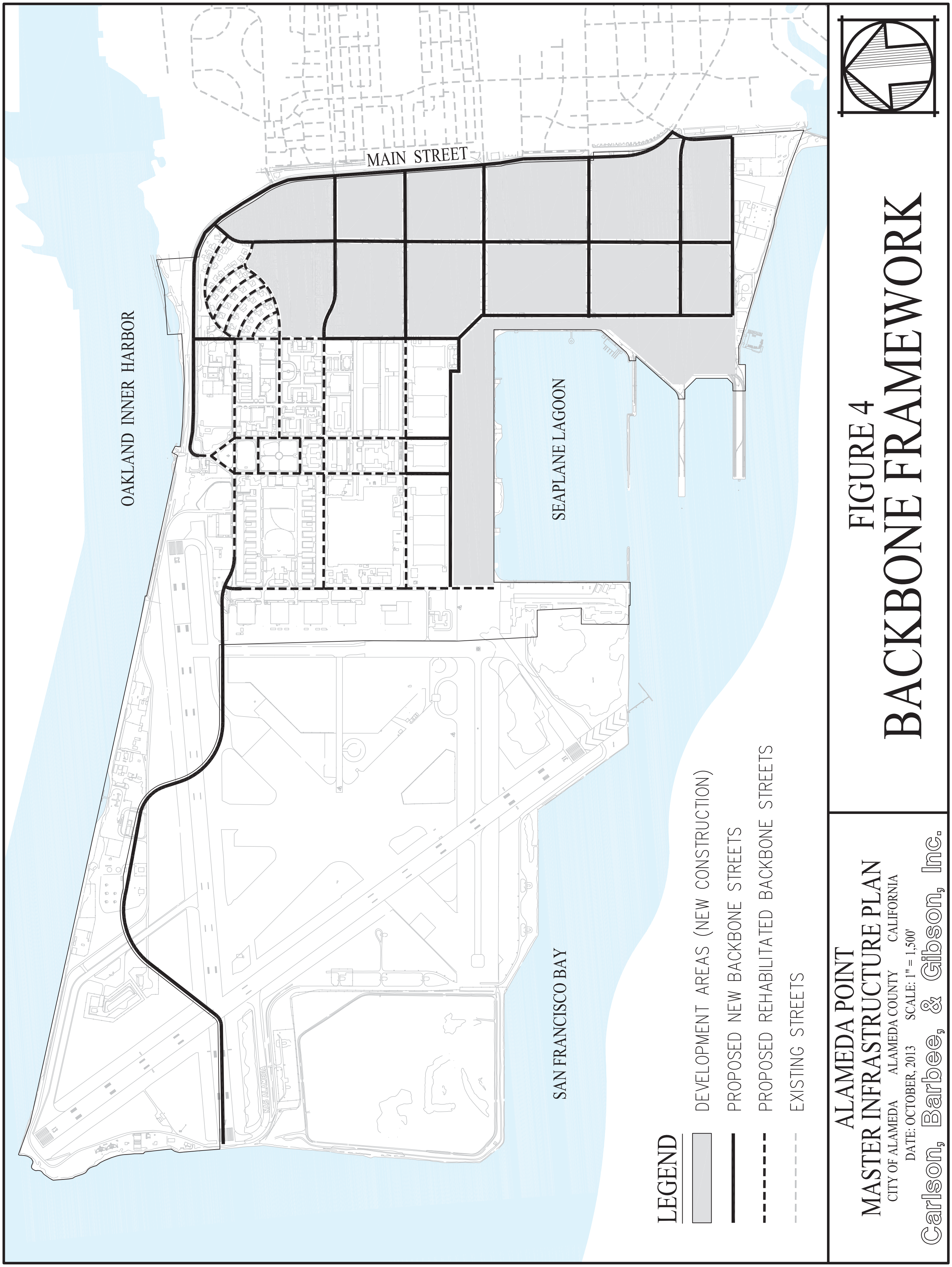
E. Backbone Infrastructure Framework

The MIP establishes a program of backbone infrastructure improvements for Alameda Point. The framework of these backbone improvements is generally based on the grid of streets that comprise the existing street system within the Project Site and the adjoining areas to the east. The framework creates development blocks that range in size from approximately 1.5 acres in the Waterfront Town Center District to nearly 30 acres in the Adaptive Reuse Sub-District. The backbone framework defines corridors necessary to be reserved for infrastructure improvements and ensure the successful phased implementation of the MIP. See Figure 4, Backbone Framework.

Additional internal streets, local utility systems and neighborhood parks, or “in-tract” and “on-site” improvements, will connect to and be supported by the backbone infrastructure. This internal / local infrastructure is dependent on the specific site plan for each development block and will be defined concurrent with the internal developments. The MIP presents general standards for the internal / local infrastructure but does not establish specific locations or provide schematics for this level of infrastructure.

F. Backbone Infrastructure Phasing

The MIP divides the Project Site into three major phases of development as a means of analyzing and illustrating the implementation of the infrastructure improvements. These major phases correlate to the Sub-Districts established by the Zoning Ordinance Amendment. Ultimately, each major phase will be further separated into smaller sub-phases as development occurs. The MIP discusses three “Phase 1” scenarios and presents the necessary infrastructure to be installed in each respective phase scenario. The intent of presenting these multiple scenarios



G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_4_BACKBONE FRAMEWORK.DWG is to outline the infrastructure requirements and coordination associated with the different potential scenarios and to inform future decisions regarding how to phase and develop the Project Site.

Each phase of infrastructure will provide corrective geotechnical measures, flood protection improvements and either new or rehabilitated street and utility systems required to support and serve the associated areas within that subject phase. The new infrastructure constructed with each phase will connect to reliable existing infrastructure systems as close to the proximity of each phase as possible. In most cases, permanent or temporary connections to the new systems will be required to maintain service to existing land uses to remain during each phase. Any connection to unreliable existing infrastructure systems will need to provide for the appropriate measures to protect the integrity of the new systems.

G. Master Infrastructure Plan Flexibility

Adjustments to the Land Use Program due to a change in economic conditions, market factors or other unanticipated change to the development concept may occur throughout the implementation of the MIP and redevelopment of Alameda Point. The MIP contemplates potential land use adjustments in the MIP Flexibility sections of the document.

In particular, the MIP analyzes "Transit Oriented Mixed Use" and "Less Development" Project Alternatives that are presented in the EIR and presents the components of infrastructure that would need to be adjusted in each alternative. The reductions and additions to the infrastructure systems associated with these Project Alternatives are presented in the Section XIV – MIP Flexibility.

H. Sustainability Considerations

The Reuse Plan established the vision for the redevelopment of Alameda Point as a sustainable development promoting conservation of natural resources, reduction in energy consumption, water usage, greenhouse gases and solid waste generation. The MIP presents the components of green infrastructure and sustainable elements that can realistically be integrated with the major backbone infrastructure systems supporting the redevelopment of Alameda Point. As sustainability technologies continuously evolve, it is expected that Alameda Point infrastructure planning will evolve over time as well and implement sustainable components, where feasible.

I. Backbone Infrastructure Costs & Value Engineering

The backbone infrastructure for Alameda Point described in the MIP is estimated to cost approximately $550 to $575 million. The cost estimate in the MIP includes items, such as the amount of parks, that may be subject to future policy decisions by the City Council. Some of these items may also be considered during the preparation and adoption of the development impact / infrastructure fee for Alameda Point, as discussed above. It is critical to implement the backbone infrastructure in phases to maintain financial feasibility. In the Phasing and Implementation Section XIII, the MIP presents three initial Sub-Phase 1A illustrative scenarios, one that establishes 23.5 acres of developable area within the Main Street Neighborhood Sub-District, another that establishes 34.5 of Developable Area within the Waterfront Town Center Sub-District and another that establishes 55 acres of Developable Area with the Enterprise Sub-District. The backbone infrastructure costs are estimated to range from $40 million to $67.5 million depending on the location and size of the scenario.

The MIP also presents value engineering opportunities for components of the backbone infrastructure that could reduce the total cost of the backbone infrastructure by approximately $11.5 million.

J. Project Datum

The elevations presented in this document are based on the City of Alameda Datum. Table 2 provides conversions from the City of Alameda Datum to other published datum.

Table 2 - Alameda Point Vertical Datum Summary

NGVD 29	NAVD 88	City of Alameda	NAS
0.00 Feet	2.70 Feet	-3.41 Feet	104.23 Feet

The difference between the North American Vertical Datum, 1988 (NAVD 88) and the National Geodetic Vertical Datum, 1929 (NGVD 29), based upon the NGS data sheet for PIC HT0880, a brass disc stamped "Main ATL 1947" at the intersection of Main Street and Atlantic Avenue in the City of Alameda, is 2.70 feet. To obtain NAVD 88 elevations, add 2.70 feet to NGVD 29 elevations.

NAVD 88 = NGVD 29 + 2.70 feet

The difference between NGVD 29 and the City of Alameda vertical datum, based upon the "City of Alameda Tide and Datum Chart from U.S.C.&G.S. Jan 1943" is negative 3.41 feet. To obtain City of Alameda elevation, subtract 3.41 feet from NGVD 29 elevations.

City of Alameda = NGVD - 3.41 feet

The difference between NGVD 29 and the Naval Air Station (NAS) datum, is 104.23 feet. To obtain NAS elevations, add 104.23 feet to NGVD 29 elevations.

NAS = NGVD 29 + 104.23 feet

III. DEMOLITION AND PRESERVATION

A. Demolition

The existing buildings and infrastructure within the Development Areas will be deconstructed and demolished. This includes non-historic buildings, buildings not intended for Adaptive Reuse, existing utility systems, existing street improvements, and landscape elements not to be preserved with the proposed project.

The existing buildings to be deconstructed and demolished were formerly a variety of military uses and supporting purposes. These buildings shall be deconstructed to maximize the reuse or recycling of materials, as feasible, consistent with the City of Alameda goal to divert 75% of waste from landfills. The deconstruction of existing buildings will include the abatement of hazardous materials including asbestos materials, lead based paints and materials, and other materials that may be identified as hazardous. The abatement of hazardous materials may limit the amount of materials available for reuse or recycling.

The existing utility systems to be demolished will either be abandoned in place or removed and disposed of. Generally, the existing utility facilities within the proposed rights of ways of the backbone streets will be removed and disposed of. This is expected in order to eliminate conflicts with the proposed new utility systems. The portions of existing utility systems within development blocks may either be abandoned in place or removed and disposed of, as determined by the City based on the development needs within each specific block and potential maintenance or operational impacts. The method of abandonment in place of existing utilities shall be provided by a geotechnical engineer and likely will include slurry fill in larger pipelines and removal of boxes, manholes and other structures.

The existing street improvements to be demolished shall be recycled and reused on-site to the maximum extent feasible. A concrete and asphalt crushing operation and program will be established to process existing materials from building foundations, street sub-grade, street pavement, sidewalks and pathways. The location of the crushing operation and associated stockpiles will need to be approved by the City of Alameda to ensure impacts to existing residents and businesses are minimized. The recycled concrete and asphalt materials shall be processed to achieve Caltrans specifications for recycled materials. These materials are anticipated to be reused on-site as proposed building foundation slab base material, street sub-grade material and utility trench backfill material.

The existing landscape elements to be demolished, including trees and plants, will be cleared and removed. The materials generated from this process shall be composted for on-site uses such as erosion control and proposed landscaping mulch areas.

B. Preservation

Alameda Point includes buildings, objects, structures and landscaped areas that have historical significance. These historical elements are associated with the military legacy of NAS Alameda and have been designated as the National Registered NAS Alameda Historic District and as a City of Alameda Local Historical Monument. The historical elements are generally located within the Adaptive Reuse, Waterfront Town Center and Main Street Neighborhood Sub-Districts. The majority of the existing structures within the Adaptive Reuse Sub-District and the Big White houses within the Main Street Neighborhood Sub-District are currently anticipated to be preserved. It is assumed that the majority of the landscape areas within these areas will also be preserved. This includes the parade grounds near the Main Gate.

The existing utility systems and street improvements within the historic areas will remain operable and will be rehabilitated and replaced, through an incremental approach. The existing elevations of the street improvements will be preserved in order to maintain the historic street alignment, streetscape and appearance of these areas.

See Figure 5 depicting the existing structures assumed by the MIP to be preserved.

C. Environmental Remediation

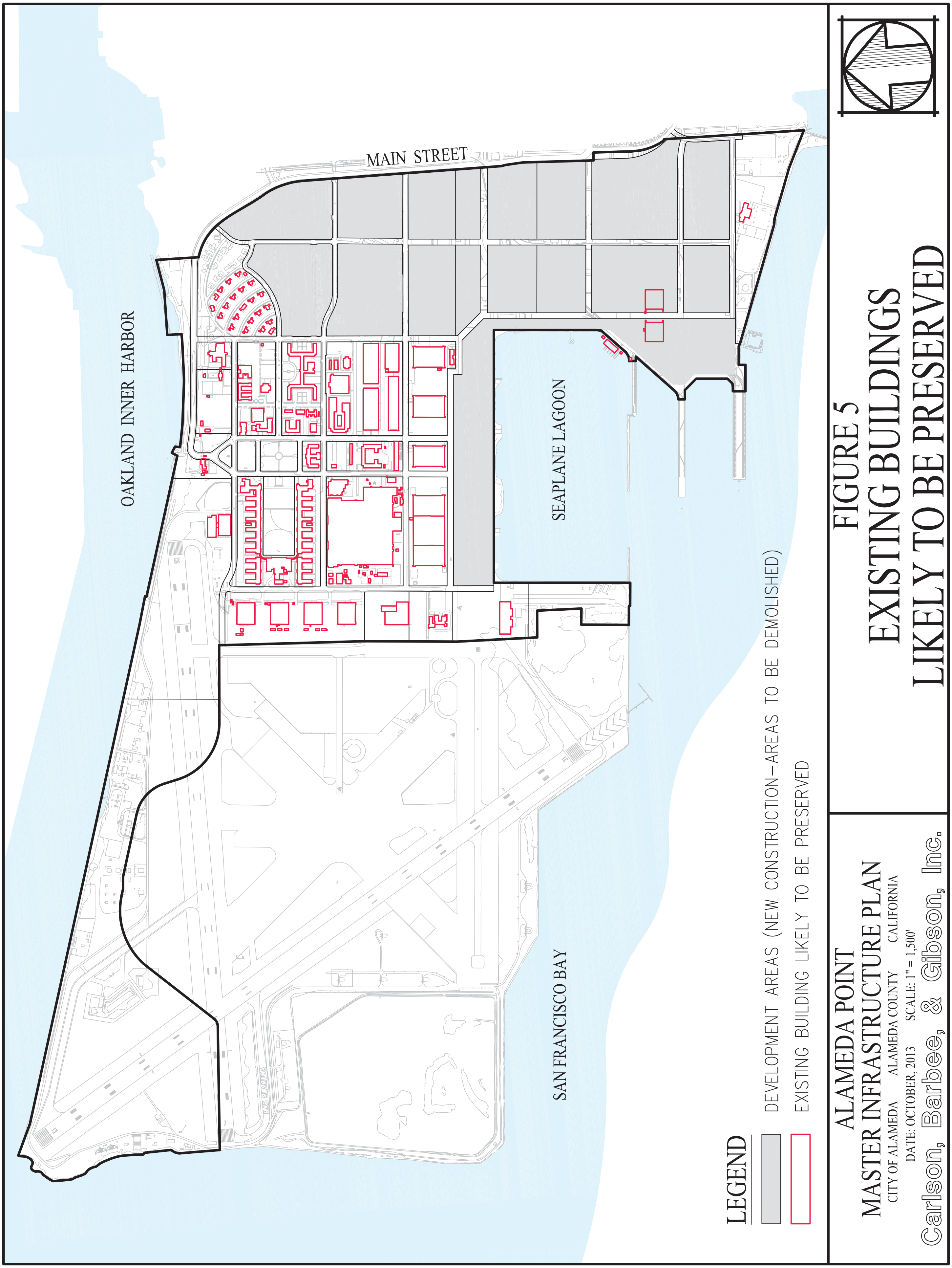
The Base Realignment and Closure (BRAC) program manages disposal of excess military real estate. This may involve base closure, environmental cleanup, and property transfer to other federal agencies or communities for reuse. NAS Alameda is a former Navy base and therefore the Department of the Navy is responsible for cleanup and restoration of the Project Site with oversight from federal and state regulators. The Navy has been conducting environmental investigations and cleanup efforts at Alameda Point both before and since the military operations were terminated at NAS Alameda in 1997. The regulatory agencies with oversight of these cleanup efforts include the U.S. Environmental Protection Agency (EPA), State of California Department of Toxic Substances Control and the San Francisco Regional Water Quality Control Board.

Alameda Point is divided into multiple cleanup Operable Units and Installation Restoration (IR) sites. There are 34 IR Sites within Alameda Point, all in various states of investigation or cleanup. The Navy has on-going remediation efforts within the Project Site. The purpose of these cleanup activities is to protect human health and the environment from contamination resulting from past military activities. See Figure 6 depicting the status of the various IR Sites as of 2013.

Additionally, the eastern portions of Alameda Point are underlain with a layer of sediment that was deposited from the late 1800's to the 1920's which was contaminated with semi-volatile organic compounds. This layer is referred to as the Marsh Crust. The City of Alameda has adopted a Marsh Crust Ordinance that requires an excavation permit for excavations into the Marsh Crust to ensure that proper measures are implemented to protect workers from contaminated materials and to require proper disposal of contaminated materials that are encountered. The areas and associated depths of excavations that require an excavation permit in order to comply with the Marsh Crust Ordinance are depicted on Figure 7.

To address the on-going protection of the human health and the environment through the construction of improvements at Alameda Point, a Site Management Plan (SMP) will be prepared for the Project Site. The SMP will provide guidelines that ensure that development activities at the Project Site will be conducted in a manner to protect the health and safety of workers, residents, visitors, and the environment.

In the case that utility construction is required through areas that have active remediation on-going that has yet to be concluded and that may pose an unacceptable health risk to workers managing and maintaining the utility, the utility will be installed within an utilidor. The utilidor is a facility that will provide protection of the utility workers from surrounding contaminants and preclude the migration of these contaminants into the utility trench. This will also protect the workers from encountering contaminants during future maintenance activities in these specific areas. At this time, the locations where the utilidors may be necessary include utilities crossing Operable Units 2B and 2C. See Figure 8 and Figure 9 depicting the potential locations where utilidors may be required and a conceptual detail for the utilidor.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
DEVELOPMENT AREAS (NEW CONSTRUCTION–AREAS TO BE DEMOLISHED)
EXISTING BUILDING LIKELY TO BE PRESERVED
FIGURE 5
EXISTING BUILDINGS
LIKELY TO BE PRESERVED
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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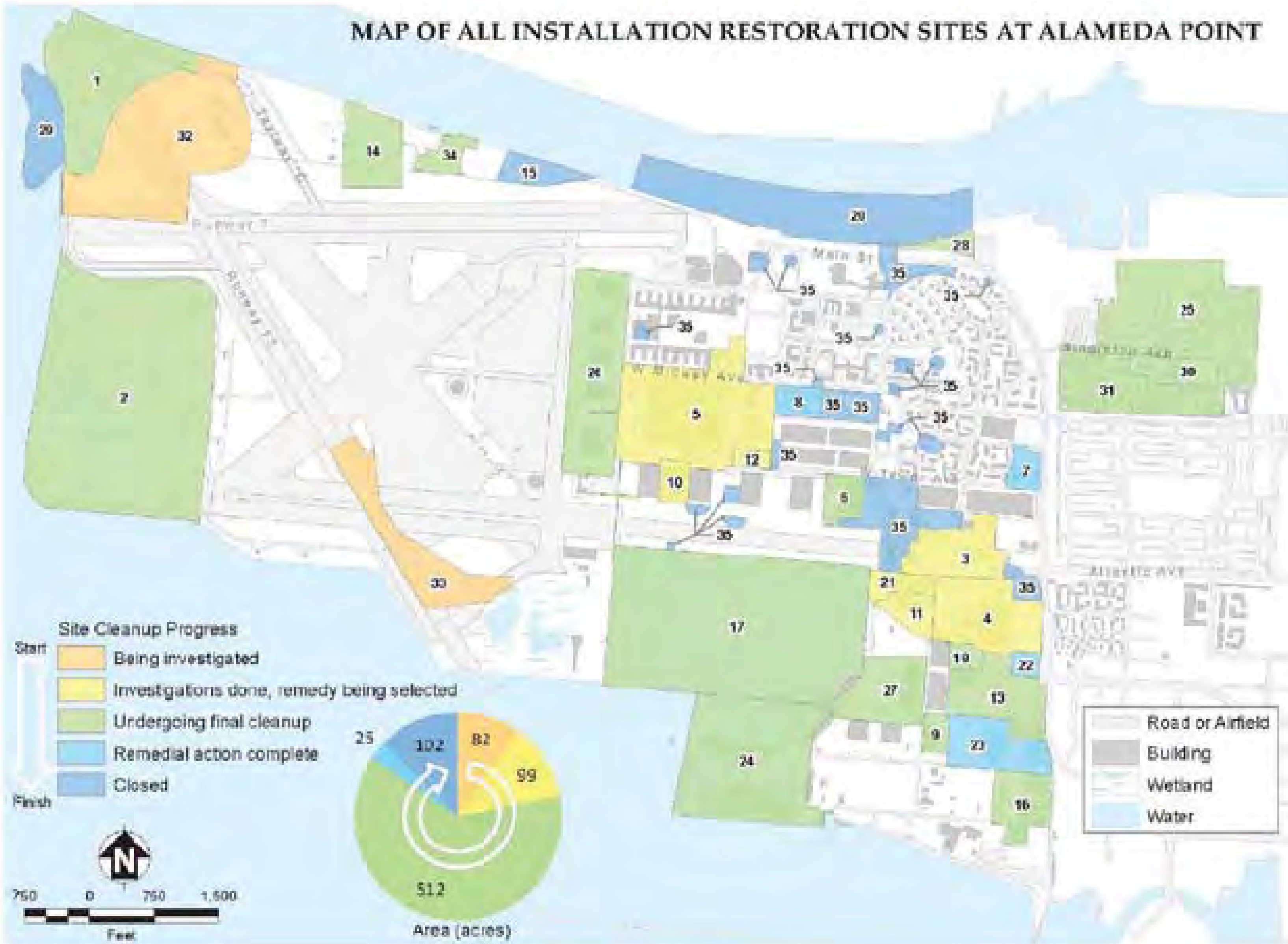

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FIGURE 6
IR SITE STATUS
AS OF APRIL, 2013

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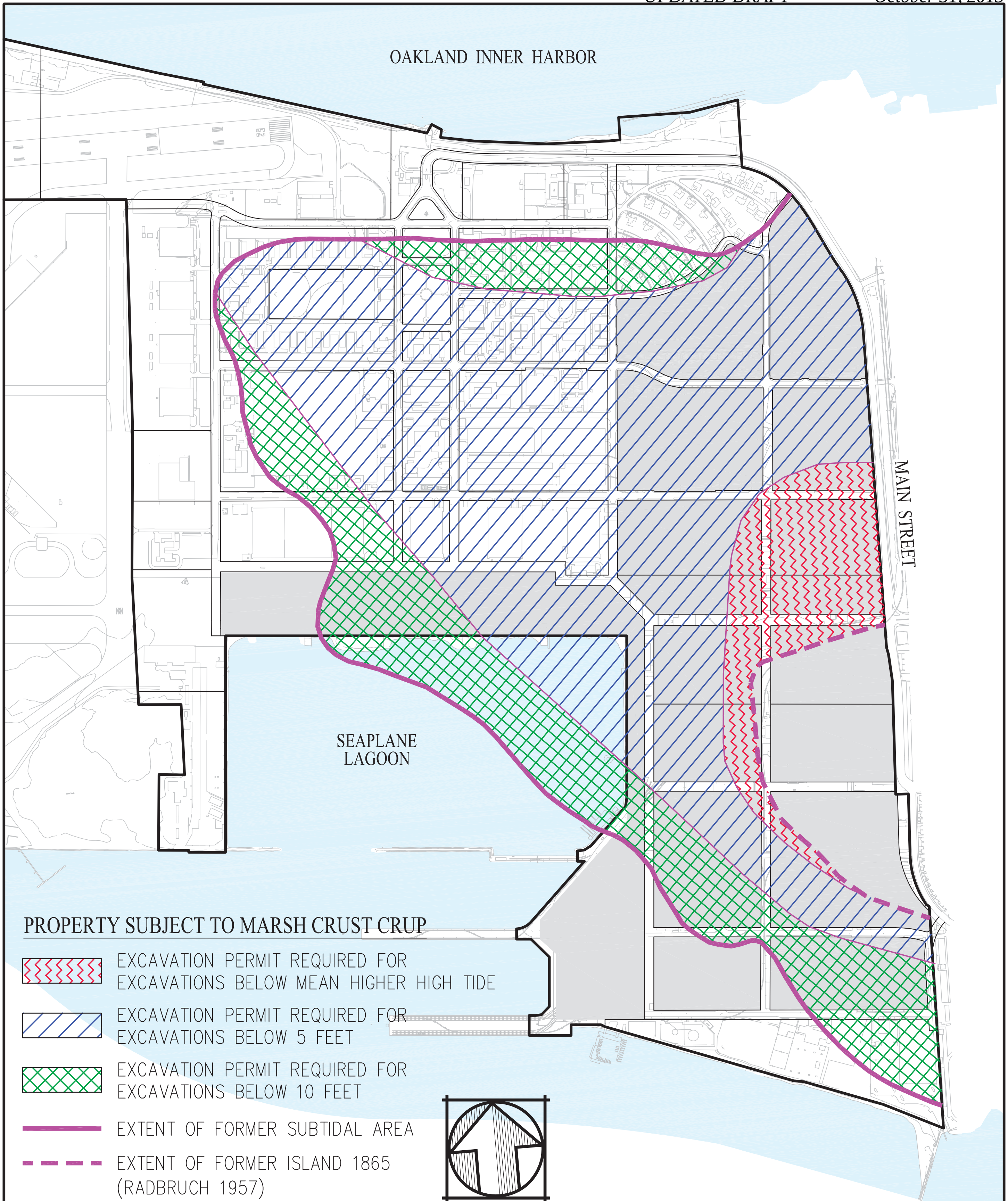

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FIGURE 7 MARSH CRUST ORDINANCE

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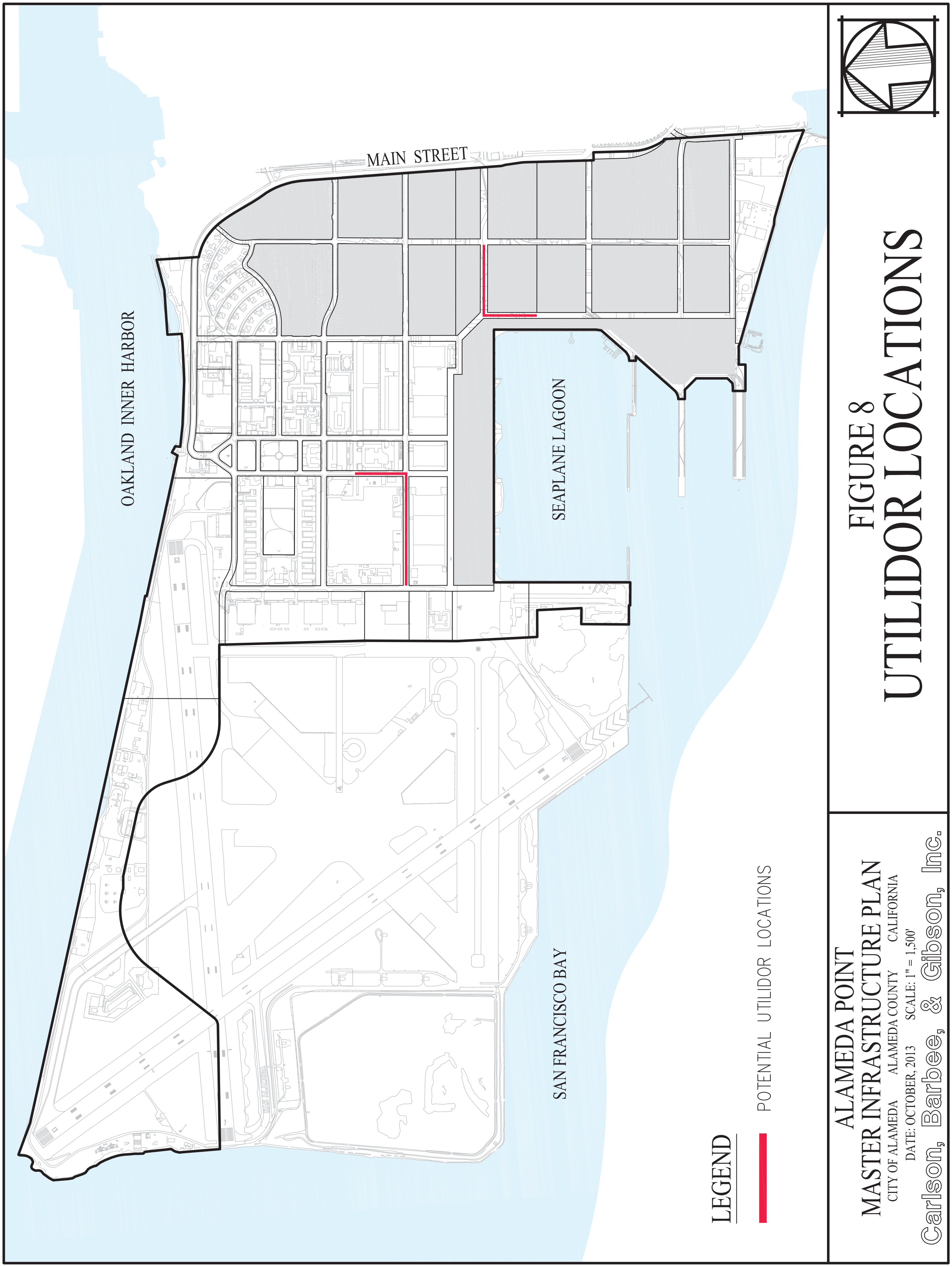

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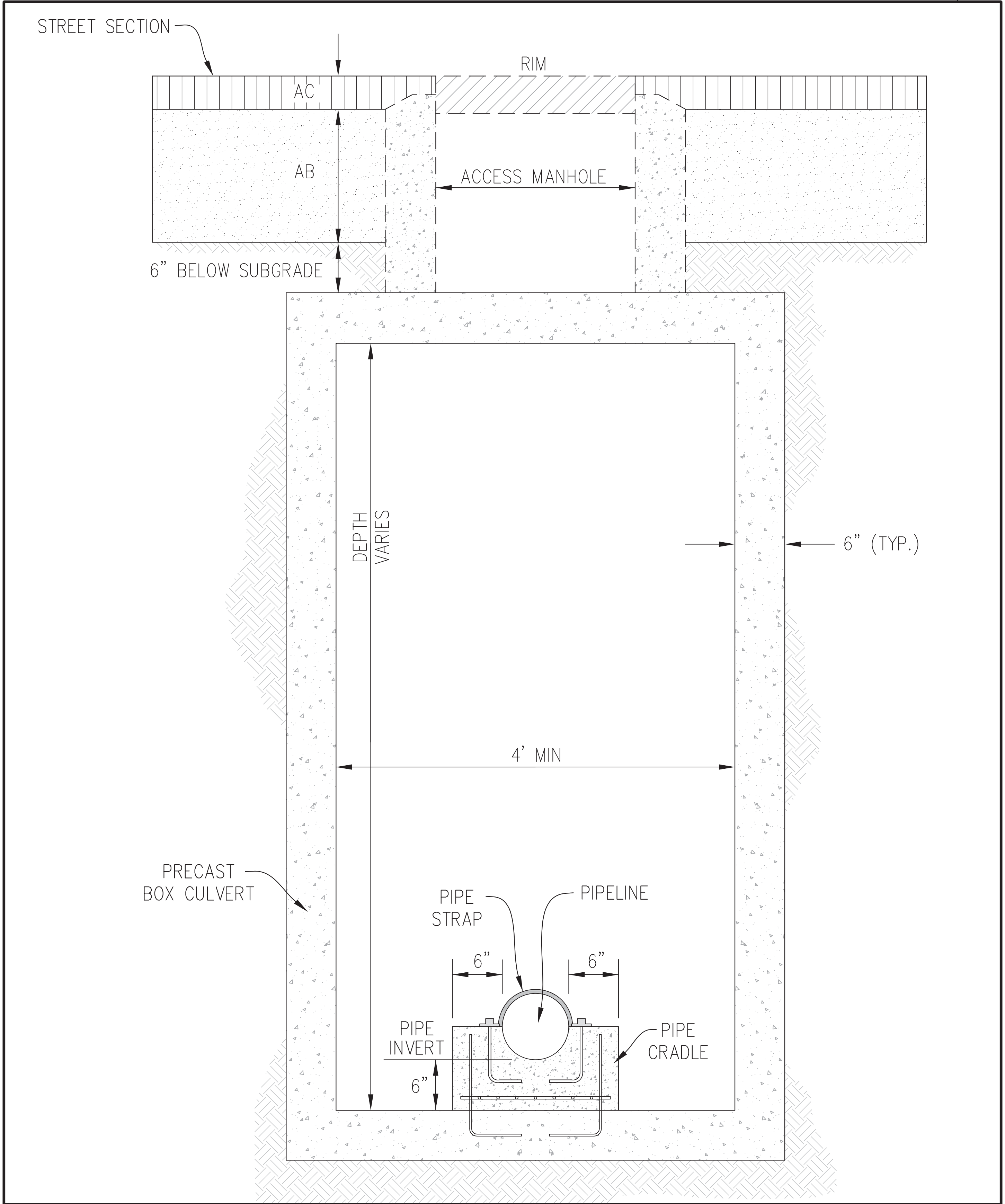

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FIGURE 9
UTILIDOR CONCEPT

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IV. FLOOD PROTECTION AND SITE GRADING

A. Sea Level Rise and Adaptive Management

1. Sea Level Rise Criteria

Development sites along the San Francisco Bay shoreline are susceptible to future inundation with sea level rise. These sites shall develop strategies and design solutions to provide protection from the expected impacts of climate change. To assist the planning of these projects, the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) issued a Sea-Level Rise Guidance Document in March 2013. This document provides guidance for incorporating sea-level rise projections into planning for projects within California. The CO-CAT projections are generally recognized as the best science-based sea level rise projections for California. The CO-CAT sea level rise projections are as follows:

Table 3 - CO-CAT Sea Level Rise Projections (March 2013)

Time Period	Amount of Sea Level Rise
2000 - 2030	1.5 - 12 inches
2000 - 2050	5 - 24 inches
2000 - 2100	17 - 66 inches

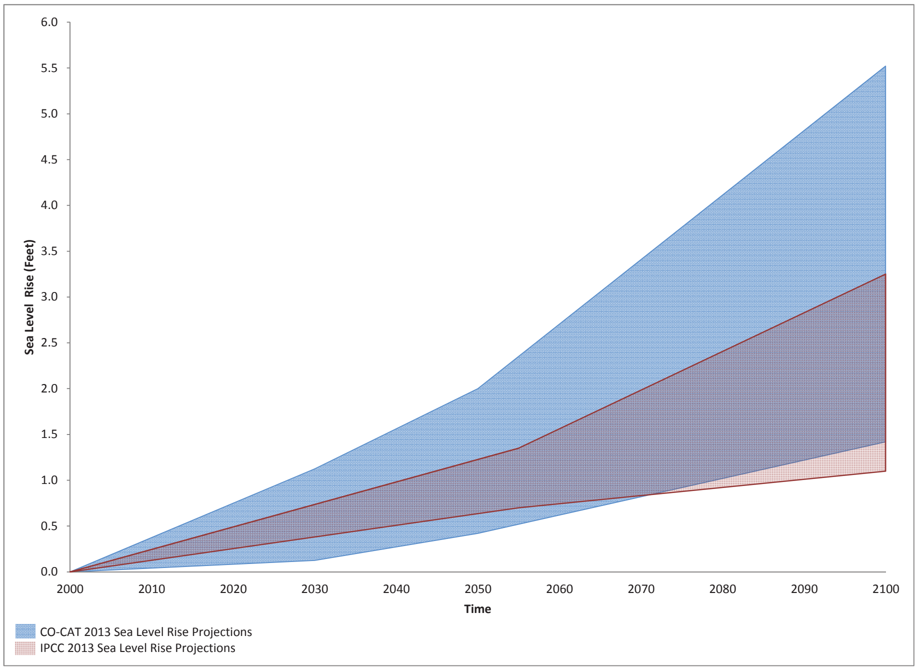
Also, recently in September 2013, the Intergovernmental Panel on Climate Change (IPCC) issued a Fifth Assessment Report on climate change. This report is an update to their Fourth Assessment Report (2007) and reflects advancements in methodologies and understandings of the various components of sea level rise, such as loss of continental ice, thermal expansion of ocean water and past sea level changes. The IPCC report concludes that the global sea level is rising and predicts a global rise between 11 and 38 inches will occur by 2100.

Identifiably, there still remains variability of sea level rise projections within the scientific community. See Graph 1 summarizing the CO-CAT and IPCC sea level rise projections through to the end of the century. Generally, up to 2050 there is agreement among the various climate models for the amount of sea level rise that is likely to occur within that timeframe (i.e., 5 to 24 inches). However after mid-century, the projections of sea level rise become more uncertain and variable, primarily due to the uncertainties associated with future global greenhouse gas emissions and land ice melting rates. Therefore, for projects with timeframes beyond 2050, such as Alameda Point, it is recommended to consider adaptive capacity and adaptive flood protection measures that provide the ability to adapt to increased amounts of sea level rise and ensure long term protection.

In addition, the San Francisco Bay Conservation and Development Commission (BCDC) updated the San Francisco Bay Plan in October 2011 to address the expected impacts of climate change in San Francisco Bay. In order to understand the potential impacts of sea level rise to the shoreline communities around the San Francisco Bay, BCDC conducted a vulnerability assessment. BCDC selected two sea level rise projections to complete this assessment, 16-inches by 2050 and 55-inches by 2100. These projections are within the range of CO-CAT sea level rise predictions. The assessment provides an understanding of the areas susceptible to inundation at these various amounts of sea level rise. From this assessment, BCDC adopted policies within the Bay Plan Amendment that include guidance for addressing future sea level rise when planning projects along the Bay shoreline. BCDC's policies require projects within their jurisdiction to evaluate the potential risks associated with sea level rise, based on the most current science. Additionally, BCDC's policies indicate that projects with a life beyond the mid-century shall have flood protection measures that can be adapted to address additional sea level rise that is projected to occur by the end of the century.

Specific to Alameda Point, the MIP recommends an Adaptive Management Plan for the flood protection system. The flood protection measures constructed in the near term, with initial development, shall be constructed with built-in protection against 18-inches of sea level rise. The 18-inches of sea level rise protection shall be in addition (added to) to other flood protection criteria, including the 100-year tidal elevation and wave/wind run-up. 18-inches is within the ranges of sea level rise predicted by CO-CAT and IPCC to occur by the end of the century.

Graph 1 - 2013 Sea Level Rise Projection



The 18-inch initial protection criteria was selected because it balanced a number of important development considerations:

- **Science and Regional Policies.** Is consistent with latest scientific projections and BCDC policies;
- **Phasing.** Allows initial phases in Development Areas to commence without costly major perimeter improvements that are very difficult for the first initial phases to implement up front;
- **Geotechnical.** Addresses geotechnical soil conditions associated with the compressible Young Bay Mud in a feasible and cost effective manner; and
- **Financial Feasibility.** Recognizes that flood protection improvements are expensive and must be phased and adaptable to balance financial feasibility and near-term development with sea-level rise protection.

2. Benchmarking Sea Level Rise Criteria

For planning of flood protection measures and shoreline improvements, the projected amount of sea level rise will be benchmarked (added to) the design flood criteria of each specific improvement.

At Alameda Point, the shoreline improvements and flood protection measures within the Development and Reuse Areas will be designed to comply with FEMA's flood protection criteria. This flood criteria includes protection from the 100-year tidal event, wave/wind run-up and storm surge. Levees will also require an additional 2-feet of protection above this criteria, as freeboard, providing additional factor of safety and protection. This is further outlined in the Section 6 - Site Grading Criteria. Accordingly, the flood protection measures for Alameda Point are planned based on this FEMA criteria plus an additional 18-inches of sea level rise added. In summary, the MIP recommends 18-inches of sea level rise protection be in addition to the flood criteria of 100-year tidal elevation, wave/wind run-up and storm surge.

There are other shoreline improvements that may have less stringent design flood criteria. For example, the Bay Trail planned in the Northwest Territories does not need to be designed to comply with FEMA's flood protection criteria. This facility may be designed to provide protection from the mean high tide and wave/wind run-up only. The mean high tide elevation is approximately 4-feet lower than the 100-year tidal elevation. In fact, BCDC's vulnerability assessment benchmarked the projected sea level rise on the mean high tide to provide an understanding of risks associated with potential more frequent flooding with sea level rise, not the very infrequent 100-year tidal event. Figure 10.2 is from BCDC's assessment and depicts the areas within Alameda Point that would be inundated by 16-inches of sea level rise and 55-inches of sea level rise, both added to current mean high tide.

Therefore, it is important to note the proposed flood protection measures at Alameda Point will have built-in sea level rise protection above the mean high tide of 66-inches (18-inches plus 4-feet) with the near term measures.

3. Proposed Sea Level Rise Protection

There are a number of flood protection strategies that can be implemented with adaptive capacities to address sea level rise. These include:

- Raise the elevations of the site to be at or above the expected flood levels and projected amount of sea level rise within the life of the project.
- Construct perimeter measures, such as floodwalls and levees, above the expected flood levels and projected amount of sea level rise.
- Set back from the shoreline and develop on areas with existing elevations above the expected flood levels and projected amount of sea level rise.

The MIP recommends a hybrid of these strategies for Alameda Point, implementing the strategy that is most appropriate for each portion of the site. Accordingly, the Development Areas are proposed to be raised to establish minimum elevations at or above the expected flood levels plus 18-inches of sea level rise. The finish floors of all new structures will be constructed 24-inches above the 100-year tidal elevation, providing an additional 6-inches above the initial 18-inches amount of sea level rise. For the Reuse Areas where preservation goals of the Historic District preclude interior elevations from being raised, perimeter measures will be constructed. Lastly, there are opportunities within the Project Site for future tidal wetlands to be created as sea levels rise. These areas are along the western shore of the Seaplane Lagoon and within the Northwest Territories.

With the scientific uncertainties regarding the pace and amount of future sea level rise, CO-CAT and IPCC are committed to continue to periodically update their projections to reflect the most accurate available data and theories. Therefore a sea level rise monitoring program will be established at Alameda Point to periodically review actual sea level rise amounts, trajectories, and updated projections.

If future sea level rise amounts are anticipated to exceed 18-inches, additional flood protection measures will be implemented. The flood protection system will be adaptively designed to address sea level rise in excess of 18-inches. The adaptive measures will include preserving inland land and right of way along the perimeter of the site such that existing shorelines and floodwalls could be elevated to manage sea level rise. The perimeter improvements shall be designed to allow for the future flood protection measures to be widened and support additional height such that no fill is placed in the Bay. Other adaptive measures that may be implemented include a flexible perimeter protection measure that shifts inland and allows the out board land to be converted to tidal wetlands. This type of solution is only anticipated as an option for the western shoreline of the Seaplane Lagoon and Northwest Territories. A funding mechanism to implement these future adaptive measures will be established for the Alameda Point area. A Geologic Hazard Abatement District (GHAD) will be established at Alameda Point to serve as the mechanism to monitor, maintain and implement the adaptive flood protection measures.

The near term and future perimeter flood protection measures shall be designed in accordance with the National Flood Protection Insurance Program (NFIP), as described in Title 4, Chapter 1, Section 65.10 of the Code of Federal Regulations.

4. Existing Conditions

a. Existing Topography

The existing topography of Alameda Point is generally flat and has gradients ranging between 0.2 and 0.75 percent. The existing elevations throughout the Project Site range between 0.5 and 9.0 (City Datum).

There is an existing slight ridge in the middle of the Project Site, near Midway Avenue. The elevations of this ridge are approximately 7.0. The existing ground slopes away from this ridge either to north or the south. The existing elevations of the southeast quadrant are also elevated, an average elevation of 7.0. This portion of the Project Site includes the existing piers, which are at elevation 9.0.

The low lying areas include the northern entrance to the Project Site at the Main Gate, where the elevation is approximately 1.0. Also, the areas in the northwest corner of the Seaplane Lagoon are at elevations ranging in between 2.0 and 3.4.

The existing elevations of Main Street adjacent to the northeastern portion of the Project Site are also low. The lowest point of Main Street is located at the Main Street / Ferry Terminal Parking Lot intersection, which is at elevation 0.5. This portion of Main Street is drained by an existing storm drain pump station.

The existing topography of the Northwest Territories generally drains northerly to the Oakland-Alameda Estuary. The existing runways are elevated and crowned, approximately at elevation 7.5, and the surrounding areas are depressed, approximately at elevations 1.5 – 5.0.

b. Existing Areas of Potential Flooding

Currently, Federal Emergency Management Agency (FEMA) has not included Alameda Point within a Flood Insurance Study or Flood Insurance Rate Map, since it was a federal facility. The existing areas of potential inundation will need to be mapped and adopted by FEMA. This process is currently underway through FEMA's California Coastal Analysis and Mapping Project. This study will include the shorelines of Alameda Point and define the coastal flood hazards within the project site based on regional-scale storm surge and wave models of the San Francisco Bay. The flood hazards affecting portions of the Project Site include areas subject to flooding in the 100-year tidal event and the perimeter shoreline that is subject to flooding in the 100-year tidal event and wave/wind run up. See Figure 10.1 depicting the approximate existing areas that are subject to the current 100-year flood hazards within Alameda Point.

The portion of Main Street adjacent to the northeastern portion of the Project Site is identified as within "Zone A", areas subject to flooding in the 100-year event, on FEMA's FIRM panel, dated 2009.

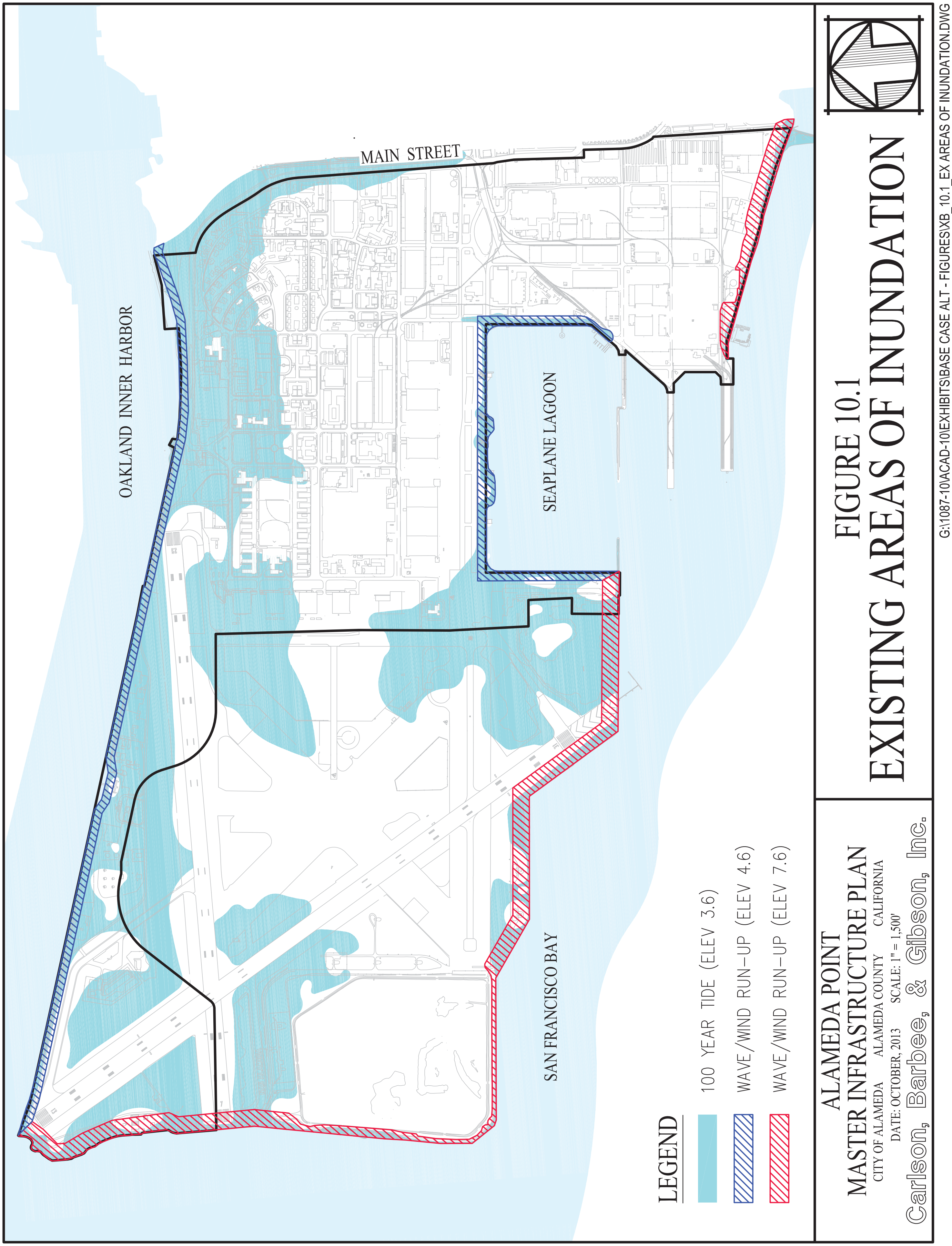
As part of BCDC's Bay Plan Amendment, BCDC conducted a vulnerability assessment. This assessment indicates the low-lying areas surrounding the San Francisco Bay that would be inundated by 16-inches of sea level rise assumed to occur by 2050 and 55-inches of sea level rise assumed to occur by 2100. See Figure 10.2 depicting the areas within Alameda Point that would be inundated at these two amounts of sea level rise. It is important to note that this figure represents that areas inundated by comparing the projected amount of sea level rise to the mean high tide. As previously stated, the 100-year tidal elevation is approximately 4-feet above the mean high tide. Accordingly, the areas depicted as inundated by the 100-year tidal event on Figure 10.1 are similar to those areas depicted as inundated by sea level rise added to the mean high tide as depicted on Figure 10.2

i. 100-Year Tide

The 100-year tidal elevation is established by the flood frequency analysis prepared by the U.S. Army Corp of Engineers in October 1984. This study, titled "San Francisco Bay – Tidal Stage versus Frequency Study" analyzed the flood frequency based upon tidal data throughout the Bay Area for a 129-year period. One of the tidal gauges utilized in this analysis in located near the piers at the southeastern portion of Alameda Point. The 100-year tidal elevation at the Alameda Point tidal gauge presented in this study is elevation 3.4. In order to account for the increased mean sea level represented between the old and new tidal epochs, the 100-year tidal elevation is increased by 0.2-feet to elevation 3.6 for the MIP.

ii. Wave/Wind Run-Up

The perimeter coastal areas within Alameda Point will be designed to account for wave/wind run up. The prevailing winds at the Project Site are from the west, with typical speeds up to approximately 25 knots. Extreme wind conditions for the Project Site were previously calculated in the Alameda Point Golf Course EIR and are summarized in Table 4.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
100 YEAR TIDE (ELEV 3.6)
WAVE/WIND RUN-UP (ELEV 4.6)
WAVE/WIND RUN-UP (ELEV 7.6)
FIGURE 10.1
EXISTING AREAS OF INUNDATION
ALAMEDA POINT
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DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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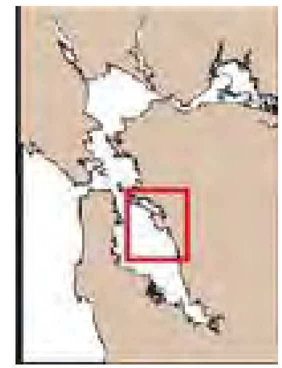

San Francisco Bay Conservation and Development Commission

Figure 1.10

- Area potentially exposed to an approximate 16-inch sea level rise
- Area potentially exposed to an approximate 55-inch sea level rise

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

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FIGURE 10.2
SEA LEVEL RISE

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Table 4 - Wind Conditions

Return Period (Years)	Wind Speed (Knots)
2	29.7
10	36.8
25	40.3
50	43.0
100	45.6

The majority of the shoreline within with Project Site is well protected from wind generated waves and from swell. The northern shoreline along the Oakland-Alameda Estuary and the Seaplane Lagoon shoreline are sheltered from the wind waves. Wave/wind run-up for these shorelines is estimated to be a maximum of 1-foot.

The shorelines along the southern edge of the Project Site, east of the Seaplane Lagoon, are directly exposed to the wind generated waves. The 100-year wind wave heights estimated for these shorelines are approximately 4-feet.

iii. Tsunamis

The Golden Gate limits the propagation of tsunamis through the San Francisco Bay providing sheltering of Alameda Point from the majority of potential tsunami damage. San Francisco Bay has had a tidal gauge, in various locations, recording data since 1854 to present. Over this period of time, there have been approximately 50 creditable tsunamis recorded or observed in the San Francisco Bay region. Of these, only 5 produced run up that exceeded 1.6 ft. (-1.8 City Datum) within the Bay. The best-documented tsunami events are the 1946, 1960 and 1964 tsunamis generated by distant earthquakes in Aleutian Islands, Southern Chile and Prince William Sound, Alaska respectively. The highest recorded wave height associated with a tsunami event at the Alameda tidal gauge was associated with the 1964 Alaskan tsunami event. The tidal gauge recorded a maximum wave height during this event of approximately 2.3 ft. (-0.8 City Datum). Based on the available records from tidal gauges within the San Francisco Bay Area, this maximum event is representative of a 100-year tsunami event. The approximate maximum wave height associated with this event is less than the 100-year tidal elevation and therefore is below the elevation of the proposed flood protection measures at Alameda Point.

Additionally, the US Geologic Survey (USGS) recently issued a report, “Community Exposure to Tsunami Hazards in California” dated March 2013, which evaluated the potential community exposure to tsunami hazards along the California coastline, including San Francisco Bay. USGS completed simulation modeling of tsunami generation, propagation and run up to determine and investigate the “worst case” type scenario. USGS determined that large ruptures along the Aleutian subduction zone is the most likely to generate the strongest tsunami within the San Francisco Bay and presents the greatest hazard, larger than any other modeled potential source either locally or in the Pacific. Specific to Alameda, this type of modeled tsunami event presented in this USGS report indicates that the maximum onshore run up elevation is 10.6 (City Datum). While this event is an extreme case with a low probability of occurrence, the majority of Alameda Point would be inundated by a tsunami event of this magnitude. This report concludes that because of the City of Alameda's high percentage of people and businesses within the tsunami prone area, the City has high potential for losses related to this significant tsunami event. Accordingly, proposed developments within the Project Site shall work with the City of Alameda emergency services to establish emergency preparedness plans and evacuation routes for Alameda Point in the case of this extreme event.

iv. Wakes

Large vessels associated with the Port of Oakland's activities commonly travel along the northern shoreline. Additionally, ferry vessels may enter the Seaplane Lagoon as part of the transit solutions for Alameda Point. This shipping traffic may generate wakes up to approximately 1-foot.

5. Initial Flood Protection System

a. Flood Protection Criteria

The flood protection criteria for Alameda Point combine those outlined by the FEMA with additional consideration for sea level rise. The FEMA guidelines for establishing the flood elevations vary for shoreline areas and for inland areas. FEMA's design criteria for shoreline areas require that the flood protection measures be established above the 100-year tidal elevation plus consideration for wave / wind run-up. If the flood protection measure is a perimeter levee, the crest elevation must include the greater of either 2-feet above the 100-year tidal elevation or 1-foot above the 100-year tidal elevation plus wave / wind run up. The FEMA design criteria for the inland areas consider only the 100-year tidal elevation. The minimum elevations of the initial flood protection system for Alameda Point will adhere to FEMA's guidelines plus an additional 18-inches of sea level rise.

b. Development Areas

The Development Areas will be elevated to achieve the initial flood protection criteria. The minimum elevations of the inland Development Areas will be designed to be at or above the 100-year tidal elevation plus 18-inches of sea level rise. The finish floors of all new structures will be constructed 24-inches above the 100-year tidal elevation, providing an additional 6-inches above the initial 18-inches amount of sea level rise. The minimum elevations of the perimeter of the Development Areas will be designed to be at or above the 100-year tidal elevation, plus consideration for wave/wind run up and 18-inches of sea level rise. The flood protection measures within the Development Areas will be phased consistent with the development phasing.

The shorelines will be designed to dedicate the necessary right-of-way and land for the future adaptive measures that will be employed as part of Alameda Point's Adaptive Management Plan for future sea level rise in excess of 18-inches. Typically, a 50 to 90-foot wide corridor shall be reserved along the Development Area shorelines. This future adaptive measures corridor is anticipated to encompass the Bay Trail alignment. This corridor will accommodate a future levee or floodwall elevated to provide protection from future sea level rise.

c. Reuse Areas

The Reuse Areas include historic structures and landscapes that will be preserved. Generally, many of the existing structures are elevated relative to the street elevations. A sample of the existing structures was field surveyed. The majority of these structures had an existing finish floor elevation above the 100-year tidal elevation plus sea level rise. However, there were some existing structures in the northwest and southwest portions of the Project Site that have existing finish floor elevations below the 100-year tidal elevation plus 18-inches of sea level rise. Additionally, the majority of the existing streets within the Reuse Areas are at an elevation below the 100-year tide. Therefore, the initial flood protection system for the Reuse Areas will be comprised of a perimeter system of levees and floodwalls. These perimeter measures will be designed to have a crest elevation that meets FEMA's guidelines, which include 100-year tidal elevation, plus wave / wind run up, 18-inches of sea level rise plus 2-feet of additional protection (freeboard). The construction of the initial flood protection system for the Reuse Areas will be completed over time as described in the Phasing and Implementation Section XIII.

The levees and floodwalls will be designed to be adapted if the amount of future sea level rise exceeds 18-inches. Typically, a 50-foot wide corridor shall be reserved along the Reuse Area shorelines. This future adaptive measures corridor is anticipated to encompass the Bay Trail alignment. This corridor will accommodate further elevating the initial construction levee or floodwall to provide increased protection from future sea level rise.

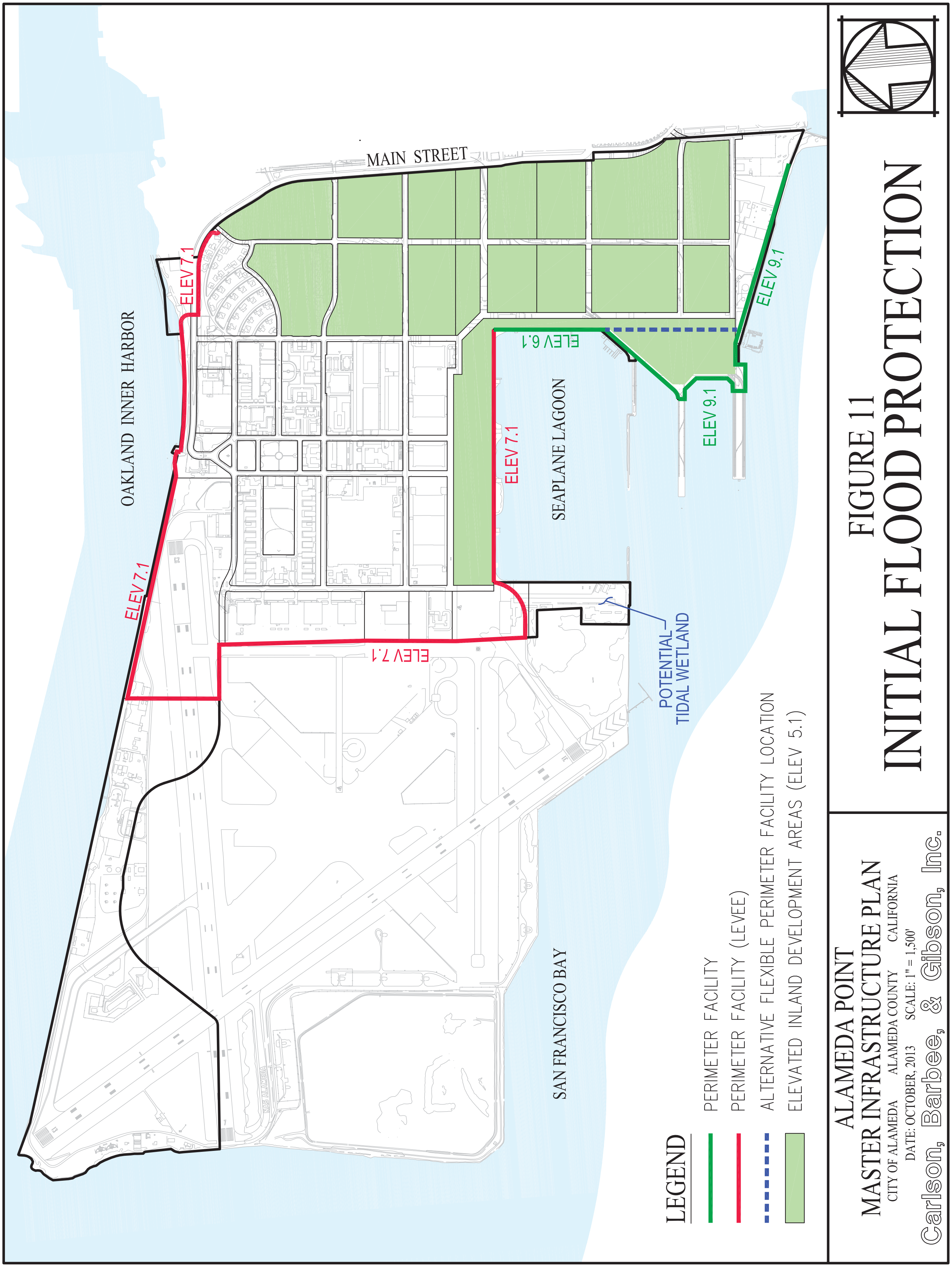
See Figure 11 depicting the initial flood protection system and minimum elevations throughout Alameda Point.

d. Bay Trail - NW Territories and VA Property

In general, the Bay Trail outside of the Development and Reuse Areas within the NW Territories and VA Property will be constructed along the shoreline. The minimum elevation of the Bay Trail shall be in accordance with BCDC's design guidelines for public use areas along the Bay shoreline. Generally, the Bay Trail will be constructed at an elevation above the anticipated amount of sea level rise within the design life of this facility. However, the Bay Trail within the NW Territories and VA Property are not expected to be constructed to the FEMA standards of a flood protection berm / levee and therefore not providing flood protection for the VA Property. Additionally, the segment of the Bay Trail along the perimeter of the VA Property is subject to review and approval by the United States Fish and Wildlife Service, if open all year outside the breeding season of the endangered California Least Tern. Other design measures for the Bay Trail may be necessary to ensure the protection of endangered and sensitive species within the VA Property.

e. Stormwater System

A new stormwater collection system will be constructed in phases within the Project Site. The stormwater system will include the construction of new outfall structures that include tide valves to prevent tidal influences in the system. For the low lying watersheds, pump stations will be constructed to minimize the depth of the stormwater pipelines and ensure stormwater discharge during extreme tides and 18-inches of sea level rise. The new stormwater system will be designed to convey the 25-year design storm with 6-inches of minimum freeboard. Additionally, the system will accommodate the 100-year storm with a maximum ponding in the streets of up to the top of curb at low points in the street profiles.



MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
ELEV 7.1
ELEV 7.1
ELEV 7.1
ELEV 7.1
ELEV 6.1
ELEV 9.1
ELEV 9.1
POTENTIAL TIDAL WETLAND
LEGEND
PERIMETER FACILITY
PERIMETER FACILITY (LEVEE)
ALTERNATIVE FLEXIBLE PERIMETER FACILITY LOCATION
ELEVATED INLAND DEVELOPMENT AREAS (ELEV 5.1)
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FIGURE 11
INITIAL FLOOD PROTECTION
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6. Site Grading Design Criteria

The site grading design criteria for the various flood protection measures presented above are summarized in Table 5.

Table 5 - Site Grading Design Criteria

	Location	**Improvements**	**Min. Elev. (City Datum)**	**Design Criteria**
Development Areas (New Construction)				
Perimeter	Eastern Seaplane Lagoon	Raise Ex Revetment	6.1	100-Year Tide +18" Sea Level Rise +1' Wind/Wave
	West & North Project Boundary	Raise Ex Headwall or Revetment	7.1	100-Year Tide +18" Sea Level Rise +2' Wind/Wave
	Existing Piers	Raise Ex Floodwall	9.1	100-Year Tide +18" Sea Level Rise +4' Wind/Wave
	Southeast Project Boundary	Raise Ex Revetment	9.1	100-Year Tide +18" Sea Level Rise +4' Wind/Wave
Inland	Areas Adjacent to Main Street	Raise Finish Grade	5.1	100-Year Tide +18" Sea Level Rise
	Areas Adjacent to Seaplane Lagoon	Raise Finish Grade	6.1	100-Year Tide +18" Sea Level Rise +1' Wind/Wave
Reuse Areas				
Perimeter	West & North Project Boundary	Construct Berm or Raise Ex Revetment	7.1	100-Year Tide +18" Sea Level Rise +1' Wind/Wave
Inland	Existing Areas to Remain	Existing Elevations to Remain	-	Existing Elevations to Remain As Is
Main Street				
Reconstruction	NW Alameda Ferry Terminal Parking Lot Entrance to Atlantic Ave.	Raise Main Street	3.6	

7. Flood Protection System Adaptations for Future Sea Level Rise

a. Adaptive Measure Criteria

As previously described, the initial flood protection system will provide flood protection for up to 18-inches of sea level rise. These initial flood protection measures will be designed to be adapted if the amount of future sea level rise exceeds 18-inches. The adaptive measures for the Development Areas will include constructing a perimeter system of levees and floodwalls. The adaptive measures for the Reuse Areas will include elevating the initially constructed perimeter levees and floodwalls. The adapted perimeter measures will be elevated to meet FEMA's guidelines with the necessary amount of sea level rise. The inland edge along the eastern boundary of Alameda Point will rely on protection from sea level rise in excess of 18-inches by regional flood protection measures along the perimeter of the remainder of Alameda.

In some locations, the location of the perimeter system may be shifted inland as part of the implementation of adaptive measures. This would allow for the creation of tidal wetlands as part of the Project's response to climate change.

A funding mechanism will need to be established to generate long term funding from the Alameda Point residents and businesses to monitor sea level rise and implement the phased construction of the adaptive flood protection measures to meet future projections. This mechanism may be GHAD. The funding and financing mechanisms will be evaluated as part of future development and financing discussions for Alameda Point.

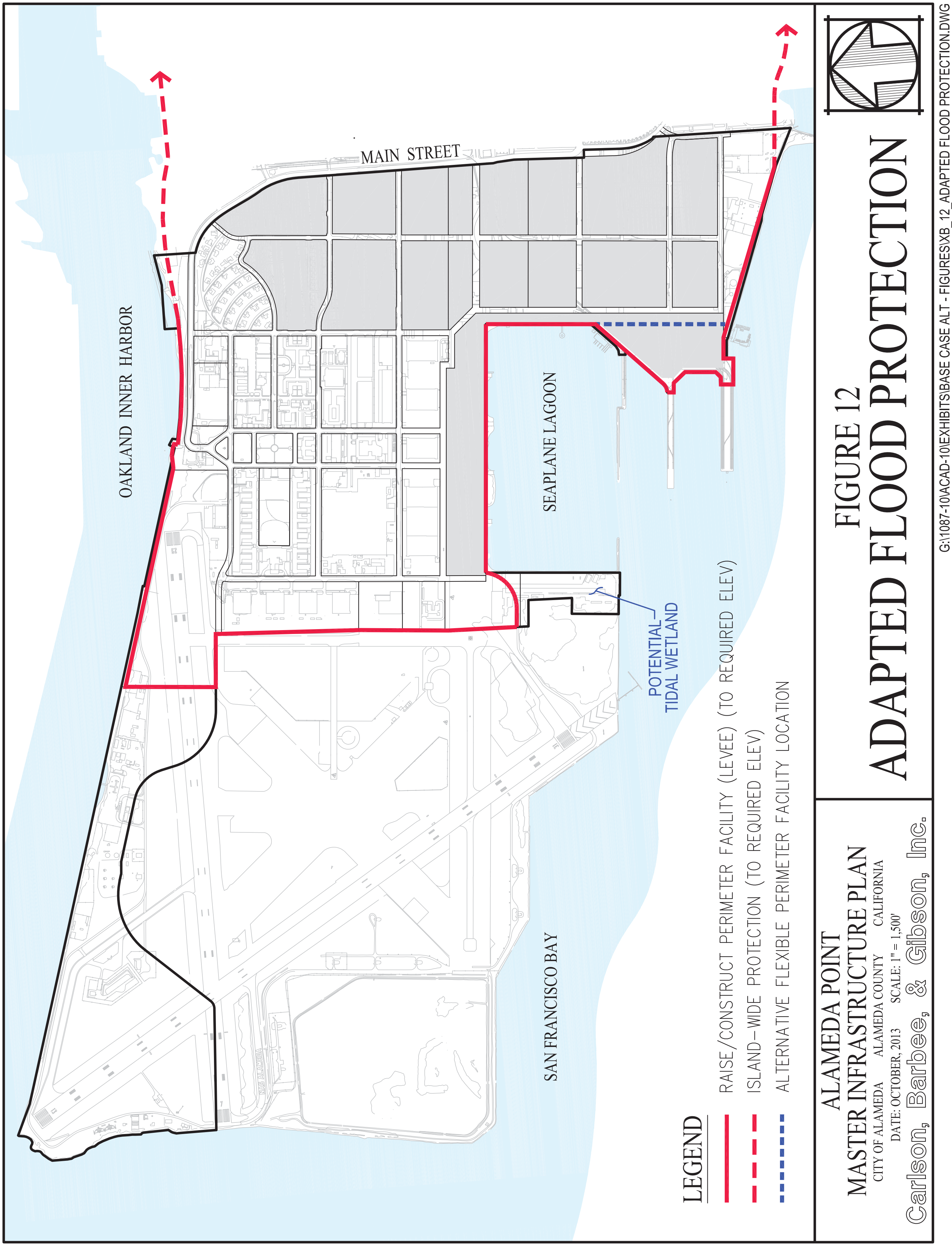
See Figure 12 through Figure 14 depicting the future flood protection system and how the adaptive measures will be implemented for future sea level rise in excess of 18-inches.

b. Stormwater System

The proposed stormwater system at Alameda Point can continue to collect and convey the required design storms regardless of the amount of future sea level rise. For those watersheds that do not include pump stations with the initial flood protection system, the adaptive measures will include the construction of a pump station, such that all watersheds within Alameda Point have pump stations as part of the stormwater collection systems. The pump stations will ensure stormwater discharge to the surrounding waters in extreme tides and with any amount of sea level rise.

8. Sea Level Rise Monitoring Program

An on-going sea level rise monitoring and financing program will be established for Alameda Point. This program may be managed through a GHAD. It will be administered through the City of Alameda and funded through the residents and businesses at Alameda Point. The program will review the sea level rise estimates prepared for the San Francisco Bay by the National Oceanic Atmospheric Administration, as well as other relevant publications regarding updated sea level rise estimates that are available at that time. The review will estimate when improvements to the initial flood protection system will need to be implemented, confirm that sufficient funds will be available to construct the improvements when needed, and, if necessary, accelerate the construction schedule and/or funding of improvements. Initially, it is anticipated that these reviews will be conducted every 5 years, however, more frequent reviews will occur over time, especially if new regulatory requirements are created to address sea level rise or the rate of sea level rise projections increases.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
POTENTIAL TIDAL WETLAND
LEGEND
RAISE/CONSTRUCT PERIMETER FACILITY (LEVEE) (TO REQUIRED ELEV)
ISLAND-WIDE PROTECTION (TO REQUIRED ELEV)
ALTERNATIVE FLEXIBLE PERIMETER FACILITY LOCATION
FIGURE 12
ADAPTED FLOOD PROTECTION
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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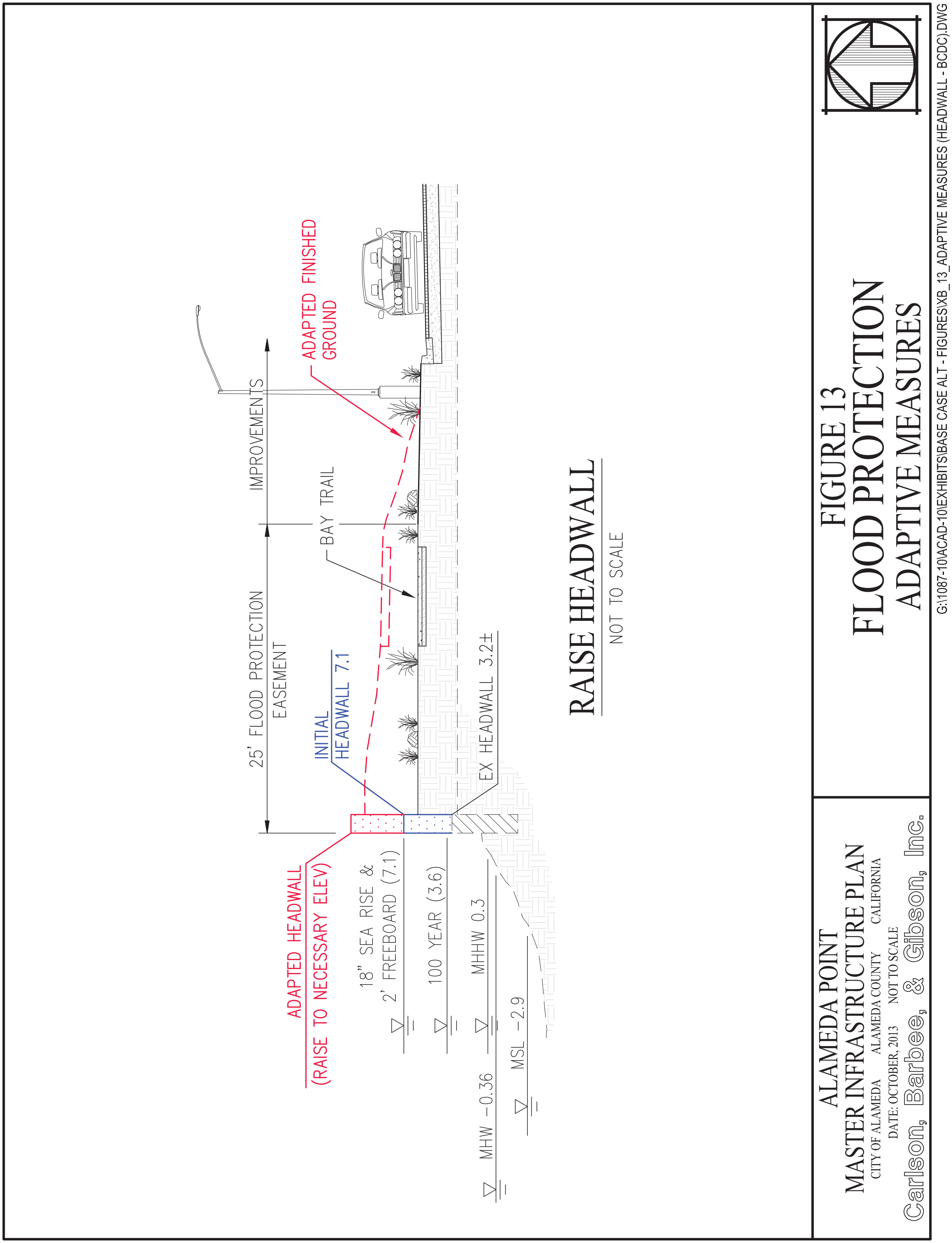
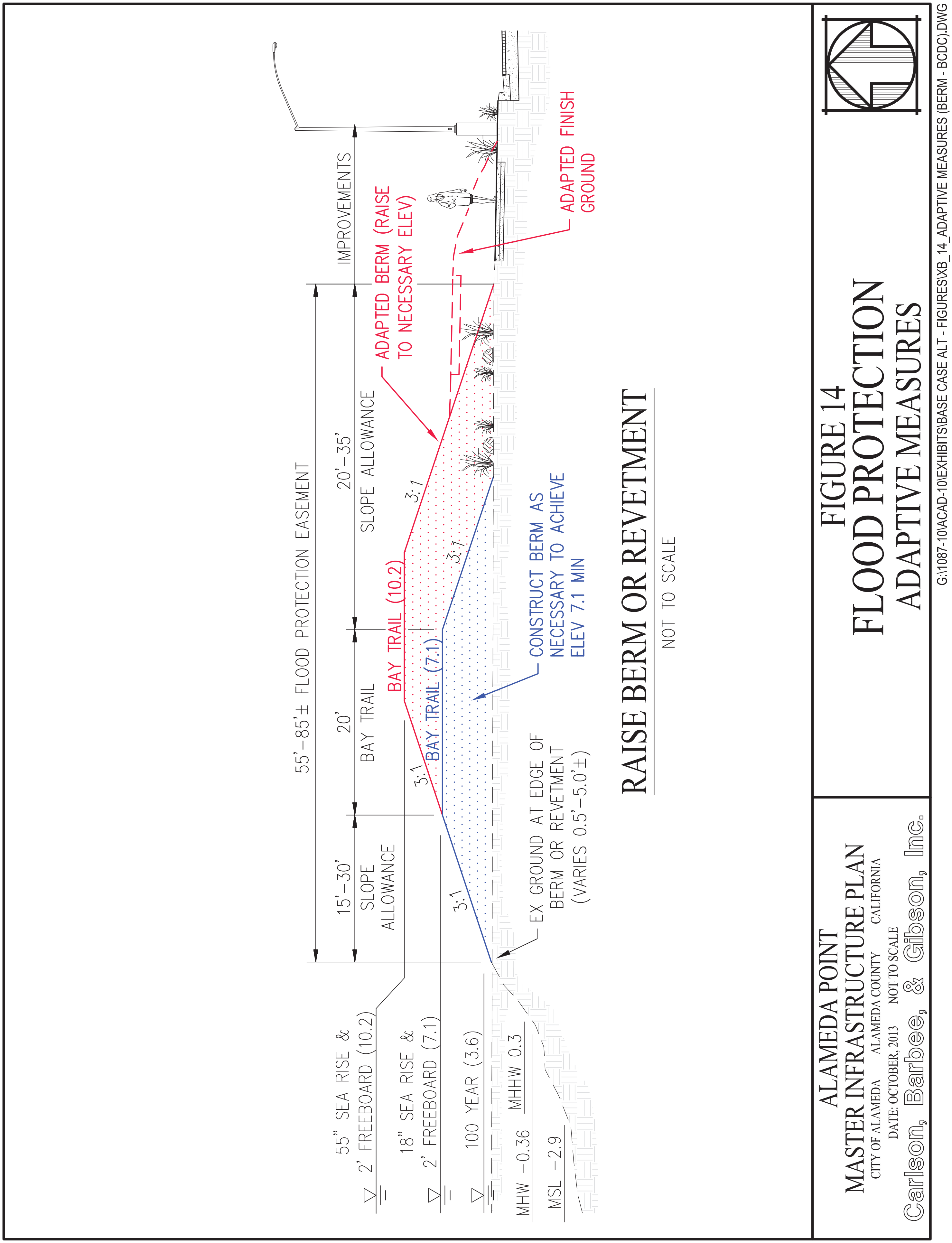
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_12_ADAPTED FLOOD PROTECTION.DWG


G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_13_ADAPTIVE MEASURES (HEADWALL - BCDC).DWG
FIGURE 13
FLOOD PROTECTION
ADAPTIVE MEASURES
RAISE HEADWALL
NOT TO SCALE
ADAPTED FINISHED GROUND
IMPROVEMENTS
BAY TRAIL
25' FLOOD PROTECTION EASEMENT
INITIAL HEADWALL 7.1
EX HEADWALL 3.2±
ADAPTED HEADWALL
(RAISE TO NECESSARY ELEV)
18" SEA RISE &
2' FREEBOARD (7.1)
100 YEAR (3.6)
MHHW 0.3
MHW -0.36
MSL -2.9
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.


55" SEA RISE & 2' FREEBOARD (10.2)
18" SEA RISE & 2' FREEBOARD (7.1)
100 YEAR (3.6)
MHHW 0.3
MHW -0.36
MSL -2.9
55'-85'± FLOOD PROTECTION EASEMENT
15'-30'
SLOPE ALLOWANCE
20'
BAY TRAIL
20'-35'
SLOPE ALLOWANCE
IMPROVEMENTS
ADAPTED BERM (RAISE TO NECESSARY ELEV)
ADAPTED FINISH GROUND
BAY TRAIL (10.2)
BAY TRAIL (7.1)
3:1
3:1
3:1
3:1
CONSTRUCT BERM AS NECESSARY TO ACHIEVE ELEV 7.1 MIN
EX GROUND AT EDGE OF BERM OR REVETMENT (VARIES 0.5'-5.0'±)
RAISE BERM OR REVETMENT
NOT TO SCALE
FIGURE 14
FLOOD PROTECTION
ADAPTIVE MEASURES
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_14_ADAPTIVE MEASURES (BERM - BCDC).DWG

9. FEMA Floodplain

Initially, the existing areas of potential inundation within Alameda Point will need to be mapped and adopted by FEMA. As previously stated, this process is currently underway through FEMA's California Coastal Analysis and Mapping Project. At the time that design of flood protection measures is being completed, a Conditional Letter of Map Revision (CLOMR) shall be processed and approved by FEMA. The CLOMR will demonstrate FEMA's concurrence that design of the flood protection measures will remove the proposed development areas from the flood zones. Once the flood protection measures have been constructed, a field survey can be completed to document the as-built elevations of these facilities. This information will be used to process a final Letter of Map Revisions (LOMR). Once the LOMR is approved by FEMA, the FIRM panel will be revised to depict the constructed flood protection measures and remove the protected areas from the floodplain. The CLOMR and LOMR can be prepared and processed in phases with the development phasing.

10. Earthwork Quantities

The site grading activities will include the geotechnical corrective measures to stabilize the site and site grading to achieve minimum elevations described above. The estimated earthwork quantities of these activities is approximately 25,000 cubic yards of cut and 1,800,000 cubic yards of fill. Therefore, it is estimated that approximately 1,775,000 cubic yards of import material will be required in order to complete the necessary site grading including a surcharge operation discussed in SectionIV.B.2.c. The import materials may be either trucked or barged to the Project Site, depending on available sources. See Figure 15 depicting the areas where fill material is required in order to achieve the minimum elevations specified in the site grading design criteria. This does not include the fill material that may be required for the Bay Trail outside of the Development and Reuse Areas.

The geotechnical corrective measures and site grading will be phased with the development phasing. The surcharge operation will likely include additional sub-phases in order to optimize and minimize the amount of import and export of materials for this operation.

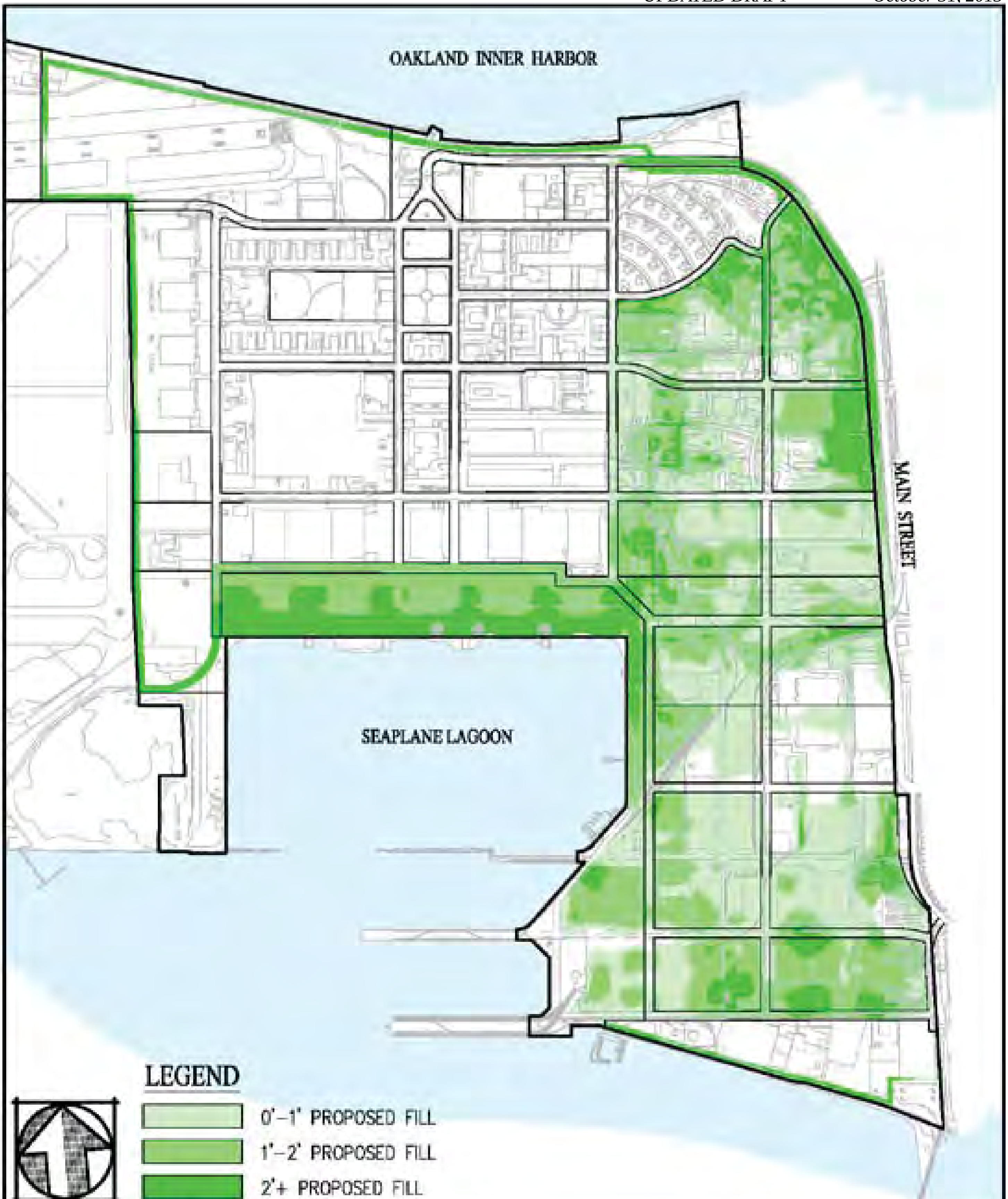
B. Geotechnical Conditions

1. Subsurface Conditions

The subsurface conditions at Alameda Point generally consist of artificial fill of varying thickness. Young Bay Mud exists beneath the fill in the portions of the site to the north of the Seaplane Lagoon with the greatest thickness of approximately 130 feet. Merritt Sand and the San Antonio formation sand exist directly beneath the fill in the southeastern portion of the site, approximately 60 to 70 feet in thickness, and dipping beneath the Young Bay Mud to the north and the west. Yerba Buena Mud, also commonly called Old Bay Mud, lies beneath the San Antonio formation.

Due to site elevations and proximity to the San Francisco Bay, the site has relatively shallow groundwater. Based on historic groundwater measurements, the groundwater is approximately 4 to 6 feet below existing grade of the site.

Much of the existing fill and some of the Merritt Sand deposits are potentially liquefiable. The Young Bay Mud deposits are highly compressible under loads associated with fill and buildings. The Young Bay Mud is also soft, typically leading to relatively low stability of cuts and slopes as well as low bearing capacity.



ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,000'
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FIGURE 15
FILL AREAS MAP

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2. Geotechnical Considerations

The main geotechnical considerations for Alameda Point are commonly encountered at waterfront development sites throughout the Bay Area. The considerations include:

- Shoreline Slope Stability
- Liquefaction
- Compressible Soils
- Underground Utility Construction

These considerations and proposed corrective measures are discussed below. A design-level geotechnical analysis to confirm the necessary corrective measures shall be prepared as part of the design process of proposed improvements.

a. North Shoreline

i. Slope Stability

The northern shoreline of Alameda Point is adjacent to a portion of the Port of Oakland's shipping channel. The historical dredging of the shipping channel has resulted in the northern shoreline having a steep slope below the water surface, down to the bottom of the channel. In 2009, the Port of Oakland completed a project deepening and widening the Inner and Outer Harbor shipping channels. This project included deepening of the shipping channel along the northern shoreline of Alameda Point. The static slope stability and seismic performance of the northern shoreline was evaluated through the permitting process of the Port's recent project.

The Port analyzed the slope stability of various locations along the northern shoreline of Alameda Point. The locations of the cross sections the Port analyzed are shown on Figure 16. The Port's analysis concluded that the static stability of cross section I-I' was marginal and the seismic performance was poor with potential deformations at all seismic levels. The seismic performance of cross section J-J' was concluded to be good at the channel limit but poor at the shoreline. The additional cross sections adjacent to the Northwest Territories , F-F', G-G', and H-H', were found to be stable under static conditions. But, the seismic conditions were also predicted to experience deformations at these cross sections. In summary, the Port's analysis indicated that the northern shoreline was marginally stable in static conditions, but had predicted deformations to occur in seismic conditions.

As part of the MIP, additional analyses of the slope stability of cross sections I-I' and J-J' have been conducted to verify the Port's conclusions. The MIP slope stability calculations confirm that the northern shoreline slopes adjacent to the Development and Reuse Areas are marginally stable under current conditions. Any new loads from fill placement or buildings within 50 feet of the northern shoreline would likely have an impact on static slope stability. Additionally, the MIP calculations also predict deformations under seismic conditions, ranging from 6-inches to over 3-feet, which are considered seismically "unstable" under the California Geological Survey presented in Special Publication 117A (SP117A). According to these guidelines, such deformation "may be sufficient to cause serious ground cracking or enough strength loss to result in continuing (post seismic) failure."

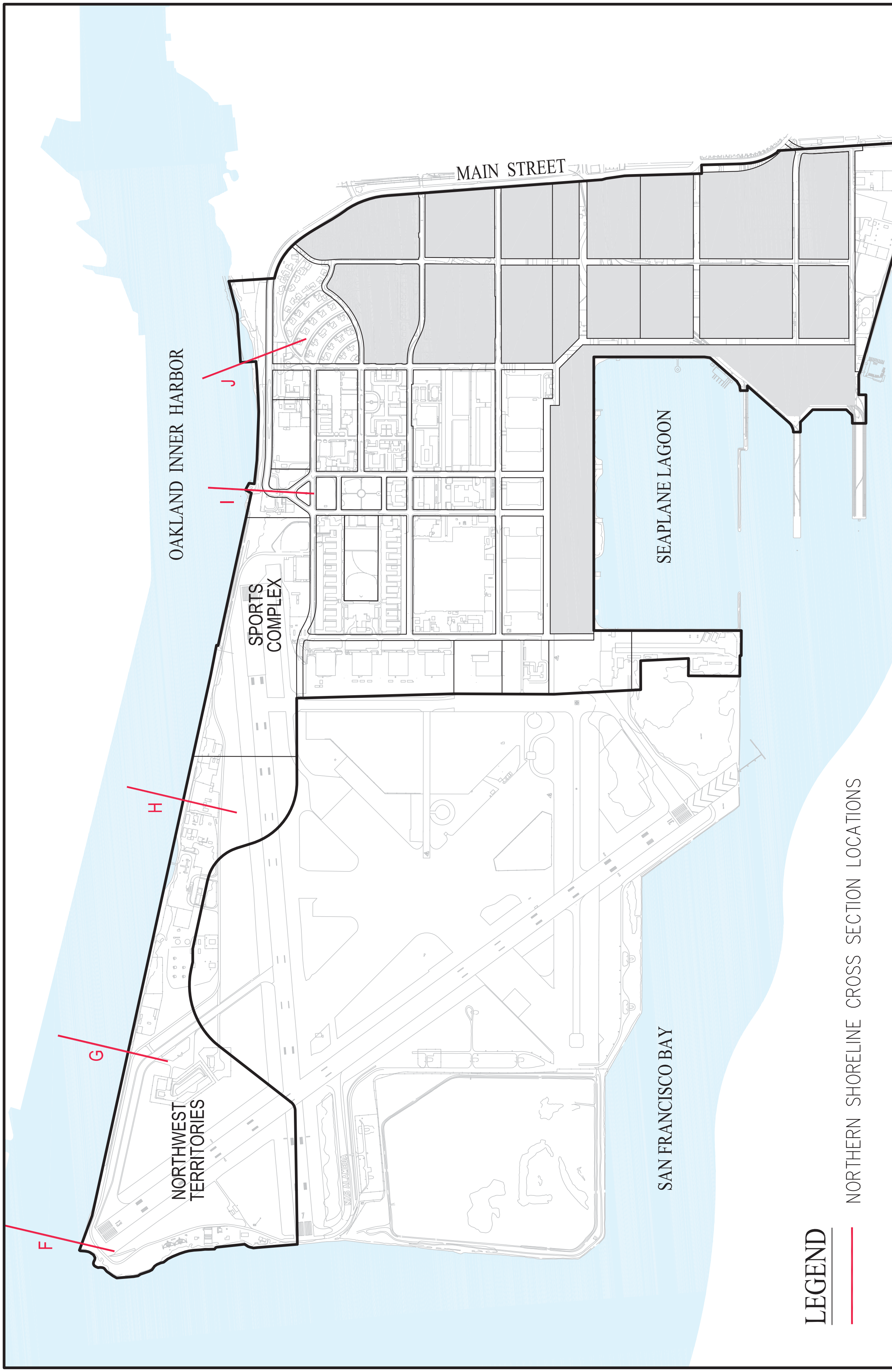

FIGURE 16
NORTHERN SHORELINE CROSS-SECTION LOCATIONS

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_16_N SHORELINE (CROSS-SECTIONS).DWG

Deformations could extend more than 1,000-feet from the shore at cross section I-I' and approximately 200-feet at cross section J-J'. The distance of potential deformation for the portion of the northern shoreline adjacent to the Northwest Territories is approximately 200-feet.

Lateral stability issues at the shoreline are not unique to this site and are found in other sites with similar subsurface conditions along the border of the San Francisco Bay. The amount of potential displacement and potential distance from the shoreline are exacerbated by the adjacent dredge cut in the channel. The amount of displacement and distance from the shoreline can be refined as part of the project design by performing additional field exploration and soil testing along with using more advanced analytical methods, such as numerical modeling.

See Figure 17 depicting the approximate zones of deformation along the northern shoreline in seismic activities.

ii. Corrective Measures

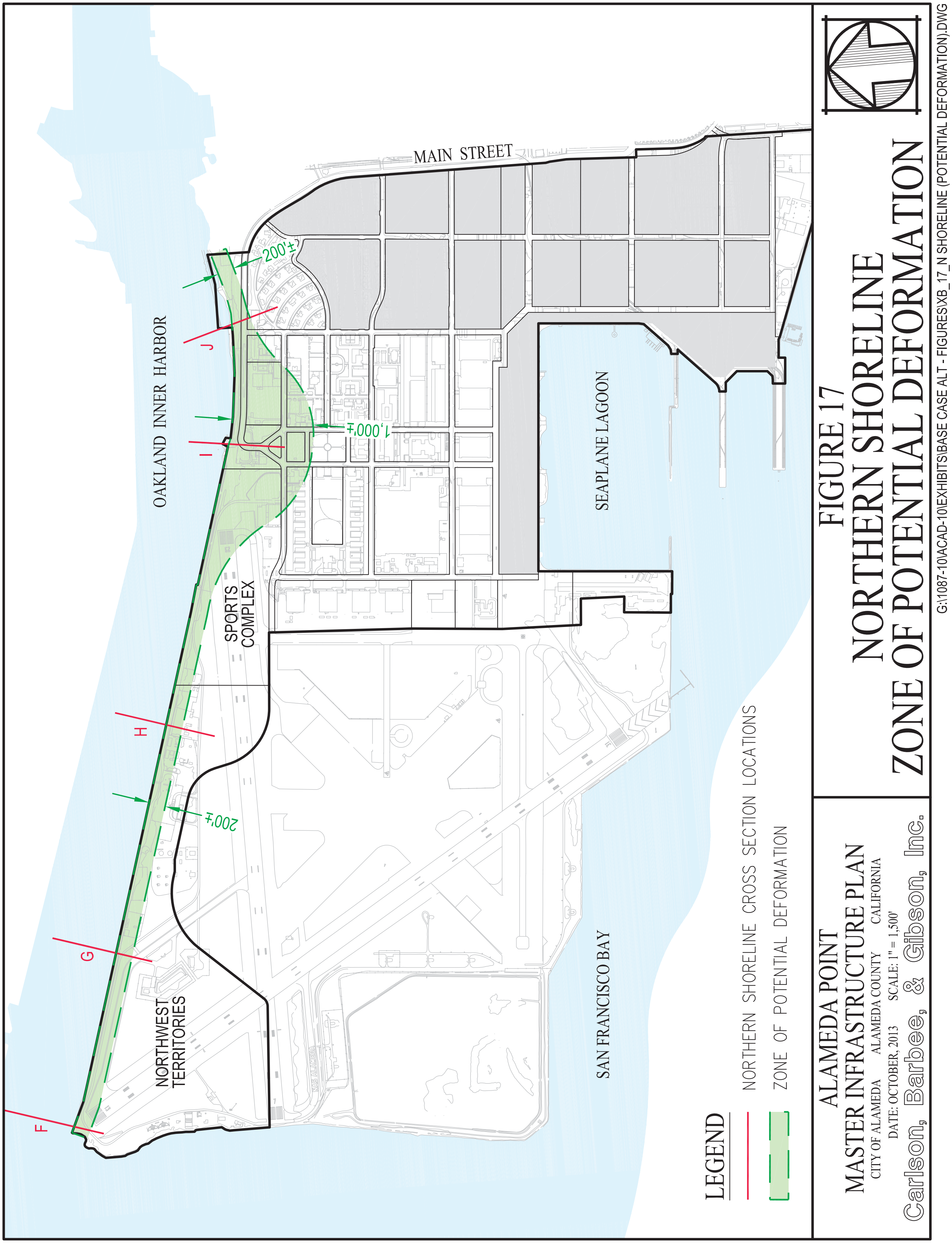
For the portion of the northern shoreline adjacent to the Reuse and Development Areas and the Sports Complex a significant setback from the shoreline is not feasible. Also, options have been evaluated to minimize the length of the northern shoreline that will be stabilized, including limiting the improvements to only adjacent to Pump Station R. However, there are multiple existing critical components of infrastructure, such as Main Street for site access, Pump Station R and the 20-inch force main, within the zone of potential deformation. Therefore, strengthening of the shoreline will be necessary in these areas to reduce the loss or damage of these facilities in a seismic event. The most cost effective shoreline stabilization measure is anticipated to be performing ground improvement such as soil/ cement mixing. Because both the liquefiable fill and Young Bay Mud impact the seismic slope stability, the soil/cement mixing will need to extend about 40 feet below the ground surface to the bottom of the Young Bay Mud layer. To appropriately improve shoreline stability it is estimated that the soil treatment may need to be performed on 15 to 30 percent of the soil volume over an area between 20 to 30 feet wide. Other shoreline improvement measures, such as a levee and flood protection system could be constructed in conjunction with the improvement area. An alternative to soil/cement mixing would be construction of a structure, such as a deep bulkhead wall.

There are no corrective measures proposed for the remainder of the northern shoreline adjacent to the Northwest Territories. This area is generally planned for passive open space uses that can accommodate the potential deformations in a seismic event. Any critical or important improvements or amenities planned within the Northwest Territories shall be located outside of the zone of deformation. Otherwise, additional shoreline stability measures will be required in these areas.

b. Liquefaction

i. Liquefiable Soils

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. The previous explorations at the site encountered sand and silty sand deposits that could potentially liquefy under seismic loading. Shallow liquefiable soil is most likely


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SPORTS COMPLEX
NORTHWEST TERRITORIES
SAN FRANCISCO BAY
200'±
1,000'±
200'±
F
G
H
I
J
LEGEND
NORTHERN SHORELINE CROSS SECTION LOCATIONS
ZONE OF POTENTIAL DEFORMATION
FIGURE 17
NORTHERN SHORELINE
ZONE OF POTENTIAL DEFORMATION
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_17_N SHORELINE (POTENTIAL DEFORMATION).DWG

to vent to the surface in the form of sand boils. Sand boils were observed in portions of the Naval Air Station Alameda in the 1989 Loma Prieta Earthquake.

An evaluation of liquefaction potential was performed for the Project Site. The results indicate that sand and silty sand fill material and native deposits are potentially liquefiable down to 40 feet below existing grades. These analyses also indicate that the potentially liquefiable soil could settle as much as 11 inches. A plan showing the depth of liquefiable soil material within the Project Site is provided as Figure 18.

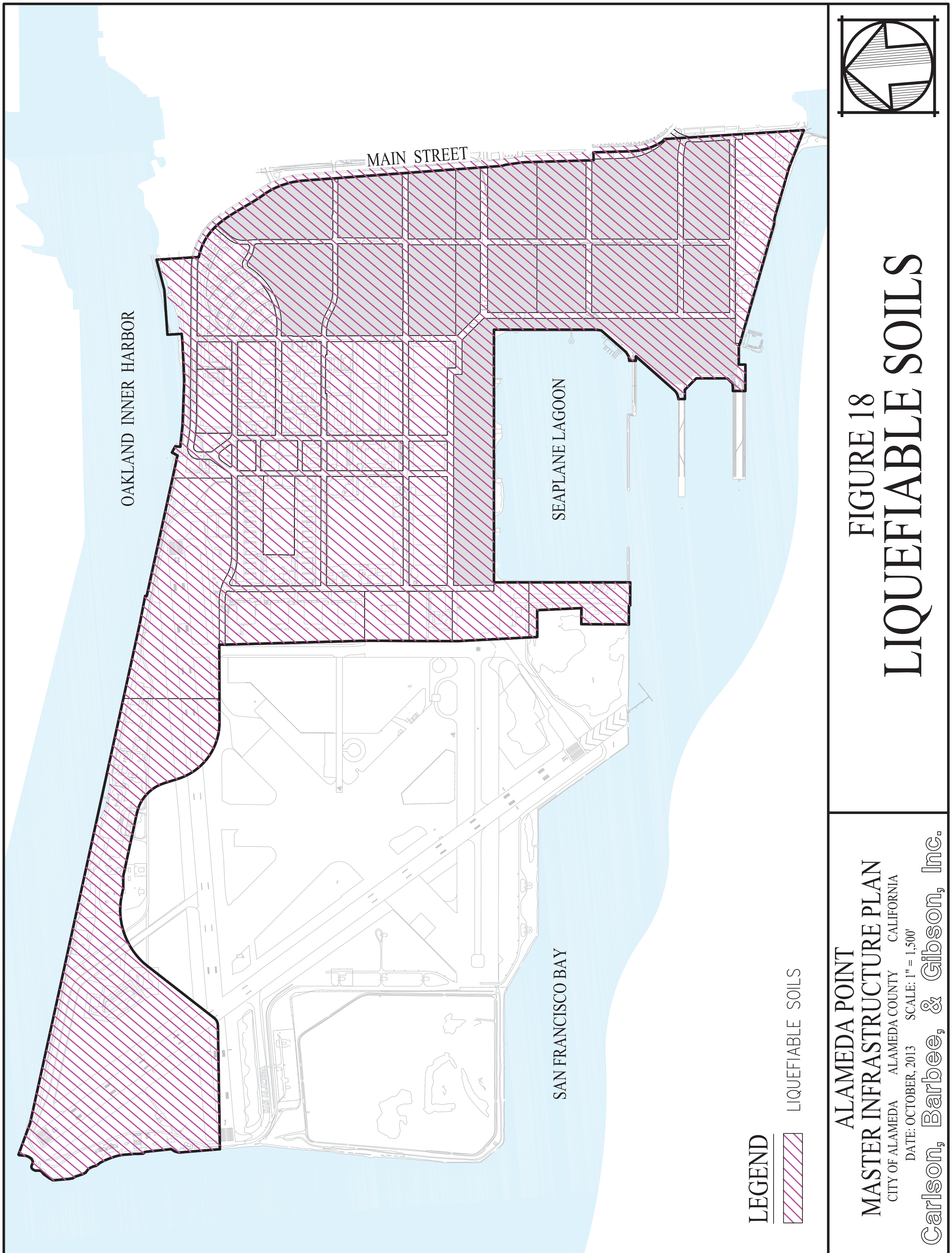
ii. Corrective Measures

The amount of potential liquefaction settlement and lateral spreading are greater than typical structures and infrastructure can tolerate without corrective measures. Ground improvement techniques will likely be necessary to reduce the liquefaction potential of the sandy deposits at the Project Site to levels that improvements can be designed to tolerate. Liquefiable soil can be addressed by either dynamic impact/vibration to densify the soil or mixing with cement to create zones of non-liquefiable soil. The success of dynamic impact methods depends on the fines content of the sand and the depth of the liquefiable material. The following are 4 methods of corrective measures that may be implemented to address liquefiable soils (See detailed descriptions of each of these measures in Appendix A):

- Deep Dynamic Compaction (DDC)
- Rapid Impact Compaction (RIC)
- Vibratory Replacement
- Soil / Cement Mixing

In the Development Areas, DDC will be the most applicable and cost effective liquefaction mitigation method. DDC results in relatively large noise and vibration impacts, so a buffer zone of up to 100 feet will be necessary from any existing structures to minimize impacts. Inside this buffer zone, other ground improvement methods such as rapid impact compaction, vibratory replacement or soil/cement mixing will be implemented.

In the Reuse Areas, liquefaction mitigation measures will be constrained by existing structures and utilities. Ground improvement techniques are not possible for existing buildings; therefore, potential liquefaction induced settlement must be mitigated structurally. Where new utilities are to be installed, RIC could be used to densify the top 15- feet of liquefiable material, and the utilities could be designed to withstand settlement up to 8-inches and differential settlement up to 4-inches. Alternatively, vibratory replacement or soil/cement mixing could be used in these areas to reduce settlement of utilities and other improvements; total and differential settlement using these approaches would be less than using RIC. Based on typical construction costs, ground improvement using RIC will likely be the most cost efficient solution though other ground improvement methods would be more effective in decreasing potential settlement where liquefiable soil is deeper than 15-feet. Existing utilities that will remain in place can be supported by grouting underneath the utility.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
LIQUEFIABLE SOILS
FIGURE 18
LIQUEFIABLE SOILS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_18_LIQUEFIABLE SOILS.DWG

c. Compressible Soil

i. Young Bay Mud

Soft, highly compressible Young Bay Mud deposits were encountered in the previous explorations at the Project Site. See Figure 19 depicting the depth of the base of the Young Bay Mud throughout the Project Site. The locations and thicknesses of these deposits are variable, ranging from nil to over 130-feet in thickness. The Young Bay Mud can settle due to loading from any new fill or from new structures constructed at the site. The amount of settlement is a factor of load and thickness of Young Bay Mud. Assuming the Young Bay Mud is normally consolidated, settlement can be as great a ½-foot for each foot of fill placed over the thickest areas of Young Bay Mud. While the majority of settlement from new loads will happen in the first 1 to 2 years after construction, in the areas of the thickest Young Bay Mud, settlement can continue for a period of 50 years or more.

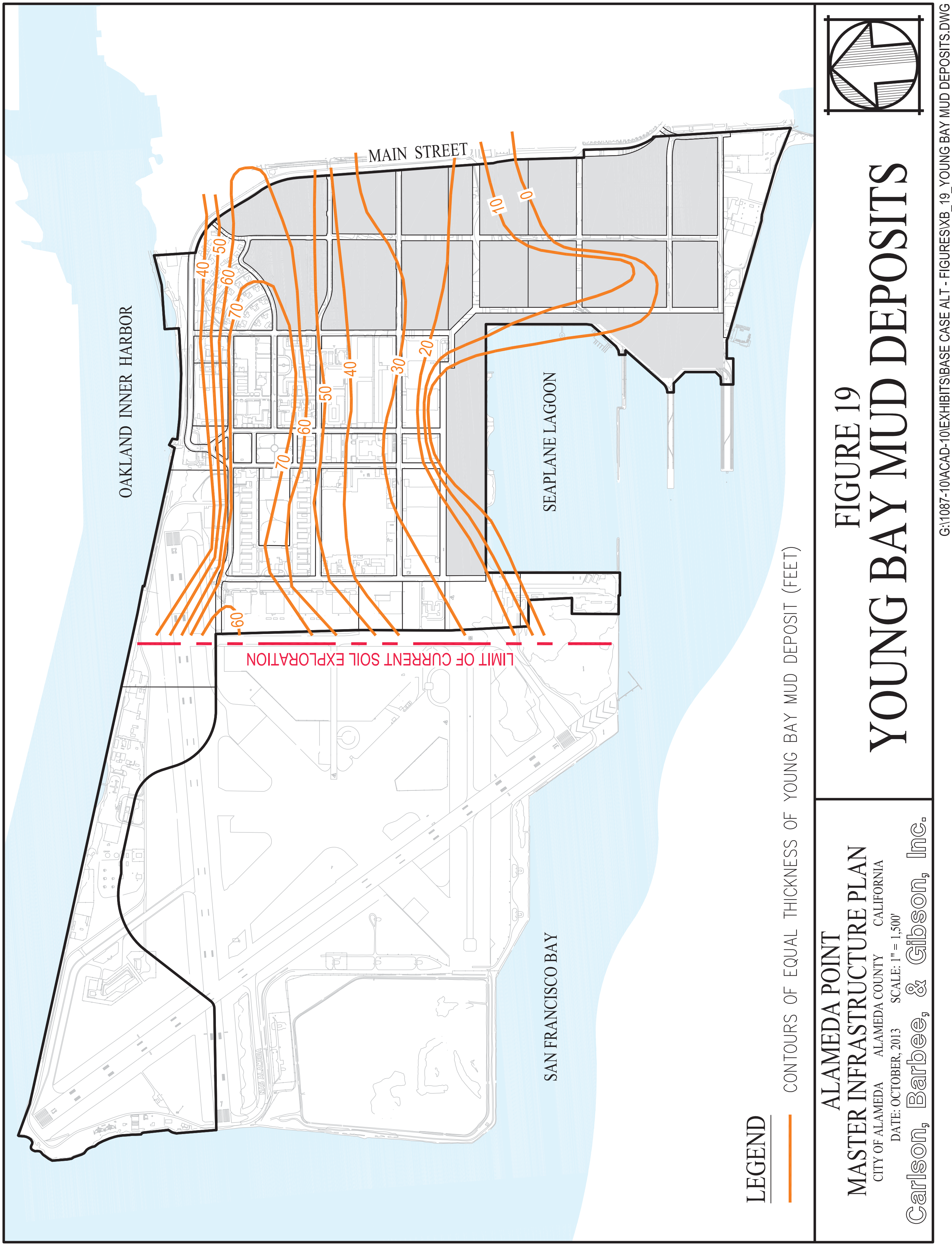
ii. Corrective Measures

Depending on the type of buildings planned at the Project Site, corrective measures of the compressible Young Bay Mud deposits may be feasible. One measure that can be used to mitigate the loading from small, relatively lightweight structures is pre-consolidation of compressible material through a surcharge program. Surcharge fill is placed above design grade elevations in areas of the site where pre-consolidation measures are necessary to reduce settlement. The surcharge fill remains in place for a period sufficient to allow the desired degree of consolidation to be achieved, such that the risk of settlement is sufficiently reduced for the planned structure. Surcharging will induce some settlement in adjacent areas; therefore, it may not be feasible to use surcharge as a compressible soil corrective measure in areas near existing structures and utilities. Likewise, surcharging of initial phases of construction should be placed wider than the footprint of the construction area so that subsequent phases of surcharge do not cause settlement of already constructed areas. Accordingly, surcharge areas of initial phases should be overbuilt by at least 20 feet laterally from the improvement area.

The amount of time necessary to effectively mitigate compressible soil through surcharge is directly related to the thickness of the compressible soil deposit. Where the Young Bay Mud is thicker than about 20 feet, it is likely that wick drains may be desired to shorten the drainage path of the compressible deposits and accelerate the surcharge program. Wick drains are small drain lines that provide a conduit for the water to escape the Young Bay Mud layer. By doing so, the voids created by the removed water accelerate the consolidation process.

The typical time frames that the surcharge fill is required to be left in place without wick drains can range from 1 to 2 years. Whereas, with the use of wick drains this time frame can be reduced to approximately 6 to 9 months.

A surcharge program is generally not efficient for structures with bearing pressures over 750 to 1,000 pounds per square foot. In these cases deep foundation systems deriving support from below the Young Bay Mud could be suitable at the Project Site. Where deep foundations are used, utilities should incorporate flexible connections as the building will not settle with the surrounding soil.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LIMIT OF CURRENT SOIL EXPLORATION
0
10
20
30
40
50
60
70
LEGEND
CONTOURS OF EQUAL THICKNESS OF YOUNG BAY MUD DEPOSIT (FEET)
FIGURE 19
YOUNG BAY MUD DEPOSITS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_19_YOUNG BAY MUD DEPOSITS.DWG

Outside of the building areas, additional fill from grading to raise the areas above the flooding elevations will also induce consolidation settlement of the Young Bay Mud, and other measures may be necessary to mitigate potential settlement that could adversely affect site improvements (i.e., streets, parking areas, drainage, underground utilities, concrete flatwork, etc.). The selected mitigation will partly depend on what level of risk is acceptable, and could range from:

- Acceptance of settlement risk and periodic maintenance,
- Implementation of a surcharge program to pre-consolidate the soil and Reduce long term settlements,
- Use of lightweight fill as compensation load to reduce settlement or
- Critical utilities could be supported on cement/soil mixed columns.

A surcharge program is anticipated to be implemented in the Development Areas. The surcharge will achieve the amount of pre-consolidation to reduce the risk of settlement associated with the structures and fill material planned for these areas. The surcharge program will include both the building areas, street areas and perimeter flood protection measure areas. This program is intended to eliminate the potential for long term settlement within the Development Areas. Wick drains will be implemented as part of the surcharge program for areas with Young Bay Mud thicker than 20 feet or when surcharge time frames are desired to be accelerated.

New structures proposed within the Reuse Areas will be constructed on a deep foundation system. New utilities will be designed to accommodate the anticipated remaining amount of potential long-term settlement. The design considerations for utilities within these areas include providing flexible joints and/or increased pipe slopes to maintain positive gradients for gravity pipelines should settlement occur. The perimeter flood protection measures surrounding the Reuse Areas will either be surcharged or be supported on a soil/cement mixed corridor.

d. Underground Utilities

i. Utility Trench Shoring & Bedding

Due to the soft nature of the Young Bay Mud, excavations that extend into Young Bay Mud deposits may become unstable. Installation of temporary sheet piles or the use of a shield or continuous hydraulic skeleton shoring should be anticipated for excavations that extend below a depth of about 3 to 5 feet. Additionally, increased pipeline bedding measures will be required in order to achieve a stable foundation for installing the pipeline. This may include a thickened section of base below the pipeline with fabric or other measures as recommended by a geotechnical engineer.

ii. Trench Dewatering

Shallow groundwater is expected at the site and trench excavations may encounter perched groundwater. Therefore, utility trench excavations may require temporary dewatering during construction to keep the excavation and working areas reasonably dry. In general, excavations should be dewatered such that water levels are maintained at least 2 feet below the bottom of the excavation prior to and continuously during shoring installation and the backfill process to control the tendency for the bottom of the excavation to heave under hydrostatic pressures and to reduce inflow of soil or water from beneath temporary shoring. Dewatering for underground utility construction will likely be accomplished by pumping from sumps.

Utility trenches adjacent to existing improvements should include a low permeability cutoff to reduce the risk of inadvertent groundwater flow along permeable bedding or backfill. In these areas dewatering may not be an option; therefore, a relatively impervious shoring system of tight interlocking sheet piles, or other impervious wall type, can be utilized to reduce infiltration during construction.

In addition, possibility of encountering contaminated soil and groundwater should be considered during underground construction and addressed in accordance with the SMP developed for Alameda Point.

C. Value Engineering Opportunities

A value engineering opportunity that could be implemented for the proposed flood protection measures is to minimize the length of the northern shoreline that is proposed to be stabilized to only those areas necessary to protect the critical components of infrastructure. These areas to be stabilized would be from Pump Station R, near Main Gate, and easterly along Main Street to protect the 20-inch force main and site access. The portion of the northern shoreline adjacent to the Sports Complex where the potential zone of deformation is only 200-foot wide could be maintained in its existing condition and not stabilized. The proposed perimeter flood protection measures would be setback from the zone of potential deformation, approximately 200-feet from the shoreline. Areas exterior to the perimeter flood protection measure will be subject to flooding in high tidal events or with future sea level rise. The improvements of these exterior areas would be passive landscaping that could be converted to tidal wetlands if future sea level rise inundates these areas. Effectively, this would reduce the active areas of the Sports Complex from 44 acres to approximately 25 to 30 acres. Assuming that the length of the Northern Shoreline Stabilization is decreased by 1,500 feet, the backbone infrastructure construction costs would be reduced by approximately $5.5 million.

V. STREET SYSTEM

The City of Alameda adopted a Transportation Element of the General Plan in 2009. The Transportation Element describes various classifications for the street system within Alameda Point based upon the existing street system framework. The MIP proposes a street system framework to enhance the integration of Alameda Point with the circulation and multi-modal elements within the rest of Alameda's street system. The following describes the updates to the Transportation Element to reflect the proposed street system at Alameda Point.

A. Existing On-Site Street System

The existing street system at Alameda Point includes a variety of street types. Street types range from industrial serving streets to residential streets. The framework of the existing streets has multiple connections to Main Street, a regional arterial. The existing system also extends three east-west island arterials into Alameda Point, including Stargell Avenue, West Atlantic Avenue (the MIP uses the current street name for W. Atlantic Avenue, but it is anticipated to be officially changed to Ralph Appezzato Memorial Parkway similar to the east) and Pacific Avenue. The framework of the existing system ranges from circuitous areas in the northeast portion of the Project Site to a grid system in the northwest and southeast portions of the site. See Figure 20 depicting the existing street framework within Alameda Point.

The existing streets were designed by the Navy with expansive areas of pavement for the movement of large airplanes, trucks and materials. Accordingly, the existing street system does not easily facilitate pedestrian and bicycle uses. Not all existing streets include sidewalks and where sidewalks do exist, they are generally narrower than current City standards. In some locations, sidewalks are in poor condition with obvious effects of settlement, resulting in non-accessible paths of travel.

The existing paved portions of the streets are usable, but in varying levels of need for rehabilitation. The existing streets have evidence of wear beyond the pavement service life. There are also areas of abandoned rail line crossings that have not been removed or improved. The existing streets require rehabilitation or reconstruction to extend the service life and usability. An important additional consideration is that the existing streetscape and alignments within the Historic District of the Project Site contribute to the historic quality of this resource.

B. Proposed On-Site Street System

The redevelopment of Alameda Point as a proposed transit-oriented community is designed to provide a comprehensive, integrated transportation network that promotes all modes of transportation, emphasizing walking, bicycling and direct and convenient access to high quality transit options. The proposed street system at Alameda Point will de-emphasize the automobile, provide protective bikeways and will be consistent with the City's Complete Street Ordinance (Resolution 14763) to provide for safe, comfortable and convenient travel for all transportation users. The proposed street system facilitates the integration of the historical Reuse Areas within Alameda Point to the surrounding street system in the adjacent portion of Alameda. The proposed street system includes the construction of new streets within the Development Areas and the rehabilitation / reconstruction of existing streets within the Reuse Areas. The proposed framework will maintain the east-west system of island arterials, including Stargell Avenue, Atlantic Avenue, Pacific Avenue and Central Avenue. The proposed street framework is a grid pattern extending the City's street network into the Project Site. See Figure 21 depicting the proposed on-site backbone street system framework within Alameda Point. This figure does not depict the additional in-tract / on-site streets that will be constructed within each development block.

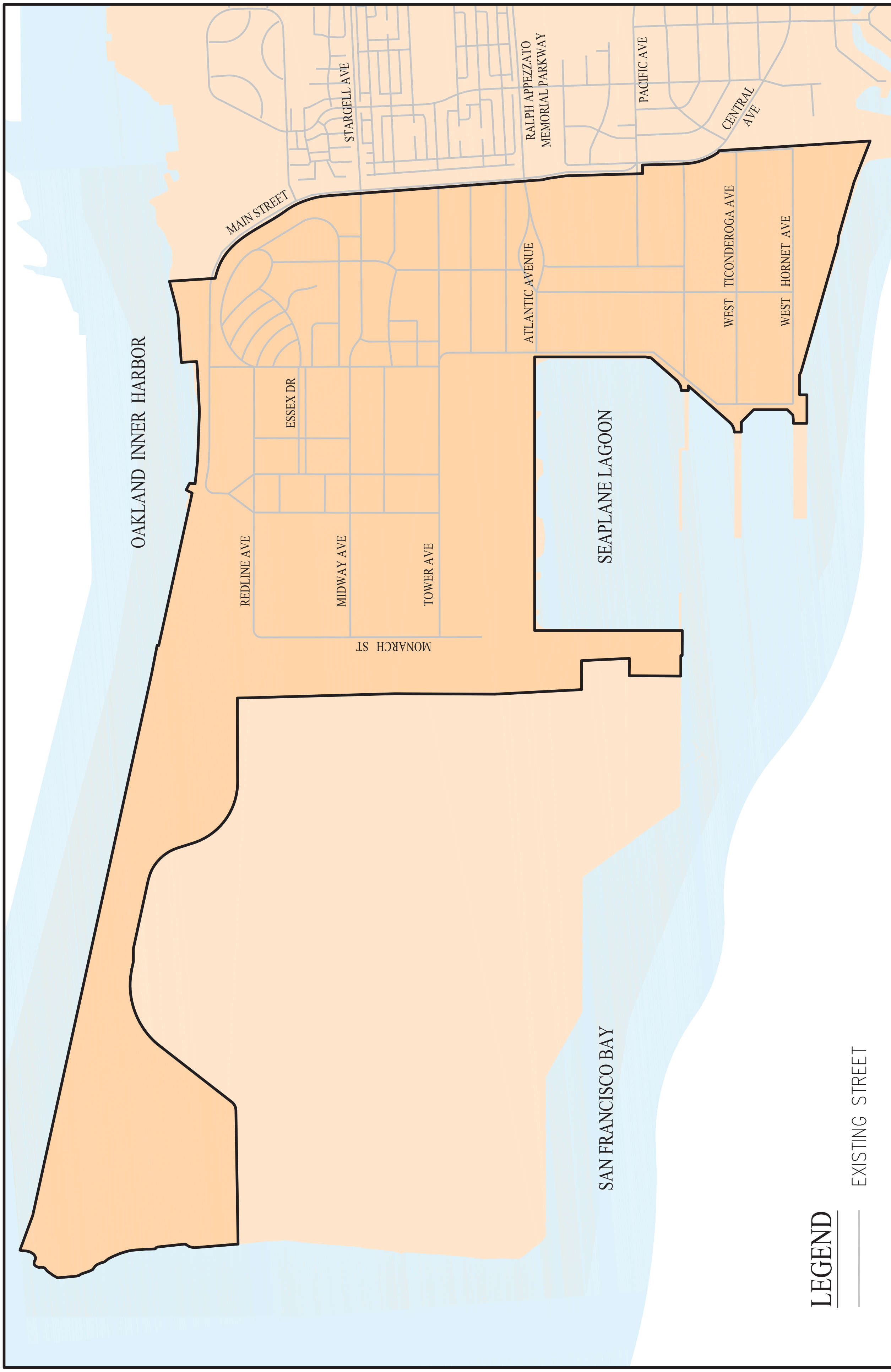

FIGURE 20
EXISTING STREET FRAMEWORK

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ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.

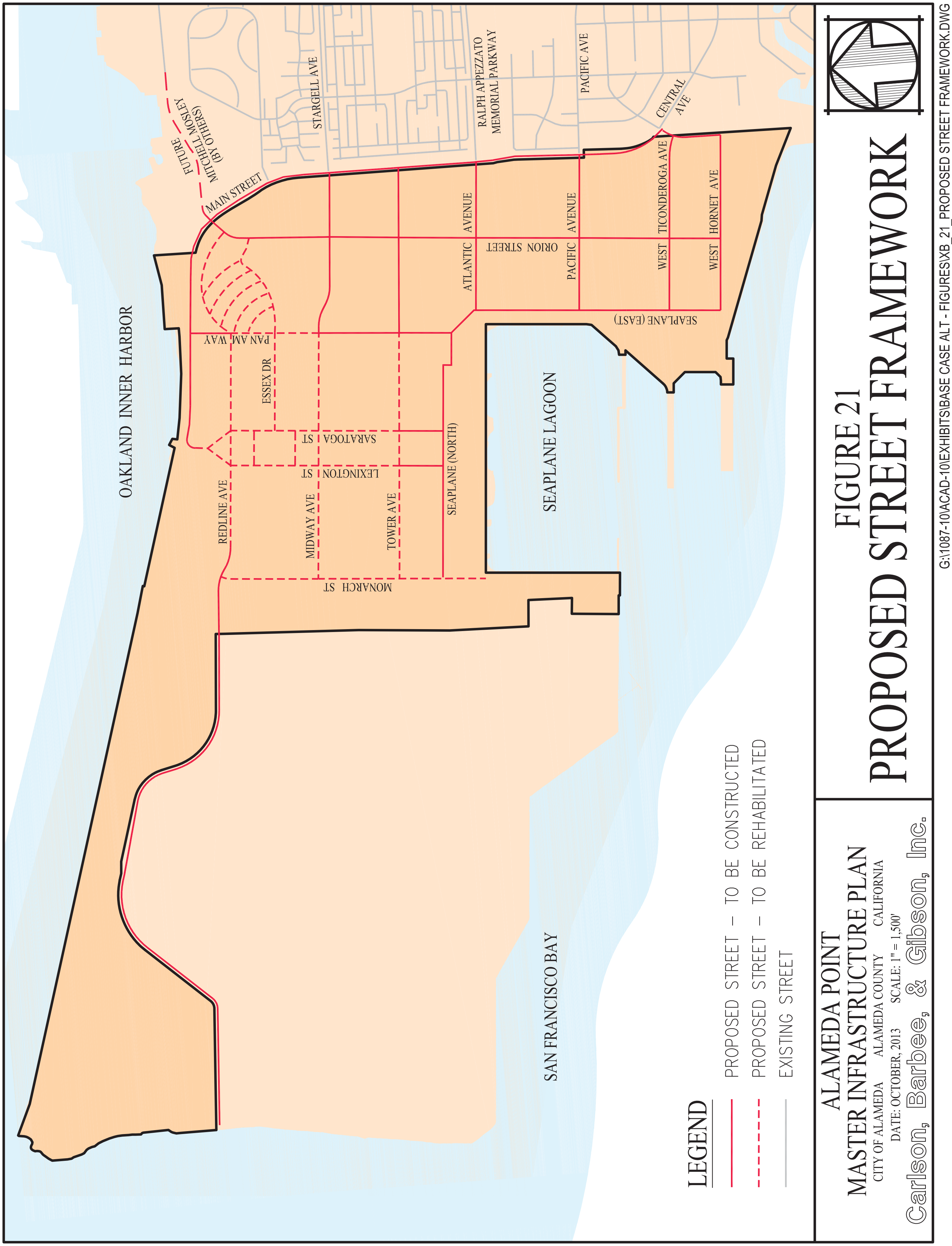


FIGURE 21
PROPOSED STREET FRAMEWORK

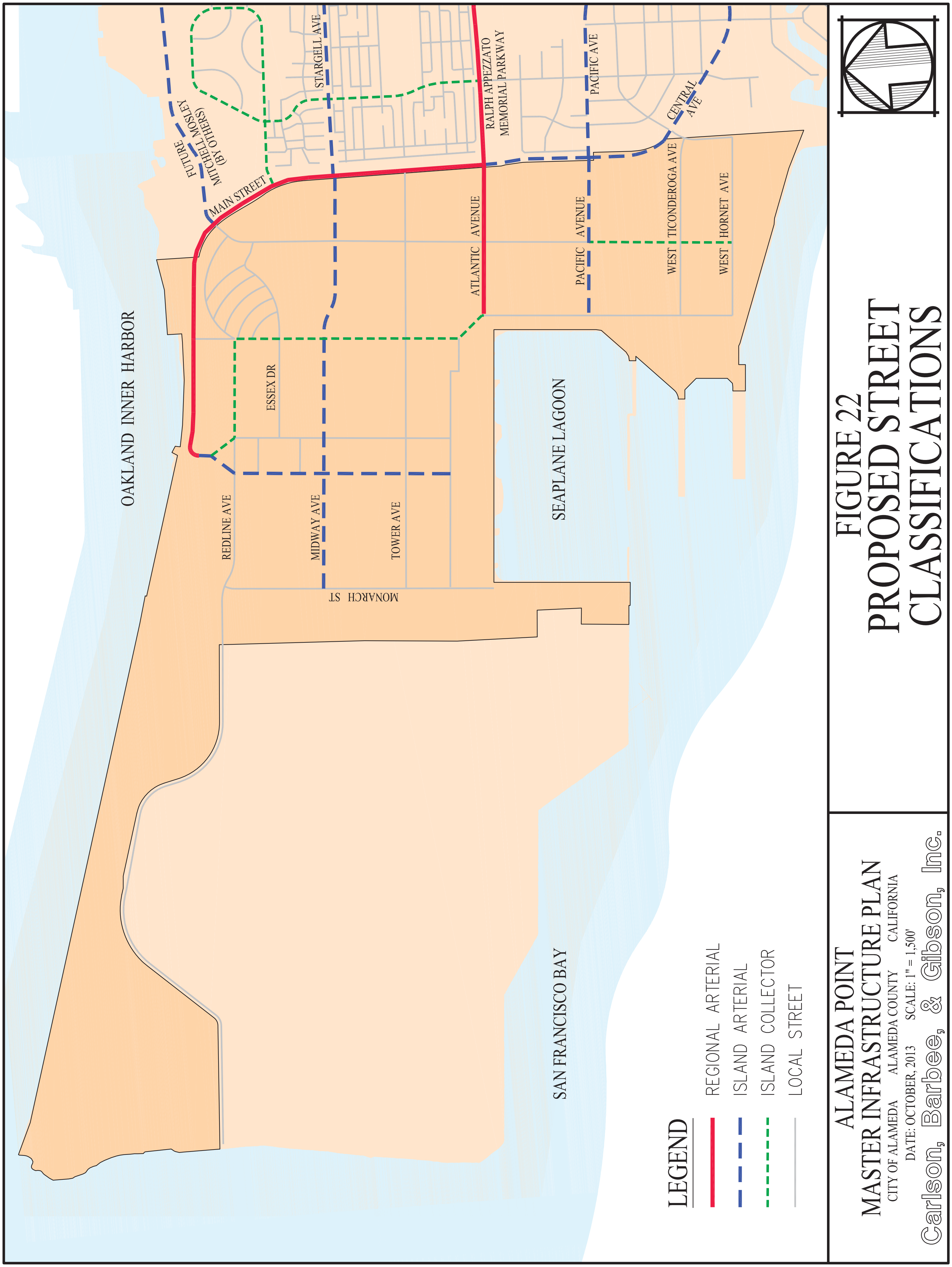
The proposed street system includes a variety of street classifications. The street classifications are based on those defined in the Transportation Element for the City of Alameda.

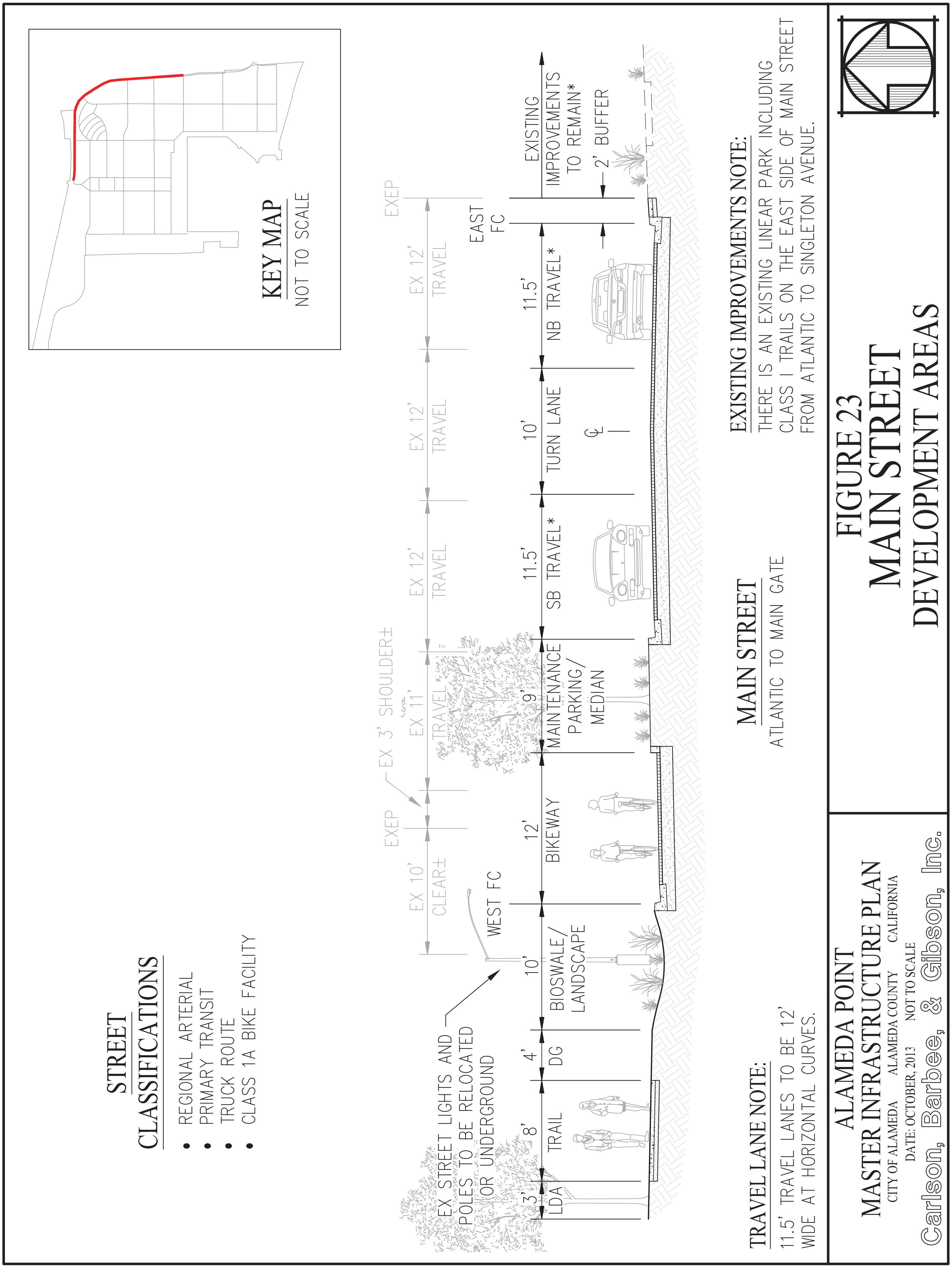
1. Street Classifications

The proposed street system includes a Regional Arterial, Island Arterials, Island Collectors and Local Streets. See Figure 22 depicting the proposed street classifications within Alameda Point. The street classifications are established to provide a street system with adequate traffic capacity, bike facilities, transit facilities and truck routes. The street sections of each of these individual street classifications will be finalized through the future planning processes of each Sub-District within Alameda Point. The MIP has prepared street sections as depicted on Figure 23 and Figure 24 to present the transportation components required within each street segment and the proposed widths. The final street sections shall be substantially consistent with these presented in the MIP, but may be adjusted to meet the needs of the City and overall project. The final street sections for each street segment will be approved with each respective development. The existing street pattern within the Reuse Areas will be maintained in order to preserve the historic street grid and streetscapes. The street sections have been designed consistent with "complete streets" principles to facilitate a range of transportation uses as well as maintaining compliance with the current Fire Codes. Also, traffic calming features will be provided to improve and promote the pedestrian and bicycle experience.

New streets will be constructed within the Development Areas. This new system of streets will be tree-lined and designed to mirror the patterns and appearance of historic Alameda. See Figure 23 depicting draft conceptual cross sections for the various street classifications within the Development Areas, including Main Street, West Atlantic Ave, Pacific Ave and Orion Street.

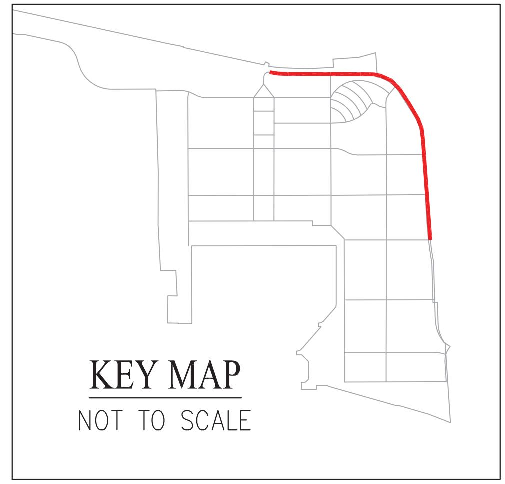
The proposed street system will maintain the historic character of the existing streets within the Reuse Areas of the Project Site. The pavement areas will be repurposed to achieve the objectives of the Project Site street system. Generally, existing travel lanes will be narrowed in order to accommodate protected bike facilities. See Figure 24 depicting the conceptual street sections for the existing streets within the Reuse Areas. These streets will be rehabilitated including pavement resurfacing, pavement section replacement, sidewalk replacement and accessibility improvements. The rehabilitation of the streets within the Reuse Areas will be completed over time as described in the Phasing and Implementation Section XIII.

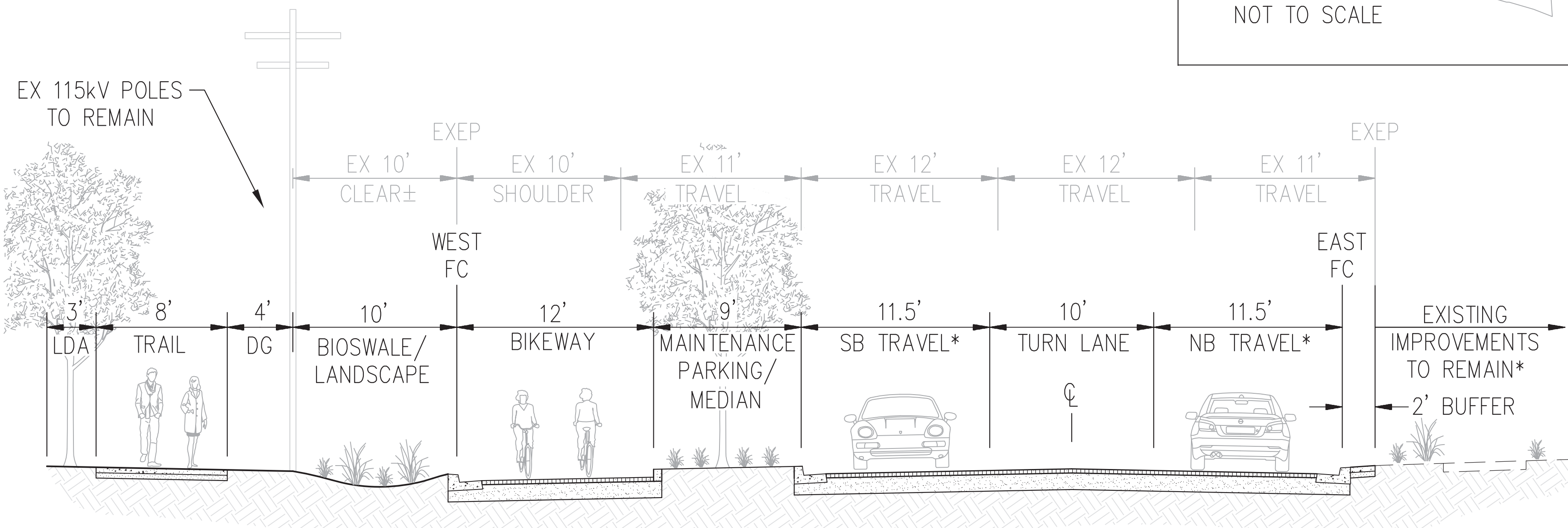

OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
FUTURE MITCHELL MOSLEY (BY OTHERS)
MAIN STREET
STARGELL AVE
RALPH APPEZZATO MEMORIAL PARKWAY
PACIFIC AVE
CENTRAL AVE
ATLANTIC AVENUE
PACIFIC AVENUE
WEST TICONDEROGA AVE
WEST HORNET AVE
ESSEX DR
REDLINE AVE
MIDWAY AVE
TOWER AVE
MONARCH ST
LEGEND
REGIONAL ARTERIAL
ISLAND ARTERIAL
ISLAND COLLECTOR
LOCAL STREET
FIGURE 22
PROPOSED STREET CLASSIFICATIONS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_22_PROPOSED STREET CLASSIFICATIONS.DWG


KEY MAP
NOT TO SCALE
STREET CLASSIFICATIONS
• REGIONAL ARTERIAL
• PRIMARY TRANSIT
• TRUCK ROUTE
• CLASS 1A BIKE FACILITY
EX STREET LIGHTS AND POLES TO BE RELOCATED OR UNDERGROUND
EX 10' CLEAR±
EXEP
EX 3' SHOULDER±
EX 11' TRAVEL
EX 12' TRAVEL
EX 12' TRAVEL
EX 12' TRAVEL
EXEP
WEST FC
EAST FC
3' LDA
8' TRAIL
4' DG
10' BIOSWALE/ LANDSCAPE
12' BIKEWAY
9' MAINTENANCE PARKING/ MEDIAN
11.5' SB TRAVEL*
10' TURN LANE
11.5' NB TRAVEL*
EXISTING IMPROVEMENTS TO REMAIN*
2' BUFFER
TRAVEL LANE NOTE:
11.5' TRAVEL LANES TO BE 12' WIDE AT HORIZONTAL CURVES.
MAIN STREET
ATLANTIC TO MAIN GATE
EXISTING IMPROVEMENTS NOTE:
THERE IS AN EXISTING LINEAR PARK INCLUDING CLASS I TRAILS ON THE EAST SIDE OF MAIN STREET FROM ATLANTIC TO SINGLETON AVENUE.
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.
FIGURE 23
MAIN STREET
DEVELOPMENT AREAS
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- REGIONAL ARTERIAL
- PRIMARY TRANSIT
- TRUCK ROUTE
- CLASS 1A BIKE FACILITY





TRAVEL LANE NOTE:

11.5' TRAVEL LANES TO BE 12' WIDE AT HORIZONTAL CURVES.

MAIN STREET

ATLANTIC TO MAIN GATE
(WITH 115kV POLES)

EXISTING IMPROVEMENTS NOTE:

THERE IS AN EXISTING LINEAR PARK INCLUDING CLASS I TRAILS ON THE EAST SIDE OF MAIN STREET FROM ATLANTIC TO SINGLETON AVENUE.

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
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FIGURE 23
MAIN STREET
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

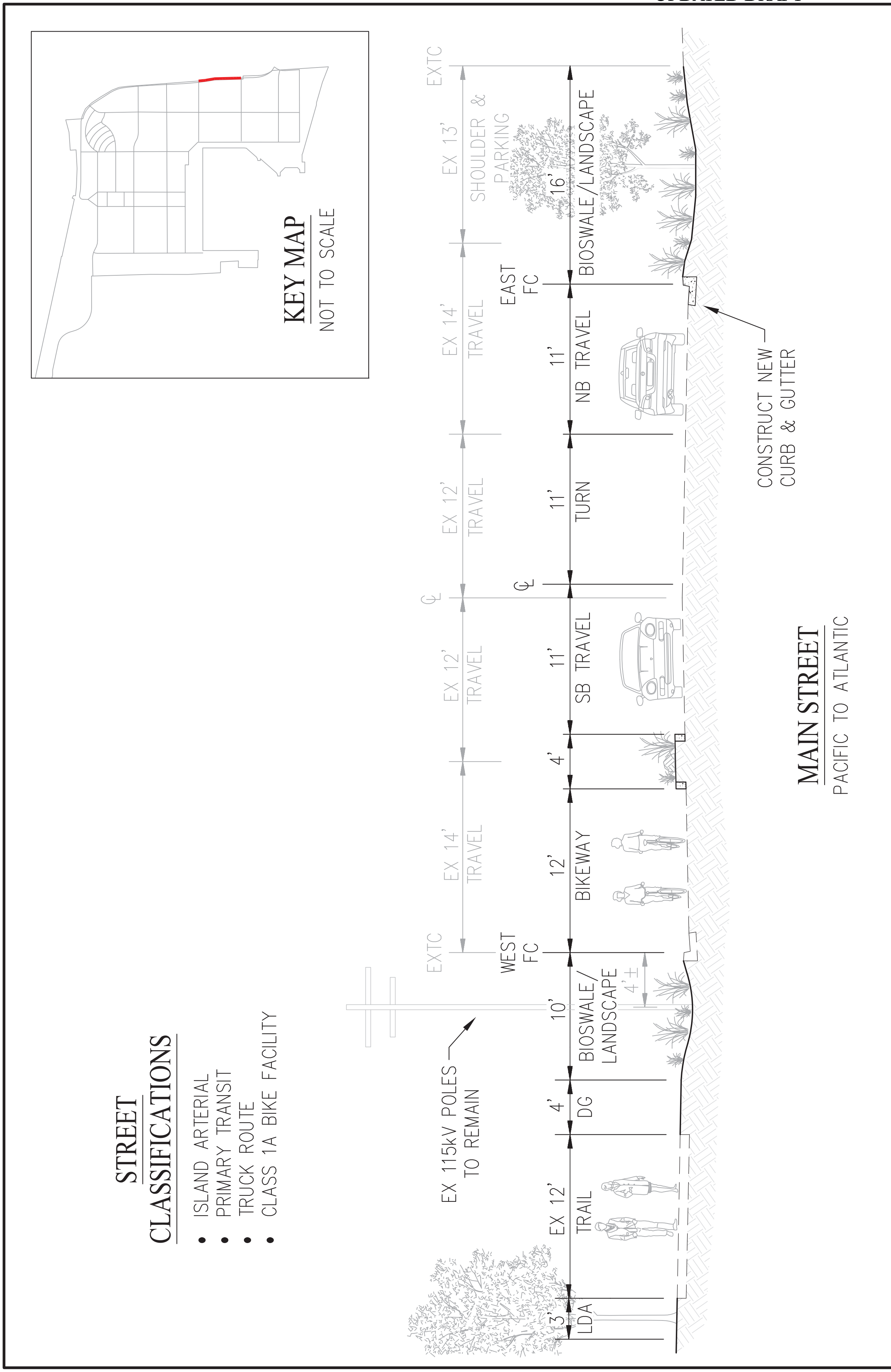

FIGURE 23
MAIN STREET
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
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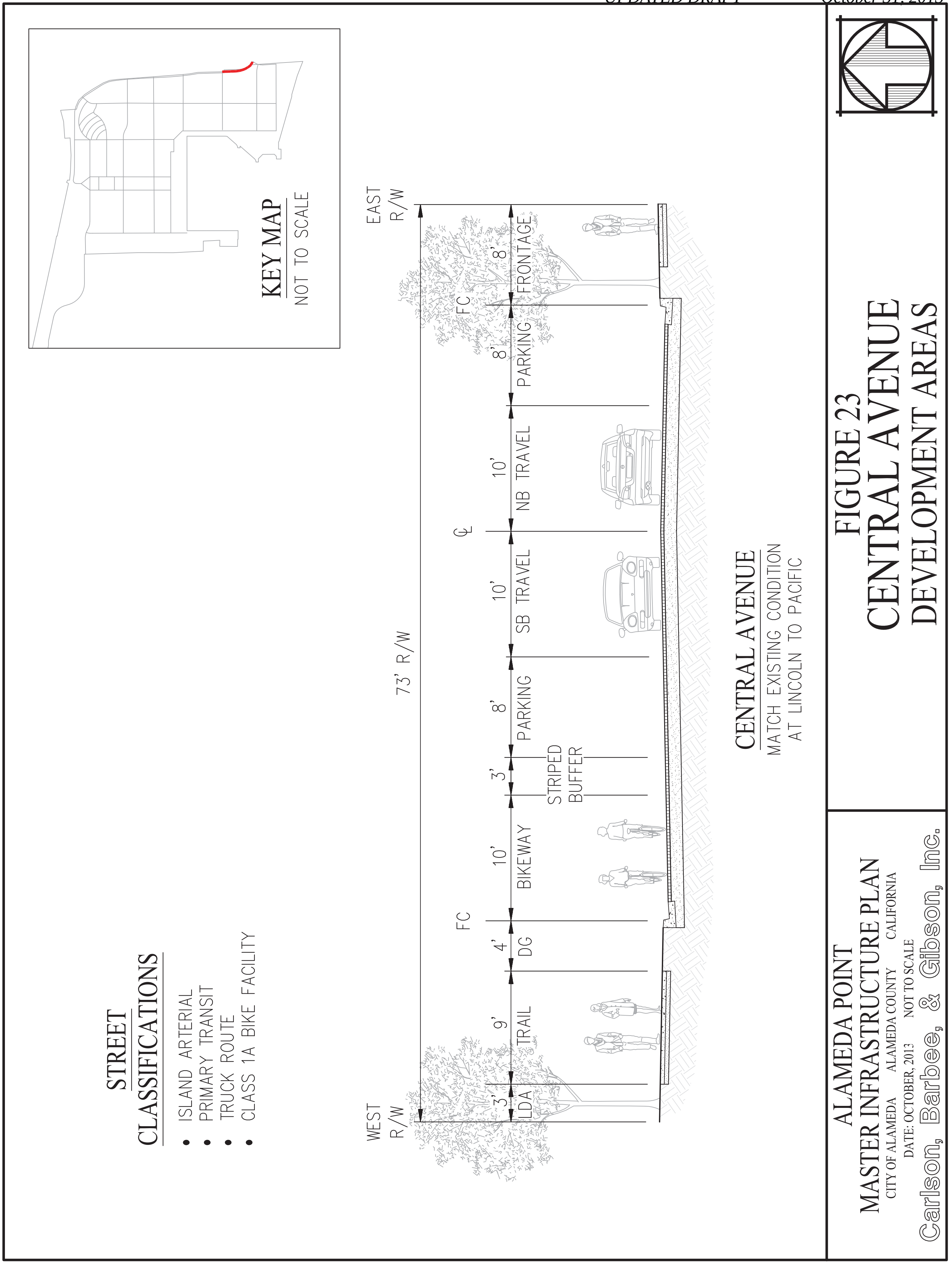
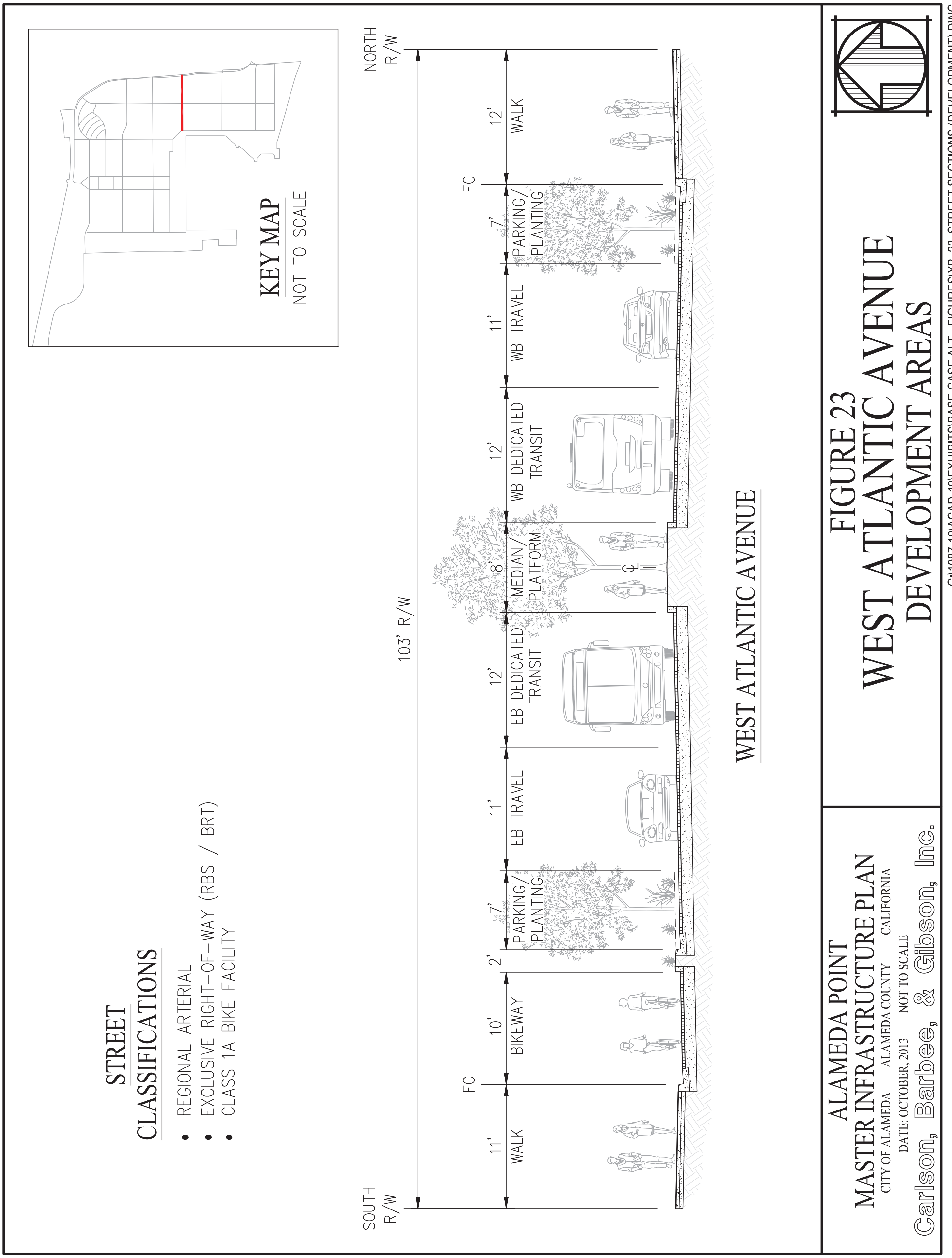
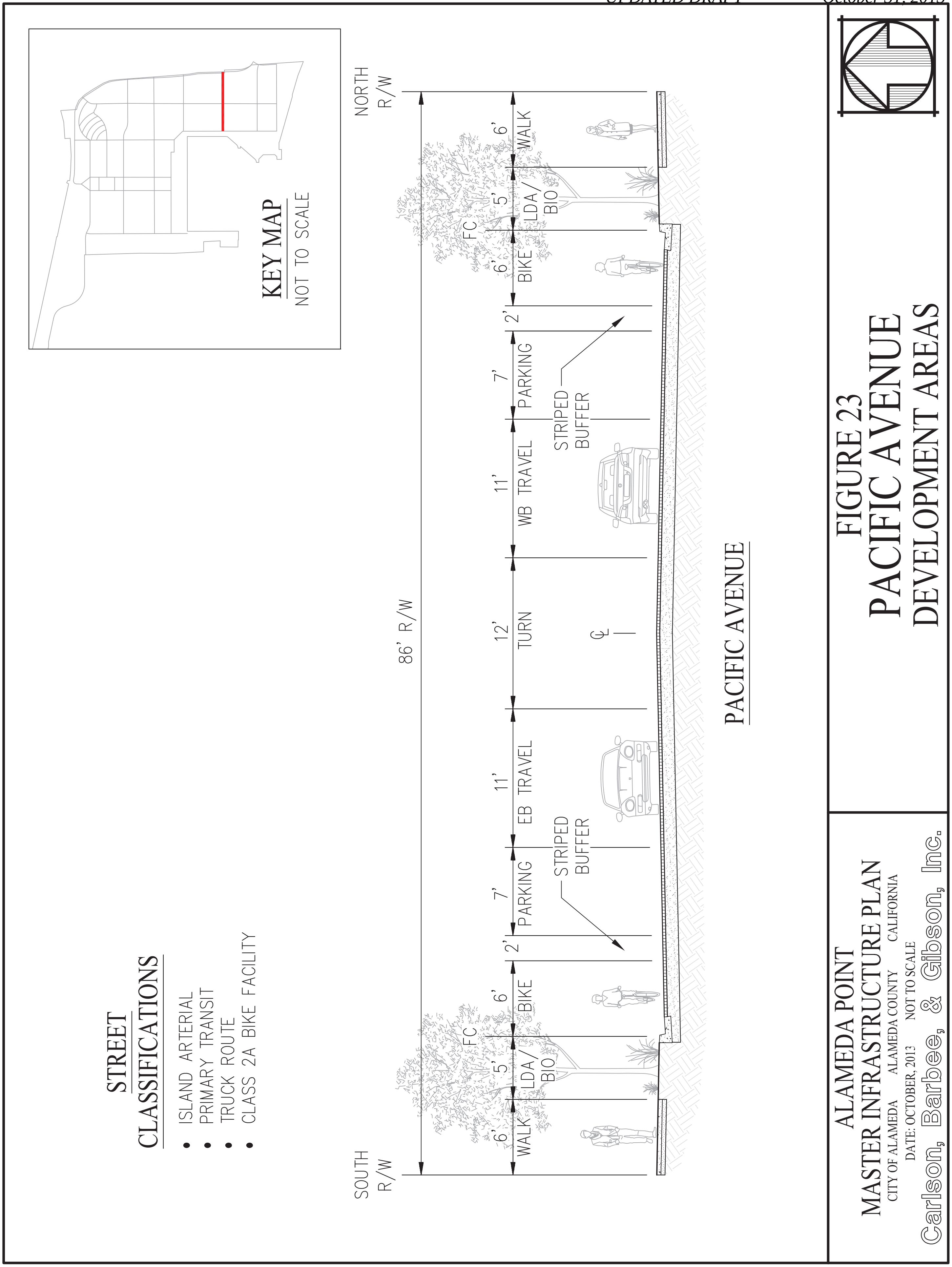
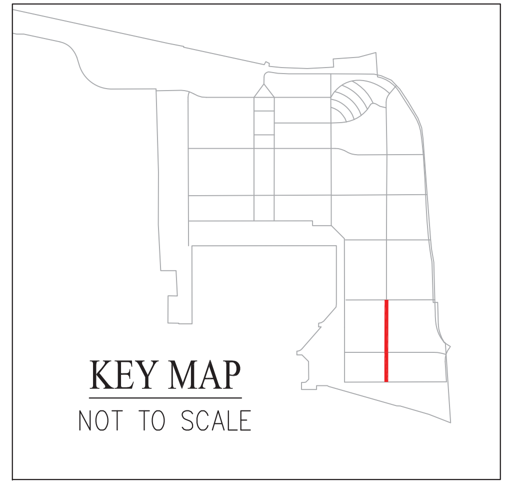

KEY MAP
NOT TO SCALE
STREET CLASSIFICATIONS
• ISLAND ARTERIAL
• PRIMARY TRANSIT
• TRUCK ROUTE
• CLASS 1A BIKE FACILITY
WEST R/W
EAST R/W
73' R/W
3' LDA
9' TRAIL
4' DG
FC
10' BIKEWAY
3' STRIPED BUFFER
8' PARKING
10' SB TRAVEL
10' NB TRAVEL
℄
8' PARKING
FC
8' FRONTAGE
CENTRAL AVENUE
MATCH EXISTING CONDITION AT LINCOLN TO PACIFIC
FIGURE 23
CENTRAL AVENUE
DEVELOPMENT AREAS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

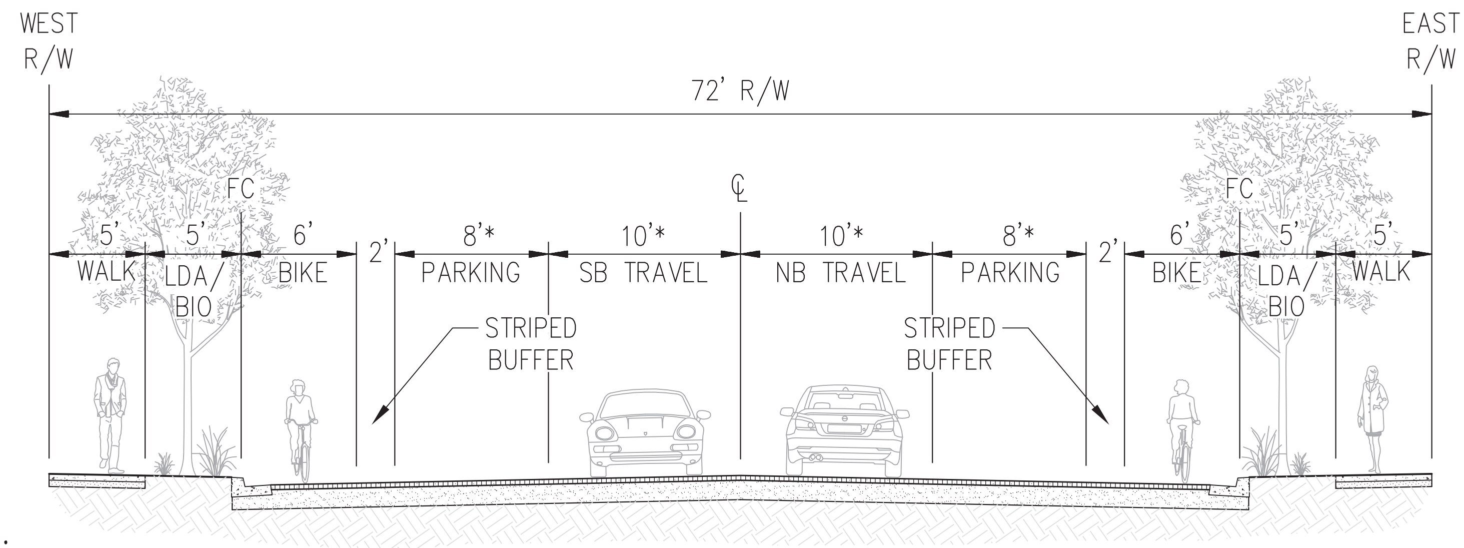

KEY MAP
NOT TO SCALE
STREET CLASSIFICATIONS
• REGIONAL ARTERIAL
• EXCLUSIVE RIGHT-OF-WAY (RBS / BRT)
• CLASS 1A BIKE FACILITY
NORTH R/W
SOUTH R/W
103' R/W
11' WALK
FC
10' BIKEWAY
2'
7' PARKING/PLANTING
11' EB TRAVEL
12' EB DEDICATED TRANSIT
8' MEDIAN/PLATFORM
12' WB DEDICATED TRANSIT
11' WB TRAVEL
7' PARKING/PLANTING
FC
12' WALK
WEST ATLANTIC AVENUE
FIGURE 23
WEST ATLANTIC AVENUE
DEVELOPMENT AREAS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG


KEY MAP
NOT TO SCALE
STREET CLASSIFICATIONS
• ISLAND ARTERIAL
• PRIMARY TRANSIT
• TRUCK ROUTE
• CLASS 2A BIKE FACILITY
NORTH R/W
SOUTH R/W
86' R/W
6' WALK
5' LDA/ BIO
FC
6' BIKE
2'
7' PARKING
STRIPED BUFFER
11' WB TRAVEL
12' TURN
11' EB TRAVEL
PACIFIC AVENUE
FIGURE 23
PACIFIC AVENUE
DEVELOPMENT AREAS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- ISLAND COLLECTOR
- SECONDARY TRANSIT
- CLASS 2A BIKE FACILITY





ISLAND COLLECTOR
BIKE LANES

PARKING NOTE:

WHEN TRAVEL LANES ARE GREATER THAN 10' WIDE, PARKING MAY BE REDUCED TO 7'.

TRAFFIC CALMING NOTE:

TRAFFIC CALMING MEASURES (I.E. CURB BULB-OUTS) TO BE INCORPORATED.

TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

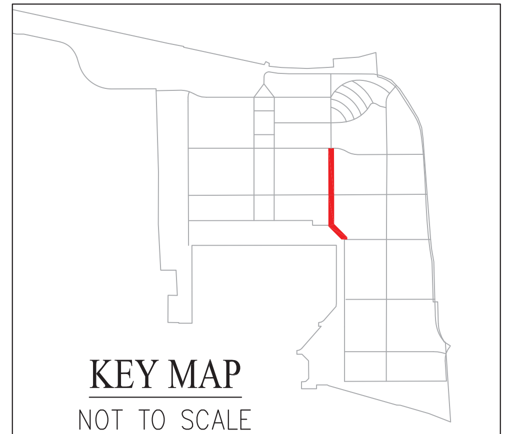
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

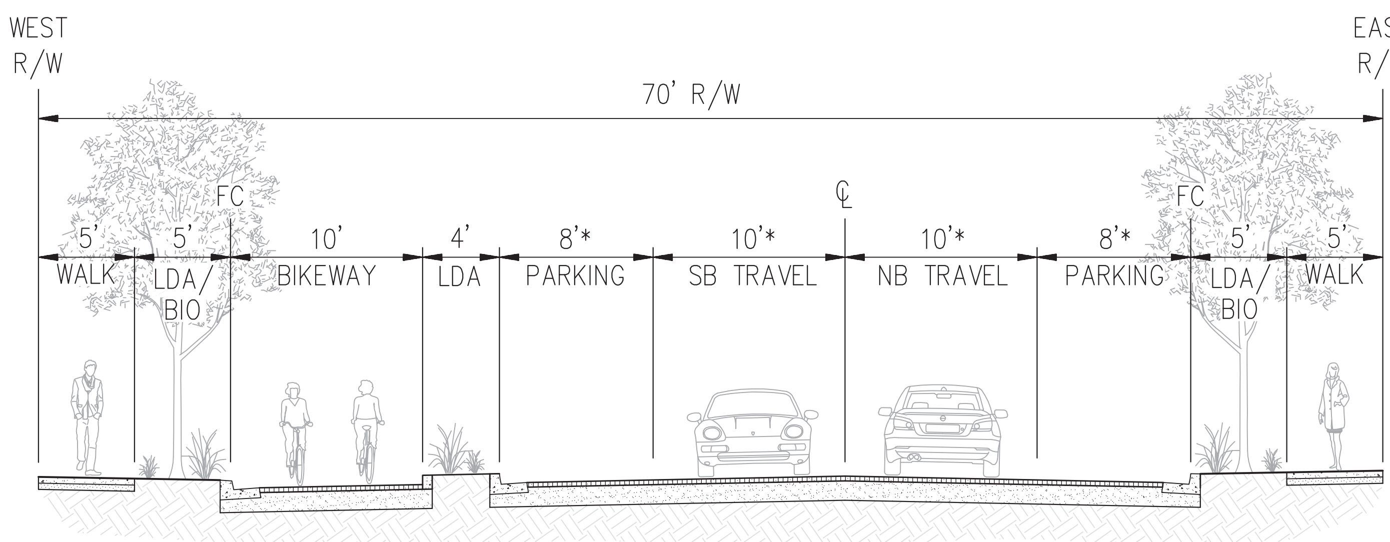
FIGURE 23
ISLAND COLLECTOR - BIKE LANES
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- ISLAND COLLECTOR
- PRIMARY/SECONDARY TRANSIT (VARIES)
- TRUCK ROUTE (VARIES)
- CLASS 2A BIKE FACILITY





ISLAND COLLECTOR
BIKEWAY

PARKING NOTE:
WHEN TRAVEL LANES ARE GREATER THAN 10' WIDE, PARKING MAY BE REDUCED TO 7'.

TRAFFIC CALMING NOTE:
TRAFFIC CALMING MEASURES (I.E. CURB BULB-OUTS) TO BE INCORPORATED.

TRAVEL LANE NOTE:
TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

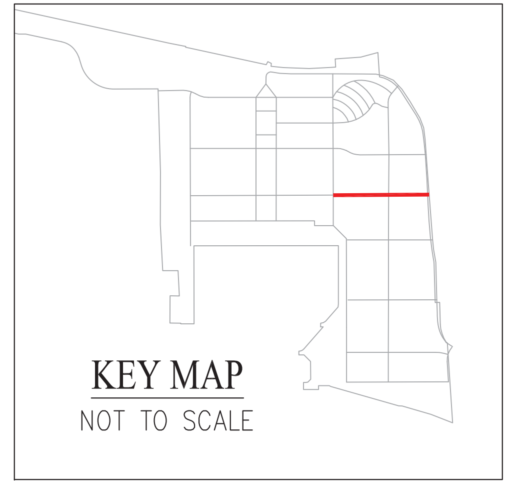
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

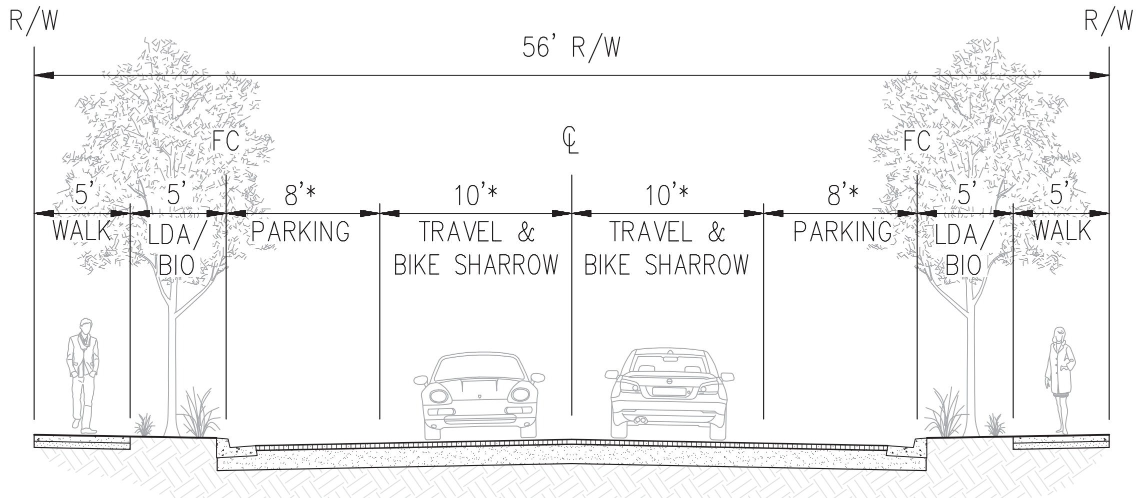
FIGURE 23
ISLAND COLLECTOR - BIKEWAY
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- LOCAL STREET
- CLASS 3B BIKE FACILITY





LOCAL STREETS SHARROWS

PARKING NOTE:

WHEN TRAVEL LANES ARE GREATER THAN 10' WIDE, PARKING MAY BE REDUCED TO 7'.

TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

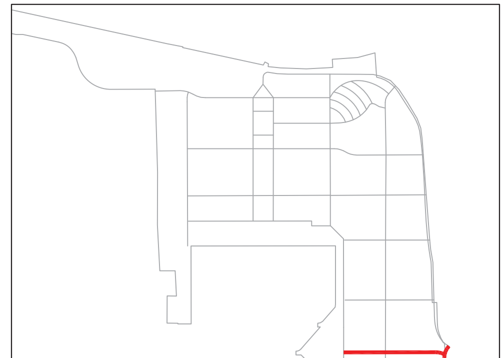
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

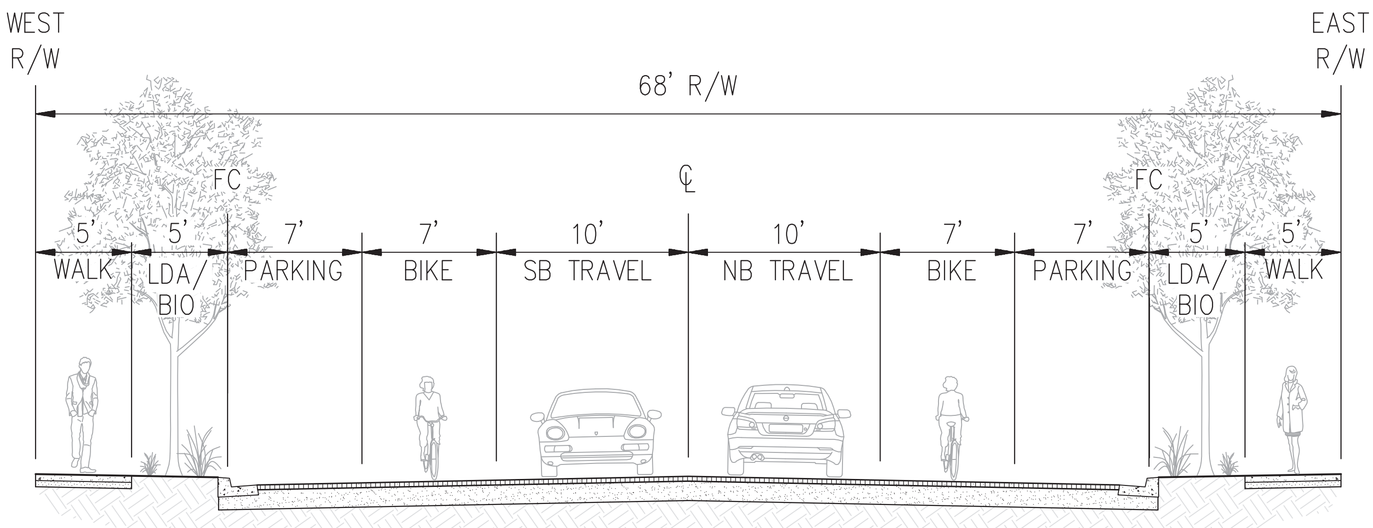
FIGURE 23
LOCAL STREETS - SHARROWS
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- LOCAL STREET
- PRIMARY/OTHER TRANSIT (VARIES)
- CLASS 2C BIKE FACILITY





LOCAL STREETS
BIKE LANES

NOTE:
NORTH–SOUTH STREET INCLUDES CLASS 1A FACILITY ALONG WEST SIDE.

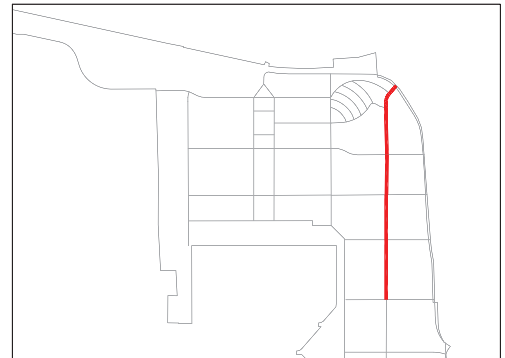
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

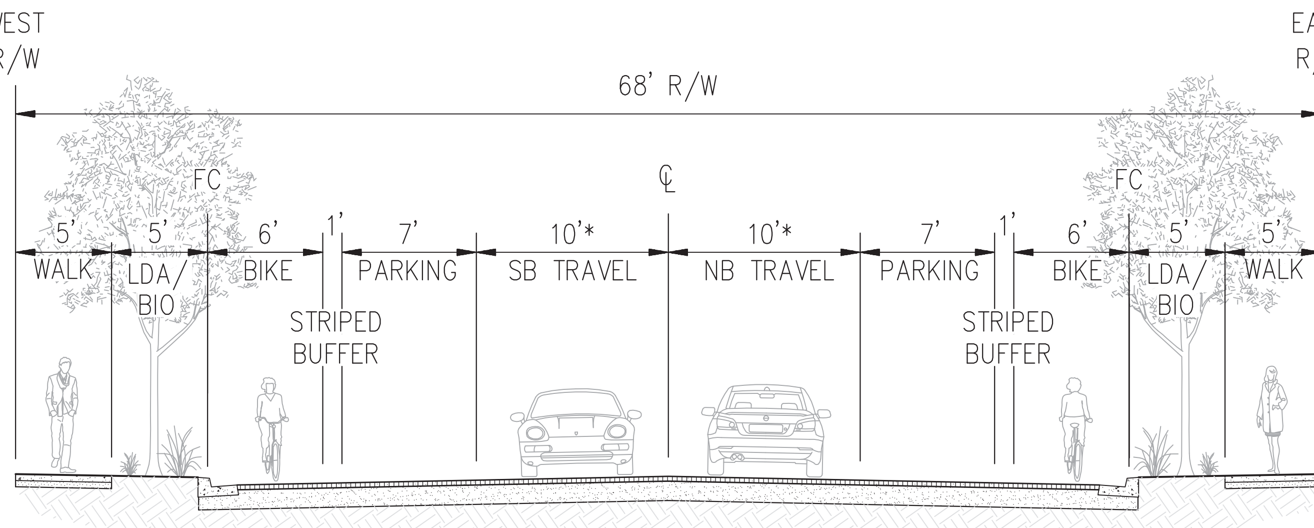
FIGURE 23
LOCAL STREETS - BIKE LANES
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- LOCAL STREET
- SECONDARY TRANSIT STREET
- CLASS 2A BIKE FACILITY





TRAVEL LANE NOTE:

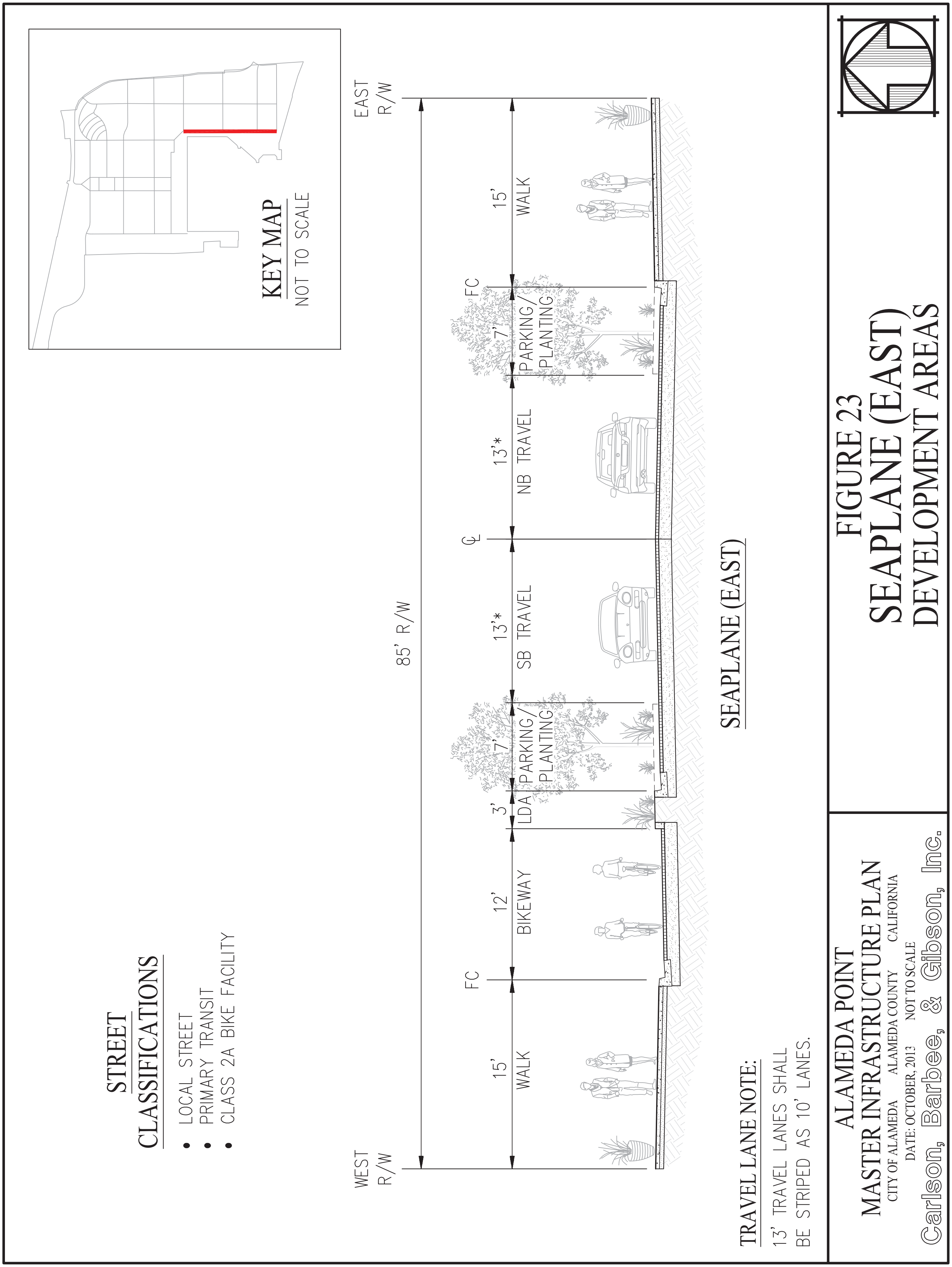
TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

LOCAL STREET
PROTECTED BIKE LANES

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

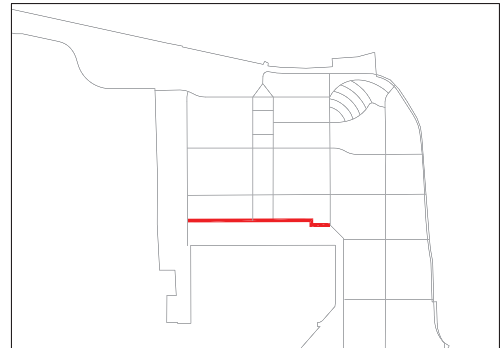
FIGURE 23
LOCAL STREETS - PROTECTED BIKE LANES
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

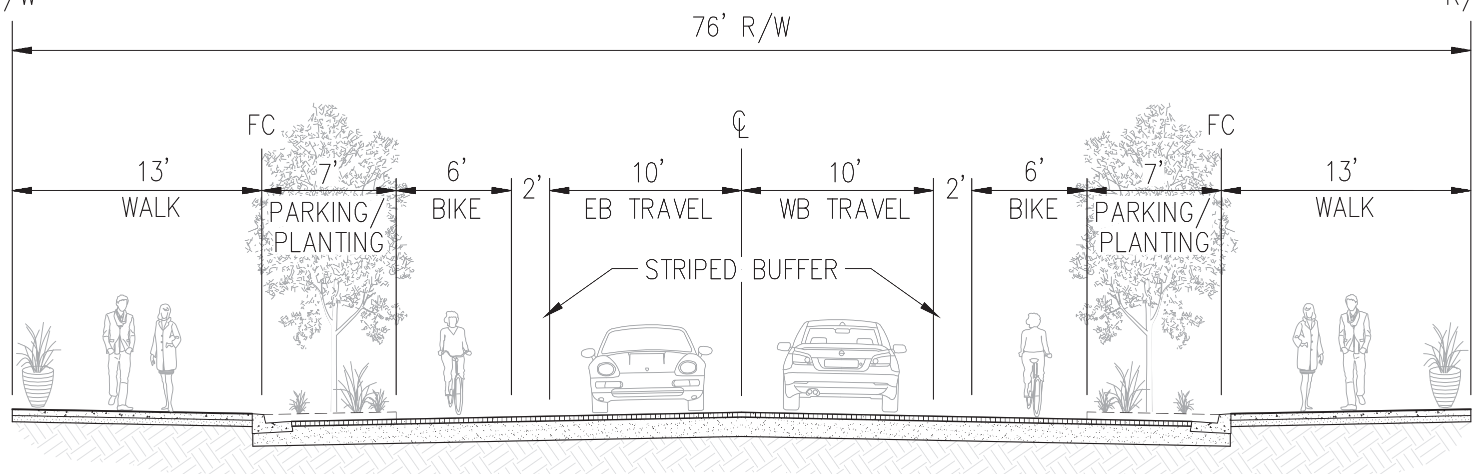

KEY MAP
NOT TO SCALE
STREET CLASSIFICATIONS
• LOCAL STREET
• PRIMARY TRANSIT
• CLASS 2A BIKE FACILITY
EAST R/W
WEST R/W
85' R/W
15' WALK
7' PARKING/ PLANTING
FC
13'* NB TRAVEL
℄
13'* SB TRAVEL
7' PARKING/ PLANTING
3' LDA
12' BIKEWAY
FC
15' WALK
SEAPLANE (EAST)
TRAVEL LANE NOTE:
13' TRAVEL LANES SHALL BE STRIPED AS 10' LANES.
FIGURE 23
SEAPLANE (EAST)
DEVELOPMENT AREAS
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

STREET CLASSIFICATIONS

- LOCAL STREET
- CLASS 2B BIKE FACILITY



KEY MAP
NOT TO SCALE



SEAPLANE (NORTH)

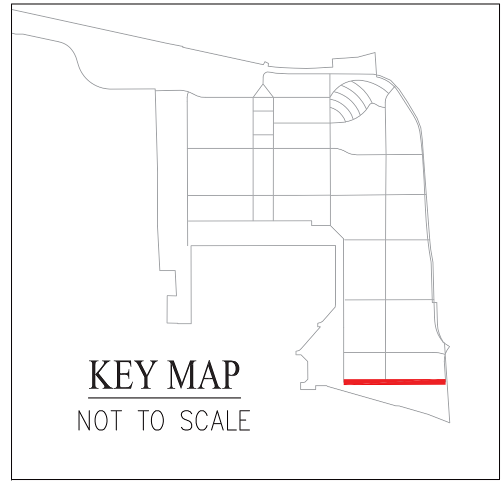
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

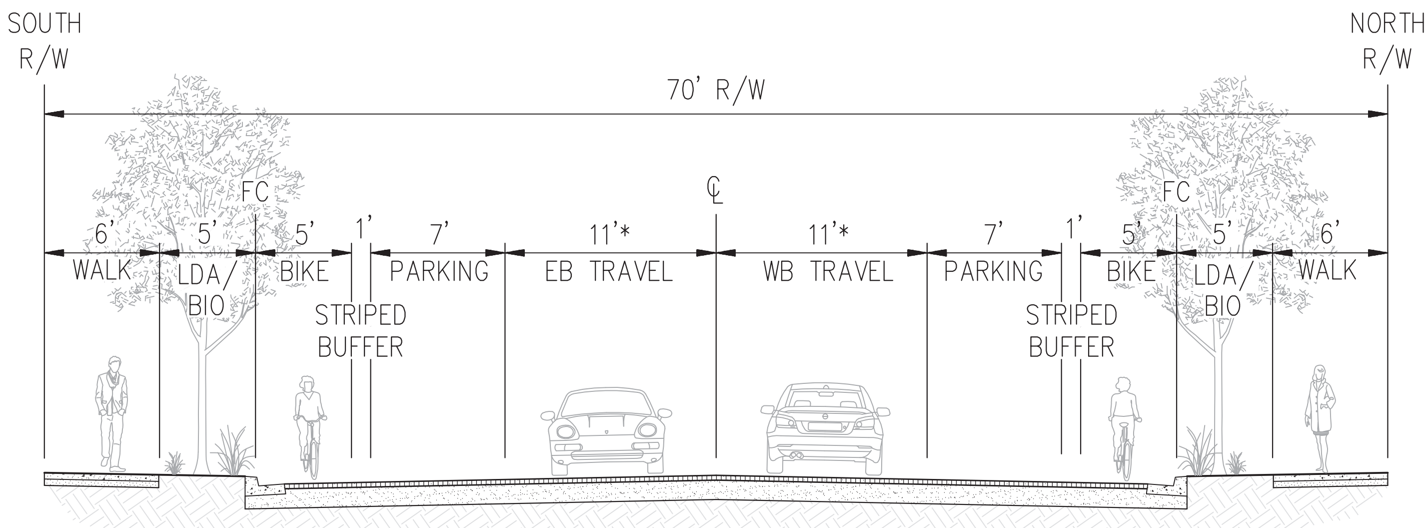
FIGURE 23
SEAPLANE (NORTH)
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- LOCAL STREET
- PRIMARY TRANSIT
- CLASS 2A BIKE FACILITY





WEST HORNET AVENUE

TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 11' LANES.

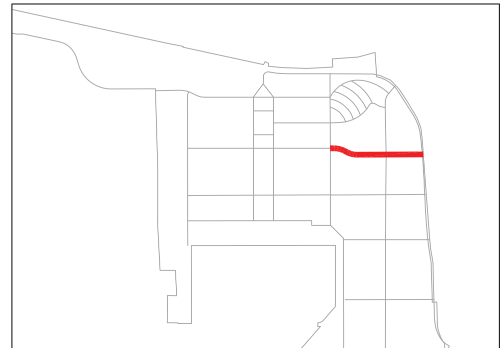
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

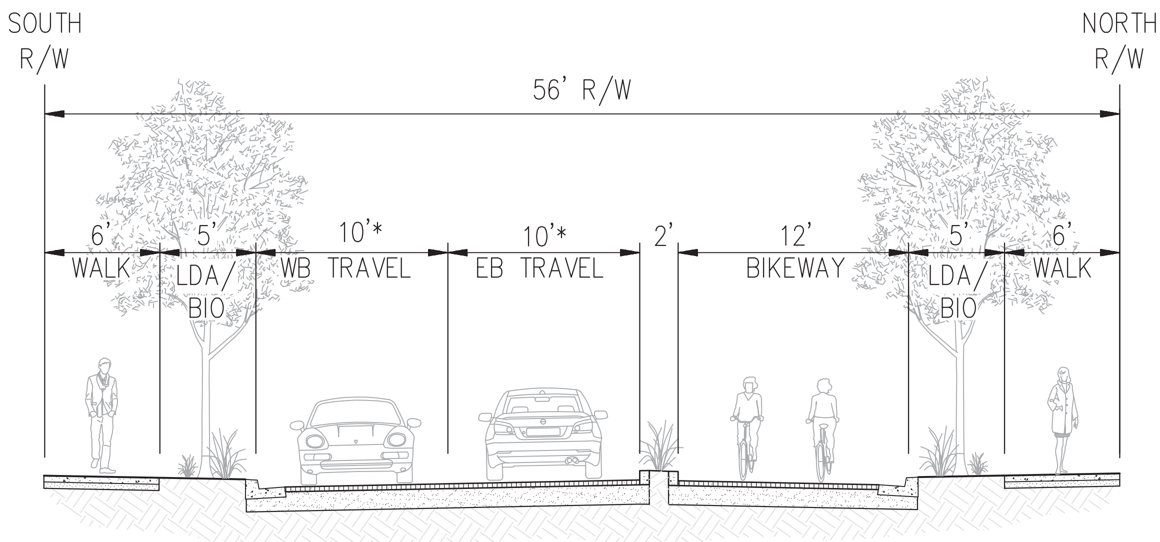
FIGURE 23
WEST HORNET AVENUE
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

STREET CLASSIFICATIONS

- ISLAND ARTERIAL
- SECONDARY TRANSIT
- CLASS 2A BIKE FACILITY





WEST MIDWAY AVENUE

TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
Carlson, Barbee, & Gibson, Inc.

FIGURE 23
WEST MIDWAY AVENUE
DEVELOPMENT AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_23_STREET SECTIONS (DEVELOPMENT).DWG

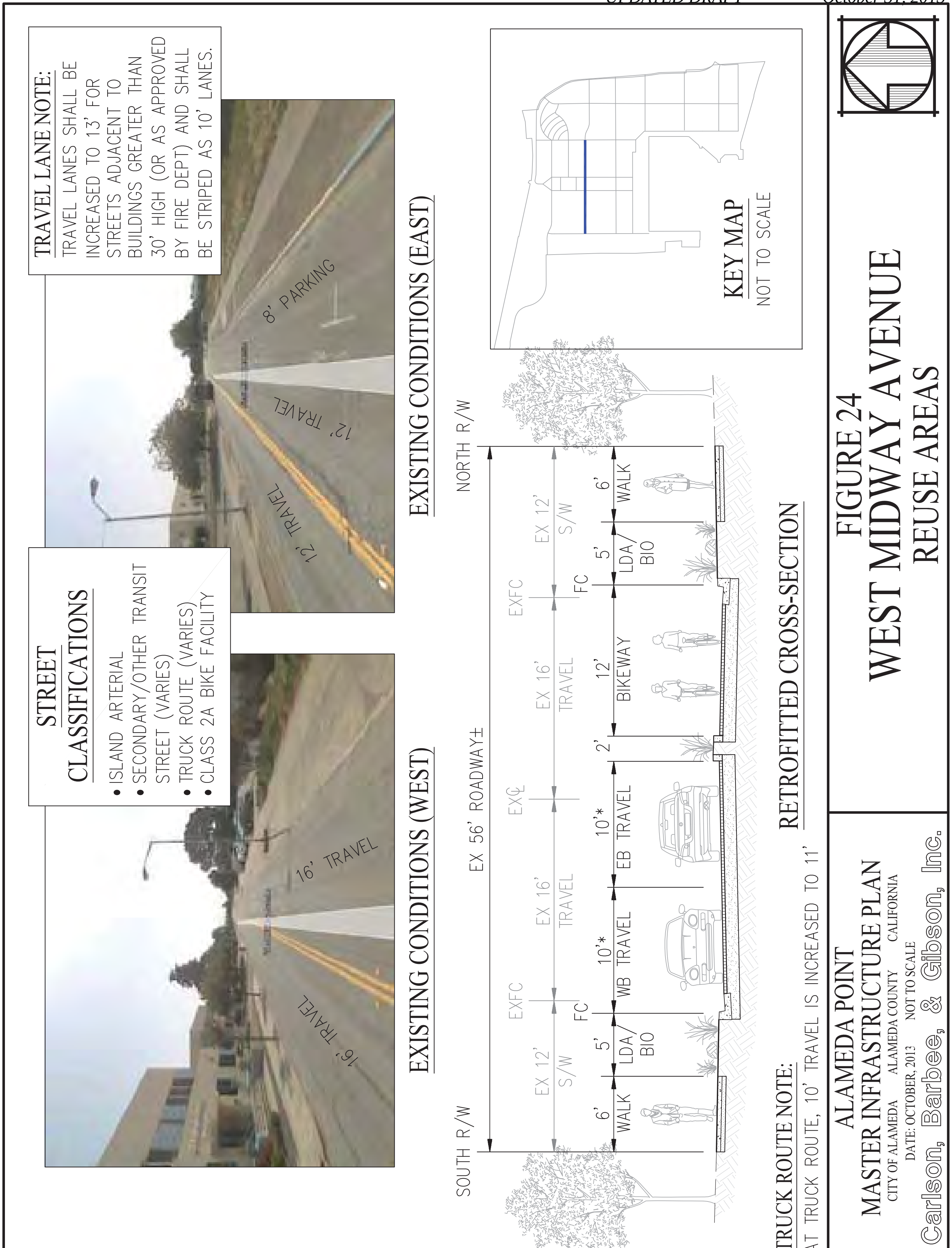

TRAVEL LANE NOTE:
TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.
STREET CLASSIFICATIONS
• ISLAND ARTERIAL
• SECONDARY/OTHER TRANSIT STREET (VARIES)
• TRUCK ROUTE (VARIES)
• CLASS 2A BIKE FACILITY
16' TRAVEL
16' TRAVEL
12' TRAVEL
12' TRAVEL
8' PARKING
EXISTING CONDITIONS (WEST)
EXISTING CONDITIONS (EAST)
SOUTH R/W
NORTH R/W
EX 56' ROADWAY±
EX 12' S/W
EXFC
EX 16' TRAVEL
EX℄
EX 16' TRAVEL
EXFC
EX 12' S/W
6' WALK
5' LDA/BIO
FC
10'* WB TRAVEL
10'* EB TRAVEL
2'
12' BIKEWAY
5' LDA/BIO
FC
6' WALK
RETROFITTED CROSS-SECTION
TRUCK ROUTE NOTE:
AT TRUCK ROUTE, 10' TRAVEL IS INCREASED TO 11'
KEY MAP
NOT TO SCALE
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
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FIGURE 24
WEST MIDWAY AVENUE
REUSE AREAS
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

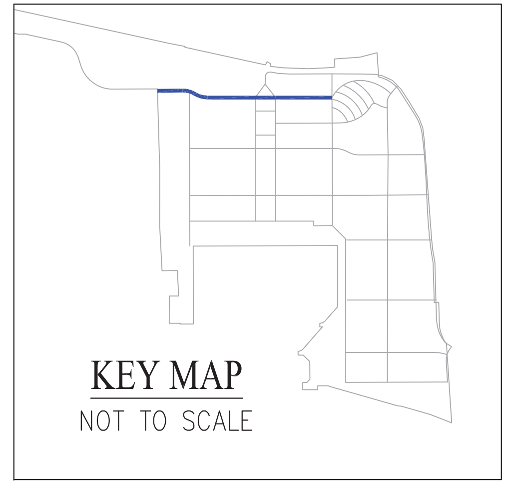
STREET CLASSIFICATIONS

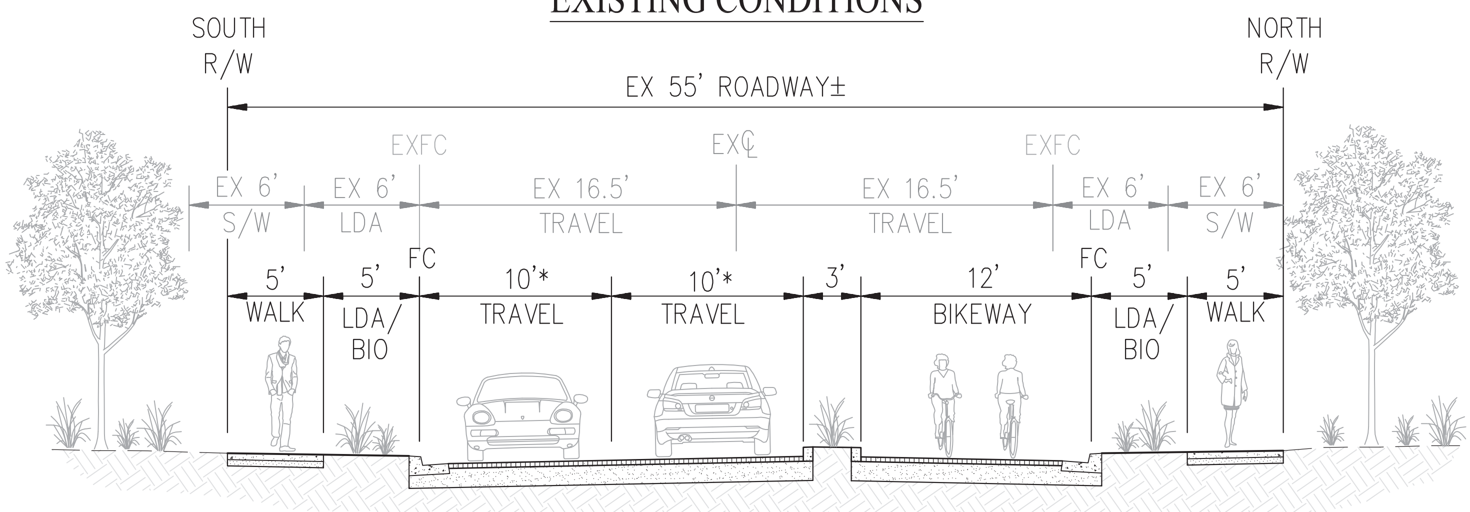
- ISLAND COLLECTOR/LOCAL STREET
- CLASS 2A BIKE FACILITY

TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

EXISTING CONDITIONS





RETROFITTED CROSS-SECTION

O-CLUB NOTE:

ADD LOADING BAY IN FRONT OF EXISTING O-CLUB.

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FIGURE 24
WEST REDLINE AVENUE
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

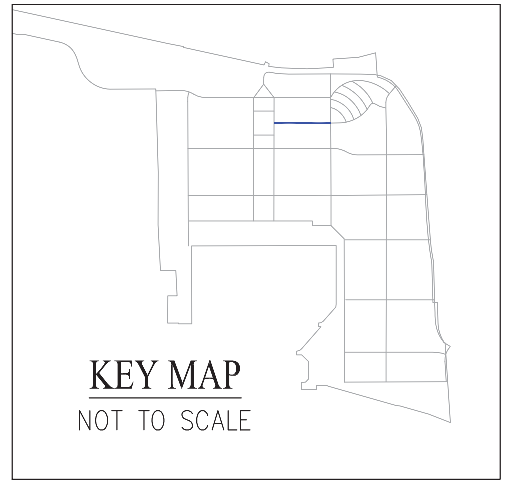
STREET CLASSIFICATIONS

- LOCAL STREET
- CLASS 2A BIKE FACILITY

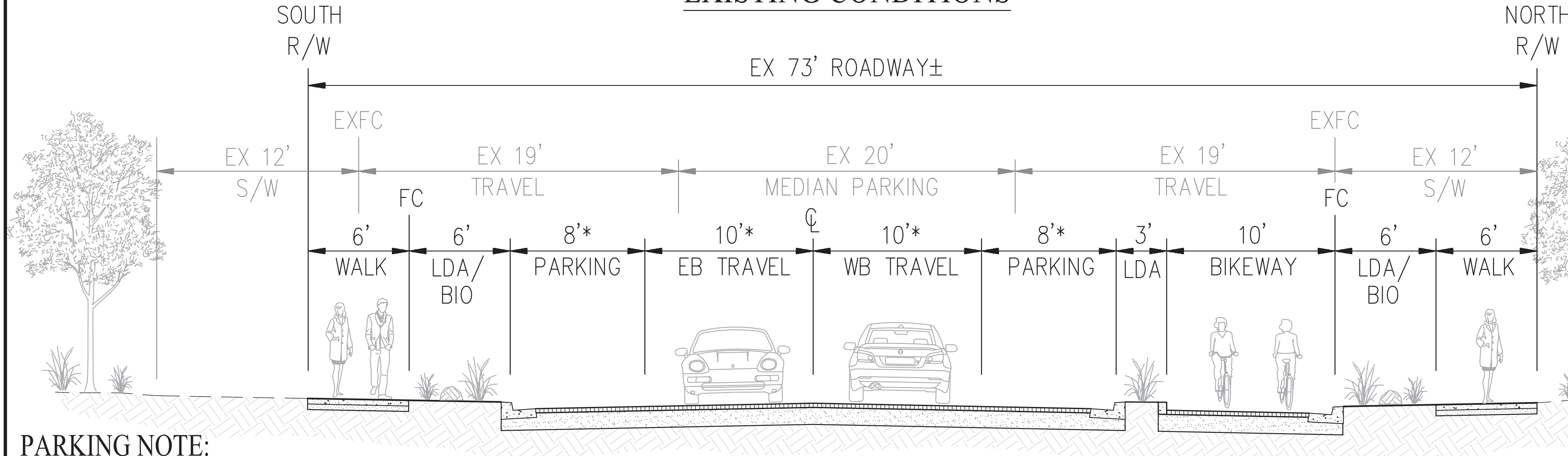
TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 10' LANES.

EXISTING CONDITIONS



KEY MAP
NOT TO SCALE



RETROFITTED CROSS-SECTION

PARKING NOTE:

WHEN TRAVEL LANES ARE GREATER THAN 10' WIDE, PARKING MAY BE REDUCED TO 7'.

ALAMEDA POINT
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FIGURE 24
ESSEX DRIVE
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

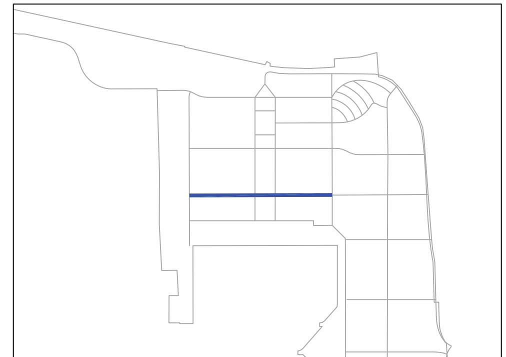
STREET CLASSIFICATIONS

- LOCAL STREET
- PRIMARY/OTHER TRANSIT STREET (VARIES)
- TRUCK ROUTE (VARIES)
- CLASS 2A BIKE FACILITY

TRAVEL LANE NOTE:

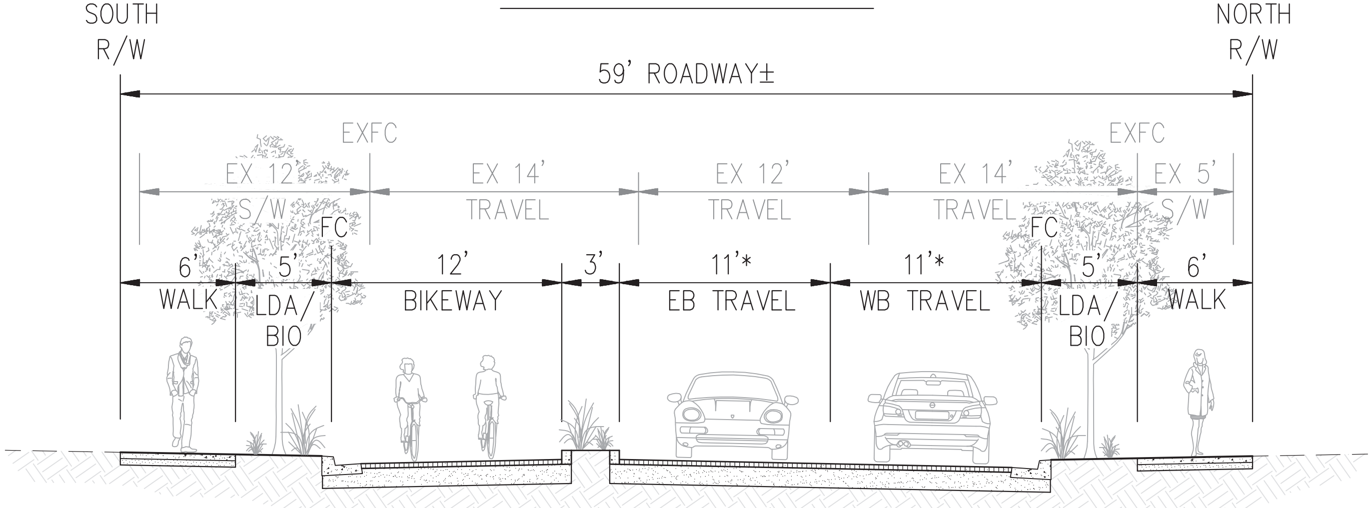
TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 11' LANES.

EXISTING CONDITIONS



KEY MAP

NOT TO SCALE



RETROFITTED CROSS-SECTION

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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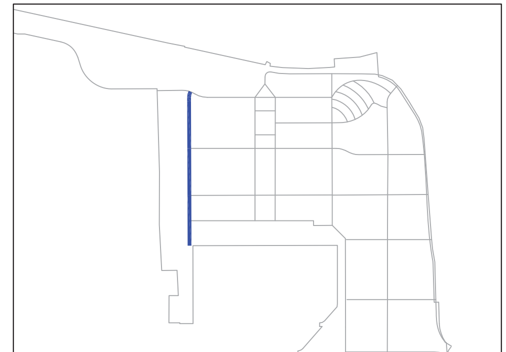
FIGURE 24
TOWER AVENUE
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

STREET CLASSIFICATIONS

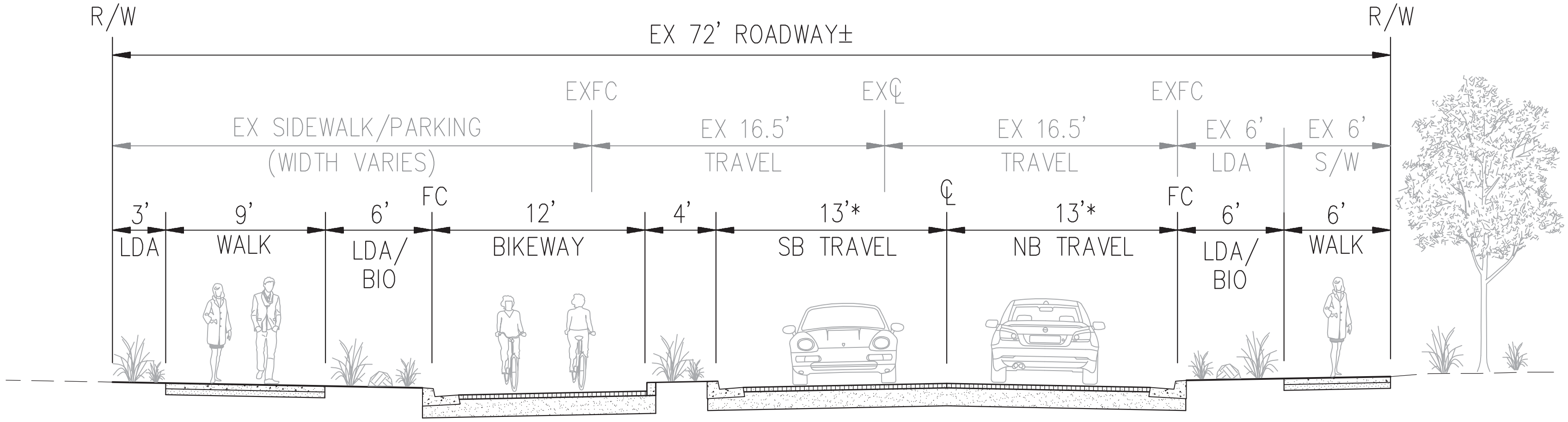
- LOCAL STREET
- CLASS 1A BIKE FACILITY

EXISTING CONDITIONS



KEY MAP

NOT TO SCALE



RETROFITTED CROSS-SECTION

TRAVEL LANE NOTE:

13' TRAVEL LANES SHALL BE STRIPED AS 10' LANES.

ALAMEDA POINT
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CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 24
MONARCH STREET
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

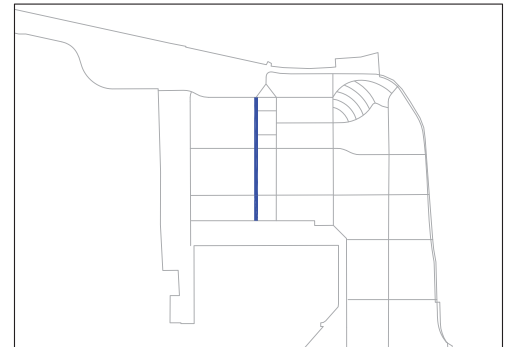
STREET CLASSIFICATIONS

- ISLAND ARTERIAL
- PRIMARY/OTHER TRANSIT STREET (VARIES)
- TRUCK ROUTE (VARIES)
- CLASS 2A BIKE FACILITY

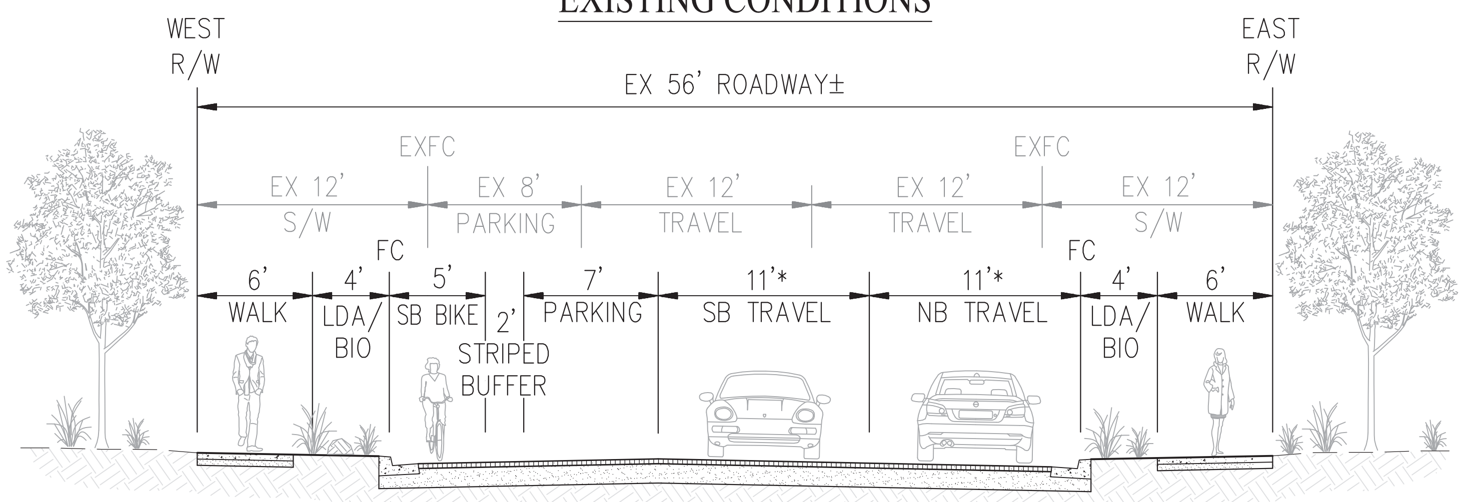
TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 11' LANES.

EXISTING CONDITIONS



KEY MAP
NOT TO SCALE



RETROFITTED CROSS-SECTION

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 24
LEXINGTON STREET
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

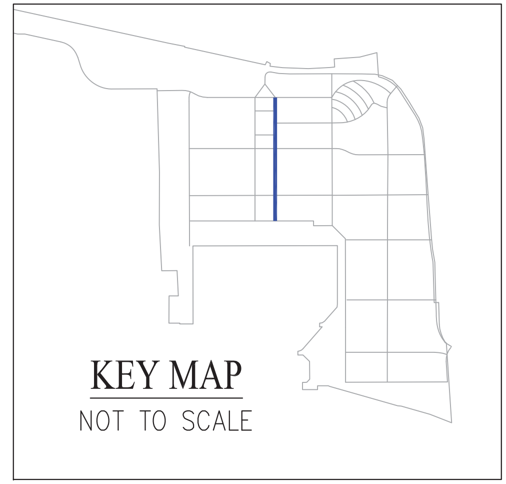
STREET CLASSIFICATIONS

- LOCAL STREET
- SECONDARY/OTHER TRANSIT STREET (VARIES)
- CLASS 2A BIKE FACILITY

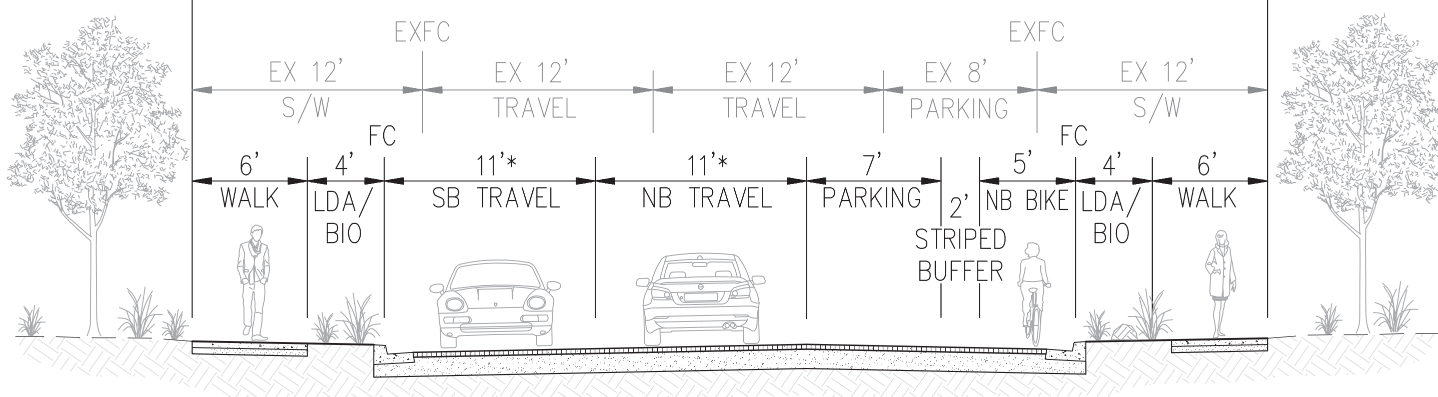
TRAVEL LANE NOTE:

TRAVEL LANES SHALL BE INCREASED TO 13' FOR STREETS ADJACENT TO BUILDINGS GREATER THAN 30' HIGH (OR AS APPROVED BY FIRE DEPT) AND SHALL BE STRIPED AS 11' LANES.

EXISTING CONDITIONS



KEY MAP
NOT TO SCALE



RETROFITTED CROSS-SECTION

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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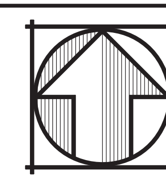
FIGURE 24
SARATOGA STREET
REUSE AREAS



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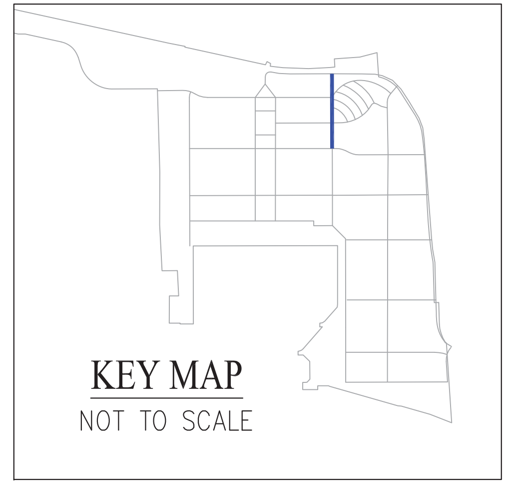
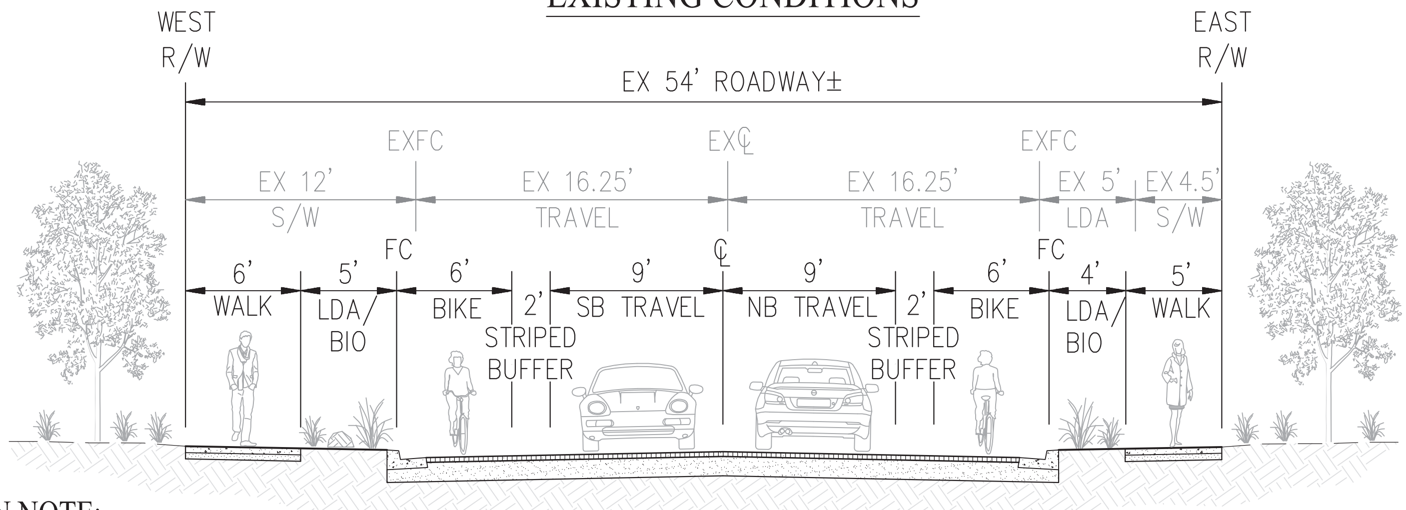
STREET CLASSIFICATIONS

- ISLAND COLLECTOR/LOCAL STREET
- CLASS 2B BIKE FACILITY

EXISTING CONDITIONS





RETROFITTED CROSS-SECTION

CONSTRUCTION NOTE:

REHAB EX PAN AM WAY FROM MIDWAY TO REDLINE.
NEW CONSTRUCTION FROM REDLINE TO MAIN STREET.

ALAMEDA POINT
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FIGURE 24
PAN AM WAY
REUSE AREAS

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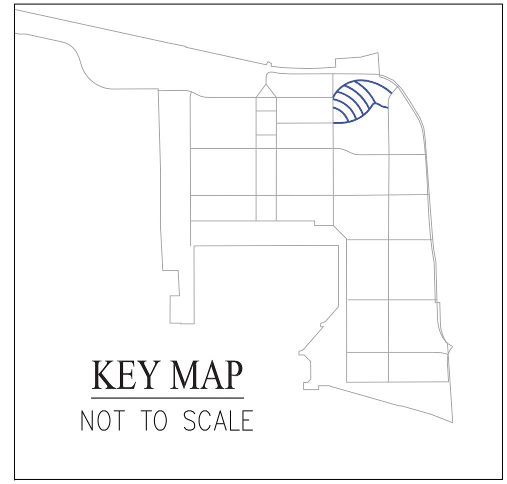
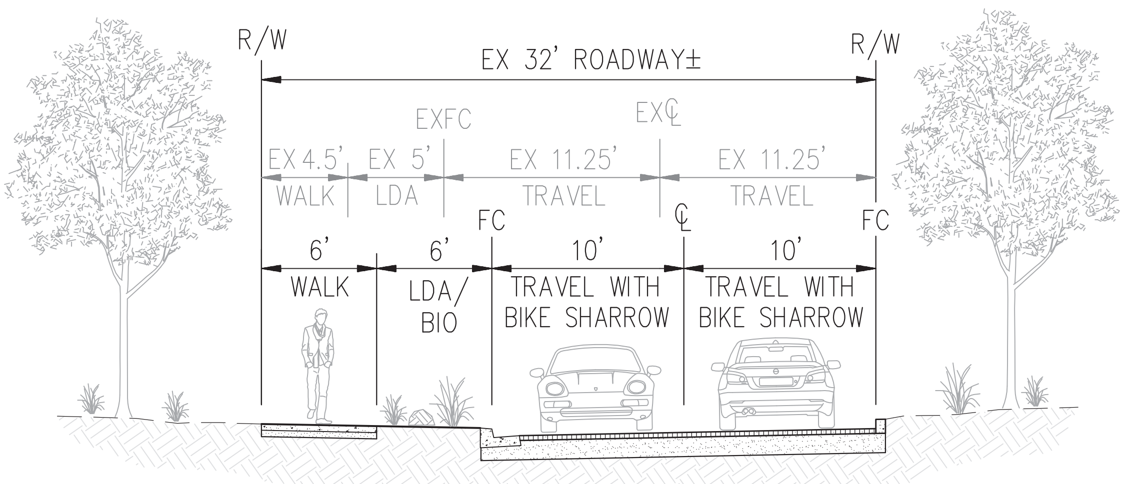
STREET CLASSIFICATIONS

- LOCAL STREET
- CLASS 3B BIKE FACILITY

EXISTING CONDITIONS





RETROFITTED CROSS-SECTION

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 24
BIG WHITES
REUSE AREAS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_24_STREET SECTIONS (REUSE AREAS).DWG

2. Proposed On-Site Bicycle Facilities

The proposed street system facilitates bicycles as a viable mode of transportation. The proposed bicycle priorities for the proposed street system include Classes I, II and III facilities throughout the Project Site. The proposed bike facilities may include bike lanes, buffered bike lanes, protected bikeways or cycle tracks and sharrows depending on adjacent land uses. The proposed bicycle facilities extend those within the other areas of Alameda, providing cross-island bicycle access to Alameda Point. Additionally, the construction of the perimeter Class I facility, Bay Trail, will enhance the recreational bicycle opportunities for the entire Alameda community. For purposes of the MIP, the following designations are used to delineate the various types of bike facilities planning throughout the Project Site.

Table 6 - Bike Facilities

	Class I	Class II*	Class III
A	Biking and walking are separated	Cycle with buffer (CT is between curb and parking	Bike boulevard
B	Biking and walking are shared	Buffered bike lane - buffer is pavement markings	Sharrows and signage
C		Bike lanes - just a stripe	Signage only

* Walking facility is sidewalk

See Figure 25 depicting the bicycle facilities proposed as art of the Alameda Point street system.

3. Proposed On-Site Truck Route

The proposed street system includes provisions for a truck route. The proposed truck route will limit the number of streets that through truck traffic is allowed. The proposed truck route will provide sufficient intersection design to allow for truck turning movements and address conflicts with pedestrians and bicycles. Additionally, the travel lane widths within the truck route may be widened up to 11 or 12-feet to accommodate trucks. See Figure 26 depicting the truck route proposed as art of the Alameda Point street system.

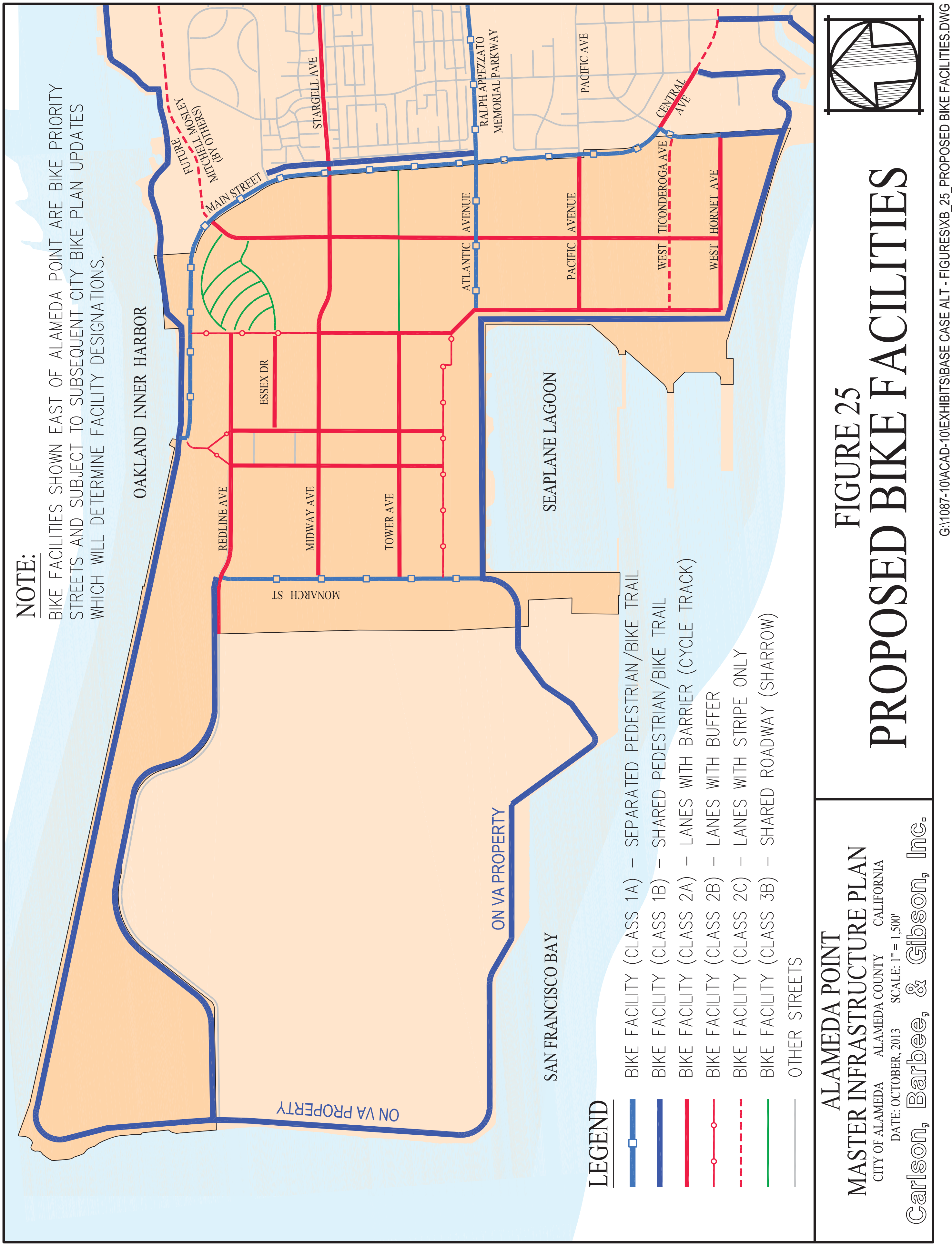
C. Proposed Transit System

1. Existing Transit Systems

There are two existing transit options at Alameda Point. There is existing bus service to portions of Alameda Point. Currently, AC Transit operates Line 31 which provides daily bus service through the central portions of Alameda Point. The destinations of this bus route include MacArthur and the Oakland Civic Center BART Stations. Additionally, the Alameda Ferry Terminal is located on the north side of Main Street adjacent to the northeastern portion of the Project Site. Water Emergency Transportation Authority (WETA) operates daily commuter and excursions ferry service from this terminal to San Francisco Ferry Building and Pier 41. Limited commuter service to South San Francisco is also provided.

2. Proposed Transit Systems

Alameda Point is a transit-oriented community designed to maximize the transit options for the community. Reliable and efficient transit service that connects to the regional transit system is critical for the redevelopment of Alameda Point. The transit options must be attractive to the residents and employees at Alameda Point. Transit will be effective if it is comparable or even faster than vehicles. A range of


NOTE:
BIKE FACILITIES SHOWN EAST OF ALAMEDA POINT ARE BIKE PRIORITY STREETS AND SUBJECT TO SUBSEQUENT CITY BIKE PLAN UPDATES WHICH WILL DETERMINE FACILITY DESIGNATIONS.
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
ON VA PROPERTY
ON VA PROPERTY
FUTURE MITCHELL MOSLEY (BY OTHERS)
MAIN STREET
STARGELL AVE
RALPH APPEZZATO MEMORIAL PARKWAY
PACIFIC AVE
CENTRAL AVE
ATLANTIC AVENUE
PACIFIC AVENUE
WEST TICONDEROGA AVE
WEST HORNET AVE
ESSEX DR
REDLINE AVE
MIDWAY AVE
TOWER AVE
MONARCH ST
LEGEND
BIKE FACILITY (CLASS 1A) – SEPARATED PEDESTRIAN/BIKE TRAIL
BIKE FACILITY (CLASS 1B) – SHARED PEDESTRIAN/BIKE TRAIL
BIKE FACILITY (CLASS 2A) – LANES WITH BARRIER (CYCLE TRACK)
BIKE FACILITY (CLASS 2B) – LANES WITH BUFFER
BIKE FACILITY (CLASS 2C) – LANES WITH STRIPE ONLY
BIKE FACILITY (CLASS 3B) – SHARED ROADWAY (SHARROW)
OTHER STREETS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
FIGURE 25
PROPOSED BIKE FACILITIES
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_25_PROPOSED BIKE FACILITIES.DWG

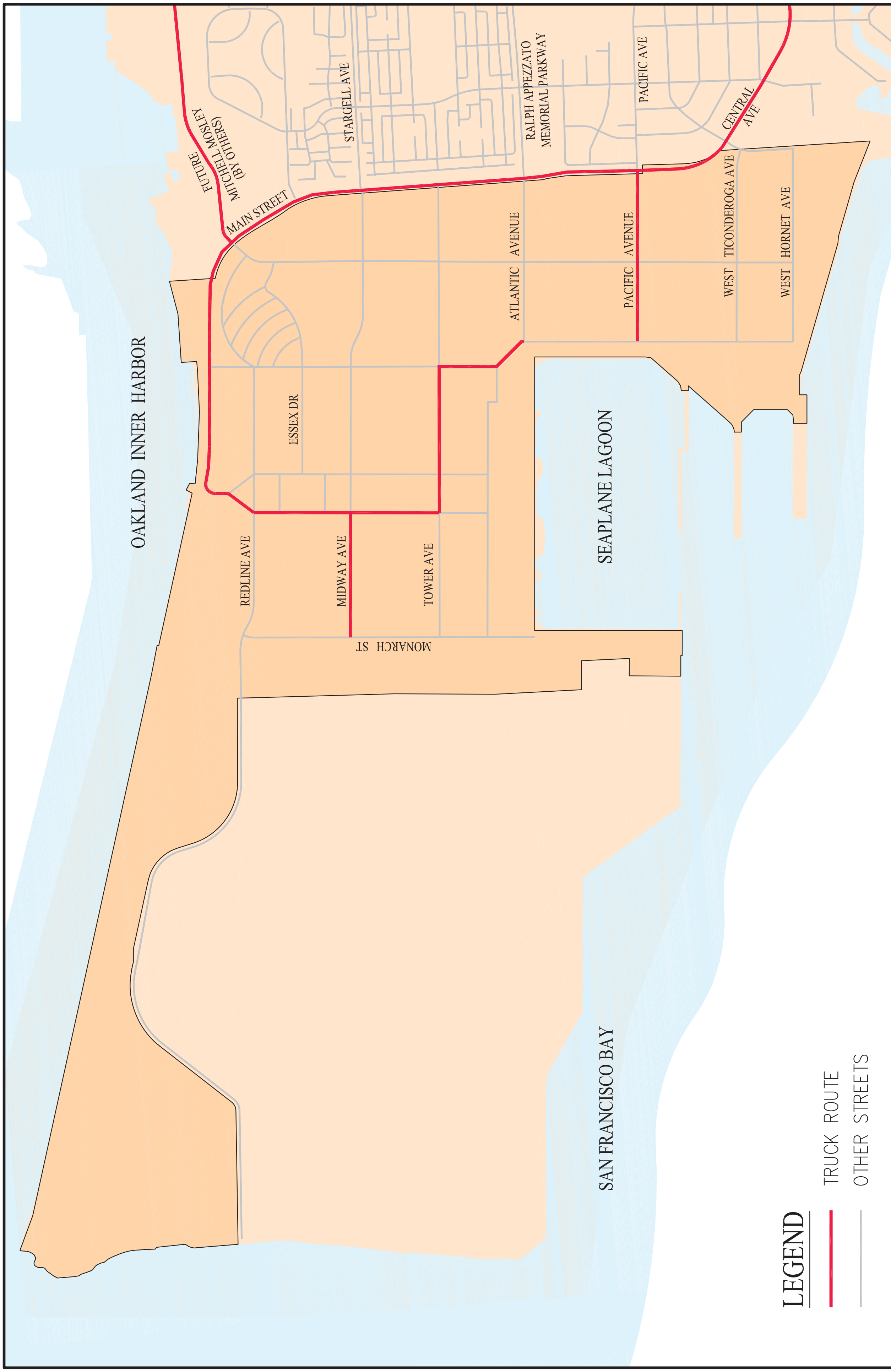


FIGURE 26
PROPOSED TRUCK ROUTE

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ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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transit strategies, measures and services will be combined into a comprehensive program that will be continually monitored and maintained to remain effective and beneficial to the community.

The proposed transit system includes an on-site Multi-Modal Transit Center, Shuttle Service, street improvements to facilitate Bus Rapid Transit (for west end Alameda), enhanced Ferry Service, and a Transportation Demand Management Plan. See Figure 27 depicting the proposed locations of the components of the proposed transit system.

a. Multi-Modal Transit Center

The proposed Multi-Modal Transit Center will be located near West Atlantic Avenue, within the Waterfront Town Center Sub-District. The Transit Center could include parking areas, car-sharing services, bicycle-sharing services, and connections to the multi-modal components of the proposed street system. Other elements of the Transit Center may include taxi stand, casual carpool loading area, travel information, way-finding signage, and a transportation management center.

b. Shuttle Service

As part of the initial development phases at Alameda Point, a shuttle will be implemented between Alameda Point and the 12th Street BART Station in Downtown Oakland. This shuttle will provide a high frequency transit option for residents and employers at Alameda Point. This shuttle would originate at the Multi-Modal Transit Center, potentially stop at other locations within the Project Site as well, and then utilize the Ralph Appezzato Memorial Parkway (RAMP) / Webster Street corridor to reach Downtown Oakland. The shuttle service is anticipated to evolve with each phase of development. Implementation and operation of the shuttle service will be flexible so that it can quickly adapt to development patterns guided by market forces.

c. Bus Rapid Transit

The City of Alameda is actively preparing and processing a Regional Transit Access Study. This study evaluates opportunities to enhance transit service to connect the City of Alameda, including Alameda Point, with regional BART transit facilities. The Study provides recommendations and findings for the proposed Bus Rapid Transit (BRT) improvements for Alameda Point. The study also provides information for the proposed Rapid Bus service improvements for northern central Alameda. The draft proposed BRT improvements are summarized as follows:

The BRT will originate at the proposed Multi-Modal Transit Center. The BRT will connect Alameda Point to the 12th Street BART station and Downtown Oakland. Exclusive transit lanes will be provided in both eastbound and westbound directions along W. Atlantic Ave and RAMP, from the Multi-Modal Transit Center to the intersection with Webster Street. For outbound (eastbound) traffic, the BRT will provide a dedicated bus-only lane from the Transit Center at West Atlantic Avenue to eastbound RAMP, and northbound Webster Street. The dedicated lane will end at Stargell Avenue and the BRT will then operate in mixed flow (transit and automobiles) from Stargell Avenue to Downtown Oakland/BART. The inbound traffic will operate in mixed flow from Downtown Oakland/BART to RAMP. A dedicated bus-only lane will be provided westbound on RAMP, from Webster Street to the Transit Center. The BRT will also incorporate measures to increase the bus operating speed. These measures will include traffic signal priority measures, bus queue jump lanes and enhanced boarding. The BRT will utilize the RAMP / Webster Street corridor. Improvements at the intersections of Webster Street / RAMP and Webster Street / Stargell Avenue will be required to improve the bus operating speed. Enhanced bus stops will also be provided at the Multi-Modal Transit Center, RAMP/Main Street, RAMP/Poggi Street and RAMP/Webster


FIGURE 27
PROPOSED TRANSIT SYSTEMS
LEGEND
EXCLUSIVE RIGHT-OF-WAY (RBS / BRT)
PRIMARY TRANSIT STREET
SECONDARY TRANSIT STREET
OTHER STREETS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_27_PROPOSED TRANSIT SYSTEMS.DWG
OAKLAND INNER HARBOR
SAN FRANCISCO BAY
SEAPLANE LAGOON
EXISTING FERRY TERMINAL
POTENTIAL FERRY TERMINAL
MULTI-MODAL TRANSIT CENTER
FUTURE MITCHELL MOSLEY (BY OTHERS)
MAIN STREET
STARGELL AVE
RALPH APPEZZATO MEMORIAL PARKWAY
PACIFIC AVE
CENTRAL AVE
ATLANTIC AVENUE
PACIFIC AVENUE
WEST TICONDEROGA AVE
WEST HORNET AVE
ESSEX DR
REDLINE AVE
MIDWAY AVE
TOWER AVE
MONARCH ST

Street intersections. The proposed route of the BRT within Downtown Oakland will include shared travel lanes on the following streets:

- North of Harrison Street to 14th Street
- West of 14th Street to Clay street
- East on 12th Street
- South on Broadway
- East on 7th Street
- South on Webster Street (return to Alameda)

Transit signal enhancement will be incorporated at the following intersections within Downtown Oakland:

- Harrison Street and 14th Street
- 14th Street and Clay Street
- Clay Street and 12th Street
- Broadway and 7th Street

Similarly, up to four enhanced bus stops are contemplated within Downtown Oakland at the following locations:

- 14th Street and Broadway
- 12th Street and Broadway
- Northbound stop on Harrison Street
- Southbound stop on 7th Street or Webster Street

It is anticipated that these improvements will result in BRT approximate travel time of 12 minutes from Alameda Point to the 12th Street BART Station.

The Alameda Point Project will construct transit improvements within West Atlantic Avenue and RAMP corridor to facilitate the implementation of the BRT. The actual implementation of the BRT is subject to coordination between the City of Alameda and local public transit agencies and providers.

d. Ferry Service

Ferry service for Alameda Point will be provided either at the existing Alameda Ferry Terminal along the northern shoreline of Alameda Point, or at a new ferry terminal located in the Seaplane Lagoon near the Multi-Modal Transit Center. Either location will provide the Project Site with frequent, high-speed ferry service between Alameda and San Francisco.

e. Transportation Demand Management Plan

A Transportation Demand Management Plan (TDMP) with an annual monitoring and reporting requirement will be prepared for Alameda Point to continuously evaluate the effectiveness of the proposed transit system and other transportation demand management strategies. Based on the monitoring results, the TDMP will refine the transit strategies and demand management programs to minimize project impacts, reduce congestion, and meet vehicle miles travel reduction goals.

D. Proposed Off-Site Street Improvements

The transportation planning for Alameda Point will also include improvements to off-site streets and intersections located in the surrounding areas of Alameda to address project impacts outlined as mitigation measures in the EIR. These are in addition to the transit improvements discussed above and will either be constructed by Alameda Point or Alameda Point will make a fair-share contribution towards the construction by others. See Figure 28 depicting the locations of the off-site street improvements associated with Alameda Point. The proposed off-site street and intersection improvements may include the following items or others as specified by the EIR:

- Project Improvements - Vehicle Improvements
  - Fernside Boulevard / Otis Drive - Intersection and Signal Improvements
  - Main Street / Pacific Avenue - Signal Improvements
  - Webster Street / RAMP - Signal Improvements
  - Park Street / Otis Drive - Signal Improvements
  - Broadway / Tilden Way - Signal Improvements
  - High Street / Fernside Boulevard - Signal Improvements
  - Atlantic Avenue / Constitution Way - Signal Modification

- Project Improvements - Bicycle Improvements
  - Stargell Avenue Class I Trail - Main Street to 5th Street
  - Main Street Class I Trail - RAMP to Pacific Avenue
  - Central Avenue Class I and II Trail - Pacific Avenue to 4th Street

- Project Contributions (Pro-Rata Share) - Vehicle Improvements
  - Park Street / Clement Avenue - Intersection Improvements
  - Park Street / Encinal Avenue - Intersection Improvements
  - Broadway / Otis Drive - Intersection Improvements
  - Tilden Way / Blanding Avenue / Fernside Boulevard - Intersection Improvements
  - High Street / Fernside Boulevard - Intersection Improvement
  - High Street / Otis Drive - Intersection Improvements
  - Island Drive / Otis Drive / Doolittle Drive - Intersection Improvements
  - Fernside Boulevard / Otis Drive - Signal Modification
  - Park Street / Blanding Avenue - Intersection Improvements
  - Challenger Drive / Atlantic Avenue - Signal Improvements
  - Park Street / Lincoln Avenue - Signal Improvements

- Project Contributions (Pro-Rata Share) - Pedestrian Improvements
  - Main Street / Pacific Avenue - Signal Improvements
  - Webster Street / RAMP - Signal Improvements
  - High Street / Fernside Boulevard - Intersection Improvements
  - Atlantic Avenue / Constitution Way - Signal Modification


FIGURE 28
OFF-SITE STREETS & TRANSIT
LEGEND
OFF-SITE IMPROVEMENTS
OFF-SITE IMPROVEMENT CONTRIBUTIONS
FUTURE BRT ROUTE & BUS STOP
OTHER MAJOR ROADWAYS
EXISTING BART STATION
BART
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 3,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_28_OFFSITE STREETS & TRANSIT.DWG
LAKE MERRITT
WEBSTER ST TUBE
OAKLAND INNER HARBOR
SAN FRANCISCO BAY
SEAPLANE LAGOON
MAIN ST
STARGELL AVE
5TH ST
MITCHELL
MOSLEY
RALPH APPEZZATO MEMORIAL PARKWAY
PACIFIC AVE
CENTRAL AVE
WEBSTER ST
CONSTITUTION WAY
ATLANTIC AVE.
LINCOLN AVE
CLEMENT AVE
ENCINAL AVE
GRAND ST
OTIS DR
BLANDING AVE
TILDEN WAY
OAK ST
PARK ST
BROADWAY
HIGH ST
FERNSIDE BLVD
FRUITVALE AVE
ISLAND DRIVE
DOLITTLE DR
580
880
980

- Project Contributions (Pro-Rata Share) - Transit Improvements
  - Park Street Transit Signal Priority - Blanding Avenue to Otis Drive
  - RAMP Transit Corridor Improvements - Main Street to Webster Street (including transit Signal priority, exclusive transit lane eastbound)
  - Stargell Avenue Queue Jump Lanes - Main Street and 5th Street Intersection

- Project Contributions (Pro-Rata Share) - Bicycle Improvements
  - Stargell Avenue Class I Trail - Main Street to 5th Street
  - Main Street Class I Trail - RAMP to Pacific Avenue
  - Central Avenue Class I and II Trail - Pacific Avenue to 4th Street
  - Oak Street Bicycle Boulevard - Santa Clara Avenue to Central Avenue

VI. PARKS AND OPEN SPACE

A. Existing Parks and Community Facilities

There is a number of existing park and community facilities within Alameda Point that are currently actively used. These facilities provide a range of benefits and uses to the community. The existing facilities within Alameda Point are as follows:

1. Existing Parks & Open Space Areas

- Alameda Point Multi-Purpose Field (W. Redline Avenue)
- City View Skate Park
- Main Street Dog Park
- Main Street Linear Park
- Main Street Soccer Field
- Hornet Soccer Field
- Lexington Street Soccer Fields
- Encinal Boat Ramp
- Parade Grounds
- Entry Monuments

2. Existing Community Facilities

- Alameda Point Gymnasium
- Albert DeWitt Officer's (O) Club

See Figure 29 depicting the locations of the various existing parks and community facilities within Alameda Point.

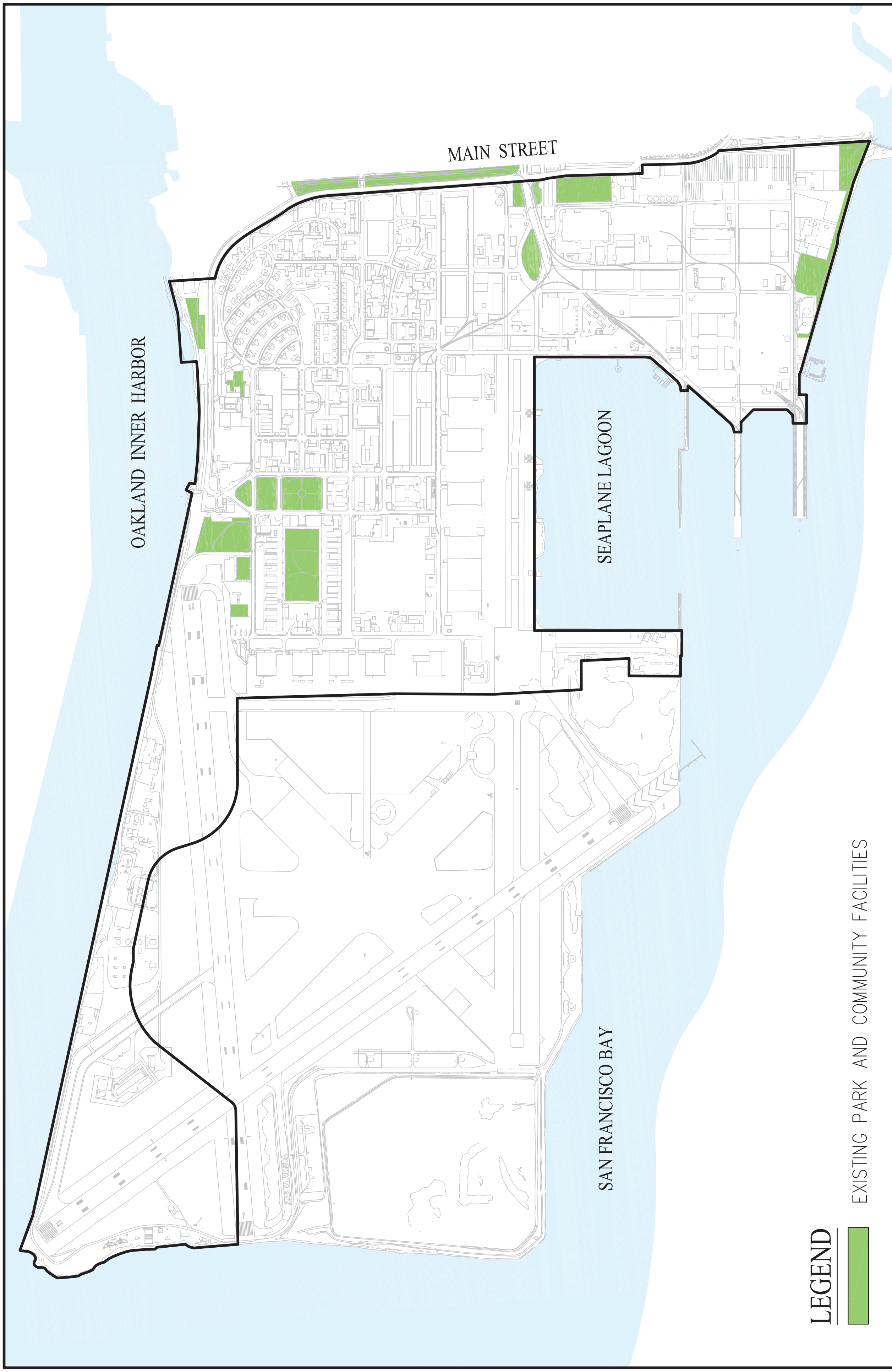


FIGURE 29

EXISTING PARK AND COMMUNITY FACILITIES

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

DATE: OCTOBER, 2013 SCALE: 1" = 1,500'

Carlson, Barbee, & Gibson, Inc.

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_29_EX PARK FACILITIES.DWG

B. City of Alameda's Urban Greening Plan and Parks Improvement Assessment

The City of Alameda prepared an Urban Greening Plan and Parks Improvement Assessment in 2012. This Plan defines a strategy of refinements and enhancements to the existing and proposed park system within the City of Alameda in order to meet the evolving needs of the community. This plan integrates the existing and new park improvements with a Urban Greening Plan targeted to mitigate the long-term effects of climate change and achieving a more sustainable and healthy community. Through this process the plan has established goals, standards and recommendations for the open space and park facilities at Alameda Point. These are summarized as follows:

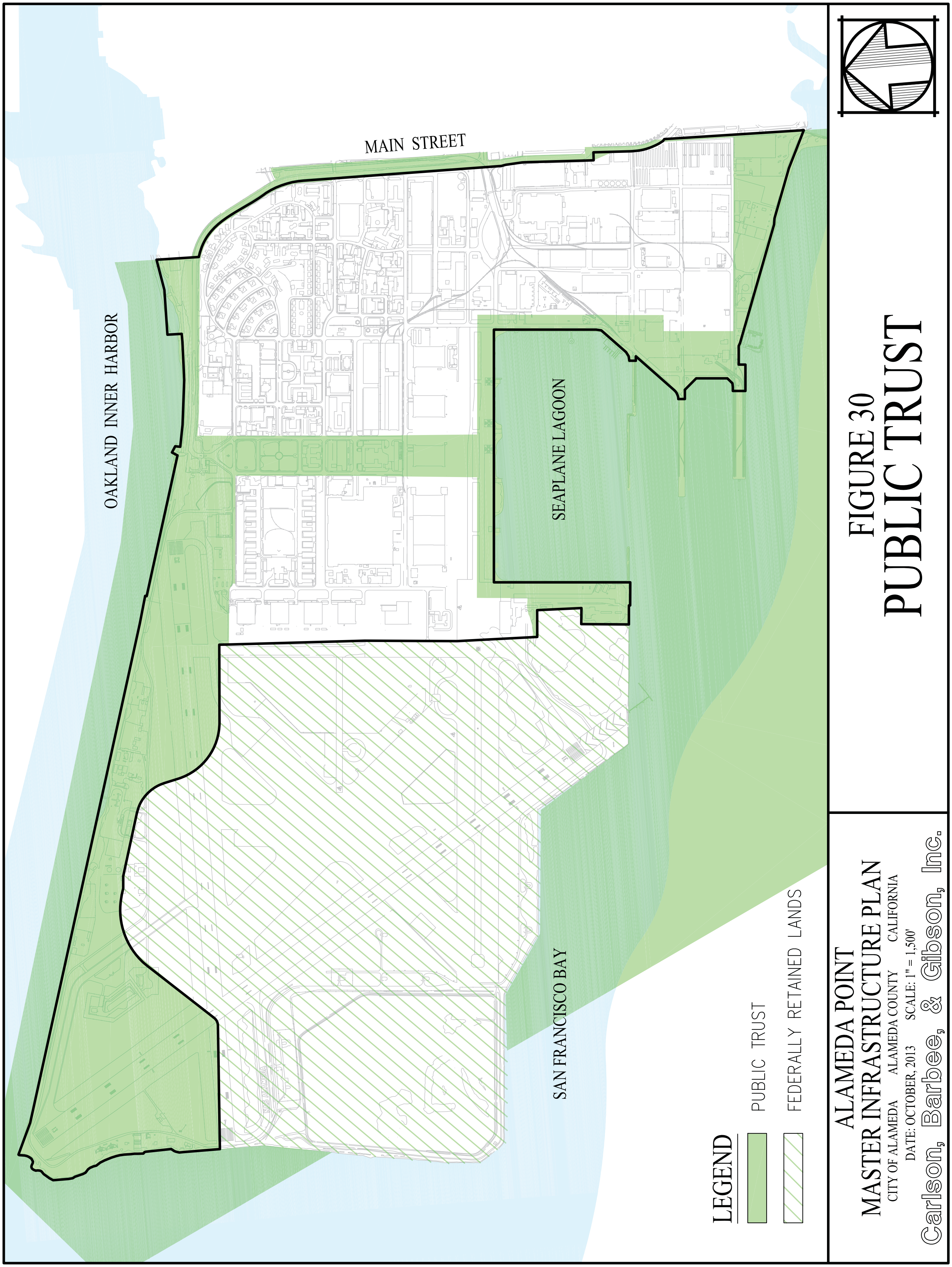
- Assign high priority to maintenance and renovation of existing parks and facilities, where feasible.
- Develop new neighborhood and community parks to achieve 3 acres of park area for each 1,000 residents.
- Develop a Regional Sports Complex that includes a variety of sports fields and uses that are a benefit to the entire community of Alameda and larger region.
- Promote public water-oriented uses within the Public Trust Areas depicted on Figure 30. These uses may include navigation, fisheries, maritime, hotels, water-oriented recreation, restaurants, visitor serving retail, parks and open space.
- Establish partnerships with public and private partners for the management of large passive parks.
- Expand access to Alameda's shoreline.
- Improve and expand the City's trail system to provide recreational opportunities and improve access to parks and shoreline.
- Upgrade parks and facilities to ADA standards to ensure accessibility for all.

C. Proposed Open Space Framework

The proposed open space framework at Alameda Point is comprised of three major components: the Nature Reserve, Primary Open Spaces and Secondary Open Spaces. The redevelopment of Alameda Point will incorporate numerous parks, open space, trail and community facilities. The specific amount and timing of proposed parks, open space and community facilities to be constructed at Alameda Point are subject to future policy decisions by the City Council and will be further evaluated as part of the development impact / infrastructure fee study for Alameda Point. See Figure 31 depicting an illustrative depiction of the anticipated proposed open space system. Additional, "in-tract" or "on-site" parks are not depicted on this figure but will be constructed as part of the proposed system. The proposed facilities are outlined as follows:

1. Nature Reserve

The Nature Reserve is located in the western portions of Alameda Point and is owned by the Federal Government. The Nature Reserve provides long-term protection of habitat primarily for the endangered California Least Tern and other wildlife. Public access within the Nature Reserve will be limited to a seasonal trail along the perimeter of the reserve consistent with federal requirements.


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
FIGURE 30
PUBLIC TRUST
LEGEND
PUBLIC TRUST
FEDERALLY RETAINED LANDS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
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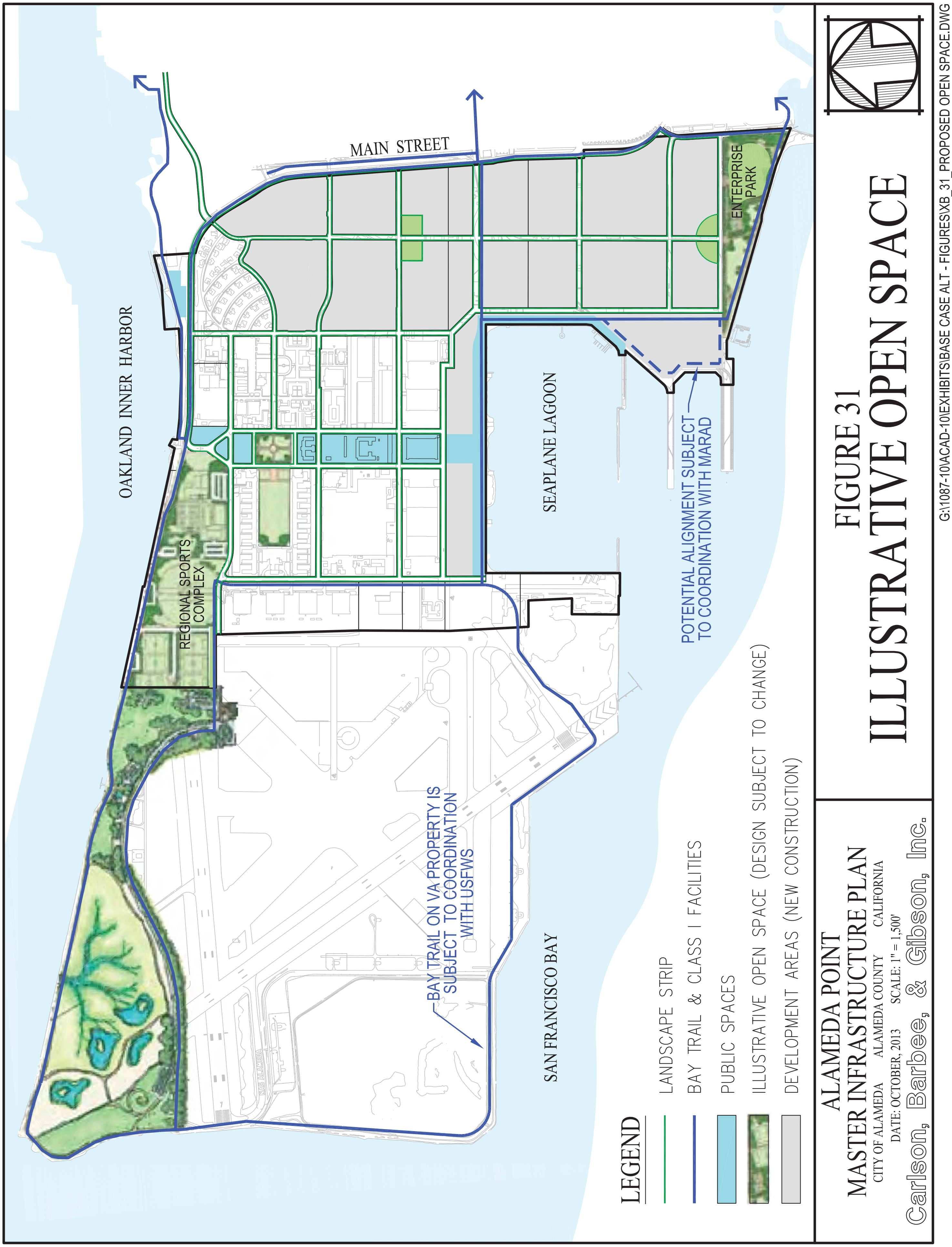
MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
ENTERPRISE PARK
REGIONAL SPORTS COMPLEX
POTENTIAL ALIGNMENT SUBJECT TO COORDINATION WITH MARAD
BAY TRAIL ON VA PROPERTY IS SUBJECT TO COORDINATION WITH USFWS
SAN FRANCISCO BAY
LEGEND
LANDSCAPE STRIP
BAY TRAIL & CLASS I FACILITIES
PUBLIC SPACES
ILLUSTRATIVE OPEN SPACE (DESIGN SUBJECT TO CHANGE)
DEVELOPMENT AREAS (NEW CONSTRUCTION)
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
FIGURE 31
ILLUSTRATIVE OPEN SPACE
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2. Primary Open Spaces

The Primary Open Spaces provide full public access and focus on visitor and community serving uses that support active recreational, community and social functions. The Primary Open Spaces include:

- Alameda Point Regional Sports Complex – Integrate the existing Alameda Point Multi-Purpose Field, Alameda Point Gymnasium, and City View Skate Park with additional sports fields and uses desired by the Alameda community, where feasible.
- Main Street Dog Park – Preserve this existing facility, if possible.
- Main Street Linear Park and Flood Control Channel – Preserve this existing facility.
- Enterprise Park – Integrate and upgrade the existing campground and Encinal Boat Ramp with additional open space consistent with the Public Trust.
- Lexington Street Soccer Fields – Preserve this existing facility.
- Parade Grounds – Preserve this existing historic facility.
- Neighborhood Parks – Construct new neighborhood parks to serve the residents which include a variety of elements, such as children's play areas, picnic tables, gathering areas, community gardens, etc., especially within the Main Street Neighborhood Sub-District.
- Seaplane Lagoon Frontage – Improve a shoreline park that frames the edges of the Seaplane Lagoon. Portions of this features will be highly amenitized, including water oriented elements such as pedestrian walks, bicycle paths, vista points, seat/rest areas, etc.
- Northwest Territories – Improve this large area with passive uses such as, wetland restoration, picnic areas, trails, trailhead, etc.

3. Secondary Open Spaces

The Secondary Open Spaces are park areas of a smaller scale that provide environmental, agricultural and social gathering areas supporting passive recreational, social and transportation uses and provide linkages throughout the new neighborhoods. The Secondary Open Spaces include:

- Bay Trail – Construct the Bay Trail along the perimeter of the Project Site, Seaplane Lagoon, and VA Property. The portion of the Bay Trail along the perimeter of the VA Property, if open all year, will be subject to review and approval from the United States Fish and Wildlife Service to ensure appropriate measures are implemented to protect endangered and sensitive species. Additionally, if the alignment of the Bay Trail near the secured premises of the MARAD Fleet moves west closer to the MARAD fleet, it will be subject to coordination with MARAD representatives.
- Main Street – Construct a Class I trail along the west side of Main Street to provide a linkage between the northern and southern shorelines.

4. Community Facilities

- Alameda Point Gymnasium – Preserve this existing facility and implement ADA and seismic retrofits.
- Albert DeWitt Officer's Club – Preserve this existing facility and implement ADA and seismic retrofits.

VII. WASTEWATER

A. Existing Wastewater System

1. Existing On-Site Wastewater Collection System

The existing wastewater collection system within Alameda Point is owned and maintained by the City of Alameda. The existing collection system consists of gravity pipelines ranging in size from 4-inch to 30-inch in diameter, 15 pump / lift stations, and force mains ranging from 4-inch to 8-inch in diameter. There is approximately 28 miles of existing wastewater pipelines within the Project Site comprised of the following:

- Gravity Mainlines = 14.2 Miles
- Force Mains = 2.3 Miles
- Building Laterals = 8.7 Miles
- Previously Abandoned Lines = 2.8 Miles

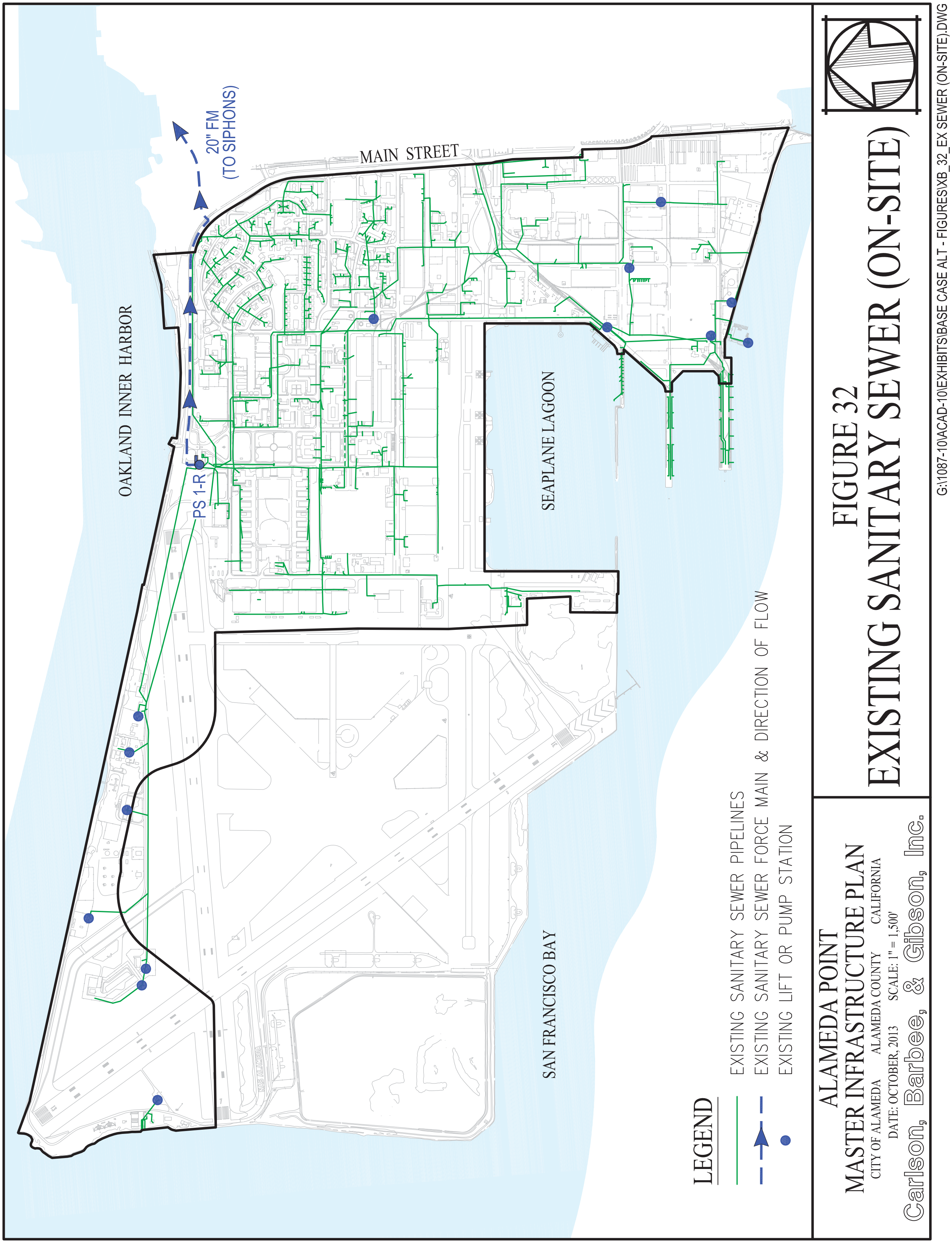
This system collects and conveys wastewater from the Project Site to the existing Pump Station, referred to as Pump Station R, located just west of the Main Gate at the northern edge of Alameda Point.

The Navy began the installation of this system approximately 70 years ago. The system is currently functional, however, the system is beyond its service life and has numerous deficiencies. Most notably, the majority of the system has deteriorated due to the age of the system and differential settlement has occurred over time at the Project Site. These effects of time have resulted in groundwater infiltration entering the on-site collection system and downstream transmission system. Additionally, portions of the existing system have adverse slopes causing wastewater build-up and stagnant conditions. There are portions of the collection pipelines that are located under existing buildings and outside of the existing and proposed backbone street rights of ways. The existing wastewater collection system does not meet the City's standards. See Figure 32 depicting the configuration of the existing wastewater collection system at Alameda Point.

Recent flow monitoring conducted by EMBUD just upstream of Pump Station R indicates the existing peak wet weather wastewater flow from Alameda Point is approximately 1.93 MGD.

2. Existing Off-Site Wastewater Transmission Facilities

The existing on-site wastewater collection system terminates at Pump Station R. Historically, the wastewater flows from Alameda Point were pumped from Pump Station R under the Oakland - Alameda Estuary and through the Port of Oakland site, eventually connecting to an EBMUD trunk main, "Interceptor", that conveyed the flows to the EBMUD Main Wastewater Treatment Plant (MWWTP). The location of the historical Estuary crossing was approximately 3,000-feet west of Pump Station R. In the early 2000's, the Port of Oakland dredged the Estuary to a depth that conflicted with the existing pipeline crossing. Accordingly, the City of Alameda, EBMUD and the Port of Oakland coordinated a project to reroute the wastewater from Alameda Point to the east and to cross the Estuary at the existing EBMUD siphon facility near the Webster / Posey Tubes. This project was completed in 2003 and included the installation of approximately 8,600 linear feet of a 20-inch force main from the Pump Station R to the siphon facility. This force main flows from west to east along the northern shoreline of western Alameda. Additionally, a third 48-inch diameter siphon was added to the two existing 30-inch and 48-inch diameter siphons. These siphons convey wastewater flows from the entire main island of the City of Alameda under the Oakland


MAIN STREET
20" FM
(TO SIPHONS)
OAKLAND INNER HARBOR
PS 1-R
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
EXISTING SANITARY SEWER PIPELINES
EXISTING SANITARY SEWER FORCE MAIN & DIRECTION OF FLOW
EXISTING LIFT OR PUMP STATION
FIGURE 32
EXISTING SANITARY SEWER (ON-SITE)
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_32_EX SEWER (ON-SITE).DWG

/ Alameda Estuary. The siphons then connect into EBMUD's Interceptor, which convey wastewater from the City of Alameda and portions of the City of Oakland to EBMUD's MWWTP. EBMUD's MWWTP is located near the eastern landing of the Bay Bridge in West Oakland, approximately 2.5 miles from the Project Site. See Figure 33 depicting the existing off-site wastewater transmission and treatment facilities.

Pump Station R, the 20-inch force main, the siphon facility (Alameda Siphon) and the EBMUD Interceptor are owned and maintained by EBMUD. These facilities convey the wastewater generated at Alameda Point to the EBMUD MWWTP. EBMUD's design reports indicate that the existing capacity of Pump Station R is 7.5 MGD. The capacity of this pump station can be increased by increasing the size of the pumps and other equipment within the pump station. The existing 20-inch diameter force main has an existing capacity of 12.1 MGD. The third siphon that was constructed with the previously described project that rerouted the wastewater from Alameda Point is part of the Alameda Siphon. The existing peak wastewater flow within the Alameda Siphon is approximately 28 MGD.

3. Existing Wastewater Treatment

The EBMUD Main Wastewater Treatment Plant (MWWTP) currently has excess dry weather flow capacity. The current average dry weather flow to the MWWTP is approximately 54 MGD and the permitted dry weather flow of the MWWTP is 120 MGD.

In regards to wet weather flow capacity of EBMUD's treatment facilities, in January 2009, EBMUD entered into a Stipulated Order for Preliminary Relief from the U.S. Environmental Protection Agency, State of California Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board. This Stipulated Order outlines the measures EBMUD is required to implement in order to address inadequately treated sewage discharges to San Francisco Bay during wet weather conditions.

EBMUD's operates three wet weather facilities that handle excess sewage during storm events when flows exceed the capacity of the District's Main Wastewater Treatment Plant. The excess flows are largely caused by storm water and groundwater leaking into the region's aging sanitary sewer collection pipelines and through improper connections that allow storm water to flow into the sewer system. The intent of the Stipulated Order is to formulate long-term solutions to minimize the high level of infiltration to the East Bay collection systems and eliminate the discharge of the excess flows from the EBMUD's wet weather facilities.

The Stipulated Order requires EBMUD to conduct a flow monitoring study to identify the regions within the District's service area that generate the largest wet weather flows. This flow monitoring study is also intended to establish a range of scenarios of capacity flow limits for specific locations within the District's system that could eliminate the need for discharges from the wet weather facilities. This flow monitoring study was completed by EBMUD in March 2012 and approved by the EPA in December of 2012.

Large redevelopment sites such as Alameda Point are expected to reduce the amount of infiltration and inflow entering the wastewater collection system through the replacement/rehabilitation of the aging, deteriorated sewer infrastructure with new systems that are constructed to current standards. EBMUD has indicated that the conclusions of their efforts to address the Stipulated Order will not limit the future growth or redevelopment at Alameda Point. EBMUD recommends that the project incorporate the following measures to comply with the Stipulated Order and maintain capacity for the Project Site:

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 3,000'
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FIGURE 33
EXISTING SANITARY SEWER
(OFF-SITE TRANSMISSION)

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- Replace or rehabilitate any existing sanitary sewer collection system, including sewer lateral lines, to reduce infiltration/inflow, and
- Ensure any new wastewater collection systems for the project, including sewer laterals, are constructed to prevent infiltration/inflow to the maximum extent feasible.

B. Proposed Wastewater System

1. Proposed Wastewater Demand

The total estimate peak wastewater generated by the full build-out of the redevelopment of Alameda Point is approximately 2.16 MGD. The wastewater flow generation factors for the various proposed land uses are based on the current City of Alameda design criteria utilized in the City-Wide sewer model and outlined in Table 7. These wastewater generation factors do not account for the implementation of water conserving fixtures throughout the proposed buildings. The wastewater flow from the Project Site will be decreased with the implementation of sustainable strategies that achieve reductions in water consumption.

Table 7 - Wastewater Flow Generation Factors

Land Use	Flow Factor (Peak Dry Weather)
Residential	480 GPD / Unit
Commercial - Office/ Retail	0.20 GPD / SF
Commercial - Manufacturing / Warehouse	0.04 GPD / SF
Commercial - Service	1.00 GPD / SF
Park	3,000 GPD / Each
Park with Sports Complex	45,000 GPD / Each

Note: All areas additionally include a GWI and I/I flow of 1,300 GPD / Net Acres (excluding Parks)

EBMUD has adequate dry weather capacity at the MWWTP for the projected wastewater flows from the redevelopment of Alameda Point. The project build out would increase the peak wet weather flow incrementally by approximately 0.23 MGD above the existing peak flows. This takes into consideration that replacement of existing infrastructure is expected to reduce peak infiltration / inflow and partially offset the projected increase in base wastewater flow. Based on the current peak wastewater flow from the City of Alameda of 28 MGD, the estimated maximum additional flow from Alameda Point represents an increase of less than 1 percent in current peak wastewater flow conveyed through the Alameda Siphon. It represents an even smaller percentage of the current peak wastewater flow of 107 MGD in EBMUD's south interceptor just downstream of the Alameda Siphon.

2. Proposed On-Site Wastewater Collection System

a. Development Areas

A new wastewater collection system will be installed within the Development Areas, where large-scale areas of new construction are anticipated. The proposed collection system will include gravity pipelines, ranging in size from 8-inch to 24-inch in diameter, and 5 lift stations. The proposed system will connect to the existing Pump Station R located at the Main Gate. The existing wastewater system, pipelines and pump / lift stations, within the Development Areas will be replaced in phases consistent with the development build-out. The proposed wastewater collection facilities will be installed within all backbone streets within the Development Areas. See Figure 34 depicting the proposed on-site wastewater collection system schematic within the Development Areas.

The proposed on-site wastewater collection system will be owned and operated by the City of Alameda. The system shall be designed and constructed consistent with the City of Alameda's Standard Specifications and Design Criteria. All lift stations will include redundant pumps, alarm systems and emergency backup power supplies to ensure no disruption of service. The proposed wastewater collection system shall efficiently collect and convey the wastewater such that the amount of lift stations required is minimized. The gravity pipelines will be designed to accommodate settlement at locations where long term differential settlement is anticipated.

b. Reuse Areas

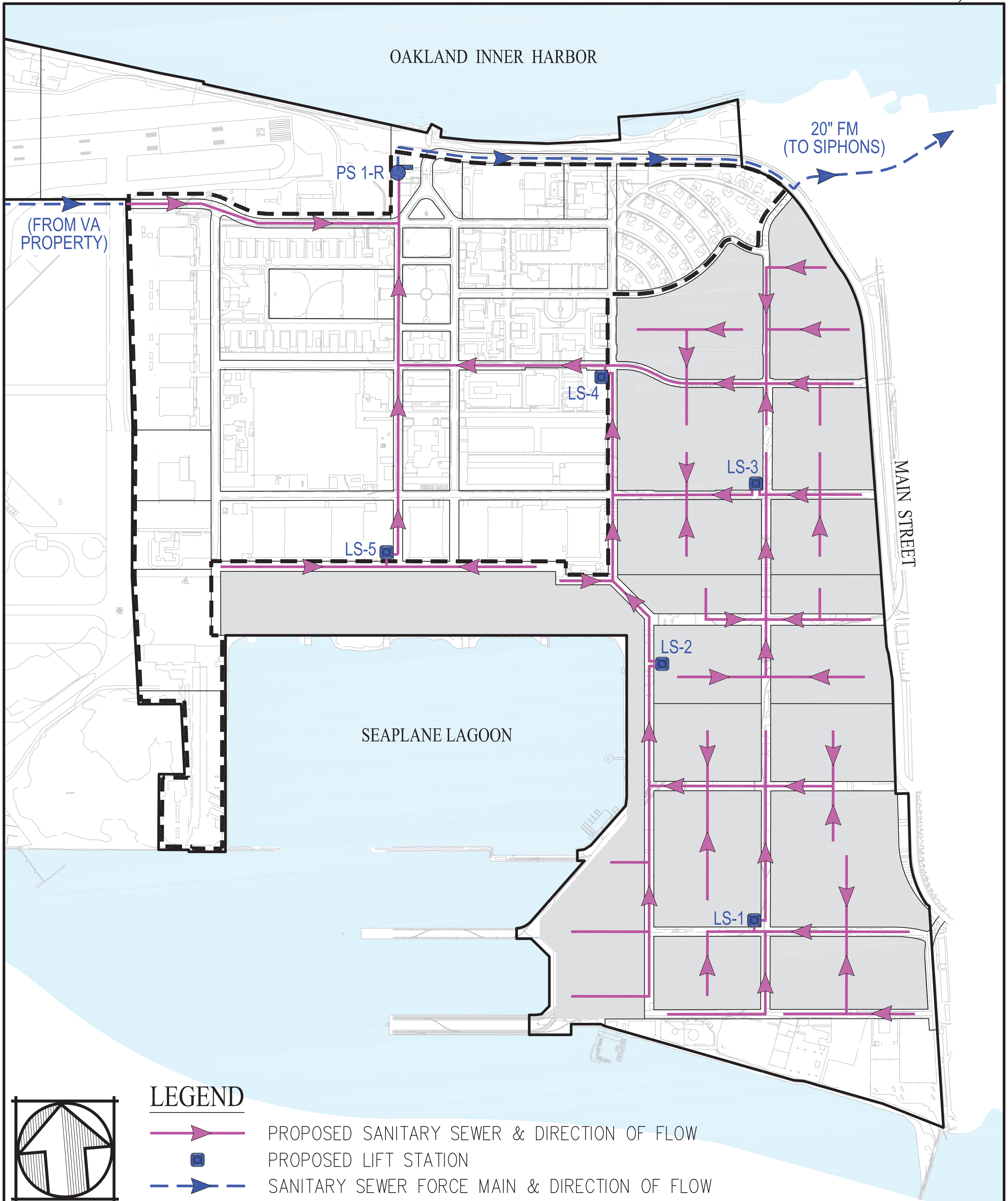
The existing wastewater collection system within the Reuse Areas will be incrementally replaced over time. Initially, the Reuse Areas will continue to utilize the existing wastewater collection system through an enhanced maintenance program. This program will rehabilitate the existing system to address deficiencies. Each proposed development within the Reuse Areas will be responsible for investigating and documenting the condition of the existing collection facilities that collect and convey the wastewater from that specific site. Any deficiencies identified shall be addressed at the time of that development to the satisfaction of the Public Works Director. The anticipated enhanced maintenance improvements include cleaning and lining of existing pipelines and manholes to address infiltration and inflow. Also, it is anticipated that portions of the existing pipelines will be required to be replaced to address adverse flow conditions and areas that have settled resulting in stagnant wastewater conditions.

Additionally, each development project within the Reuse Areas will replace the wastewater lateral and on-site pipelines serving that site, consistent with the City of Alameda's Private Sewer Lateral Replacement Ordinance. See Figure 35 depicting the existing on-site wastewater collection system schematic within the Reuse Areas to initially to be rehabilitated.

Ultimately, the wastewater collection system within the Reuse Areas will be replaced. The new system will be installed incrementally over time. As funds become available through a fee program, new backbone wastewater facilities will be installed. The City of Alameda will coordinate these improvements to ensure they are implemented orderly and with appropriate priorities. The proposed backbone collection system will be similar to the system proposed within the Development Areas, including new gravity pipelines and lift stations. The new collection pipes will connect to the adjacent on-site laterals and pipes. The system shall be designed and constructed consistent with the City of Alameda's Standard Specifications and Design Criteria. See Figure 36 depicting the ultimate on-site wastewater collection system schematic within the Reuse Areas.

3. Proposed Off-Site Wastewater Transmission System Improvements

The existing off-site wastewater transmission facilities, Pump Station R, 20-inch force main, Estuary siphon facility and the EBMUD Interceptor, have adequate capacity for the proposed wastewater flow generated by the full build-out of Alameda Point. There are no proposed improvements to these facilities as part of Alameda Point.



ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,000'
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FIGURE 34
PROPOSED SANITARY SEWER IN DEVELOPMENT AREAS

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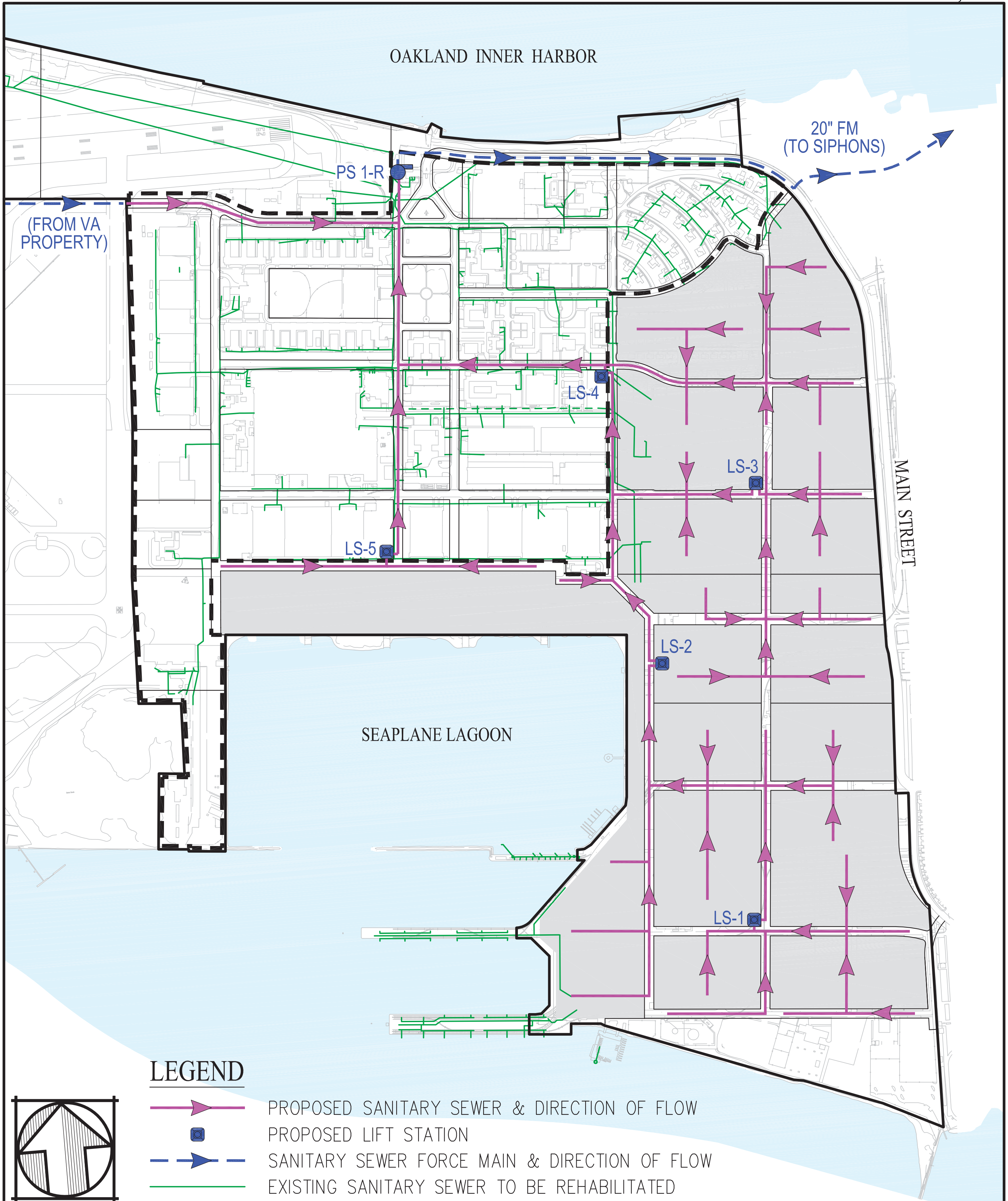

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 35
PROPOSED SANITARY SEWER
REUSE AREAS INITIAL CONSTRUCTION

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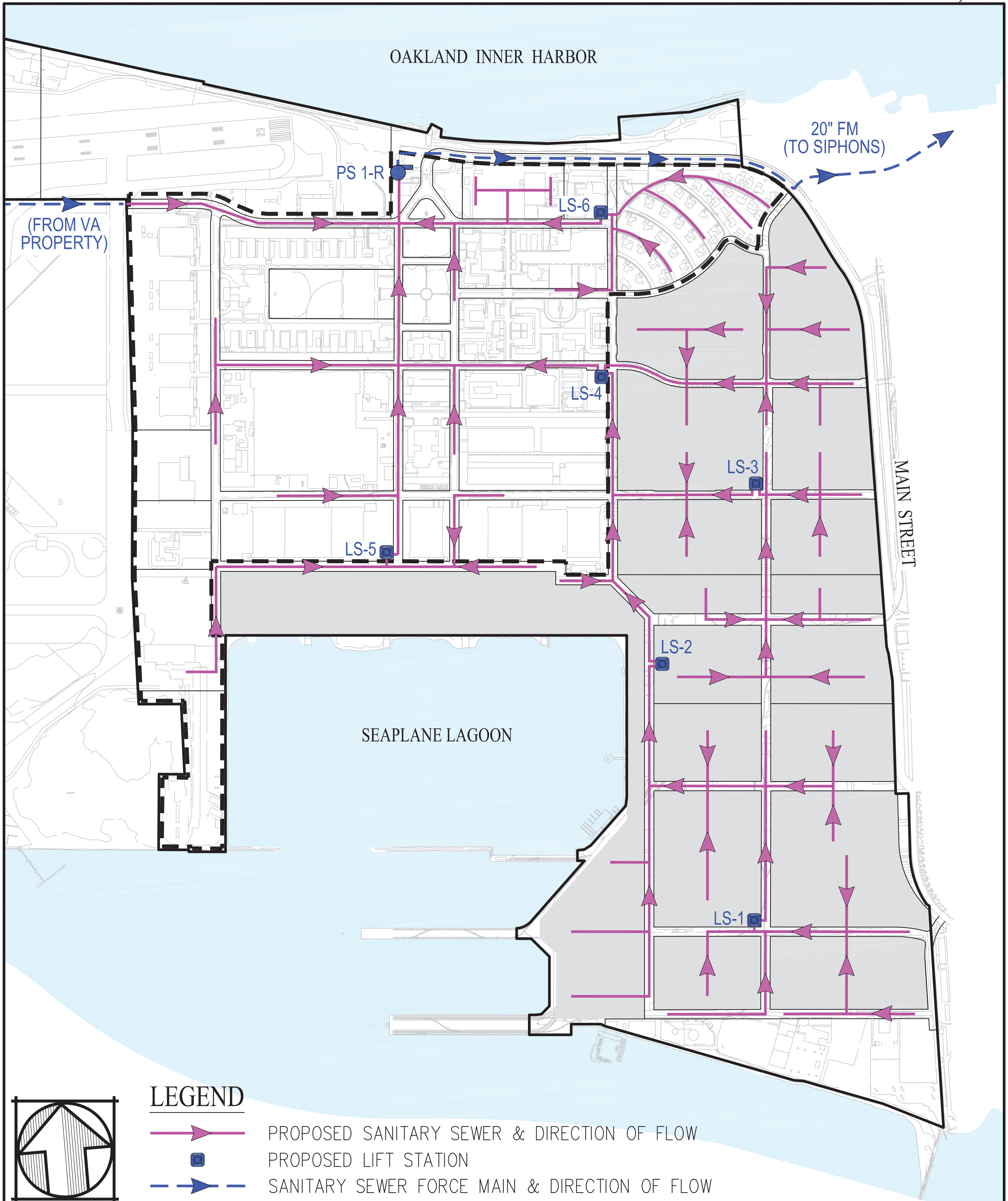

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MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 36
PROPOSED SANITARY SEWER
ULTIMATE SYSTEM

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VIII. STORMWATER SYSTEM

A. Topography and Precipitation

The existing elevations at Alameda Point are generally quite low. The highest existing elevations, just over 8 feet are located in the southeast portion of the site. The lowest elevations are less than 1 foot and are generally found in the northern portions of the site. These relatively low elevations have important implications in the design of stormwater and flood control infrastructure as discussed below.

Precipitation patterns along the central California coast are strongly influenced by a number of factors, with a marked tendency to greater rainfall intensities and associated high mean annual precipitation values in locations with higher elevations that are exposed to incoming storms, with the opposite effect in areas of low elevation. The low elevations at Alameda Point result in a mean annual precipitation of approximately 18 inches/year, which is much less than in the neighboring City of Oakland where rainfall totals are impacted by the East Bay Hills. In fact, isohyetal mapping by the Alameda County Flood Control and Water Conservation District shows that storm intensity and magnitude at Alameda Point can be expected to be among the lowest in the County, the only lower totals being found in the southern bayside areas that lie in the lee of the highest mountains of the San Francisco Peninsula.

Design storm information provided in the Storm Drain Master Plan (SDMP) for the City is based on a mean annual precipitation of 19 inches/year, slightly higher than that expected at Alameda Point. However, preliminary stormwater infrastructure design for Alameda Point uses the information from the SDMP for consistency, noting that the result will tend to be slightly conservative. On this basis, the design precipitation for the 10-, 25-, and 100-year 24-hour duration storm events are 3.2, 3.8 and 4.7 inches respectively.

B. Impervious and Development Areas

The eastern portions of the Project Site were densely developed, with the most intensely used areas located around the Seaplane Lagoon. Overall impervious cover is very high at approximately 83%, with large blocks of land having nearly 100% impervious coverage. Therefore, overall impervious coverage at the site is expected to decrease with redevelopment.

With respect to stormwater management planning at the site, it is important to distinguish between Development and Reuse Areas. In Development Areas, existing structures and facilities will be completely replaced. This allows ground elevations to be elevated during the redevelopment process. The greater difference in elevation between the ground surface in these areas and tailwater elevations in the Bay gives greater flexibility in stormwater system design and buffers the impact of potential sea level rise on such systems. This contrasts with the Reuse Areas, where constraints such as historical preservation, preclude completely replacing existing structures and modifying the existing street pattern and elevations. Therefore, Reuse Areas will generally be constrained to the existing elevations which in some areas are low, imposing immediate design considerations with respect to meeting prevailing storm drain standards and adaptively responding to sea level rise.

C. Soil Characteristics and Groundwater

The soils at the site are characterized by a shallow depth to groundwater, consistent with the low existing ground elevations. These high groundwater elevations significantly restrict the use of infiltration of stormwater into the ground as a stormwater management option at Alameda Point.

D. Tidal Characteristics

As pointed out previously, tidal characteristics are an important consideration at Alameda Point. The very highest tide levels associated with storm surge events can be high enough to cause localized flooding of the lowest-lying portions of the site under existing conditions. Additionally, all storm drain systems have to discharge to the Estuary or Bay against the tide elevations that prevail during any given storm event. This is generally not a problem for low tide conditions, but can be a significant factor limiting the conveyance capacity of existing and proposed storm drain lines during high tides.

Alameda Point experiences a diurnal tidal cycle that is typical of coastal California with two high and two low tide periods occurring each day. Important tidal datum information is included in Table 8 below, which shows the range between mean lower low water and mean higher high water is 6.6 feet. Several of the datum values are of direct relevance in stormwater infrastructure design. Most importantly, mean higher high water elevations are only slightly below the lowest ground elevations at the site. Therefore, localized flooding is a potential issue along much of the northern perimeter of the site whenever any significant rainfall coincides with the higher high tide peak, even without consideration of storm surge effects.

Higher tide elevations are also of concern. For example, the SDMP presents a thorough derivation of high tide values to be used in storm drain system design to account for the joint probability of very large storm events coinciding with storm surge events in the vicinity of Alameda. The calculated 25-year coincident peak tide elevation for this case is 1.7 feet, which is well above the lower lying elevations at the site. Likewise, the 100-year stillwater tide elevation is 3.6 feet, an elevation high enough to put portions of the site in a FEMA designated Special Flood Hazard Area (100-year floodplain).

Low tide elevations can also be important with respect to storm drain design. For example, constructing storm drain outfalls above the lowest tide elevations allows for easier routine maintenance inspections. For Alameda Point this would mean having outfall structure pipe inverts no lower than -5 feet, and preferably even higher.

Table 8 - Tidal Datum Elevations for Alameda Point

Tidal Datum	City of Alameda Datum
Mean Higher High Water	0.3
Mean High Water	-0.4
Mean Tide Level	-2.8
Mean Low Water	-5.2
Mean Lower Low Water	-6.3
Highest Observed Tide	3.3
100-Year Tide	3.6
25-Year Coincident Peak Tide	1.7

E. Existing Stormwater Management System

Stormwater runoff at Alameda Point is currently conveyed directly to outfalls by a storm drain system. The portions of the storm drain system within land owned by the City of Alameda are also owned and maintained by the City of Alameda. Whereas, the remainder of the existing storm drain system within land still owned by the Navy is owned by the Navy. The existing stormwater system was installed by the Navy starting over 70 years ago.

The system is currently operable, but does not meet current standards in several regards. These include notable capacity limitations and the fact that there is no stormwater quality infrastructure in place at present.

The majority of the existing system within Alameda Point is a gravity system that consists of pipelines, ranging in size up to 48-inches in diameter, inlets, junction boxes / manholes and outfalls to surrounding waters. See Figure 37 depicting the existing stormwater collection system and outfalls within Alameda Point. There are over 30 existing outfalls discharging stormwater runoff from the Project Site to the surrounding waters of the Seaplane Lagoon, Oakland / Alameda Estuary, and San Francisco Bay. Much of the existing infrastructure has deteriorated and has components that are in a state of disrepair. Many of the existing outfalls have missing or non-functioning flap gates allowing the tidal influences of the surrounding waters to impact the on-site system, causing flooding of low-lying areas as previously discussed. The existing low-lying areas that flood due to extreme high tides and/or storm events coinciding with high tides include areas along the northern shoreline and Main Gate, north and west edges of the Seaplane Lagoon and the Main Street / Ferry Terminal Parking Lot Entrance intersection. In fact, the exception to gravity drainage at the site is an existing stormwater pump station that was installed approximately 15 years ago to address flooding of the low lying portions of Main Street. This pump station is located at the northeast corner of the Project Site.

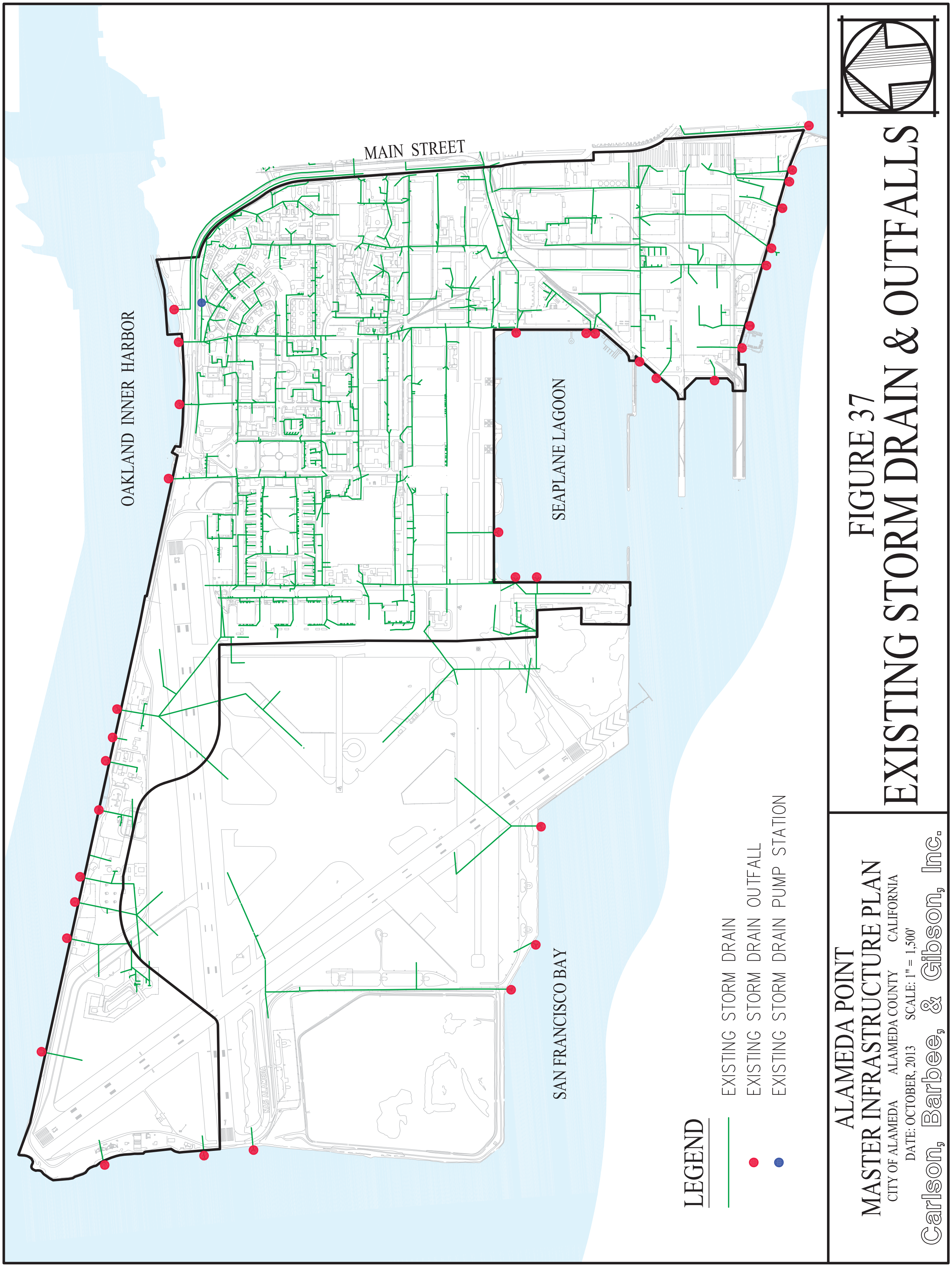
The existing drainage patterns of the Project Site are consistent with the existing topography. See Figure 38 depicting the existing drainage pattern and associated existing watersheds within Alameda Point. Stormwater runoff from the northern half of the Project Site, generally north of West Midway Avenue, is collected and conveyed by the existing system and discharged to the Oakland / Alameda Estuary through multiple outfalls along the northern shoreline. Stormwater runoff from the southeastern portion of the site is collected and conveyed by the existing system and discharged to San Francisco Bay through multiple outfalls along the southern shoreline. Stormwater runoff from the central portions of the Project Site is collected and conveyed to the Seaplane Lagoon through multiple outfalls along the Lagoon shoreline.

The watersheds for the existing stormwater system are almost exclusively limited to areas within the Project Site. However, there is one notable exception. Off-site runoff from a small watershed located along Main Street immediately to the north of Ralph Appezzato Memorial Parkway is collected and conveyed to the southwest where it outfalls the Seaplane Lagoon.

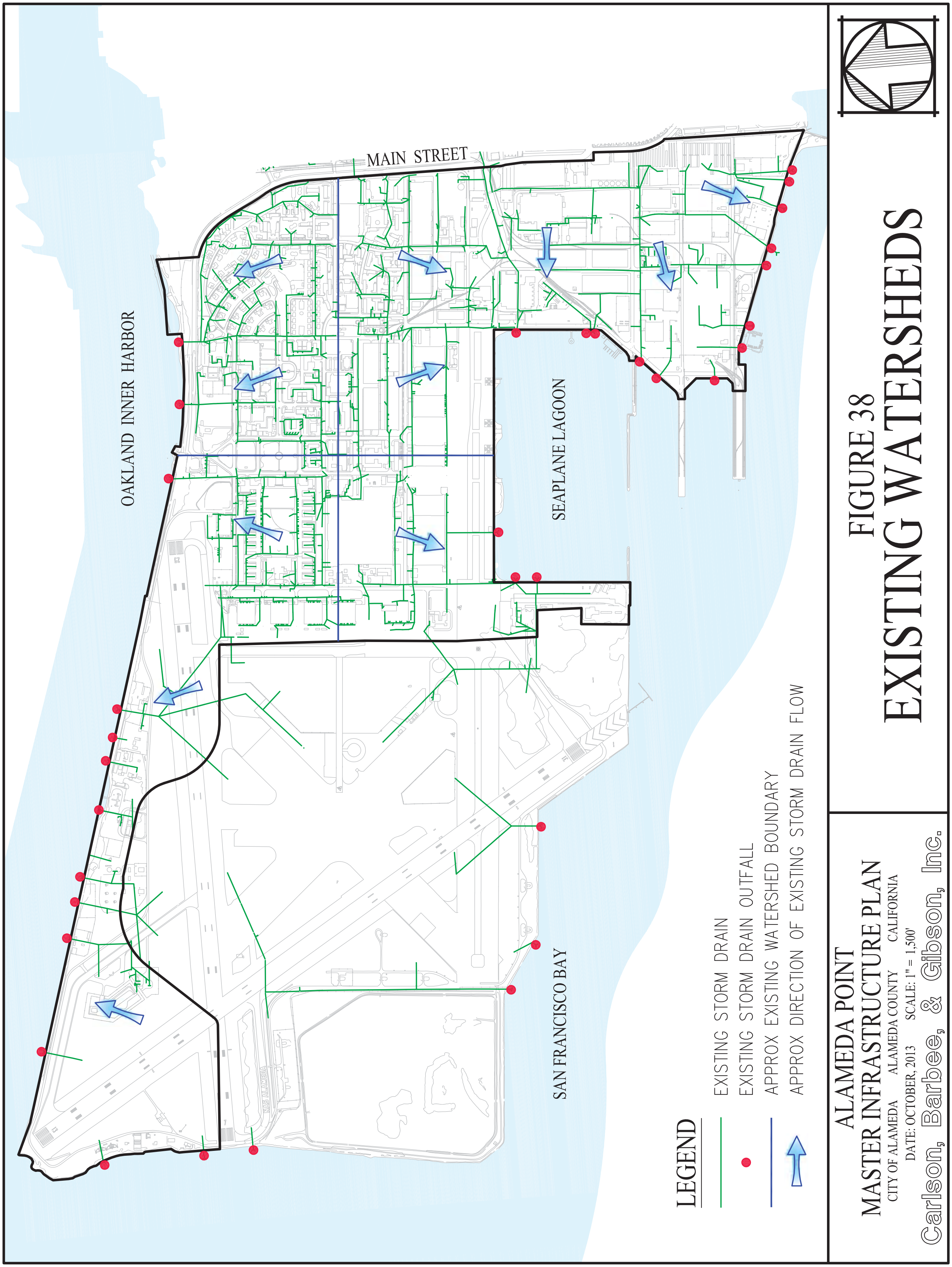
F. Proposed Stormwater Management System

A new stormwater collection system, owned and operated by the City of Alameda, will be installed at Alameda Point. The proposed system will integrate new pipelines, pump stations, multi-purpose basins, and outfalls with water quality treatment features designed to meet current City of Alameda, County of Alameda, and Regional Water Quality Control Board design criteria. The new stormwater management system will also be designed to address the potential impacts of future sea level rise through forward planning of adaptation strategies and infrastructure.

The proposed stormwater collection system will maintain the existing drainage patterns of the Project Site. Additionally, the proposed system will significantly reduce the number of outfalls to the surrounding waters in order to facilitate and minimize future maintenance obligations of the City of Alameda. Preliminary system design calls for a total of five outfalls, down markedly from over 30 outfalls at present. The proposed outfalls will be constructed at existing outfall locations to minimize potential environmental impacts associated with installation and operation of these facilities. Where used, stormwater pump stations will include redundant pump systems, alarms, and emergency backup power supplies to reduce the risk of flooding by ensuring high levels of reliability.



MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
EXISTING STORM DRAIN
EXISTING STORM DRAIN OUTFALL
EXISTING STORM DRAIN PUMP STATION
FIGURE 37
EXISTING STORM DRAIN & OUTFALLS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_37_EX STORM DRAIN & OUTFALLS.DWG


MAIN STREET
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
EXISTING STORM DRAIN
EXISTING STORM DRAIN OUTFALL
APPROX EXISTING WATERSHED BOUNDARY
APPROX DIRECTION OF EXISTING STORM DRAIN FLOW
FIGURE 38
EXISTING WATERSHEDS
ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,500'
Carlson, Barbee, & Gibson, Inc.
G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_38_EX WATERSHEDS.DWG

The new stormwater system will be built within all Development Areas. In the Reuse Areas, the existing system will initially remain in service with rehabilitation improvements such as repair or reinstallation of tide gates at existing outfalls. Eventually, as soon as there are available funds from development projects within the Reuse Areas, the existing system will be incrementally replaced. The installation of the downstream components, including trunk stormwater lines, multi-purpose basins, pump stations, and outfalls, will be prioritized. Ultimately, new stormwater management infrastructure will be incrementally installed over time throughout the Reuse Areas as well.

1. Development Areas

As discussed previously, large-scale areas of new construction are anticipated in the Development Areas. This will allow high existing ground elevations to be maintained, and even increased somewhat, and for early construction of an entirely new stormwater management system. The proposed system will include gravity storm drain pipes ranging in size from 12 to 60 inches in diameter and new outfall structures. These facilities will be installed within all backbone streets in the Development Areas. See Figure 39 depicting the proposed on-site stormwater collection system schematic within the Development Areas.

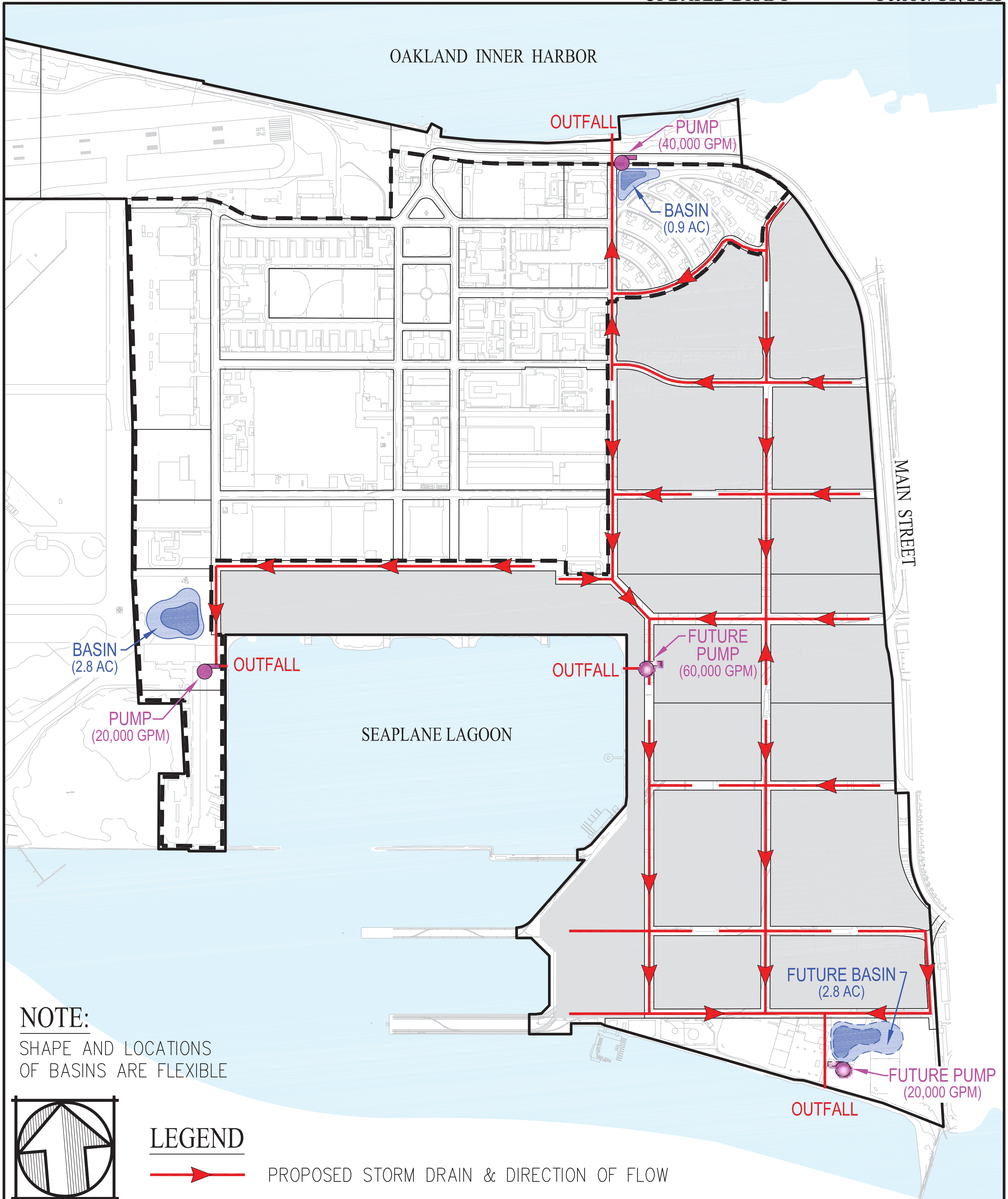
The installation of updated infrastructure, along with the higher ground surface elevations in the Development Areas, will allow for collection and conveyance of the 25-year design storm event consistent with City standards. Storm drain lines will drain by gravity to the respective outfall locations, which will be equipped with flap gates and energy dissipation to control discharge to the receiving waters. Storm drain pipes will be designed to accommodate settlement at locations where long-term differential settlement is considered possible.

Development Areas may also require future pump stations and/or multi-use stormwater basins as an adaptive response measure to future sea level rise . The pump station and multi-use basin sizes are inversely related, meaning that with a larger pump station the multi-purpose basin could be smaller or with a larger multi-purpose basin the pump station could be smaller. Additionally, the locations of the multi-purpose basins and pump stations depicted in the MIP are flexible and can be adjusted as the land use and open space plans for these areas are advanced.

2. Reuse Areas

The Reuse Areas, with their constraints on building and street replacement, will require a stormwater management system that can function effectively with many areas of low ground elevation. These low elevations will require stormwater pump stations to meet City design standards. See Figure 40 depicting the ultimate stormwater collection system schematic within the Reuse Areas.

The Reuse Areas will initially continue to utilize the existing on-site stormwater collection system .The existing stormwater management system will be progressively improved through an enhanced maintenance program. The enhanced maintenance program will rehabilitate the existing system in a step-wise manner to address deficiencies. Specifically, the enhanced maintenance program will prioritize the installation of new tide valves on the existing outfalls. Additionally, each proposed development within the Reuse Areas will be responsible for investigating and documenting the condition of the existing stormwater infrastructure within that specific site. Any deficiencies identified will be addressed at that time and funded by that development project, to the satisfaction of the Public Works Director. Anticipated enhanced maintenance improvements include cleaning and lining of existing pipelines and manholes as well as required replacement of existing pipelines to address adverse flow conditions in areas that have settled. Additionally, each development project within the Reuse Areas will replace the stormwater facilities



ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,000'
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FIGURE 39
PROPOSED STORM DRAIN IN DEVELOPMENT AREAS

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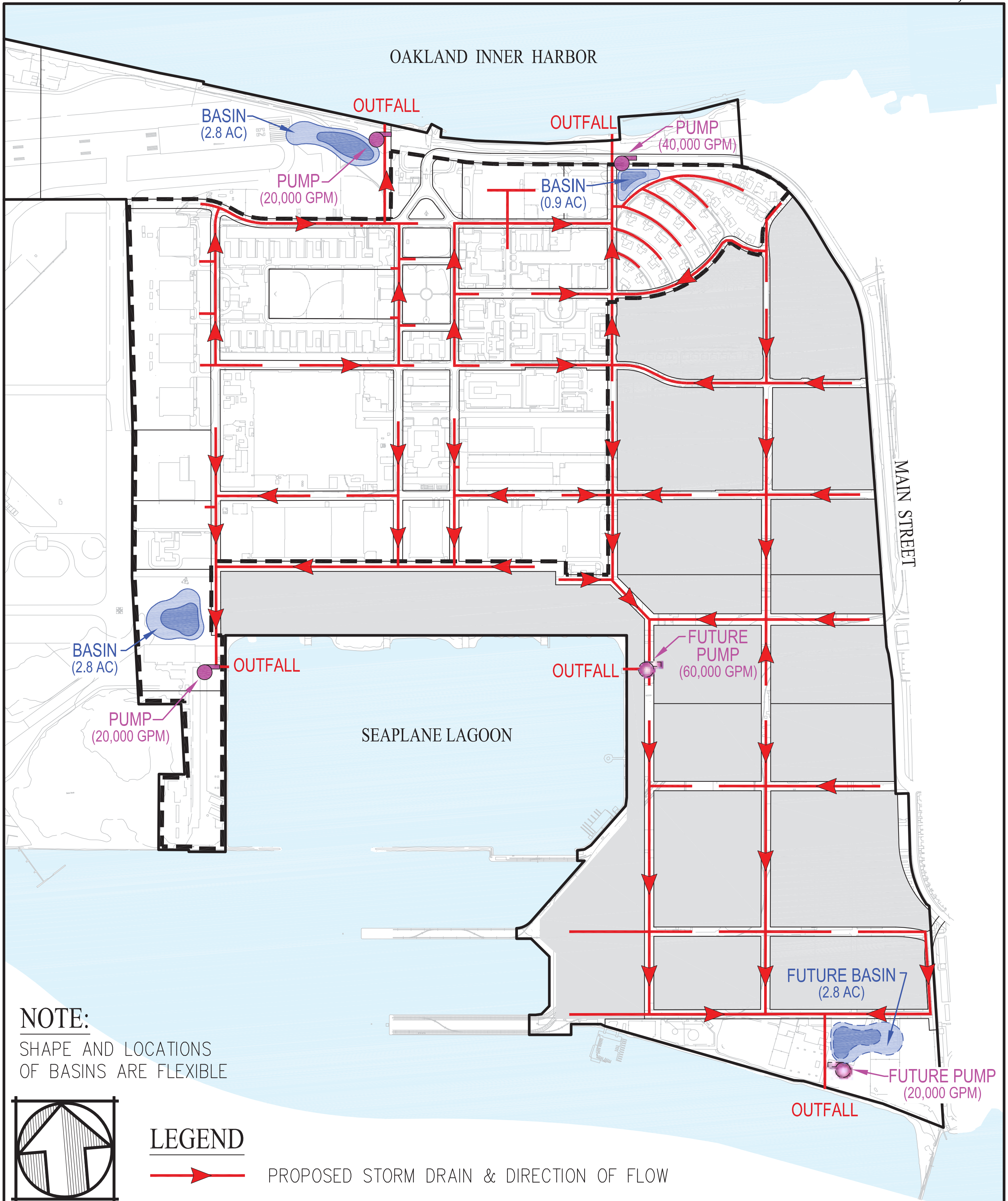

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,000'
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FIGURE 40
PROPOSED STORM DRAIN
ULTIMATE SYSTEM

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_40_STORM DRAIN (ULTIMATE).DWG and construct water quality facilities inside each respective parcel. Until the existing system is replaced, existing low lying structures within the Reuse Areas may be required to obtain flood insurance if the existing structure is below the 100-year flood elevation. Any new construction of structures within the Reuse Areas during this interim period shall be required to be constructed 1-foot above the 100-year flood elevation.

As funds become available through a fee program, the existing backbone stormwater systems will be replaced. The installation of the new stormwater system within the Reuse Areas will be incremental. The City of Alameda will coordinate these incremental improvements to ensure they are implemented orderly. The downstream improvements, including multi-purpose basins, pump stations and outfalls shall be prioritized, in order to provide flood protection for the Reuse Areas that can address climate change. The remainder of the backbone system shall be installed from the downstream portions to the upstream portions of the system and connect to the adjacent on-site systems. See Figure 41 depicting the existing on-site stormwater collection system schematic within the Reuse Areas to initially to be installed.

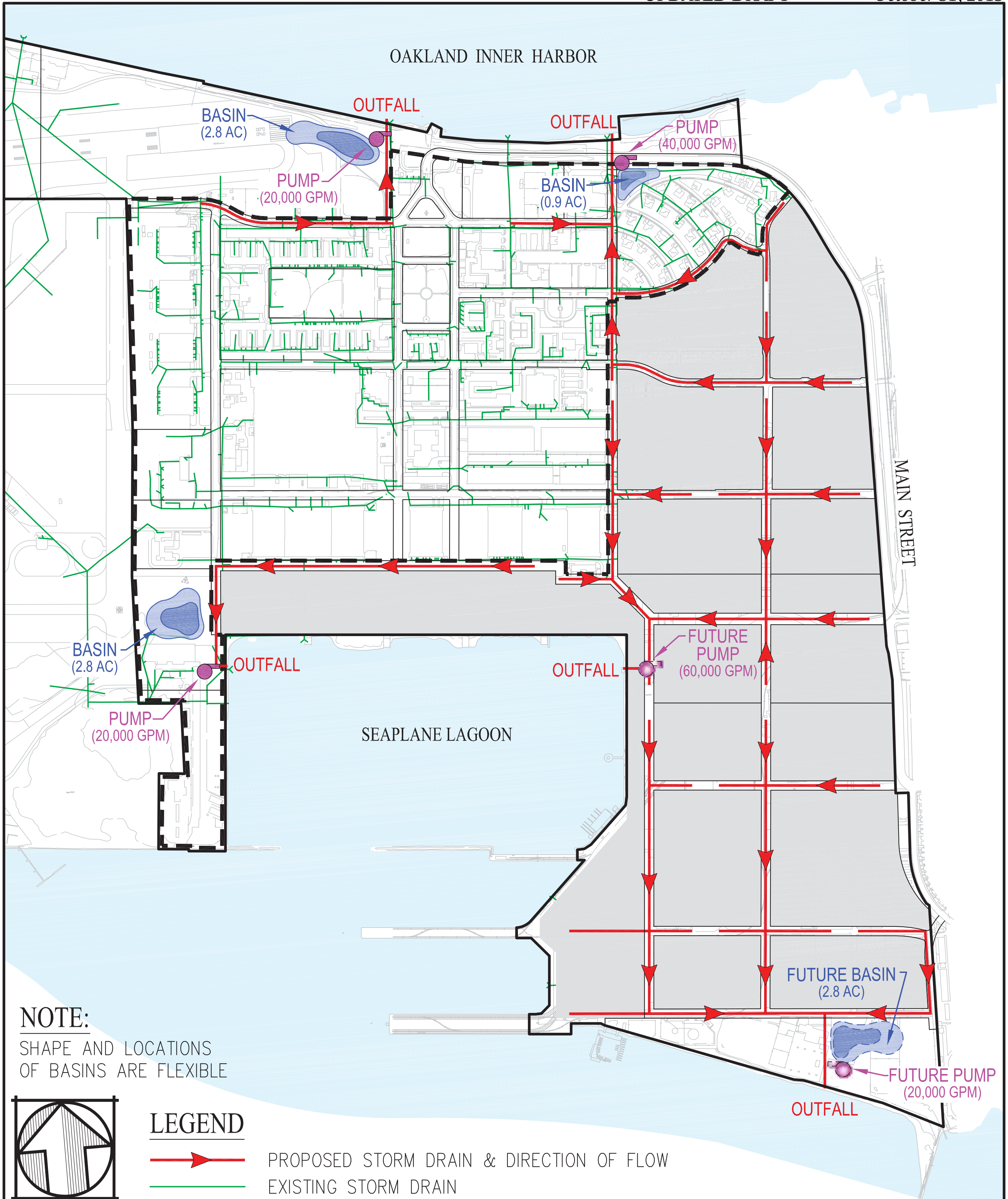
Ultimately, the enhanced maintenance program will lead to replacement of the entire stormwater management system and the construction of the flood protection facilities, including perimeter levees and floodwalls, new outfalls, multi-purpose basins and pump stations, within the Reuse Areas. The ultimate stormwater system will provide a system that full complies with the City's 25-year stormwater design criteria as discussed below.

3. Proposed Stormwater System Design Criteria

The design criteria used for the proposed stormwater system is consistent with the criteria specified in the City of Alameda's Standard Specifications and Design Criteria, dated April 1961, and the Storm Drain Master Plan (SDMP), dated August 2008. Specifically, Chapter 4 of the SDMP includes the design criteria for new stormwater systems within the City of Alameda. The following is a summary of the design criteria for the proposed stormwater collection system within Alameda Point:

Design Storm Event =	25-year design storm based on the balanced storm hydrograph developed in the SDMP
Beginning Water Surface Elevation =	25-year coincident tide based on the SDMP
Freeboard =	Hydraulic grade line within the system shall be no higher than 0.5-foot above the gutter elevation at any manhole or inlet
Minimum Cover to Pipelines =	Minimum cover to pipelines of 2 feet with approved pipeline materials

Additional design criteria will be followed to assure that the stormwater management system provides interior drainage protection for the 100-year storm event (in concert with exterior levees and floodwalls) consistent with FEMA requirements. This will include analyses and modeling demonstrating that runoff from the 100-year event (including longer durations than 24-hours) can be contained and conveyed to the Bay without flooding of structures. A detailed Operations and Maintenance Plan will need to be prepared as part of the design of any downstream facilities, such as outfalls, multi-purpose basins or pump stations. This plan will describe the interior drainage system with details regarding the associated infrastructure,



ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 41
PROPOSED STORM DRAIN
REUSE AREAS INITIAL CONSTRUCTION

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_41_STORM DRAIN (INITIAL REUSE).DWG maintenance plans and schedules, back-up facilities, and emergency protocols. Design to these criteria will remove the Alameda Point site from the Special Flood Hazard Area (100-year floodplain) in future FEMA flood hazard mapping efforts.

4. Adaptation to Sea Level Rise

As presented earlier in Section IV, adaptation strategies for potential sea level rise will be an integral part of stormwater management planning at Alameda Point. Consistent with other infrastructure improvements at the Project Site, the following governing criteria will apply:

Initial Construction =	18-inches of sea level rise shall be added to the beginning water surface elevation
Adaptive Measures =	Shall be capable of accommodating up to 55-inches of future sea level rise

Several aspects of the planning process are important to note with respect to stormwater infrastructure design and sea level rise. First and foremost among these is the understanding that, with significant enough increases in sea level, safely and effectively discharging stormwater to the Bay will require some combination of on-site detention storage and pump capacity. Storage and pump capacity are complimentary infrastructural components. That is to say, larger on-site detention storage capacity reduces the required pumping needs and vice versa. In fact, with sufficiently large storage capacity (e.g. equal or nearly equal to the total design storm runoff), stormwater pumping would not be required at all. Conversely, where space and land use constraints prevail, large detention storage facilities may not be practical and increased pump capacity will be required.

The second aspect of note has previously been discussed; the relationship of ground elevations and tidal tailwater elevations. Where ground elevations are high enough, conventional gravity storm drain systems can be designed to meet City conveyance criteria. However, as the difference between ground and coincident tide elevations decreases, the aforementioned need for storage/pumping becomes increasingly necessary if City criteria are to be met. The direct implication for Alameda Point is that even the initial construction sea level rise criteria (18-inches above current levels) will require storage/pumping facilities for the lower-lying Reuse Areas.

Finally, it is important to understand that adaptive management with respect to stormwater conveyance is not unbounded. Progressively more storage/pump capacity will be required for all the project watersheds as sea levels rise. However, once sufficient storage and/or pump capacity is in place to handle the entire runoff from the design storm without gravity outflow, tide levels in the Bay no longer matter significantly and further increases in sea level (even above the maximum adaptive criteria) can be readily addressed.

5. Preliminary Stormwater Modeling

In order to better define stormwater infrastructure needs as part of the MIP, preliminary stormwater modeling was completed for representative portions of the Project Site. The modeling was carried out using the MIKE-URBAN software package (DHI, Inc.), the same modeling platform that was used to develop the City's SDMP. Watershed parameterization and analysis explicitly followed the guidelines in the SDMP, including non-steady state routing of the balanced 25-year, 24-hour design storm against the variable 25-year coincident tidal tailwater conditions. This approach assures that stormwater infrastructure design at Alameda Point is consistent in all respects with that being applied elsewhere in the City.

The preliminary modeling focused on Watersheds B and E (see detailed discussions below) to bracket the range of anticipated constraints. See Figure 44 depicting the locations of Watersheds B and E. Watershed B is a prototypical Reuse Area watershed characterized by the lowest ground elevations within the Project Site, while Watershed E is representative of a Development Area watershed with markedly higher ground elevations. Model runs were carried out for a range of sea level rise conditions ranging from current levels and incrementing by 1 foot up to the higher adaptive management criterion of 55-inches above existing conditions. The model runs confirmed that the Reuse Areas such as Watershed B will need storage and pumping infrastructure to meet even the initial criteria. The addition of incremental sea level rise model runs provided an adaptive response infrastructure matrix, Table 9 that defines the various storage and pumping capacities associated with increasing sea level rise and identifies thresholds at which storage/ pumping would be necessary for higher elevation areas such as Watershed E. The values presented in Table 9 are the total storage volume in acre-feet for the multi-purpose basins correlated to the pump capacity and varying amounts of sea level rise.

Table 9 - Preliminary Multi-Purpose Basin & Pump Sizes with Adaptive Measures

SLR (ft. above 2012)		Pump Capacity (GPM)						
Watersheds A-C	**Watersheds D & E**	**None**	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**
0.0	3.0	0.7	0.3	0.2	0.1	No Basin	No Basin	No Basin
1.0	4.0	3.5	2.2	1.2	0.3	0.3	No Basin	No Basin
2.0	5.0	7.5	4.5	2.8	1.3	0.9	No Basin	No Basin
3.0		8.3	4.5	2.8	1.3	1.0	No Basin	No Basin
4.6		10.6	4.5	2.8	1.3	1.0	No Basin	No Basin

6. Proposed Multi-Purpose Basins and Pump Stations

The preliminary modeling efforts confirmed that multi-purpose stormwater basins and pump stations will be integral components necessary to ensure the reliability of the system and achieve the specified design criteria, effectively minimizing the risk of flooding within the Project Site.

The multi-purpose basins are only proposed for watersheds that include parks / open spaces uses near the downstream portion of the system. Basins will function in an “off-line” manner to enhance their multi-use functionality. Stormwater runoff will be routed to a vault structures at the downstream ends of the storm drain systems. Each vault structure will function as the wet well for the stormwater pumps in that system and will have an overflow weir connecting to the multi-purpose basin. The vault structures will be connected to the outfalls by both gravity lines and a force main from the pumps. This will allow discharge by gravity flow when storm events coincide with lower tide conditions. In this configuration, stormwater runoff will only enter the basins via the overflow weir when inflow to the vault exceeds the combined gravity and pumped discharge capacity. The off-line configuration will markedly reduce the frequency and quantity of runoff directed to each basin.

The basins will be designed to have two tiers, allowing for public use of the upper tier, potentially including active recreation facilities such as sports fields. The lower tier will be occupy roughly one quarter of the basin area and will be subject to more frequent inundation than the upper tier area, the latter can be managed such that it is flooded in only the largest storm events. Preliminary design calls for the floor elevation of the lower tier in each basin to generally be set 5 feet below the adjacent grade. The upper tier will encompass the remaining 75% of the basin area and will generally be only 3 feet deep in comparison to adjacent grade elevations outside the basin. See Figure 42 depicting a schematic of the two-tier multi-

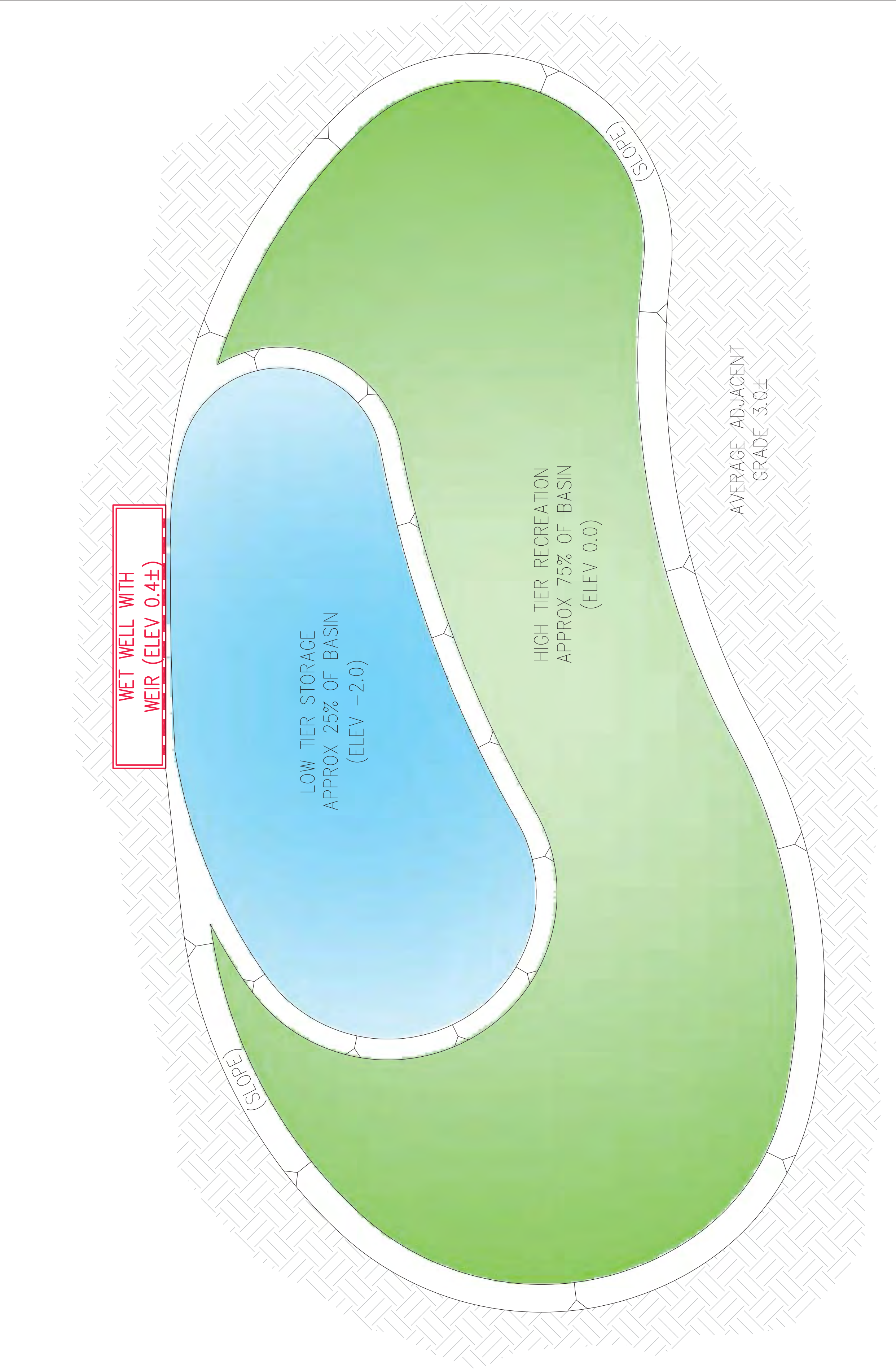

FIGURE 42
CONCEPTUAL TWO-TIER
MULTI-PURPOSE BASIN

ALAMEDA POINT
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CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 NOT TO SCALE
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G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_42_CONCEPTUAL TWO-TIER BASIN.DWG purpose basin. There will need to be appropriate signage and management of these areas to prohibit public uses during times of anticipated large storm events. Each basin will be drained (by gravity flow and/or pumping via the vault structures) within 24-hours of each storm event, limiting the periods of inundation to only a couple of days even if back to back storms occur. The multi-purpose basins are intended to be landscaped and under-drained to create a usable amenity for the community. The following design criteria will also be applied to the multi-purpose basins:

Maximum Side Slopes =	4:1
Freeboard =	1-foot to the 100-year water surface elevation

As mentioned previously, the vault structures will serve as the wet wells for required stormwater pumps. In areas where there is insufficient space available for a multi-purpose basin, the vaults and pumps will be sized to handle the peak design storm flow, necessitating much larger pumps. Future pump capacity needs are included in the sea level adaptation matrix. The southeast portion of the Development Areas (Watersheds D and E) will be at high enough elevations that they will only require a pump station and multi-purpose basin if sea levels rises more than approximately 3-feet. These facilities are to be planned as future improvements and will be implemented as part of the adaptive management of the site to address more than 18-inches of sea level rise.

7. Proposed Outfall Structures

The proposed outfall structures are to be located near existing stormwater outfalls. The outfalls will include provisions for both gravity pipes and the pump station force main pipe to discharge to the receiving waters. The proposed gravity pipeline outfall will be set at an elevation above the current mean low water, -5.0 feet, allowing for the conveyance pipelines to gravity drain at low tides and to facilitate inspection and maintenance activities. The force main pipe outfall will be set above the gravity pipeline at an elevation providing minimum or greater cover over the pipe. Outfall structures will be constructed on the shoreline and include rock slope protection designed to maintain a stable configuration. Interior to the outfall structures will be separate manholes with a backflow prevention tide valves and gate valves. This configuration will protect the tide valves from wave action, allow the manholes to be closed off from the Bay to facilitate maintenance of the tide valves, and prevent high tides from encroaching into the collection systems multi-purpose basins. See Figure 43 depicting the conceptual configuration of the proposed outfall structures.

8. Summary of Proposed Stormwater Systems per Watershed

As discussed previously, the proposed stormwater management strategy will maintain the existing drainage patterns of the Project Site. The overall proposed system will have 6 separate watersheds to encompassing the site. Some watersheds include only Development or Reuse Areas, while others include portions of both. See Figure 44 depicting the proposed watersheds established by the proposed stormwater system. The following is a description of the proposed stormwater management system anticipated for each watershed.

a. Watershed A

Watershed A encompasses the areas immediately to the north and west of the Seaplane Lagoon. This watershed includes approximately 148 acres and will discharge stormwater runoff through a newly refurbished outfall structure near the northwest corner of the Lagoon. The watershed

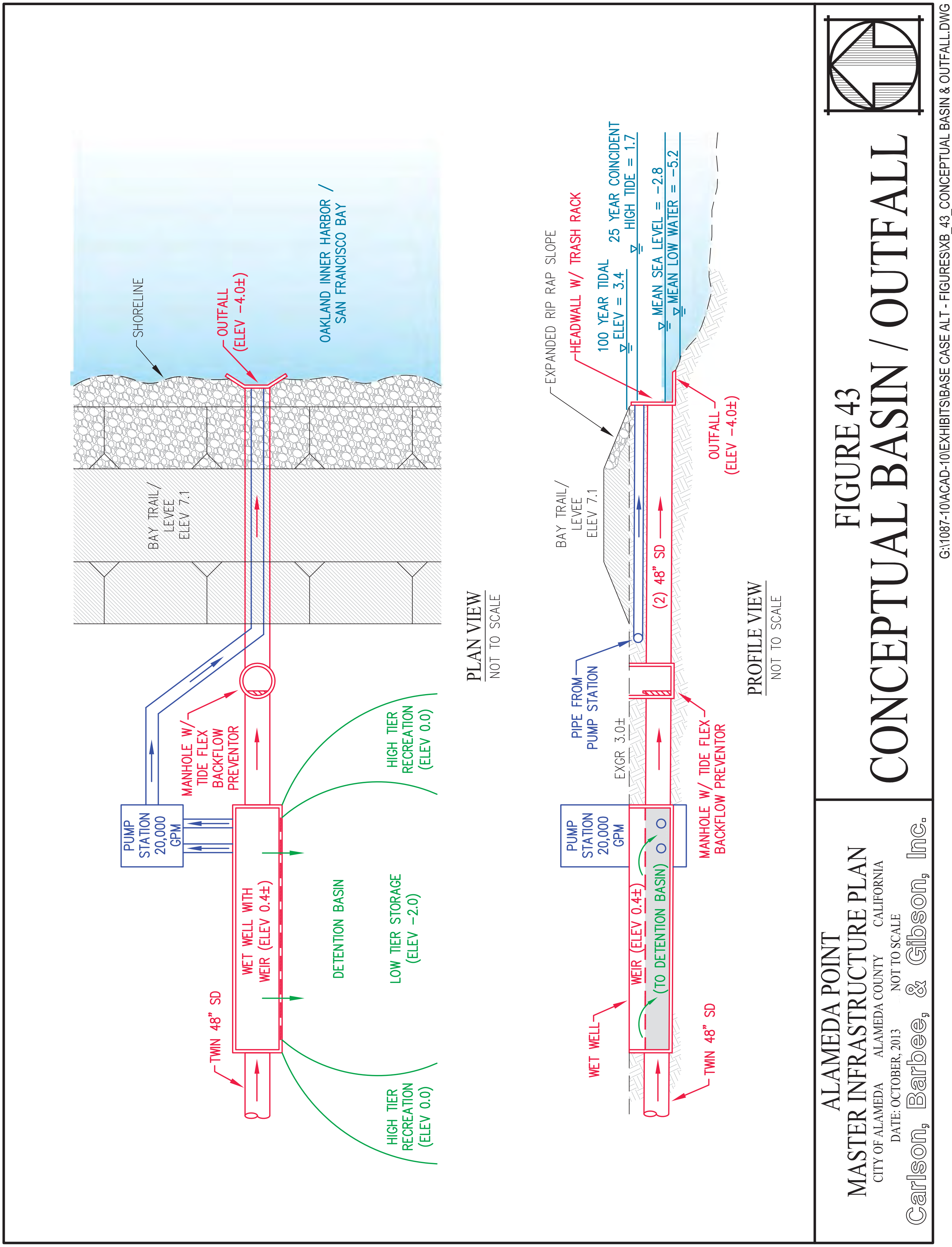
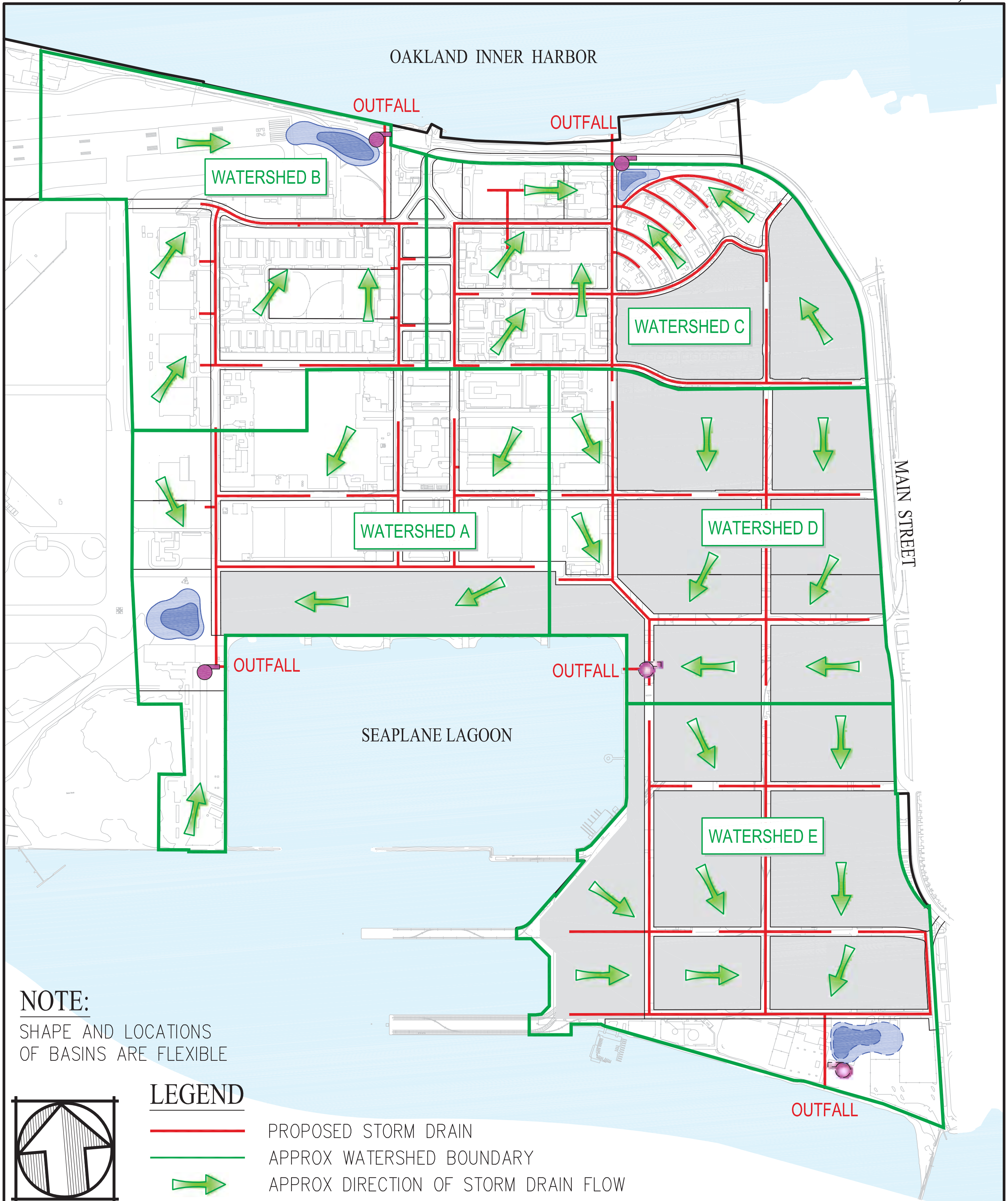


FIGURE 43
CONCEPTUAL BASIN / OUTFALL



ALAMEDA POINT
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CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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FIGURE 44
PROPOSED STORM DRAIN WATERSHEDS

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_44_STORM DRAIN WATERSHEDS.DWG includes portions of Development Areas along the frontage of the Seaplane Lagoon and Reuse Areas more interior to the Project Site, with the low-lying elevations of the Reuse Areas dictating the infrastructural components that will be needed. The ultimate stormwater system will include the installation of downstream facilities including main storm drain trunk lines, a multi-purpose basin, pump station, and the aforementioned outfall. The storm drain trunk lines will connect to the existing facilities in the Reuse Areas, as well as new storm drain lines within the Development Areas. The multi-purpose basin is proposed along the western edge of the Seaplane Lagoon and will cover an area of approximately 3 acres. The location and shape of this multi-purpose basin are flexible and should be determined in conjunction with the planning for the Seaplane Lagoon waterfront site. A pump station with the diversion vault structure will be installed at the multi-purpose basin and is anticipated to have a capacity of 20,000 gpm. An enhanced maintenance program will be implemented to rehabilitate the existing system within the Reuse Areas prior to the ultimate replacement and installation of the new stormwater collection system. Initial construction of the proposed stormwater system will include the installation of new storm drain lines in all backbone streets. This backbone system will include pipeline stubs to future Reuse parcels and connections to intercept existing on-site pipeline systems within Reuse parcels. Proposed construction within each Reuse parcel will be required to replace the existing stormwater facilities within that parcel, such that ultimately the entire existing system is replaced with a new system that meets current standards.

Providing 20,000 gpm of pumping capacity along with the 3-acre stormwater basin will allow the system to meet City standards and accommodate 55-inches of sea level rise and beyond. Watershed A will be levee protected from the flooding conditions described in the Flood Protection section and sufficient right-of-way will be maintained to increase levee height if sea level rise exceeds 18-inches.

b. Watershed B

Watershed B encompasses the northwestern quadrant of the Project Site. This watershed includes approximately 133 acres and the associated stormwater system will route runoff to a newly refurbished outfall on the Oakland / Alameda Estuary. The entire watershed area is comprised of Reuse Areas and includes the proposed Sports Complex site. As with Watershed A, the multi-purpose basin will have an area of approximately 3 acres and, in this case, is anticipated to be integrated into the Sports Complex site. The pump station is anticipated to have a capacity of 20,000 gpm. An enhanced maintenance program will be implemented to rehabilitate the existing system prior to the ultimate replacement and installation of the new stormwater collection system, which will be installed incrementally over time. Initial construction of the stormwater system will include the installation of downstream facilities including main storm drain trunk lines, a multi-purpose basin, pump station, and the aforementioned outfall, which is proposed for the northern shoreline of the Project Site, just west of the Main Gate. The proposed new stormwater system will include the initial installation of new storm drain lines in all backbone streets and will include pipeline stubs to intercept existing on-site drain lines within Reuse parcels. Proposed construction within each Reuse parcel will be required to replace the existing stormwater facilities within that parcel, such that the entire existing system is ultimately replaced with a new system that meets the design standards proposed herein.

Providing 20,000 gpm of pumping capacity along with the 3-acre stormwater basin will allow the system to meet City standards and accommodate 55-inches of sea level rise and beyond. Watershed B will be levee protected from the flooding conditions described in the Flood Protection section and sufficient right-of-way will be maintained to increase levee height if sea level rise exceeds 18-inches.

c. Watershed C

Watershed C encompasses the northeastern quadrant of the Project Site. This watershed includes approximately 112 acres and will route stormwater runoff to a newly refurbished outfall structure on the Oakland / Alameda Estuary. The areas within this watershed include Reuse Areas, including the neighborhood of the Big Whites, as well as Development Areas, but as in the case of Watershed A, the low-lying elevations of the Reuse Areas necessitate storage and pumping from the initial project stages. The ultimate stormwater system will include the installation of downstream facilities including main storm drain trunk lines, a multi-purpose basin, pump station, and the aforementioned outfall, which is proposed for the northern shoreline of the Project Site, just west of the Main Street Dog Park. Space limitations constrain the size of the proposed multi-purpose basin to an area of approximately 1 acre, which will necessitate a somewhat larger installed stormwater pump capacity of 40,000 gpm.

An enhanced maintenance program will be implemented to rehabilitate the existing system within the Reuse Areas prior to the ultimate replacement and installation of the new stormwater collection system. Initial construction of the proposed stormwater system will include the installation of new storm drain lines in all backbone streets. This backbone system will include pipeline stubs to future Reuse parcels and connections to intercept existing on-site pipeline systems within Reuse parcels. Proposed construction within each Reuse parcel will be required to replace the existing stormwater facilities within that parcel, such that ultimately the entire existing system is replaced with a new system that meets current standards.

Providing 40,000 gpm of pumping capacity along with the 1-acre stormwater basin will allow the system to meet City standards and accommodate 55-inches of sea level rise and beyond. The Reuse Areas within Watershed C will be levee protected from the flooding conditions described in the Flood Protection section, with associated options for adaptively raising levee crest as needed to respond to sea level rise greater than 18-inches. The Development Areas within the watershed will be at an elevation above the required flood protection elevations for initial construction described in the Flood Protection section.

d. Watershed D

Watershed D encompasses the central and eastern areas portions of the Project Site. This watershed includes approximately 130 acres and will discharge runoff to the Seaplane Lagoon through a newly refurbished outfall near the northeast corner of the Lagoon. The majority of the development within the watershed is Development Area, with only a small component of Reuse Areas. The proposed stormwater system will include the installation of new storm drain lines in all backbone streets, as well as pipeline stubs to future Development parcels and stubs to intercept existing on-site pipeline systems within Reuse parcels. The downstream portion of this watershed is within the Waterfront Town Center Sub-District, where plans call for a higher density development. Therefore, it is anticipated that there will not be sufficient land available to construct a multi-purpose basin. However, elevations within the watershed are high enough to meet City design standards (with 18- inches of sea level rise) without initial construction of a fully equipped pump station. Accordingly, the initial backbone infrastructure improvements for this watershed will include construction of the pump station vault, which will function through gravity outfall until such time that sea level rises more than 18-inches above current levels. At that point incremental stormwater pump capacity will be installed up a total of 60,000 gpm to pump the peak system flows to the Lagoon.

Providing a refurbished outfall and pump station vault will allow for adaptive management of the system to continue to meet the City's 25-year conveyance standard. The Development Areas within Watershed D will have minimum grades above the required flood protection elevations for initial construction described in the Flood Protection section. However, a levee will need to be constructed if sea level rise exceeds 18-inches and stormwater pump capacity will need to be installed up to a predicted maximum of 60,000 gpm, which would provide protection up to and beyond a sea level rise of 55-inches.

e. Watershed E

Watershed E encompasses the southeastern quadrant of the Project Site. This watershed includes approximately 158 acres and will route stormwater runoff to a newly refurbished outfall structure San Francisco Bay. The watershed consists entirely of Development Area. The proposed stormwater system will include the installation of new storm drain lines in all backbone streets. The system will also include pipeline stubs to future Development parcels. The initial construction will only require an outfall to be constructed to the Bay. The elevations of this watershed are higher than other areas within the Project Site, and therefore, do not require a multi-purpose basin or pump station to be installed at the time of initial construction. A pump station with capacity of 20,000 gpm and a roughly 3-acre multi-purpose basin will be required if the sea level rise exceeds approximately 3 feet. The proposed outfall for this watershed will be located along the southern shoreline of the Enterprise Park.

The Development Areas within Watershed E will have minimum grades above the required flood protection elevations for initial construction described in the Flood Protection section. The stormwater system can be adapted to accommodate sea level rise over 3-feet with the installation a pump station and multi-purpose basin. A perimeter levee will need to be constructed if sea level rise exceeds 18-inches and sufficient right-of-way will be maintained for that adaptive measure as well.

f. Northwest Territories / VA Developed Areas

The Northwest Territories / VA Developed Areas encompass the northwestern areas of Alameda Point. This watershed includes approximately 275 acres and discharges storm runoff to the Oakland / Alameda Estuary. It is comprised of open space areas, mostly passive with some active areas, abandoned airplane runways and the VA Developed Area. The VA Developed Area will install new outfalls along the northern shoreline, which will convey runoff from the VA Developed areas, adjacent abandoned runways, and open space areas. The proposed storm drain lines and outfalls from the VA Developed Areas will intercept any existing stormwater facilities and replace existing outfalls within their vicinity. The remaining open space areas within this watershed will utilize the remainder of the existing stormwater facilities, pipelines and outfalls.

The VA Developed Area will have minimum grades above flood protection elevations including 55-inches of sea level rise. The remaining Open Space areas and abandoned runways will remain at similar elevations as the existing conditions and will therefore not be protected from 100-year coastal flooding hazards or future sea level rise.

g. Off-Site Watersheds

The City's SDMP suggests a number of improvements to the Alameda Northside drainage area lying immediately to the east of Alameda Point. This drainage area is the largest in the City and has been subject to localized flooding issues due to capacity limitations in a number of locations. The prioritized 10-year improvements for the system call for disconnecting the western portions of the system at West Campus Drive and redirecting the runoff to an alternative outfall location to off-load the existing Arbor and Northside (Marina Village) Pump Stations. One proposed alternative outfall location, and the one requiring the smaller amount of new storm drain line, is the northeast corner of the Seaplane Lagoon.

Modeling presented in the SDMP suggests that a new 72-inch diameter storm drain line would be required to meet a 10-year design storm standard to gravity outfall at this location. Construction of this alternative outfall location could be accommodated in the infrastructure planning for Alameda with adequate forethought, although the size of the line would potentially present challenges with respect to right-of-way and locating of other utilities. However, it is important to note that increasing the design standard of system for the off-site watershed to the 25-year event would likely require an additional terminal stormwater pump station (or installation of stormwater pumps earlier than otherwise needed at the Watershed D outfall). Providing 25-year protection including sea level rise of 55-inches would require an additional 60,000 gpm of pumping capacity above and beyond that previously cited for Watershed D.

An alternative to the configuration suggested in the SDMP is to upgrade the existing pump station off-site of Alameda Point at Third Street to improve this off-site watershed. A bio-retention basin could also be constructed near the existing pump station, within the old Alameda Belt Line corridor to provide water quality benefit for this existing watershed. In this alternative a force main would be constructed from this upgraded pump station to the west and entering Alameda Point. This would provide design flexibility within Alameda Point for the pipeline that the force main connects to and accepts this off-site flow.

The City will determine which option is preferred prior to the beginning of the detailed storm drainage design for Alameda Point. The City's Urban Runoff Fund would be required to fund these improvements.

9. Proposed Water Quality Treatment Measures

The Alameda Countywide Clean Water Program oversees the implementation of the Municipal Regional Stormwater NPDES Permit (MRP) that was issued for urban stormwater discharges from Alameda County, including the City of Alameda. The MRP outlines a number of regulatory goals and requirements for stormwater management for new development and redevelopment sites. The permit previsions require the implementation of Low Impact Development (LID) measures as outlined in Section C.3.c of the MRP. These measures include source control, site design, and treatment requirements to reduce the amount of stormwater runoff and improve the quality of the stormwater runoff.

The MRP identifies appropriate LID stormwater management measures such as rainwater harvesting and re-use, infiltration, evapotranspiration, and biotreatment, while emphasizing that biotreatment systems are only to be used where it is practically infeasible to utilize the other three cited measures. Alameda Point has been identified as practically infeasible for large-scale rainwater harvesting and infiltration by utilizing the Alameda Countywide Clean Water Program's Infiltration/Harvesting and Use Feasibility Screening Worksheet. Accordingly, biotreatment will be the primary method of accomplishing stormwater treatment within Alameda Point. The LID biotreatment measures that will be implemented throughout Alameda Point will include bioretention planters, street planters, bioswales, subgrade infiltration areas, permeable paving and any other treatment measures approved by the Regional Board. Permeable surfaces (pavement and concrete) have been installed as part of the adjacent Bayport development, however, because of shallow groundwater they were ineffective and had to be removed because they did not function properly. Implementation of these types of surfaces is not allowed unless with approval from the Public Works Director and a determination that the groundwater elevation will not interfere with the functioning of these units. The following describes the water quality plan for the Development and Reuse Areas:

a. Development Areas

The new backbone streets will be constructed with water quality facilities that provide treatment for the runoff from the impervious areas within that street right-of-way. These streets are anticipated to include linear bio-retention planters, bioswales and street planters providing bio-filtration of stormwater within the landscape strips of the street cross section. The water quality improvements within the backbone streets will be phased to closely match the development phasing.

The on-site / in-tract areas of development parcels within the Development Area will be required to be designed with LID principles and treat the runoff interior to that parcel. This treatment can be accomplished by allocating and integrating water quality treatment measures within on-site / in-tract landscape areas. Development parcels also may implement on-site / in-tract rain harvesting systems, where feasible.

With implementation of the water quality measures in the backbone streets and on-site / in-tract development parcels, all runoff from impervious areas within the Development Areas will be treated in compliance with MRP. In case that it is determined by the City of Alameda that it is not feasible or practical for a development parcel to provide all of the necessary treatment for that respective parcel, then that development parcel may implement water quality improvements elsewhere, within Alameda Point, consistent with the "Alternative or In-Lieu Compliance" previsions outlined in Section C.3.e of the MRP.

b. Reuse Areas

Water quality improvements within the Reuse Areas will be implemented incrementally over time. Development applications or long term leases for Reuse parcels will be required to construct on-site water quality improvements to provide treatment for that Reuse parcel. At this time, the water quality treatment of these existing streets is exempt from the requirements of the MRP. However, as backbone streets are improved with the Reuse Areas, water quality improvements will be implemented, to the maximum extent feasible, to treat the runoff from that street.

c. Water Quality Certification

A water quality certification, Section 401, will be required from the Regional Water Quality Board (RWQCB) for activities within wetlands or below the ordinary high water line. This certification will be required for the outfall construction at Alameda Point. The project will need to demonstrate compliance with the water quality regulations of the MRP for the storm runoff from the Project Site. As described above, the implementation of the water quality improvements will be phased in the

Development Areas and incremental in the Reuse Areas. Accordingly, it is anticipated that a site-wide water quality certification will be pursued for all outfalls and waste discharge requirements will be established for the site outlining how the water quality compliance will be achieved over time.

IX. POTABLE WATER

A. Existing Potable Water System

1. Existing Potable Water Supply

Potable water is supplied to Alameda Point by EBMUD. EBMUD has supplied water to the Project Site since 1941. Historical records indicate that when the former NAS Alameda was in operation, the average daily demand of potable water consumed by the Project Site was approximately 2.8 million gallons per day (MGD).

EBMUD supplies potable water to the Project Site through the existing potable water distribution system within the Alameda street network east of Main Street. EBMUD owns and operates a 24-inch transmission water line that crosses the Oakland / Alameda Estuary near the Webster / Posey Tubes. This facility supplies water to the majority of the west end of the City of Alameda. EBMUD's distribution system, ranging in size from 6-inches to 16-inches in diameter, extends from this transmission main to Main Street. There is an existing 10-inch diameter pipeline within Main Street, north of RAMP, and 12-inch and 16-inch diameter pipelines within Main Street to the south between RAMP and Pacific Avenue. Alameda Point receives water via three large existing meters, two (2) 8-inch and one (1) 10-inch, which connect to these EBMUD pipelines in Main Street.

2. Existing Potable Water Distribution System

The existing potable water system within Alameda Point connects to the meters described above and distributes potable and fire water to all areas within the Project Site. This existing system was installed by the Navy and the majority of the system is over 60 years old. In 1986, the existing water system in the southeast portion of the Project Site was reconstructed and new pipelines were installed.

Historically, there were two distinct water systems at Alameda Point, a potable water system and a dedicated fire protection system. The dedicated fire protection system was designed as a high flow deluge system to provide very large fire flows for a short period of time, suitable to protect aircraft and aircraft related activities at the former NAS Alameda. This fire system included large pipelines, up to 24-inch diameter, and up to approximately 1.5 million gallons of on-site storage. The storage facilities included two elevated and two ground level tanks. The fire system also included an on-site pumping plant to boost available fire flows. There is no demand for this type of system since aircraft operations ceased at the Project Site. Additionally, this fire protection system was costly to maintain operable, the elevated tanks required seismic retrofitting and there was insufficient water circulation / turnover in this system resulting in water quality concerns. Therefore, this fire protection system has since been abandoned and fire protection has been converted to the existing potable water system.

The existing potable water system of pipelines ranges in size from 6-inch to 16-inch in diameter. The system is currently owned by the City of Alameda, as it does not meet the standards for EBMUD to accept it into their ownership and system. The existing system remains functional and is providing water service to the existing uses within the Project Site. However, this system is deteriorated, requires frequent maintenance and is not considered reliable. The existing water pipelines are commonly not located in existing or proposed street alignments and portions of the system are located underneath existing buildings. Additionally, the existing system is commonly shallow and does not have adequate cover resulting in pipeline breaks and leaks. EBMUD anticipates that there is a significant amount of potable water that is lost and wasted at the Project Site due to undocumented leakage.

The Project Site is within EBMUD's central pressure zone. A recent fire flow test was conducted on the EBMUD's existing system at the intersection of Stargell Ave and Main Street. This fire flow test indicated that the static pressure of the system is 71 psi and the residual pressure at 2,000 gpm is 66 psi.

Currently, EBMUD operates and maintains the existing water system on behalf of the City of Alameda through a Joint Powers Agreement (JPA). See Figure 45 depicting the existing on-site potable water system and meters that supply water to the Project Site.

B. Proposed Potable Water System

1. Proposed Potable Water Demand & Supply

The total estimate average daily demand of potable water at full build-out of the redevelopment of Alameda Point is approximately 2.06 MGD. The potable water demand for the various proposed land uses and each Sub-District are outlined in Table 10 and Table 11. These potable water demand factors do not account for the implementation of water conserving fixtures throughout the proposed buildings. The estimated demand includes 0.95 MGD of irrigation demand at the Project Site. This maximum demand does not assume the use of recycled water for the irrigation demand or for other permitted uses, such as toilet flushing within commercial buildings. The potable water demand will be decreased accordingly with the delivery and use of recycled water at the Project Site. Additionally, this development will commit to a range of sustainable strategies that achieve reductions in water consumption, which will further reduce the estimated water demand.

Table 10 - Potable Water Flow Generation Factors

Land Use	Flow Factor
Residential	280 GPD / Unit or 165 GPD / Unit
Commercial	0.084 GPD / SF or 0.15 GPD / SF
Hotel	100 GPD / Room
Park	3,040 GPD / Net Acre
Marina	22 GDP / Slip

Table 11 - Estimated Potable Water Demand (Buildout)

Land Use	Units	Square Footage	Acres	Estimated Flow (MGD)
Residential	1,425			0.38
Commercial		5,500,000		0.51
Hotel	300			0.03
Park			311	0.94
Marina	530			0.01
VA Development Area			75	0.19
			Total Potable Water Flow:	**2.06**

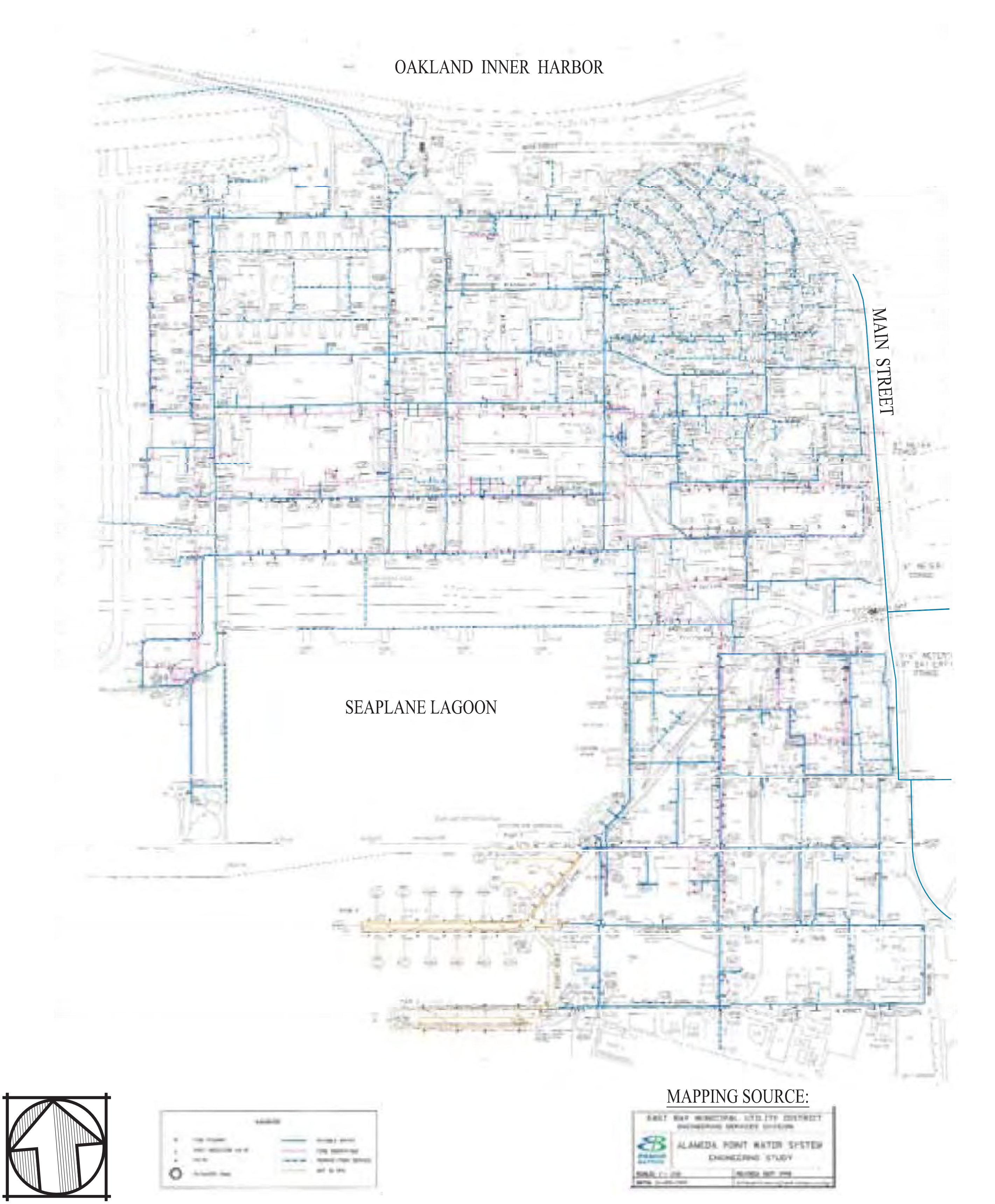

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FIGURE 45
EXISTING WATER SYSTEM

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EBMUD recently (August 2013) completed a water supply assessment (WSA) for the proposed project, including the transit oriented mixed use alternative. The WSA indicates that EBMUD has a long history of supplying water to the Project Site. The WSA concludes that EBMUD has adequate supply for the proposed project and alternative. Similarly, EBMUD's 2010 Urban Water Management Plan has included the water demand projections associated with the redevelopment of the site, maintaining adequate supply allocation to the Project Site.

2. Proposed Potable Water Distribution System

The proposed water distribution system will be owned and operated by EBMUD. The system shall be designed and constructed consistent with EBMUD's Standard Specifications for Pipelines 20-inches and smaller. The pipeline material for pipelines that are smaller than 12-inches in diameter will be polyvinyl chloride (PVC). Pipelines that are 12-inches in diameter and larger will be mortar-lined and plastic coated steel. Flexible connections or other flexible designs will be implemented at locations where differential settlement is anticipated.

The potable water distribution system will also provide fire water supply for the Project Site. The potable water system will be designed to provide the maximum daily demand plus a fire flow. Conservatively, the assumed fire flow design criteria is 3,000 gpm for 2 hours at a residual pressure of 20 psi from any three adjacent or reasonably nearby fire hydrants flowing at the same time.

The proposed water distribution system provides the maximum daily demand plus fire flow without storage facilities or booster pumps required.

Appropriate backflow prevention facilities will be required for all fire service connections and any connections (permanent or temporary) to the existing on-site distribution system.

a. Development Areas

A new potable water distribution system will be installed within the Development Areas at Alameda Point. The proposed distribution pipelines will connect to the existing EBMUD water facilities in Main Street. The existing water system will be replaced with the existing system in phases consistent with the development build-out. The proposed distribution system will range in size from 8-inch to 16-inch in diameter. The proposed water distribution facilities will be installed within all backbone streets providing reliable potable and fire water to all development parcels within the Development Areas. See Figure 46 depicting the proposed potable water system.

b. Reuse Areas

The Reuse Areas within Alameda Point initially will continue to utilize the existing potable water distribution system through an enhanced maintenance program. This program will incrementally replace the existing system. These incremental improvements will be coordinated through the City of Alameda and EBMUD to ensure the improvements are implemented orderly and addressing priority areas. The exterior pipeline loop within W. Redline Street, Monarch Street, W. Tower Avenue and Pan Am Street shall be prioritized. This improved loop will provide a more reliable system with adequate water pressure for fire protection within the Reuse Areas. Additionally, each development project within the Reuse Areas will replace the potable and fire water lateral serving that site.

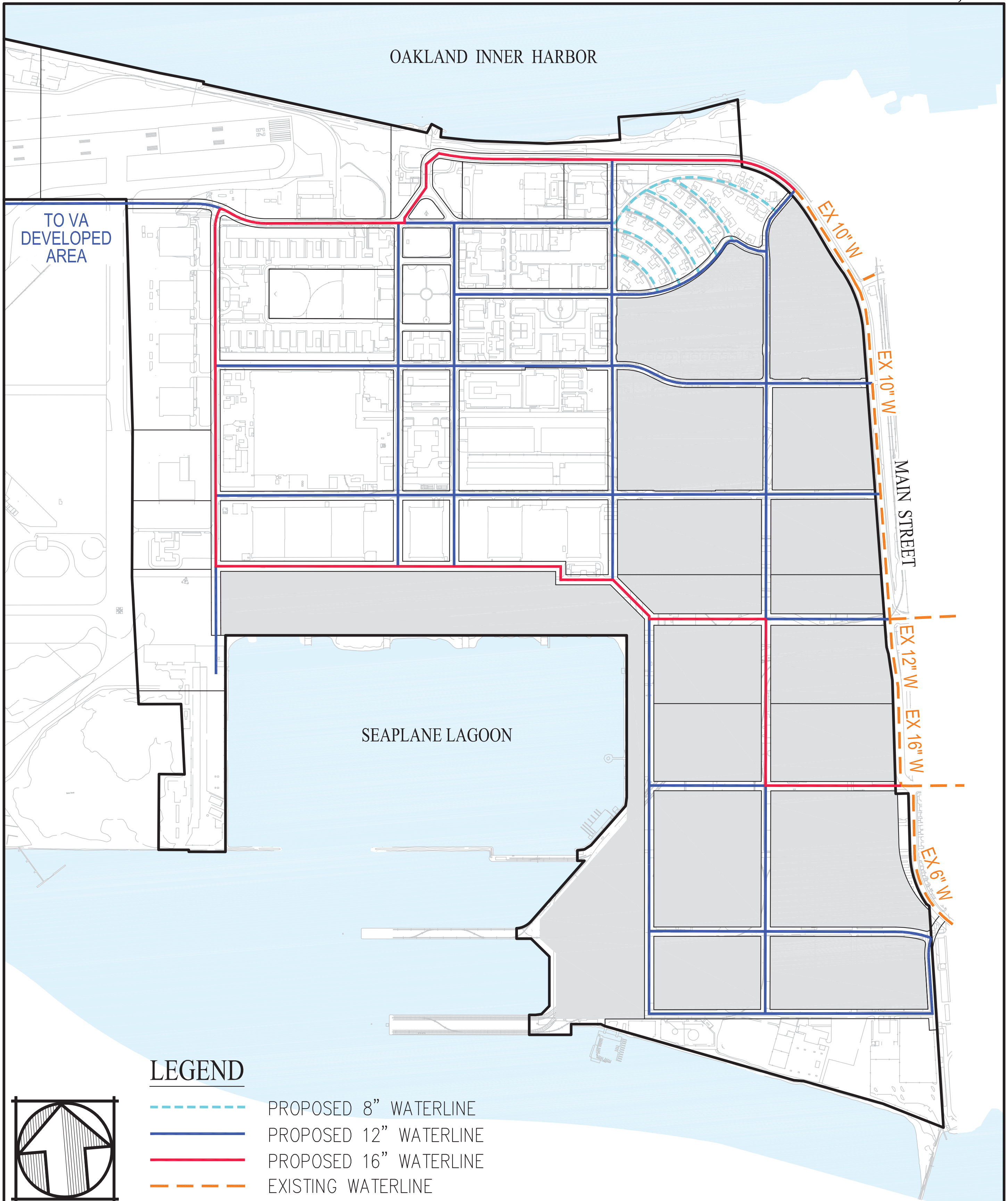

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FIGURE 46
PROPOSED ULTIMATE WATER SYSTEM

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Ultimately, the potable water distribution system within the Reuse Areas will be replaced. The proposed distribution system will be similar to the system proposed within the Development Areas, including new pipelines and appurtenances. The replacement of the potable water system within the Reuse Areas will be completed over time as described in the Phasing and Implementation Section XIII.

C. Value Engineering Opportunities

A value engineering opportunity for the potable water system is to adjust the fire flow design criteria. The governing design parameter establishing the required pipeline sizes within the Project Site is the fire flows. The fire flow criteria assumed by the MIP is high in comparison to surrounding cities. Once more specific development details are available, such as sizes of proposed structures within defined areas of the site, this design parameter could be refined and reduced. The final fire flow design shall be confirmed with the City of Alameda Fire Department and be consistent with the current version of the California Fire Code. The current code allows for 50% reductions in the required fire flow when buildings are sprinklered, which is intended for the buildings at Alameda Point. Assuming reduced flow rates of 1,500 GPM typical residential construction and 2,500 GPM for commercial buildings, this would reduce the backbone infrastructure costs by approximately $4.2 million.

X. RECYCLED WATER

A. Existing Recycled Water System

1. Existing Recycled Water and Supply System

Currently, there is not an existing source of recycled water at Alameda Point. Accordingly, there are no existing recycled water distribution facilities within the Project Site.

B. Proposed Recycled Water System

1. Proposed Recycled Water Supply

EBMUD is implementing the East Bayshore Recycled Water Project, which currently supplies recycled water to portions of Oakland and Emeryville. EBMUD plans to extend their recycled water service to the City of Alameda, including Alameda Point, with future phases of this project. This multi-phase project will eventually supply an annual average of approximately 2.2 MGD of recycled water to portions of Alameda, Albany, Berkeley, Emeryville and Oakland.

EBMUD's source of recycled water for Alameda Point is generated at their Main Wastewater Treatment Plant (MWWTP) located at the eastern landing of the Bay Bridge. The recycled water facilities at the MWWTP utilize microfiltration and extra disinfection to produce recycled water that meets or exceeds the California Department of Health standards for unrestricted use.

Currently, EBMUD has existing operational recycled water distribution facilities in portions of West Oakland, near 7th Street and Jefferson Street intersection. The East Bayshore Recycled Water Project will eventually construct a recycled water supply line from these facilities in West Oakland, across the Oakland - Alameda Estuary, and into the western portions of Alameda. Alameda Point will likely connect to the recycled water facilities installed with the Bayport project, in order to connect to EBMUD's reliable supply. See Figure 47 depicting the existing and planned future facilities associated with EBMUD's East Bayshore Recycled Water Project.

2. Proposed Recycled Water System and Uses

As a key component of the Project's sustainable objectives to reduce potable water consumption and demand, a new recycled water distribution system will be installed at Alameda Point. A network of recycled water pipelines will be constructed within the proposed rights of ways of the backbone streets and will range in size from 6 to 12 inches. The recycled water facilities will be designed and constructed in accordance with EBMUD's regulations, standards and specifications.

The proposed recycled water system at Alameda Point will include a backbone network of pipelines throughout all Sub-Districts. This network of facilities will allow for continued growth of recycled water uses and flexibility for the Development and Reuse Areas to utilize this resource. The system will also extend to all anticipate large open space or park facilities, such as the Northwest Territories, Sports Complex and Enterprise Park areas. See Figure 48 depicting the proposed recycled water system.

The recycled water usage at Alameda Point will supplement and minimize the potable water usage. The anticipated uses of recycled water within the Project include landscape irrigation, wetland restoration support and irrigation, plumbing fixtures in dual-plumbed buildings and industrial processes. The recycled

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FIGURE 47
EBMUD EAST BAYSHORE RECYCLED WATER PROJECT

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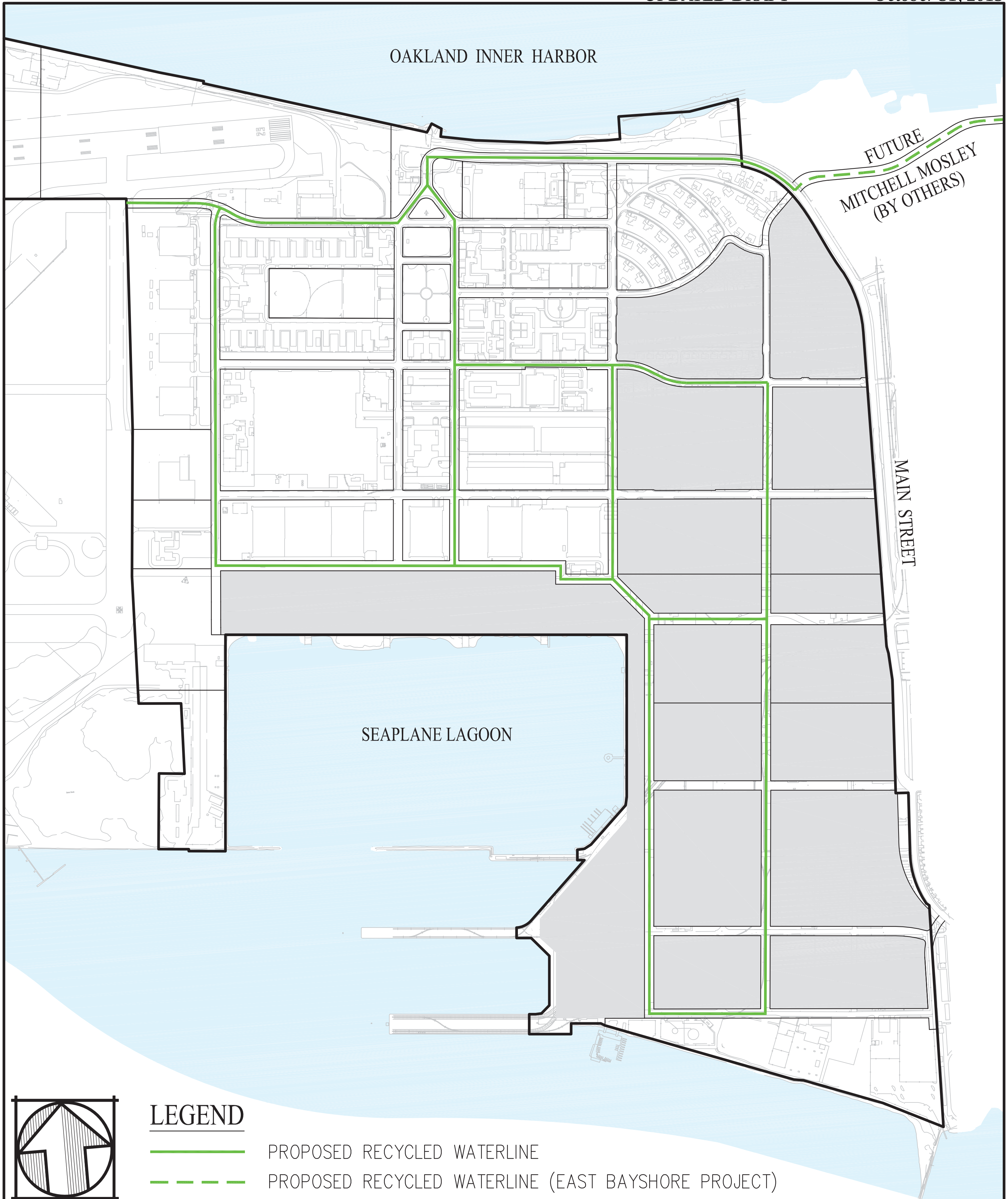

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FIGURE 48
PROPOSED RECYCLED WATER

G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_48_RECYCLED WATER.DWG water demand to provide irrigation to the proposed public open space areas within the Project Site is estimated to be 0.95 MGD. This is the largest expected demand for recycled water at Alameda Point and supply to these areas will be prioritized. All other proposed uses of recycled water will need to confirm available supply with EBMUD at the time of that project application.

There is potential that the EBMUD East Bayshore Recycled Water Project will not have extended recycled water supply to the western portions of Alameda by the commencement of construction of the Alameda Point backbone infrastructure. The proposed recycled water system will be installed regardless so that recycled water can be distributed throughout Alameda Point once EBMUD's supply is available. Additionally, under this scenario dual water services, potable and recycled, will need to be installed to all public open spaces and other uses that anticipate utilizing the recycled water once it is available. Potable water will be utilized at these locations until the conversion to recycled water use is complete.

As described above, the recycled water usage throughout the Project Site will reduce the potable water consumption. Utilizing recycled water for the irrigation demand of the large public open spaces planned within the Project Site will reduce the potable water demand by 0.95 MGD.

C. Value Engineering Opportunities

The largest anticipate demands for recycled water are the irrigation to landscape and wetland restoration areas and industrial processes. A value engineering opportunity is to limit the recycled water backbone system to only provide recycled water service to the areas within the Open Space and Adaptive Reuse Sub-Districts. This would reduce the backbone infrastructure costs by approximately $1.8 million.

XI. DRY UTILITIES

The dry utilities at Alameda Point include electric power, natural gas, communications and cable television.

A. Electric System

1. Existing Electric System

Alameda Municipal Power (AMP) owns and operates the existing electric power facilities at Alameda Point and throughout the City of Alameda. The existing electric system at Alameda Point consists of 115kV transmission, 12kV and 4kV distribution facilities. Electricity is supplied to the Project Site via the existing overhead 115kV transmission facilities along Pacific Avenue to the east, which turn north on Main Street and enter Alameda Point and connect to the Cartwright Substation near the Skyhawk / 11th Street intersection. The overhead 115kV transmission line continues north on Main Street and connects to NCPA Combustion Turbines twin peaking generators located north of the linear park & trail along Main Street.

The Cartwright Substation is a critical component of the existing electric system and is intended to remain in service throughout the redevelopment of Alameda Point. The substation provides local electric distribution to Alameda Point and portions of the surrounding areas to the east. Cartwright is a 115/12.47kV substation, equipped with two 33/44/55 MVA transformer banks. Nine active 12.47kV, 600 Amp underground distribution feeders (electric main lines) exit the substation to the west, providing local electric service throughout the Project Site. 600 Amp and 200 Amp looped underground distribution circuits provide feeds to local unit substations and existing customers throughout the Project Site. Unit substations located in strategic areas of the Project Site provide switching and/or protection for the various 12kV electric main lines. See Figure 49 depicting the existing electric system and associated key components

2. Existing Electric System Disposition and Capacity

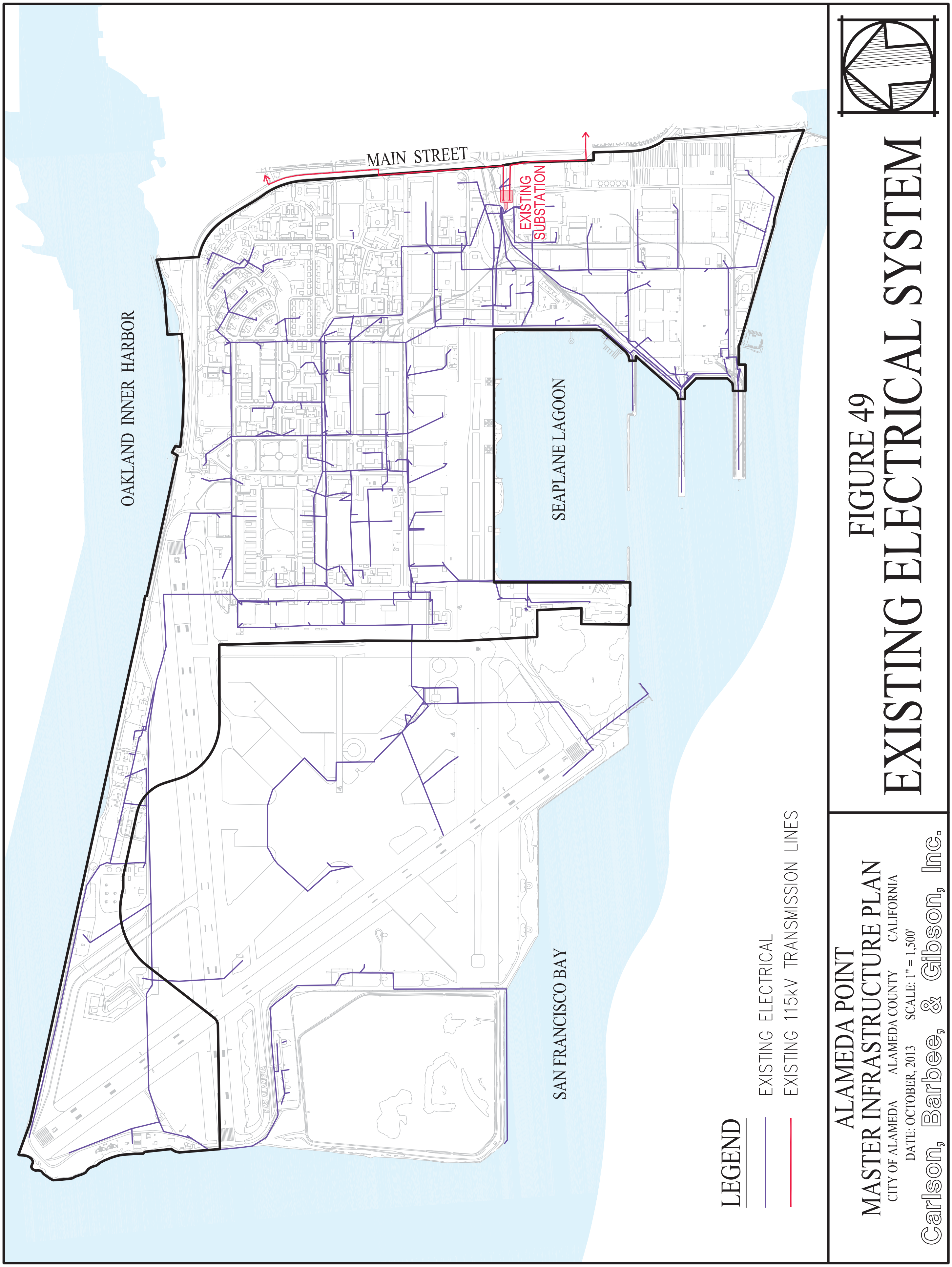
AMP estimates that the Cartwright Substation has an existing electric capacity for a maximum demand of approximately 50 MVA. The substation can be upgraded to increase the electric capacity, if necessary. The upgrades would most likely include a transformer and bus and breaker improvements within the substation.

The electric transmission system facilities, 115kV pole lines, providing electricity to Alameda Point will support an additional electric demand of approximately 80 MVA.

The existing electric system is operable and provides electricity to the existing tenants within the Project Site. The Cartwright Substation is in acceptable condition to AMP and will be preserved. The existing 115kV overhead electric transmission lines along Main Street and connecting to the Cartwright Substation will remain overhead, but may be relocated to accommodate adjacent street improvements or developments if determined necessary. The existing electric distribution facilities on the piers were recently replaced and will remain.

The majority of the existing electric distribution system meets current codes and standards; however there are reliability issues within portions of the Project Site.

The locations of the existing distribution facilities are commonly outside of existing streets, and are within future Development areas.


MAIN STREET
EXISTING SUBSTATION
OAKLAND INNER HARBOR
SEAPLANE LAGOON
SAN FRANCISCO BAY
LEGEND
EXISTING ELECTRICAL
EXISTING 115kV TRANSMISSION LINES
FIGURE 49
EXISTING ELECTRICAL SYSTEM
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3. Proposed Electric Demand

The estimated total coincident electric demand for the ultimate redevelopment of Alameda Point is approximately 40 – 50 MVA. See Table 12 for a summary of estimated electric demands associated with the build-out of the Community Reuse Plan. The estimated demand is based on historical electric utility load data for the various proposed land uses in the local climate zone. The existing transmission facilities and Cartwright Substation have adequate capacity for the Project's estimated ultimate electric demand.

Table 12 - Estimated Electric Demand (Buildout)

Land Use	Units	Square Footage	Acres	Estimated Loads (MVA)
Residential	1,425			4.3
Commercial		5,300,000		36.4
Retail		200,000		2.5
VA Development Area			75	3.0
			Total Electrical Load:	**46.2**

If additional capacity is necessary to accommodate proposed use within Alameda Point that exceeds the available capacity, equipment additions and improvements can be implemented at the Cartwright Substation to increase the available capacity. Other capacity upgrades and system protection / automation could be developed with input from AMP on an as needed basis.

Large industrial or other types of uses with high electric demands may require additional electric capacity. These types of demands would be in excess of about 4 MVA, and would likely require to be served at Primary Voltage (12.47 kV). This proposed use and associated electric demand would need to be evaluated and coordinated with AMP.

4. Proposed Electric System

The existing 115kV overhead transmission facilities will remain and continue to provide electric power to the Project Site. The 115kV pole lines directly east and connecting to the Cartwright Substation will be preserved. There is an existing easement, approximately 140-feet wide, in favor of AMP for this area, which will be preserved restricting the potential land uses to landscaping or parking areas. The 115kV pole lines along the west side of Main Street will remain but may be relocated to eliminate conflicts with proposed street improvements or development sites. The new 115 kV transmission lines, where they are relocated to, must be constructed and energized prior to removal of the existing lines.

The Cartwright Substation will be preserved and remain as a key component of the proposed electric distribution system.

a. Development Areas

From the Cartwright Substation, a new underground electric distribution system will be installed with the Development Areas. This new electric system will replace the existing electric system in phases consistent with the development build-out. The proposed electric distribution system will consist of new underground conduits, vaults, boxes, and pads; which will accommodate 15kV rated cables, transformers, switches and other utility distribution equipment including its SCADA communication monitoring and controls. The existing nine (9) electric main lines emanating from the west side of the Cartwright Substation will be replaced with approximately six (6) new main lines. These main lines will require a utility corridor and reserved easement in aggregate, approximately 40-feet wide, to assure utility compliance for minimizing exposure and maintaining separation of circuits to avoid mutual heating of conductors. See Figure 50 depicting a conceptual configuration of the electric utility corridors and easements near the Cartwright Substation.

From the main lines, the electric distribution facilities will be installed within all backbone streets within the Development Areas. The electric conduits and cables will be placed in a joint utility trench. This trench will also accommodate the Pacific Gas & Electric (PG&E) natural gas, telephone, cable television, possible ancillary fiber optic cable systems and street light facilities. The proposed electric system and joint trench will be constructed in accordance with AMP's rules and regulations as outlined in their Material and Installation Criteria for Underground Electric Systems, latest version. See Figure 51 depicting the schematic proposed joint trench system at Alameda Point.

Some of the existing unit substations may remain if they do not conflict with other proposed utilities, streets or Development areas. Specifically, the existing unit substations, Substation #12 and Substation #14, near the piers will likely remain and provide service for the MARAD uses on the piers. The unit substations map also be used for underground trunk loop systems in the Development Areas.

b. Reuse Areas

The Reuse Areas within Alameda Point initially will continue to utilize the existing electrical distribution system through an enhanced maintenance program. This program will be administered by the City of Alameda / AMP and will rehabilitate the existing system to address deficiencies. Each proposed development within the Reuse Areas will be responsible for investigating and documenting the condition of the existing distribution facilities directly adjacent to that specific site. Any deficiencies identified shall be address at the time of that development. Additionally, each development project within the Reuse Areas will replace the transformer and electrical service to that site.

Ultimately, the electrical distribution system within the Reuse Areas will be replaced. The proposed system will be similar to the system proposed within the Development Areas, constructed in a joint utility trench. Similarly, the unit substations at preserved buildings within the Reuse Areas will likely remain and be served from the proposed distribution system. The replacement of the electrical system within the Reuse Areas will be completed over time as described in the Phasing and Implementation Section XIII.

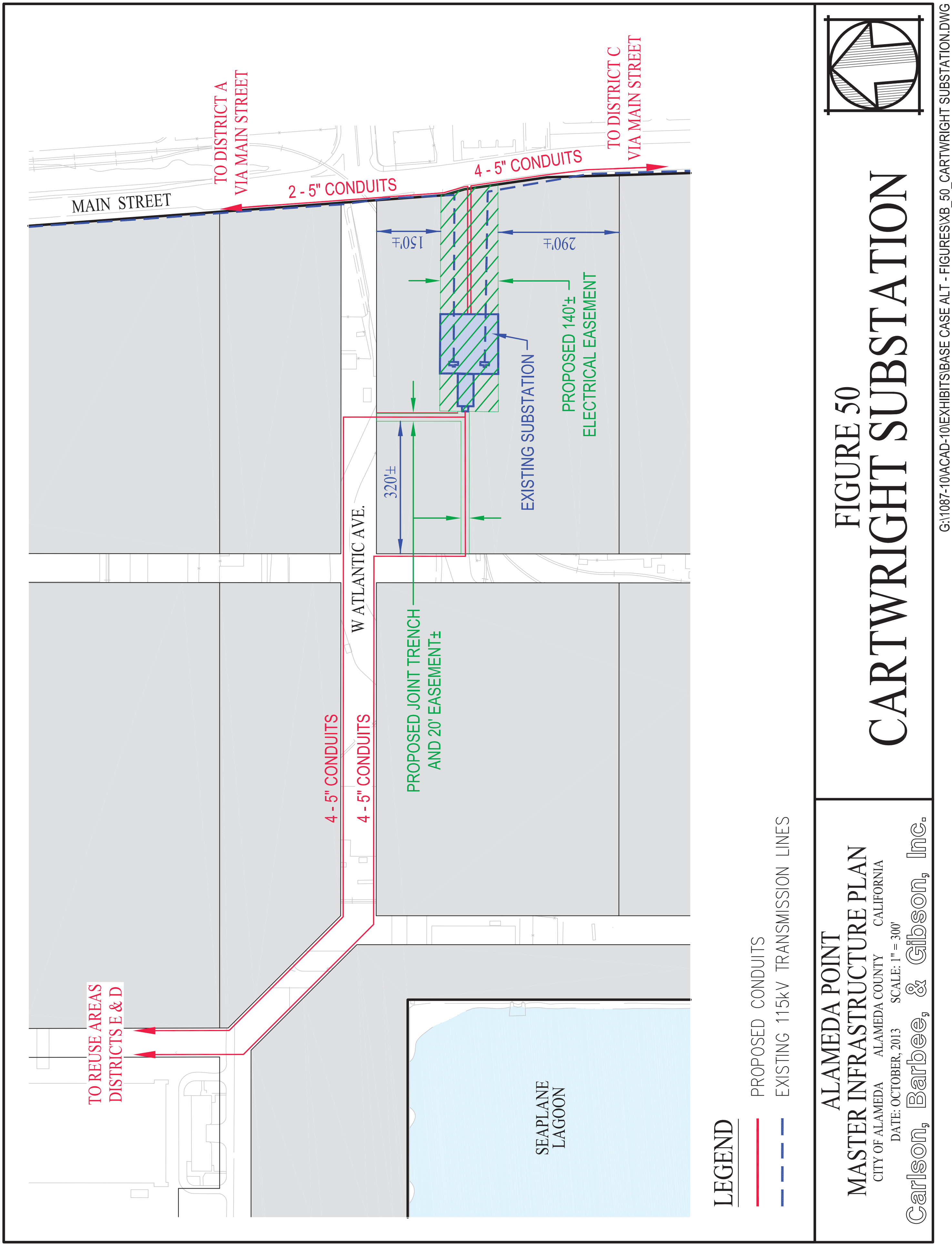
FIGURE 50
CARTWRIGHT SUBSTATION
MAIN STREET
2 - 5" CONDUITS
4 - 5" CONDUITS
TO DISTRICT A VIA MAIN STREET
TO DISTRICT C VIA MAIN STREET
150'±
290'±
320'±
EXISTING SUBSTATION
PROPOSED 140'± ELECTRICAL EASEMENT
PROPOSED JOINT TRENCH AND 20' EASEMENT±
W ATLANTIC AVE.
4 - 5" CONDUITS
4 - 5" CONDUITS
TO REUSE AREAS DISTRICTS E & D
SEAPLANE LAGOON
LEGEND
PROPOSED CONDUITS
EXISTING 115kV TRANSMISSION LINES
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G:\1087-10\ACAD-10\EXHIBITS\BASE CASE ALT - FIGURES\XB_50_CARTWRIGHT SUBSTATION.DWG

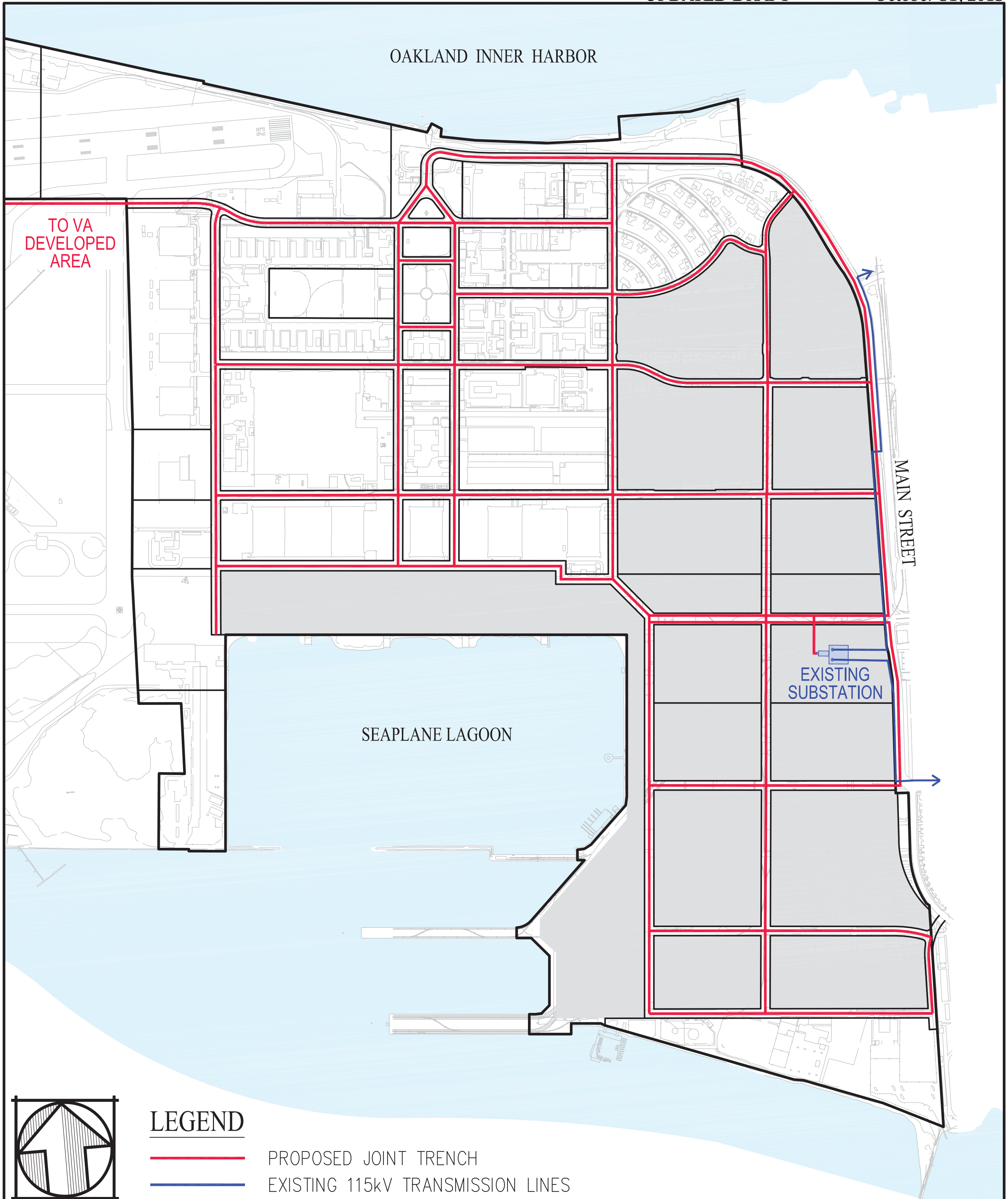

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FIGURE 51
PROPOSED ULTIMATE JOINT TRENCH

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B. Natural Gas System

1. Existing Natural Gas System

The existing natural gas supply facilities at Alameda Point are owned and operated by PG&E. Natural gas is supplied to Alameda Point by an existing 8-inch steel main, at an operating pressure of approximately 50 psi. This 8-inch main is located along W. Atlantic Ave and continues within the Project Site heading northwest along the former rail line route. The 8-inch main terminates at an existing regulating /metering station that is located at the Ferry Point / W. Tower Ave intersection. See Figure 52 depicting the Existing Natural Gas Facilities. The existing gas distribution facilities after the regulating / metering station are owned and operated by the City of Alameda. These facilities have deteriorated and are unreliable. The gas system does not extend to all areas within Alameda Point. Additionally, the operating pressure of the existing system is so low that many existing tenants cannot utilize the natural gas service. PG&E will not accept the existing gas distribution system as it does not meet their standards. PG&E is currently evaluating a system improvements and rehabilitation prior to the redevelopment of Alameda Point.

2. Proposed Natural Gas Demand

The estimated total coincident natural gas demand for the ultimate redevelopment of Alameda Point is approximately 1,160 mcfh. See Table 13 for a summary of estimated natural gas demands associated with the build-out of the Reuse Plan. The estimated demand is based on historical natural gas utility load data for the various proposed land uses in the local climate zone.

Table 13 - Estimated Gas Demand (Buildout)

Land Use	Units	Square Footage	Acres	Estimated Demands (Mcfh)
Residential	1,425			57
Commercial		5,300,000		1,060
Retail		200,000	200,000	40
VA Development Area			75	50
			Total Gas Demand:	**1,207**

The existing gas supply line in W. Atlantic Avenue has adequate capacity for the Project's anticipated gas demand. If a capacity upgrade to the existing gas supply line is determined to be necessary, it will be implemented by PG&E and at PG&E's expense per their tariff rules and regulations.

Atypical natural gas demands may necessitate the extension of gas distribution or transmission facilities and regulating stations. These will include any use with a natural gas demand of approximately 10 psi or higher, which is above typical distribution load and or pressure requirements

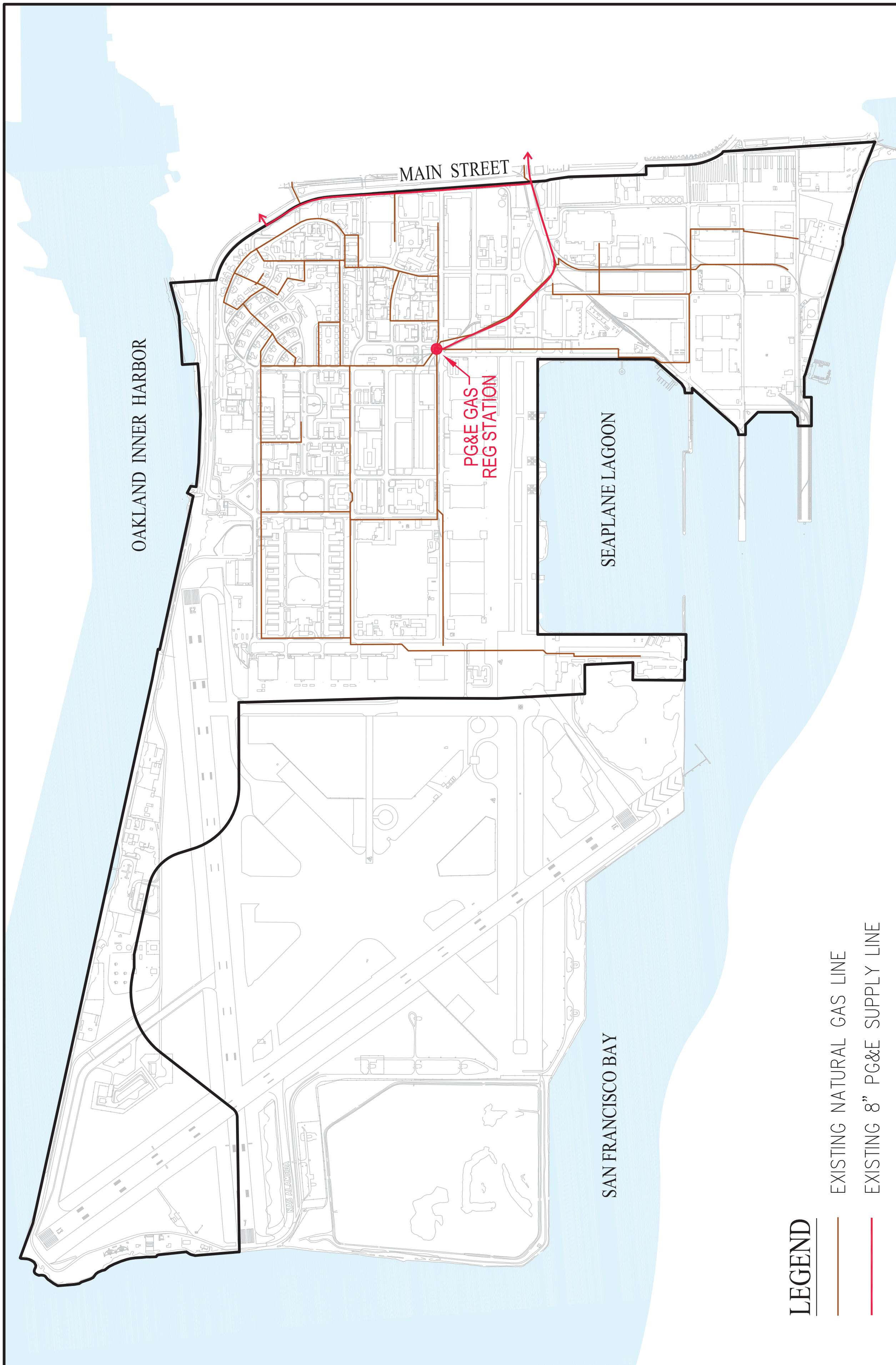

FIGURE 52
EXISTING NATURAL GAS LINES

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3. Proposed Natural Gas System

a. Development Areas

A new natural gas distribution system will be installed throughout Alameda Point, within the Development areas. This system will connect to the existing 8-inch steel main near the W. Atlantic Ave. / Main Street intersection. The proposed gas facilities will be constructed in all backbone streets, providing reliable gas service to all Sub-Districts. The new natural gas system will replace the existing natural gas system in phases consistent with the development build-out. The proposed gas distribution system will include steel and / or plastic pipe, fittings, regulators and meters, and supervisory control equipment that are compliant with the latest PG&E standard requirements. PG&E will own and operate the new gas system. The proposed gas system will be installed in a joint utility trench as previously described.

b. Reuse Areas

The existing system within the Reuse Areas will be rehabilitated and/or replaced by PG&E. New gas distribution facilities will be extended by PG&E into backbone streets where there are not current facilities.

C. Telecommunications and Cable Television

1. Existing Telephone and Cable Television System

The existing communication utility systems at Alameda Point are owned and operated by AT&T, AMP and Comcast.

AT&T operates the existing telephone system east of the Project Site. AT&T's system includes conduits and fiber optic cables that extend across the Project Site and terminate at the eastern corner of Building 2, near the W. Midway Ave / Lexington Street intersection. The AT&T facilities terminate at this location which is AMP's "head-end" facility and the demarcation point of AMP's telephone system. This telephone system provides service to the Project Site via conduits and sub-structure facilities that emanate from the AMP "head-end".

Comcast operates the existing cable TV system within the Project Site. Comcast has extended their wires within existing available conduits within AMP's sub-structure facilities. This approach results in inadequate clearances between the electric system and the cable TV system.

The existing telecommunication systems within the Project Site are not reliable and not constructed to current standards and regulations. Additionally, the existing systems are not located in the proposed backbone street corridors.

The existing communications, telephone, fiber optic and cable TV systems operated by AT&T and Comcast to the east of the Project Site have adequate capacity to serve the proposed project.

2. Proposed Telephone and Cable Television System

a. Development Areas

New telecommunications systems, including telephone, and cable TV will be installed within the Development Areas. Additional empty conduits shall be installed to accommodate the implementation of fiber optics by others. These systems will connect to the existing systems east of the Project Site, near Main Street. The proposed telecommunication facilities will be constructed in all backbone streets, within both the Development and Reuse areas, providing reliable service to all Sub-Districts. The new telecommunication system will replace the existing systems in phases consistent with the development build-out. The proposed system will include extensions of conduits, substructure facilities, and supervisory control equipment that are compliant with the latest AT&T and Comcast standard requirements. The proposed telecommunications systems will be installed in a joint utility trench as previously described.

b. Reuse Areas

The Reuse Areas within Alameda Point initially will continue to utilize the existing telecommunication system through an enhanced maintenance program. This program will rehabilitate the existing system to address deficiencies. Each proposed development within the Reuse Areas will be responsible for investigated and documenting the condition of the existing facilities directly adjacent to that specific site. Any deficiencies identified shall be address at the time of that development.

Ultimately, the telecommunication system within the Reuse Areas will be replaced. The proposed system will be similar to the system proposed within the Development Areas, constructed in a joint utility trench. The replacement of the telecommunication system within the Reuse Areas will be completed over time as described in the Phasing and Implementation Section XIII.

D. Street Light System

1. Existing Street Light System

The existing street lighting system at Alameda Point is owned and operated by AMP. The existing street lighting is operable but does not meet the current utility standards or lighting requirements.

2. Proposed Street Lighting System

A new street lighting system will be installed within all backbone streets of the Development Areas. The street light system within the Reuse Areas will be replaced over time as described in the Phasing and Implementation Section XIII. Photometric requirements and placement of lighting units shall comply with AMP's standards. The lighting criteria shall also be compliant with the latest Illuminating Engineering Society (IES) standards. The lighting units shall utilize energy efficient luminaires, such as light emitting-diode (LED) type luminaires.

The proposed lighting system will be designed in accordance and adhere to the lighting mitigation measures defined in the Biological Opinion issued by the United States Fish and Wildlife Service for Alameda Point and a Memorandum of Agreement with the VA regarding lighting mitigation measures.

XII. SUSTAINABILITY CONSIDERATIONS

The MIP establishes a practical yet comprehensive approach to integrating sustainable considerations with the backbone infrastructure proposed for Alameda Point. The key sustainable elements of the backbone infrastructure include creating a seismically stable site that can adapt to the potential impacts of climate change, utilize existing utility capacities available at the Project Site, harness the green infrastructure of the utility agencies serving the Project Site, conserve and restore natural resources, promote the well-being of the community through numerous active parks and open space areas and allow for future green infrastructure enhancements to be implemented within future in-tract / on-site development areas.

When constructing NAS Alameda, the Navy designed the Project Site and associated infrastructure for a limited design and service time frame. Similar to many of the historic infrastructure systems in the Bay Area, the existing infrastructure, including flood and seismic protection measures, at Alameda Point has a limited life and requires eventual replacement or enhancement. The proposed site improvements presented in the MIP rehabilitate and replace the existing infrastructure to establish reliable and protected systems. The proposed improvements will provide long term protection and future adaptability from potential rising sea levels associated with climate change. Additionally, corrective geotechnical measures will be implemented to address liquefiable soils and shoreline instability. The proposed improvements at Alameda Point transform the Project Site into a long term, flood and seismically safe community with dependable systems able to serve and protect many generations.

The historic uses at NAS Alameda required large infrastructure demands. Therefore, the Project Site offers a unique setting with large existing and available utility capacities. These include wastewater treatment by EBMUD, potable water supply by EBMUD and electrical supply from AMP. Both EBMUD and AMP have exceptional sustainable and environmentally conscious systems. As examples, EBMUD uses nearly 90% less energy to delivery water to its service area than the average water provider in California. Also, EBMUD became the first utility district in North America to operate a wastewater treatment plant that generated more renewable energy at the plant than is needed to run the facility. Similarly, AMP maintains a power portfolio that typically is comprised of 80% of renewable and clean energy sources. The backbone infrastructure at Alameda Point is proposed to continue to connect to these highly sustainable sources of infrastructure.

Other sustainable components of the backbone infrastructure include:

- Demolish and abate unusable and decrepit structures.
- Rehabilitate and re-use of historic and other usable structures.
- Re-use and recycling of on-site materials.
- Implement sea level rise adaption plan that includes monitoring and methods to provide long term protection and adapt flood protection improvements to varying amounts of sea level rise.
- Construct a new grid of "complete streets" supporting a broad range of transportation choices.
- Construct a comprehensive network of pedestrian and bicycle routes including components of the Bay Trail and the Cross Alameda Trail.
- Construct walkable streets with controlled intersections, bulb-outs and high-visible crosswalks.
- New and improved transit systems such as a shuttle/bus rapid transit, and improved ferry terminal.
- Implement Low Impact Development (LID) principles for the management and treatment of stormwater runoff with bio-swales, bio-filtration areas and other technologies to clean stormwater runoff prior to outfall to the Bay or Estuary.
- Install a new wastewater collection system reducing the amount of groundwater infiltration and wet weather flows.
-

The future on-site / in-tract developments and the associated construction of structures will build upon the foundation established by the backbone infrastructure and further improve the sustainability of Alameda Point. New construction at Alameda Point will be designed to conserve resources and minimize demands by utilizing water reducing fixtures and energy efficient appliances within proposed structures. Additionally, a Transportation Demand Management Plan (TDM) being developed by the City will focus on ways to reduce single occupancy vehicles and encourage the use of other modes of transportation. Examples of other sustainability features of future development are likely to include:

- Offering of transit passes to residents and employees to promote and increase the use of transit for residents and employees living and working at Alameda Point, including shuttle services.
- Provide opportunities for car and bike sharing and other TDM programs.
- Implement rain water harvesting systems that reuse stormwater as a supplements supply of water for landscaping and other approved uses. These systems could include a rain barrel or similar type of rain water collection and storage system.
- Incorporate non-polluting renewable energy generation sources, such as solar, geothermal and / or biomass.

As sustainable technologies advance and evolve, future green and sustainable enhancements within the development sites at Alameda Point will likely become more feasible.

XIII. PHASING AND IMPLEMENTATION

A. Principles of Phasing and Implementation

The backbone infrastructure improvements required for the redevelopment of Alameda Point will be phased to match the development phases as closely as possible. The required improvements for each phase will include demolition, flood protection, corrective geotechnical measures, site grading, utilities, streets and transit improvements. Each phase will construct the portion of infrastructure required to support the proposed uses and surrounding existing uses and to maintain financial feasibility of the project. In some cases, initial phases of development will construct components of the backbone infrastructure that also benefit subsequent phases or conversely later phases may construct infrastructure components that benefit prior phases.

The following are principles of phasing and implementation for each component of the backbone infrastructure:

1. Demolition

The demolition of existing utilities and streets will be completed in phases to match the development phases.

2. Corrective Geotechnical Measures

The northern shoreline stabilization should be completed as soon as possible in order to eliminate the existing risk of losing critical infrastructure along this corridor. At minimum, the northern shoreline stabilization will be completed prior to or concurrently with the flood protection measures along this shoreline are constructed.

The other corrective geotechnical measures, liquefaction remediation and Young Bay Mud compression, will be completed in phases to match the development phases.

3. Flood Protection and Site Grading

Within the Development Areas, the flood protection measures and proposed site grading will be phased to match the development phases. The flood protection measures, including the initial sea level rise protection strategy, required to protect each development phase will be implemented with that phase. The initial development phases will likely be required to construct flood protection measures that will benefit the subsequent phases such as stormwater outfalls, basins or pump stations.

Within the Reuse Areas, the flood protection measures will be constructed as soon as adequate funds are available, as discussed in Section XIII.B, to construct the required improvements. Until then, flood insurance policies shall be obtained by owners and tenants of existing low lying structures.

4. Street System

Within the Development Areas, the construction of new on-site street improvements will be phased to match the development phases. The required timing of the off-site street improvements and implementation of the transit improvements will be outlined in the mitigation measures in the Alameda Point EIR.

Within the Reuse Areas, the rehabilitation of the existing on-site street improvements will be constructed through an enhanced maintenance program as funds permit through a fee program or grants. These streets will become part of the City's citywide pavement rehabilitation program and will be improved over time on a priority basis through this program. Additional improvements will be completed as adequate funds are generated through the fee program or available grants have been obtained.

5. Wastewater System

Within the Development Areas, the construction of new on-site wastewater collection system will be phased to match the development phases. The initial development subphases will be required to construct the new wastewater facilities within that development area. These initial subphases may analyze the feasibility of utilizing the existing wastewater system from that specific development to Pump Station R. The existing system shall be inspected and televised to determine if interim rehabilitation improvements are necessary. Eventually, when there is an adequate amount of development, such that the capacity of the existing system is exceeded or as determined by the Public Works Director, the ultimate system from the development area to Pump Station R will be required to be installed.

Within the Reuse Areas, the replacement of the existing wastewater system will be incrementally completed over time as funds permit through a fee program. An enhanced maintenance program will be established to implement the interim rehabilitation of the existing facilities and the eventual replacement. Interim rehabilitation improvements will be implemented by individual development projects within the Reuse Areas. These improvements will likely include cleaning and lining of existing pipelines and manholes to address infiltration and inflow.

The ultimate replacement of the existing facilities will be completed incrementally over time as adequate funds are available, through a fee program or grants as discussed in Section XIII.B. The incremental replacements should start at the downstream portion of the system.

All new adaptive reuse projects within the Reuse Areas will replace the wastewater lateral and on-site pipelines serving that site, consistent with the City of Alameda’s Private Sewer Lateral Replacement Ordinance, at the time of that project.

6. Stormwater System

Within the Development Areas, the construction of new on-site stormwater collection system will be phased to match the development phases. The initial development phases will be required to construct the new downstream stormwater facilities ensuring adequate discharge to surrounding waters and flood protection. These downstream improvements will include pipeline extensions to the shoreline, multi-purpose basins, pump stations and outlets, which will benefit the subsequent phases within that watershed.

Within the Reuse Areas, the replacement of the existing stormwater system will be incrementally completed over time as funds permit through a fee program. An enhanced maintenance program will be established to implement the interim rehabilitation of the existing facilities. The initial interim improvements to be prioritized for the Reuse Areas include replacement of tide valves at the existing stormwater outfalls. These initial improvements should be prioritized as they will eliminate the tidal waters backing up through the existing system and inundating low lying areas in a high tide event. The low lying structures will require flood insurance throughout this enhanced maintenance program period until the ultimate flood protection measures have been completed.

Additional interim rehabilitation improvements to the existing system will be implemented with available funds through a fee program, as discussed in Section XIII.B. The additional rehabilitation improvements include cleaning, lining and replacement of existing pipelines and manholes.

The ultimate replacement of the existing facilities and the implementation of the ultimate flood protection measures will be completed over time as adequate funds are available through a fee program or grants, as discussed in Section XIII.B.

7. Potable Water System

Within the Development Areas, the construction of new on-site potable water distribution system will be phased to match the development phases. The new potable water system will be required to connect to and extend from the existing reliable EBMUD pipelines in Main Street.

Within the Reuse Areas, the replacement of the existing potable water system will be incrementally completed over time. The replacement of the exterior water line loop throughout the Reuse Areas shall be prioritized. This loop includes the pipelines within W. Redline Ave, Monarch Street, W. Tower Ave and Pan Am Street.

The ultimate replacement of the existing facilities will be completed over time as adequate funds are available through a fee program or grants, as discussed in Section XIII.B. The system replacements shall extend east to west, from the new reliable facilities within the Development Areas to the Reuse Areas.

All new adaptive reuse projects within the Reuse Areas will replace the potable and fire water lateral serving that site.

8. Recycled Water System

Within both the Development and Reuse Areas, the construction of new on-site recycled water distribution system will be phased to match the development phases.

9. Dry Utility System

Within the Development Areas, the construction of new on-site dry utility systems will be phased to match the development phases. The new electrical system will be required to connect to and extend from the existing Cartwright Substation. The new natural gas and telecommunications systems will be required to connect to the reliable systems in Main Street. The dry utilities will be constructed in a joint utility trench.

Within the Reuse Areas, the replacement of the electrical and telecommunication systems will be completed over time as funds permit through a fee program. The system replacements will be completed as adequate funds are available through a fee program or grants, as discussed in Section XIII.B. PG&E will rehabilitate and extend the existing natural gas system as necessary to serve the Reuse Areas with reliable facilities.

10. Service to Existing Lessees

Temporary reconfiguration of utilities and streets that are within a development phase and serve existing surrounding tenants will be required to ensure there is no disruption of service to the tenants. Temporary connections to the new systems will be required to maintain service to existing land uses. Any connection to unreliable existing infrastructure systems will need to provide the appropriate measures to protect the integrity of the new systems.

B. Conceptual Financing Plan

As part of the planning of the MIP, the City has formulated a conceptual financing plan (CFP) to begin the work of understanding how the necessary infrastructure will be funded and constructed concomitant with development. A key concept in the Alameda Point planning efforts and the MIP is flexibility, which is also an essential element of the CFP. The CFP is designed to be incremental, linking development to infrastructure and ensuring that the right infrastructure is built, in the right amount, as development progresses. The projects and associated infrastructure will develop gradually over time, taking into account long-term needs. The financing plan for development at Alameda Point will be reviewed, evaluated, and updated as every individual project is considered and ultimately, implemented.

The infrastructure financing strategy will have three components:

- Each development site pays for on-site and site-adjacent infrastructure
- Each development site contributes its fair share to a fund for backbone infrastructure and facilities (i.e., fire station and parks) through a development impact / infrastructure fee.
- Each development submits to a Community Facilities District (CFD) assessment to pay for infrastructure.

This approach ensures that development will have the immediate infrastructure needed adjacent to the site, while also contributing to long term costs that will not be incurred until further in the development process, but to which incremental development nevertheless contributes. This linkage of development to infrastructure responsibility allows for flexibility - the development plan can respond to market forces and the infrastructure plan can adapt. Over time, the individual project sites will combine to form the overall plan, with the infrastructure and funding in place.

The plan is organized into phases, which contemplates gradual, incremental development. The phases are not prescribed in any fixed order, however, but are instead organized around geographic proximity, the logic of some infrastructure, and types of development. The phases are intended to provide an organizing principle for development, but individual phases can develop as market and other opportunities arise.

The basic sources of the financing plan will consist of the following:

- Land Sale Proceeds – funds paid to the City by developers and others for site acquisition.
- Community Facilities Districts and Assessments – assessments and special taxes paid by land owners for services and facilities.
- Infrastructure Financing District – Special district that collects incremental property tax revenue for finance capital improvements if allowed for Alameda Point by changes in State legislation.
- Infrastructure Fee – fee paid by development at building permit to pay for infrastructure improvements and City facilities.
- Public Grants and Loans – grants and other special revenues provided by third parties, such as the federal government.
- Developer Equity – developer funding of infrastructure from the anticipated profits of development.

This list may be supplemented by other sources as/if they become available. Assessments and special taxes are funded through property tax, and appear as part of each owner's property tax bill. It is important to note that a number of other special taxes and assessments are being contemplated for Alameda Point, including:

- CFD to fund public infrastructure improvements;
- CFD to fund certain City services as mitigation for any anticipated adverse impacts to the City's other funds;
- Transportation Management Association and parking district assessments to fund implementation and operations of the TDMP;
- Geological Hazard Abatement District (GHAD) to ensure a long-term source of funding for the adaptive management of sea-level rise protection; and.
- Community Benefits District assessments and Homeowner's Association fees to provide ongoing funding for basic and/or enhanced common area maintenance, marketing and special event planning, etc

Generally the sum of these taxes, plus the ad valorem tax, cannot exceed two percent of the assessed value of the property. Also, commercial uses typically maintain a lower overall tax burden than residential uses. This constraint will be taken into account as the CFP is further refined and balanced against the other needs of the project and the City.

As the development plans become firmer and the first tranche of development becomes clearer the City will formulate a financing strategy that combines the needs and requirements of the overall plan with the particular circumstances of each development. The financing plan will include a balance of the above items, and will likely shift over time as the real estate and financial markets shift.

The flexibility and market responsiveness of the plan mean that the overall plan can build on success over time. Completed projects will reduce uncertainty for subsequent projects, reducing uncertainty and thereby increasing land value and reducing financing costs attributable to risk. Based on market conditions, some types and locations of development will commence ahead of others. Although this trend has been sometimes characterized as "cherry picking", in reality it is no different from how development occurs in the normal course of events. Absent a subsidy, either a master developer or the City would have to wait until individual development types and parcels are financially feasible before they could be developed. One concern, however, is that early development might occur on parcels that do not require much infrastructure or other investment to be developable. The CFP ensures that this will not happen – early development will pay not only for its immediate infrastructure but also its fair share of larger backbone items that may not need to be constructed for several years. However, there may be non-essential improvements for a major catalyst project that may be waived or deferred until State or federal funding is available, if determined by the City Council that this meets other more important policy objectives.

Specific to the fee program, it is anticipated that a development impact / infrastructure fee will be established at Alameda Point. This fee will provide a mechanism to coordinate the funding and implementation of the components of the infrastructure that have project-wide benefit, such as transportation improvements. This fee will be collected from all development areas within Alameda Point, including those in the Development and Reuse Areas. For the Reuse Areas, there will be an additional component of this fee to coordinate the funding and repayments associated with implementing the incremental replacement of the existing infrastructure. As these funds are generated, the following improvements within the Reuse Areas and with site-wide benefit should be prioritized, in no specific order:

- Northern Shoreline Stabilization
- Perimeter Flood Protection Measures
- Wastewater Pipeline Replacements
- Exterior Potable Waterline Loop

Additionally, a GHAD will be established at Alameda Point to serve as the mechanism to monitor, maintain and implement the adaptive flood protection measures addressing future sea level rise.

C. Phase 1 - Scenario 1

Phase 1 Scenario 1 contemplates the Enterprise Sub-District as the first phase at Alameda Point. See Figure 53 depicting this Phase 1 scenario. The following are the required backbone improvements for this scenario:

1. Demolition

- Construct temporary re-routed utility services to the active tenants and uses on the piers (MARAD) and recreation uses in Enterprise Park.
- Construct temporary access streets to the active tenants and uses on the piers (MARAD) and recreation uses in Enterprise Park.
- Demolish and recycle existing structures, utilities and streets within Phase 1 areas.

2. Flood Protection and Site Grading

- Implement the required corrective geotechnical measures, anticipated measures include:
  - DDC for liquefiable soils across Phase 1
  - Implement a surcharge operation for compressible soils within the portion of Phase 1 underlain by Young Bay Mud
- Elevate the shoreline facilities as required to achieve the minimum elevations outlined in the site grading design criteria.
- Elevate the inland areas to achieve the minimum elevations outlined in the site grading design criteria.

3. Street System

- Construct new on-site streets within Phase 1 areas
- Construct off-site street improvements and transit system improvements as identified in the mitigation measures in the Alameda Point EIR.
- Construct temporary transitions to existing streets within surrounding areas.

4. Wastewater System

- Construct new on-site wastewater collection system of pipelines and lift stations within Phase 1 areas
- Construct new wastewater collection system through future phases to connect to Pump Station R.
- Construct temporary connections to the existing on-site wastewater collection system within surrounding areas.

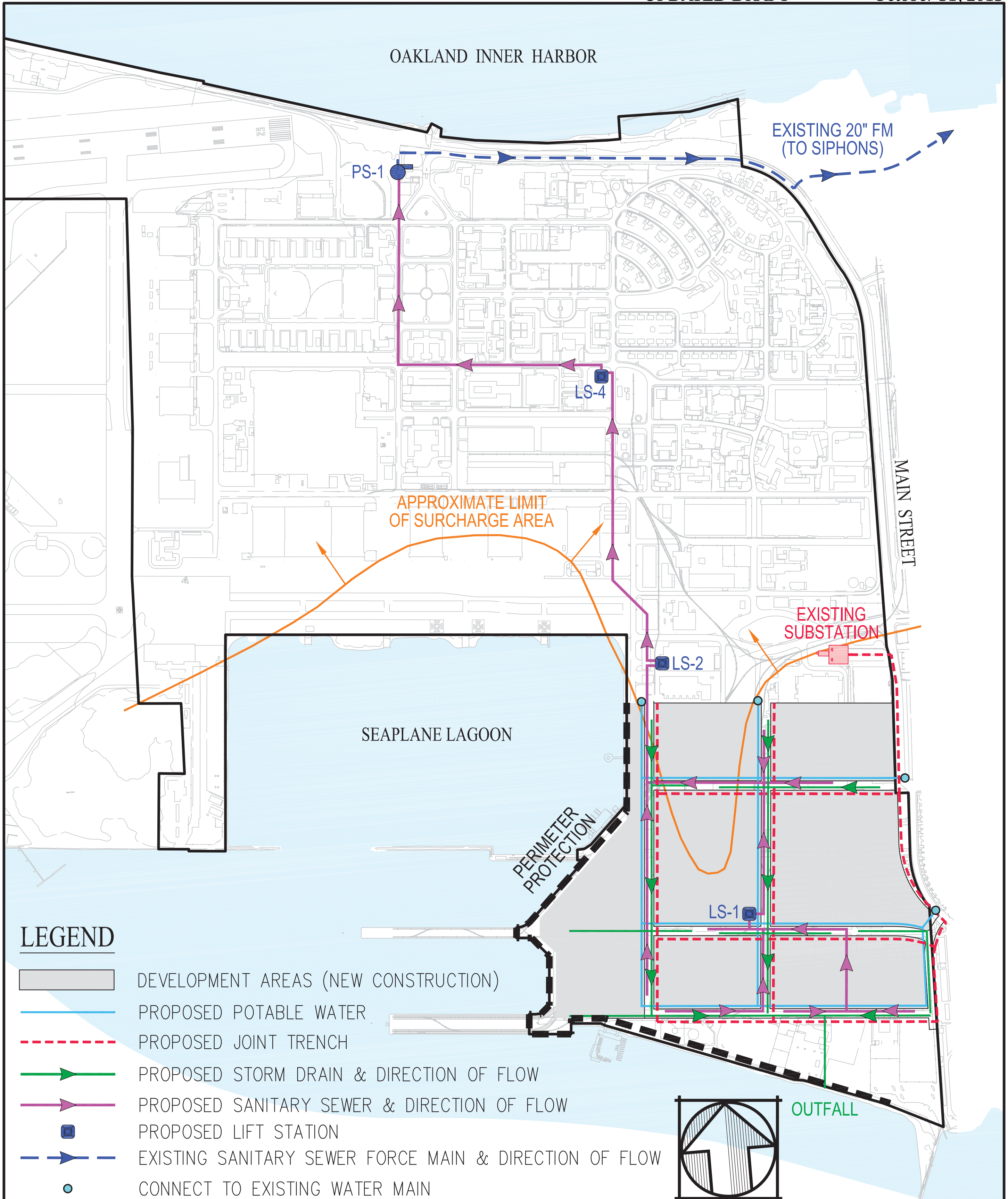

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FIGURE 53
PHASING PLAN
SCENARIO 1

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5. Stormwater System

- Construct new on-site stormwater collection system within Phase 1 areas
- Construct new pipeline and outfall to the southern shoreline
- Construct water quality improvements within proposed streets and development blocks.
- Construct temporary connections to the existing on-site stormwater collection system within surrounding areas.

6. Potable Water System

- Construct new on-site potable water distribution system within Phase 1 areas
- Connect to the existing EBMUD pipelines within Main Street.
- Construct temporary connections with appropriate backflow measures to the existing on-site potable water system within surrounding areas.

7. Recycled Water System

- Construct new on-site recycled water distribution system within Phase 1 areas

8. Dry Utility System

- Construct new dry utility system in a joint trench within Phase 1 areas
- Construct new electrical main lines in Main Street to connect to the Cartwright Substation.
- Connect to the existing natural gas and telecommunication facilities within Main Street.
- Construct temporary connections to the existing dry utility systems within surrounding areas.

9. Fee Program

- Contribute to the fee program for this Development Area’s fair share of project-wide improvements and community benefits.
- Document and seek reimbursements from future phases for any shared improvements constructed as part of Phase 1.

D. Phase 1 - Scenario 2

Phase 1 Scenario 2 contemplates the Main Street Neighborhood Sub-District as the first phase at Alameda Point. This Sub-District includes areas within both the Development and Reuse Areas. See Figure 54 depicting this Phase 1 scenario. The following are the required backbone improvements for this scenario:

1. Demolition

- Assist and support the coordination of the relocation of the Alameda Point Collaborative supportive housing to a new site.
- Construct temporary re-routed utility services to the active tenants and uses within the Adaptive Reuse and Waterfront Town Center Sub-Districts.
- Construct temporary access streets to the active tenants and uses within the Adaptive Reuse and Waterfront Town Center Sub-Districts.
- Demolish and recycle existing structures, utilities and streets within Phase 1 areas.

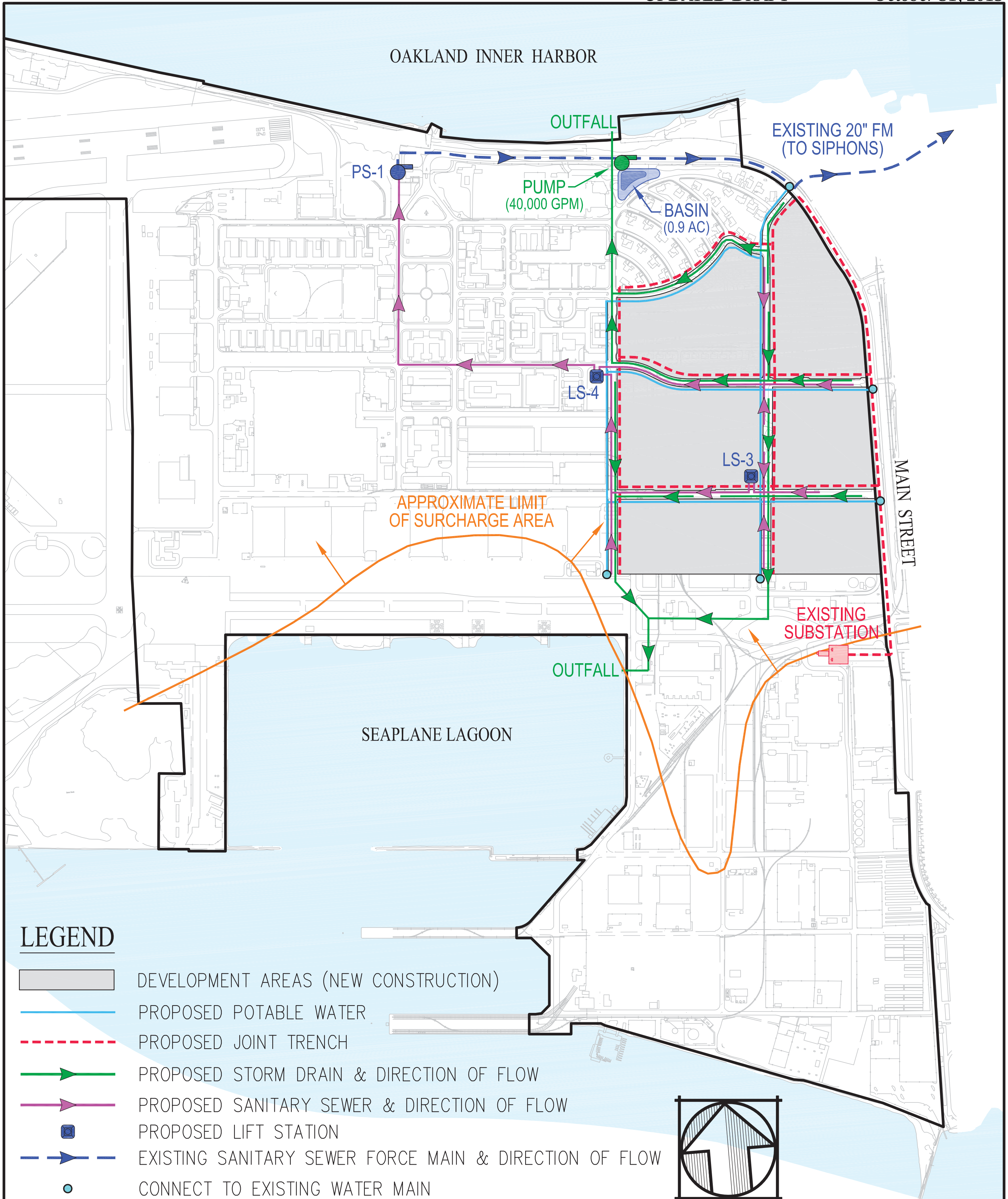

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FIGURE 54
PHASING PLAN
SCENARIO 2

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2. Flood Protection and Site Grading

- Implement the required corrective geotechnical measures, anticipated measures include:
  - DDC for liquefiable soils across Phase 1
  - Implement a surcharge operation for compressible soils across Phase 1
- Elevate the shoreline facilities as required to achieve the minimum elevations outlined in the site grading design criteria to elevation 7.1 along the northern shoreline and 6.1 along the Seaplane Lagoon.
- Elevate the inland areas to achieve the minimum elevations outlined in the site grading design criteria, to elevation 5.1.

3. Street System

- Construct new on-site streets within Phase 1 Development areas
- Construct off-site street improvements and transit system improvements as identified in the Alameda Point EIR.
- Construct temporary transitions to existing streets within surrounding areas.

4. Wastewater System

- Construct new on-site wastewater collection system of pipelines and lift stations within Phase 1 Development areas
- Construct new wastewater collection system through future phases to connect to Pump Station R.
- Construct new wastewater laterals within Phase 1 Reuse Areas (Big Whites)
- Construct temporary connections to the existing on-site wastewater collection system within surrounding areas.

5. Stormwater System

- Construct new on-site stormwater collection system within Phase 1 Development areas
- Construct new pipelines, multi-purpose basins, pump station and outfalls to the northern and Seaplane Lagoon shorelines
- Construct water quality improvements within proposed streets and development blocks.
- Construct temporary connections to the existing on-site stormwater collection system within surrounding areas.

6. Potable Water System

- Construct new on-site potable water distribution system within Phase 1 Development and Reuse areas
- Connect to the existing EBMUD pipelines within Main Street.
- Construct temporary connections with appropriate backflow measures to the existing on-site potable water system within surrounding areas.

7. Recycled Water System

- Construct new on-site recycled water distribution system within Phase 1 areas

8. Dry Utility System

- Construct new dry utility system in a joint trench within Phase 1 Development and Reuse areas
- Construct new electrical main lines in Main Street and W. Atlantic Ave to connect to the Cartwright Substation.
- Connect to the existing natural gas and telecommunication facilities within Main Street.
- Construct temporary connections to the existing dry utility systems within surrounding areas.

9. Fee Program

- Contribute to the fee program for this Development Area's fair share of project-wide improvements and community benefits.
- Document and seek reimbursements from future phases for any shared improvements constructed as part of Phase 1.

E. Phase 1 - Scenario 3

Phase 1 Scenario 3 contemplates the adaptive reuse of the Bachelors Enlisted Quarters in the Adaptive Reuse Sub-District as the first phase at Alameda Point. This development block is solely within the Reuse Areas. See Figure 55 depicting this Phase 1 scenario. The following are the required backbone improvements for this scenario:

1. Flood Protection and Site Grading

- Contribute to the fee program for this site's fair share amount of the require flood protection measures for the Reuse Areas.

2. Street System

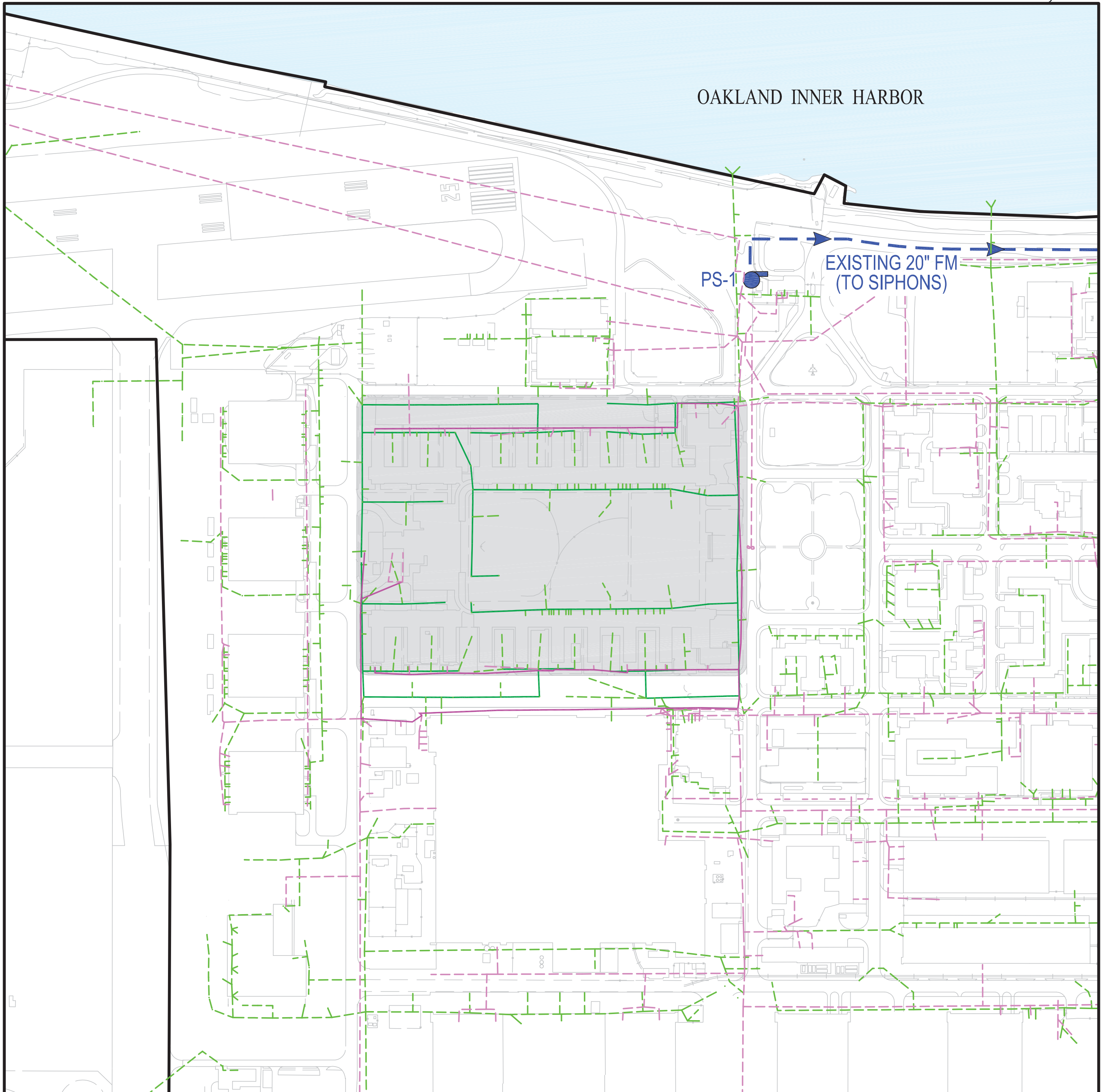
- Contribute to the fee program for this site's fair share amount of the rehabilitation of the existing streets within the Reuse Areas.

3. Wastewater System

- Investigate the existing pipelines collecting and conveying the wastewater from this site.
- Construct necessary rehabilitating improvements to the existing system to address any deficiencies identified.
- Construct new wastewater laterals to structures within Phase 1
- Contribute to the fee program for this site's fair share amount of the replacement of the wastewater system within the Reuse Areas.

4. Stormwater System

- Contribute to the fee program for this site's fair share amount of the new downstream stormwater facilities, pipelines, multi-purpose basin, pump station and outfall to the northern shoreline.
- Contribute to the fee program for this site's fair share amount of the replacement of the stormwater collection system within the Reuse Areas.
- Construct new stormwater and water quality facilities within the development parcel.



LEGEND

- REUSE AREA
- PROPOSED STORM DRAIN (TRUNK MAIN RETROFIT)
- PROPOSED SANITARY SEWER (TRUNK MAIN RETROFIT)
- EXISTING STORM DRAIN
- EXISTING SANITARY SEWER

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MASTER INFRASTRUCTURE PLAN
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FIGURE 55
PHASING PLAN
SCENARIO 3

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5. Potable Water System

- Contribute to the fee program for this site's fair share amount of the replacement of the potable water distribution system within the Reuse Areas.
- Construct new potable and fire water services to the development parcel.

6. Dry Utility System

- Contribute to the fee program for this site's fair share amount of the replacement of the electrical and telecommunication systems within the Reuse Areas.
- Construct new electrical and telecommunication services to the development parcel.

7. Fee Program

- Contribute to the fee program for this site's fair share amount of project-wide improvements and community benefits.

F. Sub-Phases

The sub-phases that comprise each of the Phase 1 scenarios outlined above will implement the backbone improvements generally consistent with the principles outlined above. Each sub-phase within the Development Areas will construct the new backbone infrastructure within and adjacent to that specific sub-phase. The only utility system within Development Areas that may be deferred is the installation of new wastewater facilities extending to Pump Station R. The initial phases may analyze the feasibility of utilizing the existing wastewater system from that specific development to Pump Station R. The existing system shall be inspected and televised to determine if interim rehabilitation improvements are necessary. Eventually, when there is an adequate amount of development, such that the capacity of the existing system is exceeded or as determined by the Public Works Director, the ultimate system from the development area to Pump Station R will be required to be installed. See Figure 56 through Figure 58 depicting the conceptual infrastructure to be installed with the three illustrative conceptual sub-phases (1A).

The infrastructure improvements within the Reuse Areas will be implemented as funds permit through a fee program or grants.

G. Permitting

The following are the agencies that have oversight to the backbone infrastructure at Alameda Point and will issue permits for certain components of infrastructure:

1. City of Alameda

Any proposed street, storm drainage, water quality and sanitary sewer system improvements will be required to be reviewed and approved by the City of Alameda.

2. Alameda Municipal Power

Any proposed improvements to the electrical, telephone or joint trench system will be required to be reviewed and approved by Alameda Municipal Power.

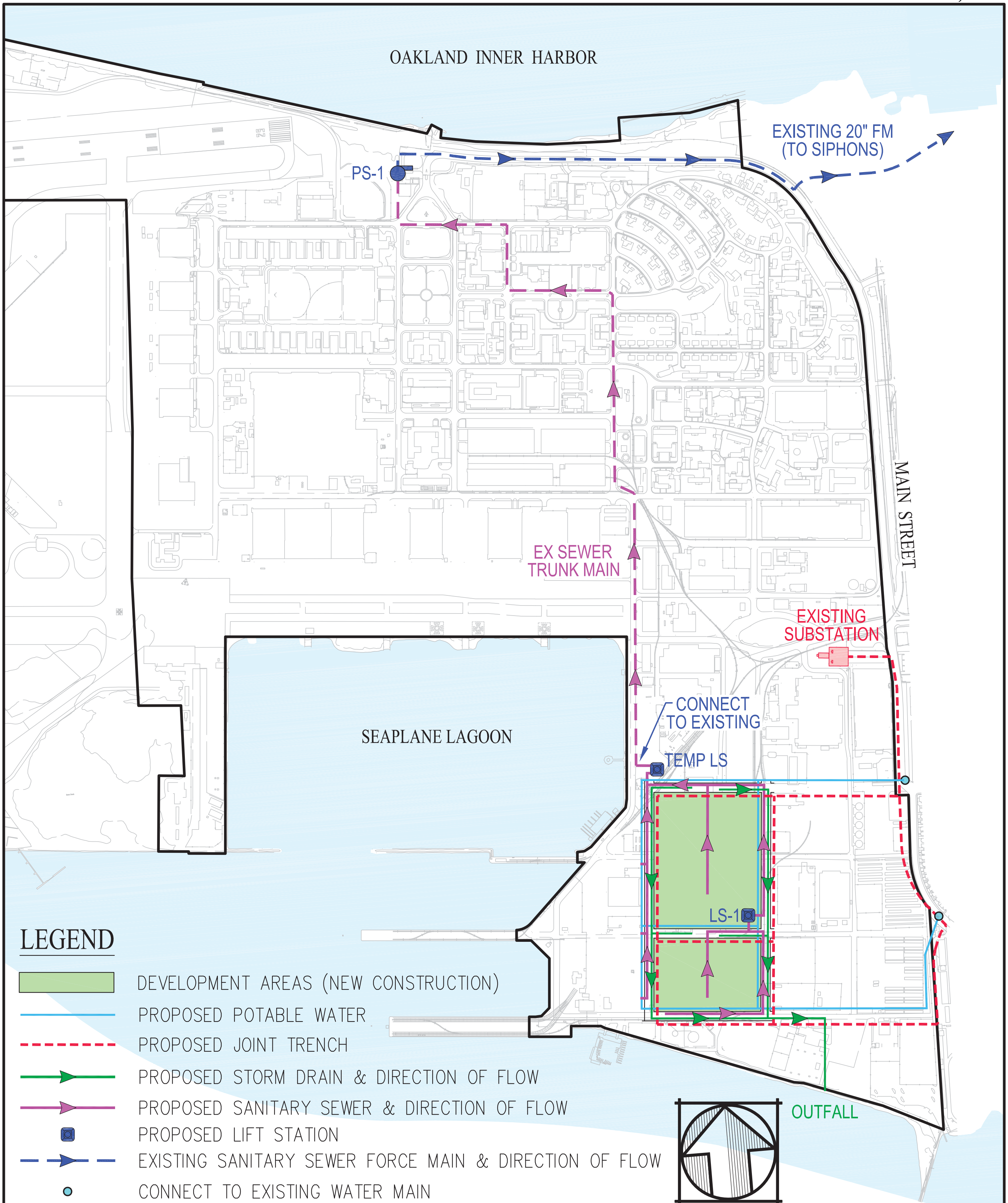

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FIGURE 56
PHASE 1A
"SOUTH"

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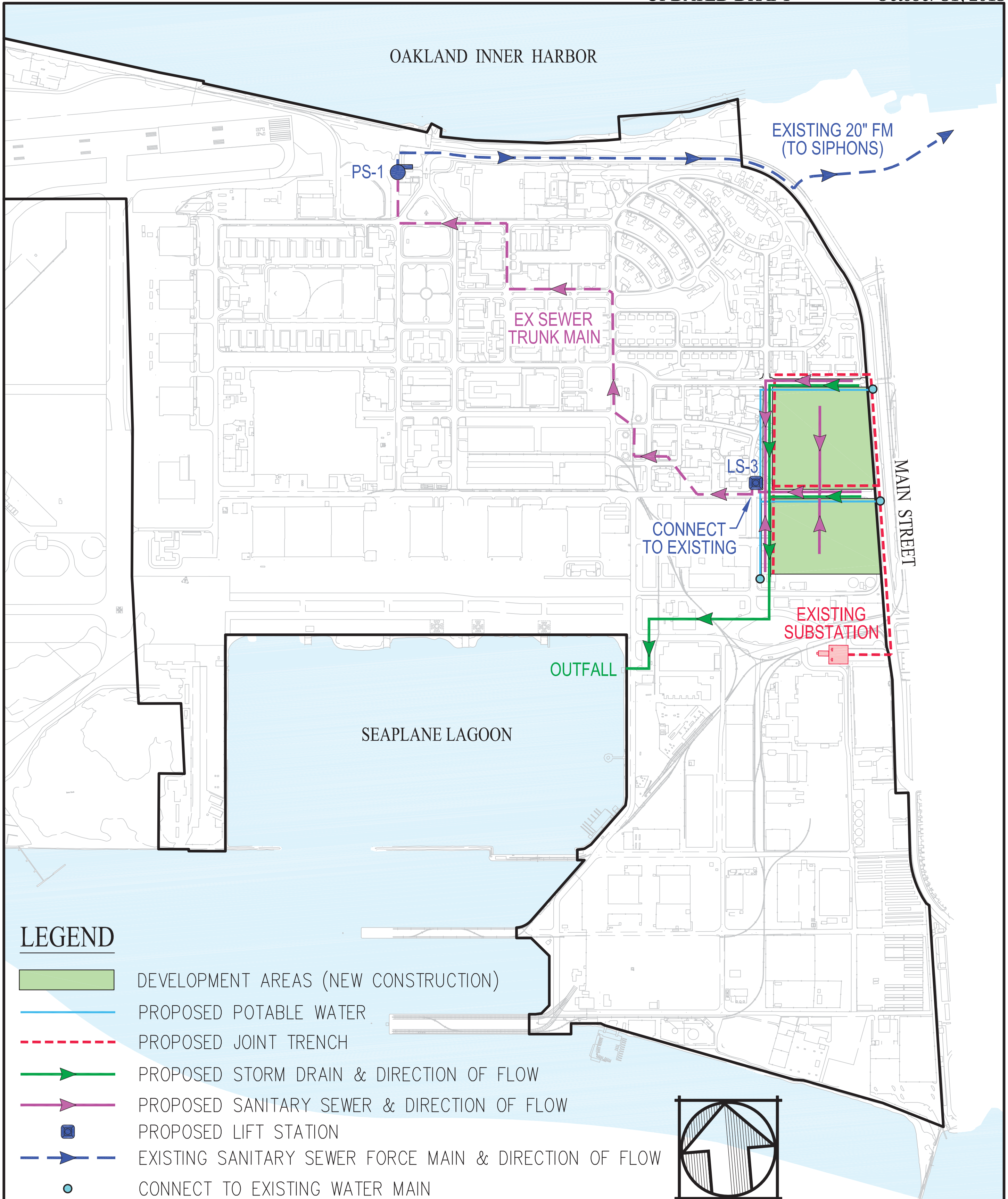

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FIGURE 57
PHASE 1A
"NORTH"

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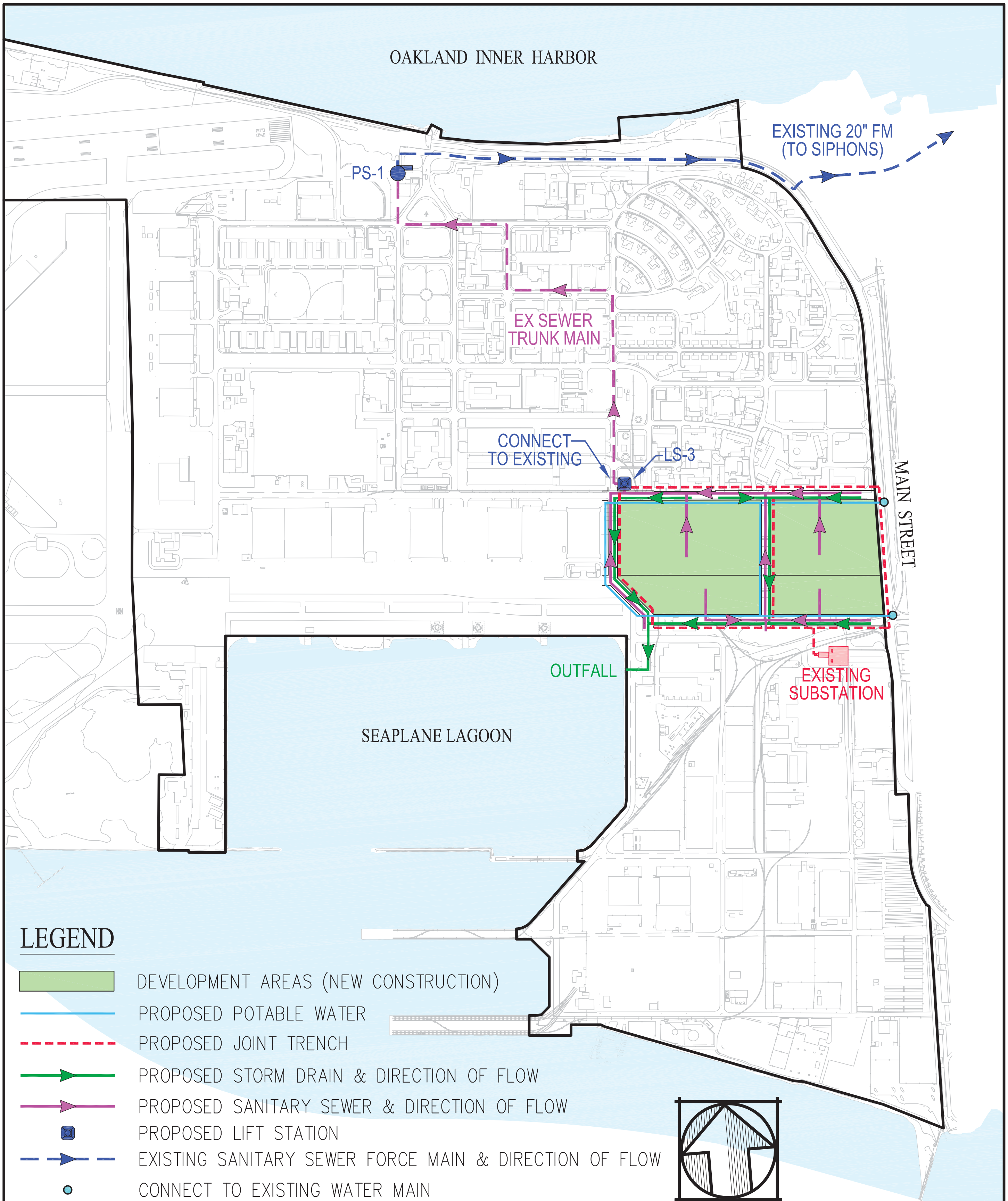

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FIGURE 58
PHASE 1A
"TOWN CENTER"

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3. EBMUD

Any proposed improvements to the EBMUD owned and maintained sanitary sewer transmission facilities will be required to be reviewed and approved by EBMUD. This would include any proposed improvement to the existing Pump Station R near the Main Gate and/or the 20-inch force main.

Any proposed improvements to the potable or recycled water systems will be required to be designed, reviewed and approved by EBMUD.

4. FEMA

Initially, a Flood Insurance Study will be prepared and processed with FEMA to evaluate the existing conditions at Alameda Point and define the flood zones within the Project Site. The study shall be conducted for the entire Project Site. This process is currently underway through FEMA's California Coastal Analysis and Mapping Project. This study will include the shorelines of Alameda Point and define the coastal flood hazards within the project site based on regional-scale storm surge and wave models of the San Francisco Bay. The FIRM maps (panels) for the City of Alameda will be revised through this process to include Alameda Point.

At the time that design of flood protection measures is being completed, a Conditional Letter of Map Revision (CLOMR) shall be processed and approved by FEMA. The CLOMR will demonstrate FEMA's concurrence that design of the flood protection measures will remove the proposed development areas from the flood zones. Once the flood protection measures have been constructed, a field survey can be completed to document the as-built elevations of these facilities. This information will be used to process a final Letter of Map Revisions (LOMR). Once the LOMR is approved by FEMA, the FIRM panel will be revised to depict the constructed flood protection measures and remove the protected areas from the floodplain. The CLOMR and LOMR can be prepared and processed in phases with the development phasing.

5. Regional Water Quality Control Board (RWQCB)

A water quality certification, Section 401, will be required from the Regional Water Quality Board (RWQCB) for activities within wetlands or below the ordinarily high water line. This certification will be required for the outfall construction at Alameda Point. The project need to demonstrate compliance with the water quality regulations of the MRP for the storm runoff from the Project Site. As described above, the implementation of the water quality improvements will be phased in the Development Areas and incremental in the Reuse Areas. Accordingly, it is anticipated that a site-wide water quality certification will be pursued for all outfalls and waste discharge requirements will be established for the site outlining how the water quality compliance will be achieved over time.

6. Army Corp of Engineers

Any improvement within the waters of the United States shall require a permit, Section 404, from Army Corp of Engineers. This will include construction of the stormwater outfalls or any shoreline flood protection measures that require construction below the ordinary high water line. Additional consultations from other federal agencies may be determined necessary by the Army Corp of Engineers in order to issue the permit. A permit may be pursued for each separate outfall consistent with the development phasing.

7. BCDC

Any improvement or proposed structure within Bay or within 100-feet of the Bay shoreline will require a permit from BCDC. A permit for each specific improvement within the 100-foot Bay shoreline may be pursued from BCDC consistent with the development phasing. Alternatively, a “major permit” may be pursued that would provide for a programmatic approval of all the proposed improvements within the 100-foot Bay shoreline. With the “major permit,” future review and permits from BCDC will be required once the specific project details are available.

8. US Fish and Wildlife Service

All proposed improvements and structures shall be compliant with the active mitigation measures outlined in the Biological Opinion issued by the US Fish and Wildlife Service, the Declaration of Restrictions recorded on the Alameda Point property and a Memorandum of Agreement with the VA for lighting mitigation measures related to protecting the least turn colony within the VA Property. The City of Alameda will review all proposed improvements to ensure compliance and may request additional consultation from the Service, if necessary.

XIV. MIP FLEXIBILITY

The Land Use Program is expected to adjust throughout the implementation of the backbone infrastructure. Changes in economic conditions, market factors or other unanticipated changes to the development concept are likely to occur during the course of redevelopment of Alameda Point. Accordingly, it is important to understand the potential adjustments to the backbone infrastructure associated with either increases or decreases in the intensity of land uses. This provides limits to the range of potential infrastructure demands at Alameda Point. The MIP has analyzed the Less Development and Transit Oriented Mixed Use Alternative Land Use Programs consistent with two of the alternatives in the EIR to characterize which components of the backbone infrastructure would require adjustments.

The summary of the land use programs for the Less Development and Transit Oriented Mixed Use Alternatives relative to the Reuse Plan, which the MIP is based upon, are presented in Table 14.

Table 14 - Low and High Density Alternatives Relative to the Reuse Plan

Land Use	**1996 Reuse Plan**	**Less Development Alternative**	**Transit Oriented Mixed Use Alternative**
Residential	1,354	1,000	3,400
Office	1,627,500	500,500	852,500
Manufacturing / Warehouse	3,060,500	1,224,500	2,815,500
Retail	300,000	100,000	1,000,000
Service	512,000	285,000	642,000
Agricultural	0	190,000	190,000
Subtotal Commercial	**5,500,000**	**2,300,000**	**5,500,000**

A. Less Development

The Less Development Alternative includes decreases in quantities of both the residential and commercial land use designations. The amounts of residential units are slightly decreased, whereas the commercial square footage is decreased by over 50%. As expected, the infrastructure demands are less for this Alternative. However, since the Alternative maintains the same development footprint, the amount of backbone infrastructure required to be constructed for this Alternative remains similar to the Reuse Plan. There are some infrastructure systems that would be reduced in size since the demand has decreased.

Specifically, the wastewater and potable water demands associated with this Alternative decrease from 2.16 MGD to approximately 1.6 MGD and from 2.06 MGD to approximately 1.7 MGD, respectively. Consequently, the sanitary sewer collection and potable water distribution systems can be reduced in size with this Alternative. See Figure 60 and Figure 62 depicting the adjustments to these systems that could be implemented with this Alternative.

The traffic volumes generated by this Alternative decrease from 2,928 total AM trips and 3,294 total PM trips to 1,560 and 1,921 respectively. Accordingly, there are less traffic mitigations associated with this Alternative as outlined in the EIR.

Whereas, the flood protection, storm drain, dry utility and street systems are expected to remain similar for this Alternative as to what is required for the Reuse Plan. This is largely due to the development footprint of this Alternative remaining consistent with the Reuse Plan.

The decreases to the portions of the wastewater and potable water systems and traffic mitigations associated with this Alternative are estimated to reduce the backbone infrastructure construction cost by approximately $7.6 million.

B. Transit Oriented Mixed Use

The Transit Oriented Mixed Use Alternative includes an increase to the quantity of the residential land use designation. The amounts of residential units are increased to 3,400, whereas the overall commercial square footage is maintained the same as Reuse Plan. However, the retail square footage is increased. The infrastructure demands do increase for this Alternative. There are some components of the infrastructure systems that would be increased in size since the demand has increased.

Specifically, the wastewater and potable water demands associated with this Alternative increase from 2.16 MGD to approximately 2.8 MGD and from 2.06 MGD to approximately 3.4 MGD, respectively. Only portions of the sanitary sewer collection and potable water distribution systems will need to be increased in size with this Alternative. See Figure 59 and Figure 61 depicting the adjustments to these systems that could be implemented with this Alternative.

The traffic volumes generated by this Alternative increase from 2,928 total AM trips and 3,294 total PM trips to 3,521 and 4,255 respectively. Accordingly, there are additional traffic mitigations associated with this Alternative as outlined in the EIR.

Whereas, the flood protection, storm drain, dry utility and street systems are expected to remain similar for this Alternative as to what is required for the Reuse Plan.

The increases to portions of the wastewater and potable water systems and traffic mitigations associated with this Alternative are estimated to increase the backbone infrastructure construction costs by approximately $1.2 million.

C. Implementation

In order to maintain flexibility for future land use changes, the City of Alameda will determine with each sub-phase if any of the backbone infrastructure adjustments described above shall be implemented.

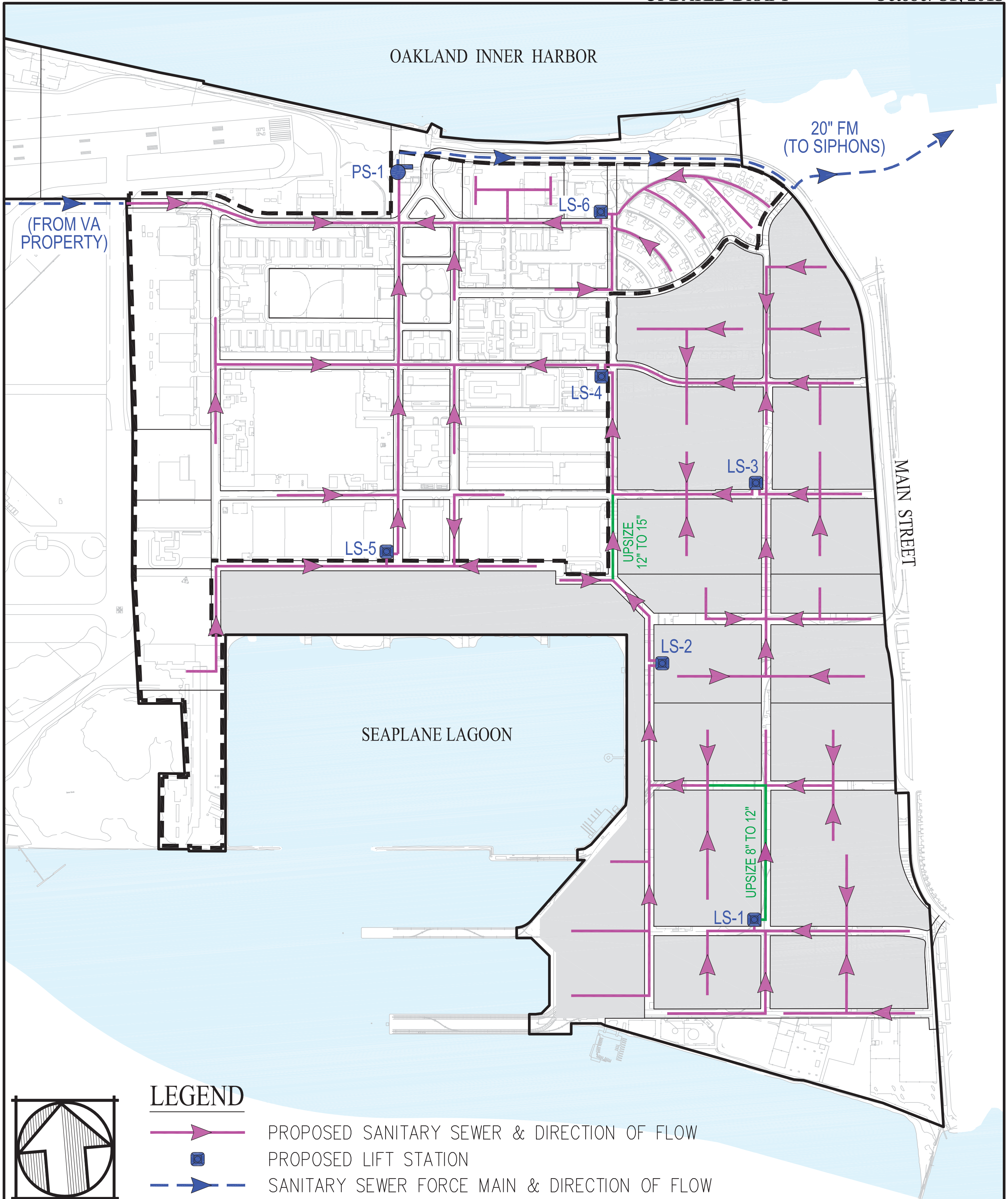

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FIGURE 59
PROPOSED ULTIMATE SEWER SYSTEM
HIGH DENSITY ALTERNATIVE

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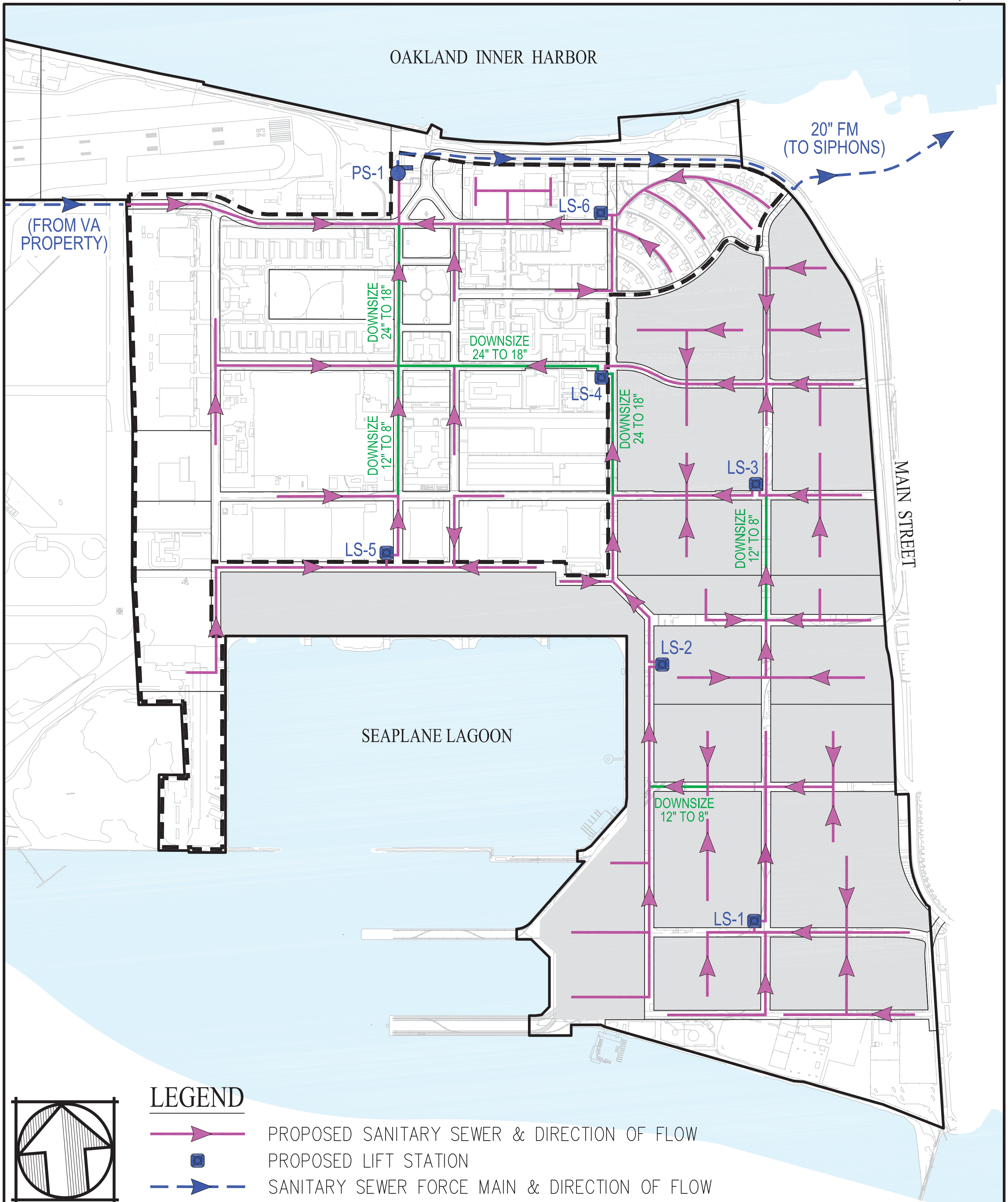

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FIGURE 60
PROPOSED ULTIMATE SEWER SYSTEM
LOW DENSITY ALTERNATIVE

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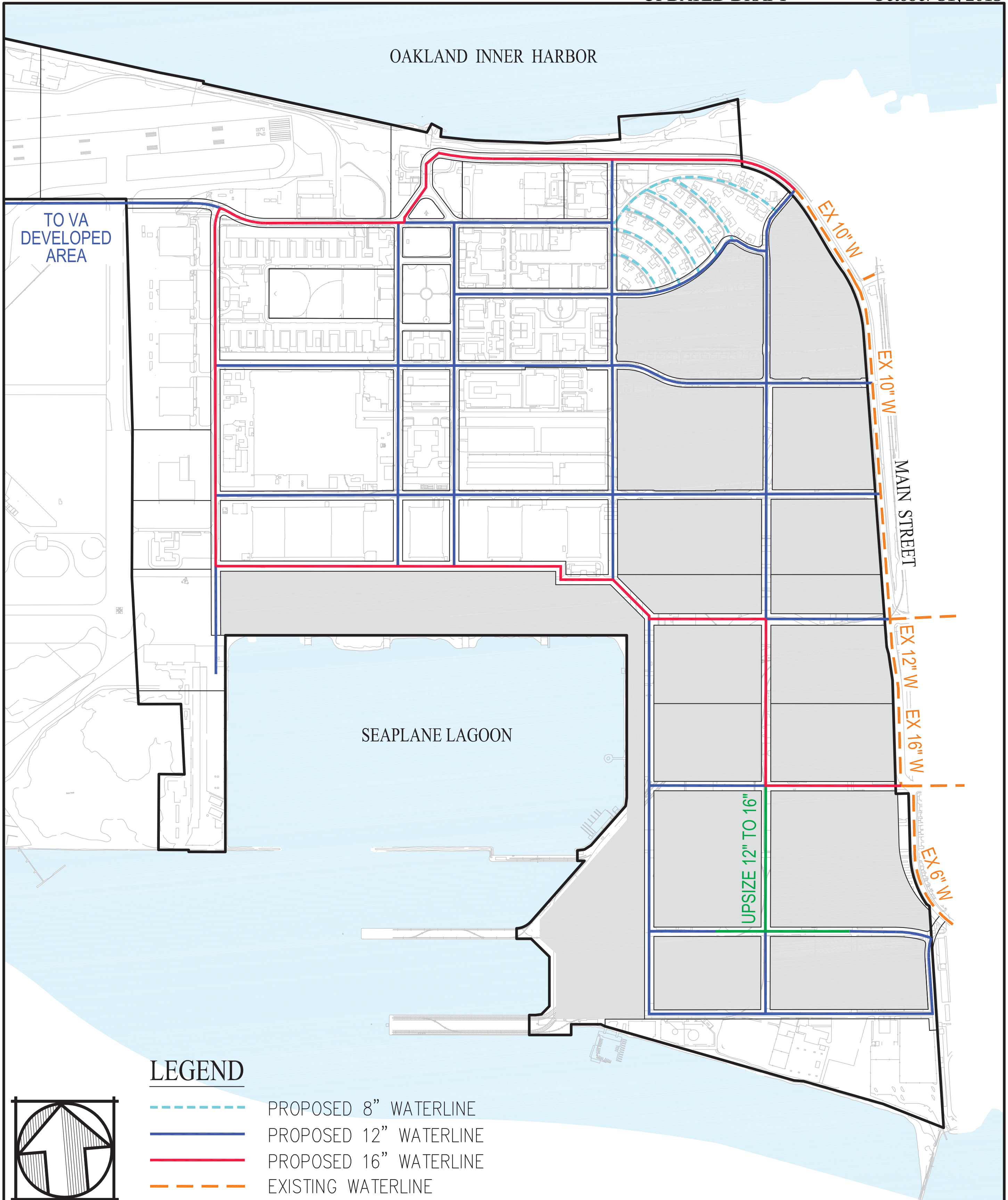

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FIGURE 61
PROPOSED ULTIMATE WATER SYSTEM
HIGH DENSITY ALTERNATIVE

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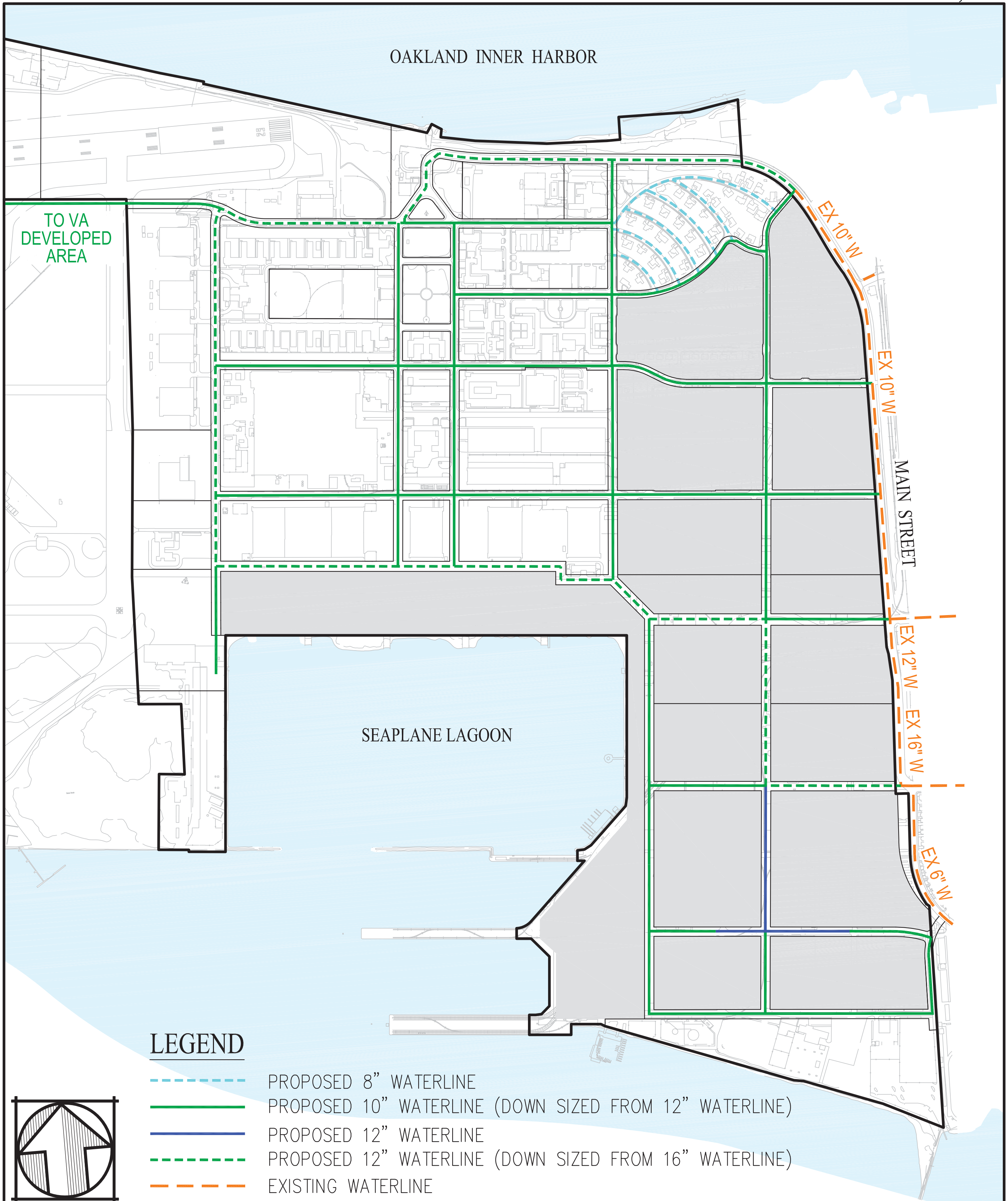

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CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
DATE: OCTOBER, 2013 SCALE: 1" = 1,000'
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FIGURE 62
PROPOSED ULTIMATE WATER SYSTEM
LOW DENSITY ALTERNATIVE

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XV. CONSTRUCTION COSTS

A. Backbone Infrastructure Costs

The Alameda Point backbone infrastructure described in the MIP is estimated to cost approximately $550 to 575 million. These costs are based in 2013 dollars and do not include cost escalations over time. Financial cash flow models for the Project will need to account for cost (and revenue) escalations over the life of each of the proposed development projects.

The Project Site is assumed to be constructed in three large phases for cost estimating purposes. See Figure 63 depicting the assumed three phases for the cost estimate. The gross areas within each phase are as follows: Phase 1 = 192 acres, Phase 2 = 139 acres and Phase 3 = 266 acres. Table 14 outlines the various categories of costs for each phase and provides an overall total estimated cost. These construction costs represent the backbone infrastructure only. There are other costs associated with the on-site / in-tract improvements that will be constructed within the development blocks that are not included in this cost estimate.

As discussed in the Phasing and Implementation Section XIII, it is likely that the three larger phases will be sub-phased into smaller development areas. The Sub-Phase 1A "North", "South" and "Town Center" scenarios depicted in Figure 56 through Figure 58 represent potential locations and configurations of an initial phase of development at Alameda Point. The backbone infrastructure construction costs associated with the Sub-Phase 1A "North" scenario are estimated to be approximately $40 million. Sub-Phase 1A "North" includes 23.5 acres of developable area, net of the backbone street rights-of-ways. The backbone infrastructure construction costs associated with the Sub-Phase 1A "South" scenario are estimated to be approximately $67.5 million. Sub-Phase 1A "South" includes 55 acres of developable area, net of the backbone street rights-of-ways. The backbone infrastructure construction costs associated with the Sub-Phase 1A "Town Center" scenario are estimated to be approximately $57 million. Sub-Phase 1A "Town Center" includes 34.5 acres of developable area, net of the backbone street rights-of-ways. These estimated costs includes those associated with the improvements necessary to support this initial phase as well as the proportionate contribution from this sub-phase to other site-wide improvements that will be constructed with later phases.

Table 15 - Backbone Infrastructure Construction Costs

	Description	**PHASE 1**	**PHASE 2**	**PHASE 3**	**TOTAL**
	BACKBONE INFRASTRUCTURE				
1	DEMOLITION / SITE PREPARATION	$33,919,000	$42,064,000	$1,946,000	$77,929,000
2	ENVIRONMENTAL REMEDIATION	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS
3	FLOOD PROTECTION AND SITE GRADING	$41,483,000	$40,343,000	$23,573,000	$105,399,000
4	DEWATERING	$3,740,000	$2,955,000	$2,680,000	$9,375,000
5	SANITARY SEWER	$12,657,000	$3,255,000	$4,497,000	$20,409,000
6	STORM DRAIN	$13,325,000	$8,408,000	$10,250,000	$31,983,000
7	POTABLE WATER	$5,314,000	$4,405,000	$6,110,000	$15,829,000
8	RECYCLED WATER	$1,470,000	$506,250	$876,000	$2,852,250
9	DRY UTILITIES	$7,201,000	$6,149,000	$6,491,000	$19,841,000
10	ON-SITE STREET WORK	$23,455,000	$19,904,000	$13,411,000	$56,770,000
11	TRANSPORTATION	$10,400,000	$34,206,000	$-	$44,606,000
12	PARKS AND OPEN SPACE	$28,990,000	$15,898,000	$20,030,000	$64,918,000
13	PUBLIC BENEFITS	$1,250,000	$16,038,000	$-	$17,288,000
	SUBTOTAL (to the nearest $10,000)	**$183,200,000**	**$194,130,000**	**$89,860,000**	**$467,200,000**


MAIN STREET
1
2
3
OAKLAND INNER HARBOR
SEAPLANE LAGOON
NATURE RESERVE
VA DEVELOPED PARCELS
LAND USE LEGEND
EMPLOYMENT (AP-E)
EMPLOYMENT - ADAPTIVE REUSE (AP-AR)
TOWN CENTER (AP-TC)
RESIDENTIAL (AP-R)
OPEN SPACE (AP-OS)
FIGURE 63
ESTIMATE PHASING
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CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA
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	SOFT COSTS				
14	CONSTRUCTION ADMIN	$5,862,000	$6,212,000	$2,876,000	$14,950,000
15	PROFESSIONAL SERVICES	$21,984,000	$23,296,000	$10,783,000	$56,063,000
16	FEES	$7,720,000	$7,784,000	$4,694,000	$20,198,000
17	IMPROVEMENT ACCEPTANCE	$733,000	$777,000	$359,000	$1,869,000
	SUBTOTAL (to nearest $10,000)	**$36,300,000**	**$38,070,000**	**$18,710,000**	**$93,080,000**
	TOTAL (to the nearest $10,000)	**$219,500,000**	**$232,200,000**	**$108,570,000**	**$560,280,000**

The backbone infrastructure construction costs include demolition, flood protection and site grading, utility systems, on-site street improvements, street improvements off-site as required in the mitigation measures outlined in the EIR, parks and open space and public benefits. The cost estimate in the MIP includes items, such as parks, that could be subject to future policy decisions by the City Council. These may also be considered during the preparation and adoption of an infrastructure/impact fee program for Alameda Point. These construction costs also include a 25% contingency applied to all costs to account for items that are not fully characterized at this time. Other budgets that are associated with design and construction of the backbone infrastructure are included, such as construction administration, professional services, plan review and inspection, and improvement acceptance. The following is a list of the general categories of improvements included in the cost estimate. Also, see the Appendix for the detailed cost estimate summary which includes the estimated costs associated with each individual improvement.

- Demolition / Site Preparation
  - Demolition and abatement of existing structures
  - Removal and/or slurry filling of existing utilities to be abandoned

- Flood Protection & Site Grading
  - Corrective Geotechnical Measures – shoreline stabilization and liquefaction remediation
  - Construction of perimeter flood protection measures
  - Import of material to raise elevations for perimeter flood protection measures and Development Areas
  - Mass grading of development blocks

- Utility Systems
  - Sanitary sewer system – pipelines, manholes and lift stations
  - Stormwater system – pipelines, manholes, inlets, pump stations, multi-purpose basins and outfalls
  - Potable water system – pipelines, appurtenances and fire hydrants
  - Recycled water system – pipelines and appurtenances
  - Dry utility system – joint trench, conduits, wires, substructure and street lights

- On-Site Street System
  - New on-site street construction – pavement, curbs, gutters, sidewalks, landscaping and striping
  - Reconstruction of existing on-site streets – pavement, curbs, gutters, sidewalks, landscaping and striping
  - Traffic calming

- Transportation Improvements
    - Off-site improvements as outlined in the mitigation measures of the EIR
    - Participation to BRT System
    - Parking lot expansion at the existing ferry terminal
    - New ferry terminal in Seaplane Lagoon
    - Transit center
    - Shuttle system
    - TDM

- Parks and Open Space
    - Seaplane Lagoon frontage
    - Regional Sports Complex
    - Enterprise Park
    - Bay Trail
    - Other parks and open space areas

- Other Public Benefits
    - Fire station
    - Pro-Rata Share of Public Works satellite corporation yard
    - Bay Trail extension (Northwest Territories & VA Property)

B. Value Engineering and Potential Cost Reductions

The value engineering options that are described throughout the MIP could result in the backbone infrastructure construction costs being reduced by $11.5 million. The feasibility of implementing these value engineering opportunities will be evaluated through the final design process for the backbone infrastructure. The backbone infrastructure will evolve with the planning of Alameda Point and additional value engineering opportunities are expected to be identified and considered in effort to minimize construction costs, where possible and appropriate.

As previously described, the Dept. of Veteran Affairs is planning a project in the VA Property, west of the Development and Reuse Areas within Alameda Point. This project includes a VA Outpatient Clinic and a Columbarium Cemetery that will require extension of infrastructure systems to this project location. If the VA project is constructed prior to redevelopment commencing in the northwest portions of Alameda Point, specifically within West Redline Avenue and Lexington Street, then the VA will install infrastructure components outside of the VA Property. This infrastructure will provide access and utility service to the Reuse Areas, the Regional Sports Complex and the Northwest Territories. The City of Alameda and the VA have entered into a non-binding term sheet that contains provisions for the scenario that the VA installs infrastructure outside the VA Property. In this scenario, the infrastructure shall be designed to support the future development demand anticipated within Alameda Point. This scenario would result in the VA installing infrastructure improvements that would otherwise need to be installed to support the redevelopment of Alameda Point and therefore reducing the construction costs for Alameda Point by approximately $12.5 million.

C. Public Services

Willdan has prepared an analysis of the cost of providing municipal services to the project, as well as revenues for the City expected to be generated there. The analysis includes services costs and the cost of maintaining the infrastructure needed for the plan (where the City is the party responsible for providing maintenance). The fiscal analysis includes the regular (weekly, monthly, annual, etc.) maintenance costs, such as chip seal of road surfaces, but not the cost of replacement of infrastructure that is being newly constructed as part of the development of Alameda Point. Willdan has prepared an estimate of the net fiscal impact of the project, which will be presented to the City Council at the November 19, 2013 public hearing.

In addition to capital improvements, the financing plan for Alameda Point will include fiscal mitigation measures, such as a services assessment or special tax if necessary, to ensure that the project does not have a net negative fiscal impact on the City. Based on the current fiscal impact estimate the financing plan will be able to accommodate mitigation of the impact on the City. For example, a CFD could mitigate the estimated projected impact with a special tax of less than 0.25 percent of assessed value. The exact method and amount of mitigation has not yet been determined but mitigation of the fiscal impact of Alameda Point will be feasible.

Not included in the analysis, however, is the cost of replacement at the end of the expected lifespan of the infrastructure. As with any other infrastructure in the City, most infrastructure replacement costs are built into the rates and fees associated with services, such as water, wastewater, and electricity. This approach, in which the users pay for the eventual replacement cost of the facilities they are using, is appropriate and financially sound.

XVI. NEXT STEPS

The MIP shall be used as a reference and guide continually through the evaluation and implementation of Development and Reuse projects within Alameda Point. Once the MIP is adopted by the City of Alameda, the main next steps will include the completion of detailed designs of the backbone infrastructure and the completion of a Financing Plan.

A. Infrastructure Design

The City of Alameda Public Works Department, EBMUD and Alameda Municipal Power will be responsible for reviewing and approving each of their respective components of the proposed infrastructure improvements with each development. The MIP outlines the necessary backbone infrastructure improvements for each development throughout the site. Additionally, the MIP provides phasing principles for each infrastructure system that will guide the planning for each development proposal and ensure that future phases are not compromised by initial phases.

In the planning stage of various development projects at Alameda Point, each applicant shall review the MIP to understand the required infrastructure for that subject area of the site. The applicant shall prepare preliminary engineering plans consistent with the current City of Alameda submittal requirements for entitlement applications. These preliminary plans shall demonstrate the proposed flood protection, drainage, utility and street improvements proposed with each subject project. These will be reviewed by the City and utility agencies to ensure consistency with the MIP and their current regulations. Additional materials, such as supplemental engineering reports and studies, may be requested by the City or the utility agencies to confirm the required infrastructure for each development.

If the proposed development project is not consistent with the land uses assumed with the Reuse Plan and the MIP, the applicant shall evaluate the necessary modifications to the infrastructure systems at Alameda Point to support the proposed project. This information shall be provided to the City and utility agencies for review and approval.

In the design stage of development projects, construction documents and final reports shall be prepared and processed through the City's Permit Center, EBMUD, AMP and any other approving agency. These final documents shall be substantially consistent with the preliminary plans approved with the project's entitlements.

The costs associated with Public Works Department, EBMUD and AMP's reviews of plans, reports and details are included in the cost estimate included in Appendix G.

B. Financing Plan

A Financing Plan will be developed for each individual project at Alameda Point. The Financing Plan will further evaluate the feasibility of available funding sources for the backbone infrastructure. Additionally, the Alameda Point development infrastructure/impact fee will be established as a mechanism to collect funds from both Development and Reuse Areas to ensure the implementation of infrastructure elements with site-wide benefit.

REFERENCES

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City of Alameda Standard Subdivision Improvement Specifications and Design Criteria, April 1965

City of Alameda Storm Drain Master Plan, August 2008, prepared by Schaaf and Wheeler Consulting Civil Engineers

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C.3 Stormwater Technical Guidance, Alameda County Cleanwater Program, May 14, 2013

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National Flood Insurance Program, Flood Insurance Rate Map Numbers 06001C0062G, 06001C0064G, 06001C0066G and 06001C0068G, August 3, 2009, prepared by Federal Emergency Management Agency

Numerical Modeling of Tsunami Effects at Marine Oil Terminals in San Francisco Bay, June 2006, prepared by Borreno, Et Al (Department of Civil Engineering, University of Southern California), prepared for Marine Facilities Division of the California State Lands Commission

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Regional Transit Access Study: Volume 2 – DRAFT, September 2012, prepared by Nelson Nygaard

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State of California Sea Level Rise Guidance Document, prepared by Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), dated March 2013

Stipulated Order for Preliminary Relief, East Bay Municipal Utility District, January 2009

Town Center Core Progress Update, prepared by SDM, dated October 14, 2013

Transportation Element of the City of Alameda General Plan, January 2009, prepared by the City of Alameda

Urban Greening Plan Parks Improvement Assessment, June 2012, prepared by Gates & Associates

APPENDICES

A) GEOTECHNICAL CONSTRAINTS MEMORANDUM (ENGEO, INC.)

Project No.
5687.100.104

January 16, 2013
Revised January 30, 2013

Mr. Angelo Obertello
Carlson Barbee & Gibson
6111 Bollinger Canyon Road, Suite 150
San Ramon, CA 94583

Subject: Alameda Point – Infrastructure Planning
Alameda, California

GEOTECHNICAL CONSTRAINTS

References:

1. A3GEO, Inc. and Alan Kropp & Associates, Inc.; Data Report, Preliminary Geotechnical and Geologic Studies, Lawrence Berkeley National Laboratory Future Scientific Facility, Alameda Point, Alameda, California; October 28, 2011.

2. ENGEO; Preliminary Geotechnical Exploration, Alameda Point Development, Alameda, California; April 8, 2003; Project No. 5497.100.102.

3. Subsurface Consultants Inc.; Geotechnical Investigation, Oakland Harbor Navigation Improvement (-50 foot) Project, Port of Oakland, Oakland and Alameda, California; February 12, 1999.

4. Carlson, Barbee & Gibson Inc.; Alameda Point, Master Infrastructure Plan, Base Case – Reuse Plan, Land Use and Zoning Districts; October 11, 2012.

Dear Mr. Obertello:

At your request, we prepared the following discussion of the geotechnical constraints that will impact redevelopment of Alameda Point in Alameda, California. We understand that the City of Alameda (City) is advancing site development planning. The purpose of this study is to assist in infrastructure planning at the site. The referenced documents were utilized for this study:

SITE DESCRIPTION AND PROJECT DESCRIPTION

Alameda Point is an area located on the westerly portion of Alameda Island in the City of Alameda, California. Alameda Island lies along the eastern side of the San Francisco Bay, adjacent to the City of Oakland. The site is a portion of the former Naval Air Station Alameda that ceased operations as a military base in 1997. The site is roughly rectangular in shape and is approximately 2 miles long and 1 mile wide. Based on a planning document by Carlson, Barbee & Gibson Inc., (Reference 4), the City is currently interested in developing an infrastructure plan in order to facilitate redevelopment of the site with a mixture of housing, commercial, retail, marine-related facilities, and open spaces.

PREVIOUS GEOTECHNICAL DOCUMENTS

Numerous previous geotechnical explorations have been performed at the site during history. Reports by Subsurface Consultants Incorporated in 1999, ENGEO in 2003, and A3GEO, Inc. and Alan Kropp & Associates, Inc. in 2011, References 1, 2, and 3, are highly relevant to the current study. Numerous borings, Cone Penetration Tests (CPTs) and lab tests were included in these studies. We have compiled and selectively used, as deemed appropriate, the previous field and laboratory data in this current study. The approximate locations of the previous explorations are illustrated on Figure 1 (Site Plan).

SUBSURFACE CONDITIONS

Based on our review of the subsurface information in References 1 through 3, artificial fill of varying thickness was encountered in historic explorations throughout the site. Young Bay Mud was encountered beneath the fill in the portions of the site to the north of the seaplane lagoon with the greatest thickness approximately 130 feet. Merritt Sand and the San Antonio formation sand were found directly beneath the fill in the southeastern portion of the site (approximately 60 to 70 feet in thickness) and dipping beneath the Young Bay Mud to the north and the west. Yerba Buena Mud (also commonly called Old Bay Mud) lies beneath the San Antonio formation.

Due to site elevations and proximity to the San Francisco Bay, the site has relatively shallow groundwater. Based on historic groundwater measurements, we have assumed the groundwater is approximately 4 feet below existing grade in the analyses performed for the site.

Much of the existing fill and some of the Merritt Sand deposits are potentially liquefiable. The Young Bay Mud deposits are highly compressible under loads associated with fill and buildings. The Young Bay Mud is also soft, typically leading to relatively low stability of cuts and slopes as well as low bearing capacity.

GEOTECHNICAL CONSIDERATIONS

Based on the references provided, the main geotechnical concerns for the proposed site development include: (1) stability of the north shoreline, (2) liquefaction, (3) compressible soils and (4) underground utility construction. These concerns are discussed below and should be considered in the initial planning for the project site. A design-level geotechnical analysis should be performed as part of the design process.

North Shoreline Slope Stability

The geotechnical investigation report prepared by Subsurface Consultants Incorporated (SCI) for the Oakland Harbor Navigation Improvement Project at the Port of Oakland (Reference 3) analyzed the proposed deepening and widening of the Inner and Outer Harbor shipping channels and included an evaluation and discussion of that project's impact on adjacent land. The Port's shipping channel deepening project was completed in 2009. A portion of the deepened channel is adjacent to the north shore of the Alameda Point project site.

Reference 3 presents static slope stability analyses performed using limit equilibrium theory to locate the minimum factor of safety and critical slip surface. These analyses were performed using Bishop's Simplified Method and the Spencer Method. Liquefaction analyses were performed using the procedures outlined by Seed, et al. (1984). Lateral spreading was investigated using the Bartlett and Youd method (1995) and seismic slope stability due to inertial forces was analyzed using the method outlined by Makdisi and Seed (1978).

Three levels of seismic design criteria were used in this investigation. Levels 1, 2, and 3 correspond to ground shaking with a 50-, 20-, and 10-percent probability of exceedance in 50 years, and correspond to peak ground accelerations (PGA) of 0.29g, 0.45g, and 0.57g, respectively. A Magnitude 7¼ to 7½ earthquake was assumed for these analyses.

Two cross sections, I-I' and J-J', were analyzed which encroach into a portion of the north shoreline of the proposed Alameda Point project, and the results are presented in Reference 3. The report concluded that the static stability of cross section I-I' was marginal and the seismic performance was poor with very large deformations at all seismic levels. Mitigation in the form of shoreline excavation, ground improvement, rock dikes, and/or bulkheads was recommended. Alternatively, the report suggests moving the channel 25 feet north. The seismic performance of cross section J-J' was concluded to be good at the channel limit but poor at the shoreline. Since the dredging of the channel had a limited effect on the stability of cross section J-J', no mitigation was recommended.

Reference 3 also includes analyses of the northern shoreline stability to the west of the mapped development area. Three additional cross sections, F-F', G-G', and H-H' were evaluated using the methodologies discussed above. The stability was evaluated for both deep failures that would propagate (global failure) on to land as well as localized failures of the cut slope. The previous study indicates that, under static loading, the stability for global failures is relatively high with calculated factors of safety between 1.7 and 2.1, but localized stability of the dredged cut would be slightly above marginal with an approximate factor of safety of 1.3 for all three cross-sections. Under seismic loading, the previous study predicted displacement of the slope (both global and local) for all three cross sections under all three seismic levels. The predicted displacements range from as little as 1 foot to greater than 10 feet of displacement. In all three cross sections, the predicted seismic slope displacements are greater for the localized failure surfaces yet still relatively large for the global failure surfaces.

Based on our understanding of the channel deepening project, no mitigation was performed along the north shore of Alameda Point to improve slope stability.

Limited Slope Stability Analysis

Utilizing information from Reference 3, we analyzed the slope stability of cross sections I-I' and J-J' to verify SCI's results. The locations of these cross sections are shown on Figure 1. We performed the analyses using the computer program SLIDE© (Version 6). SLIDE© is a limit equilibrium program that allows the user various search routines to locate the minimum factor of safety and critical slip surface. We choose the Spencer Method and circular and non-circular searching algorithms for our analysis. We performed seismic deformation analysis on these cross sections, based on the method of Bray and Travasarou (2007) in keeping with the guidelines of the California Geological Survey presented in Special Publication 117A (SP117A). In our analysis, we used the shear strength parameters specified in Reference 3.

Our slope stability calculations indicate that these slopes within the study area are probably marginally stable under current conditions. Any new loads from fill placement or buildings within 50 feet of the northern shoreline would likely have an impact on static slope stability. The calculated seismic slope deformations are in the range (15cm to 100cm) that would be considered potentially seismically "unstable" under SP117A. According to the guidelines, such deformation "may be sufficient to cause serious ground cracking or enough strength loss to result in continuing (post-seismic) failure." Deformations could extend more than 1,000 feet from the shore.

To the west of the study area, the existing slopes appear to be stable under the current conditions but could experience significant deformations (up to 7 feet) under seismic shaking similar to the design earthquake for the site. The distance the deformation could extend is likely smaller than near the development area.

The slope stability results from this study and Reference 3 are included in the Appendix.

Liquefaction

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded fine sands below the groundwater table. Empirical evidence indicates that loose fine-grained soil including low plasticity silt and clay is also potentially liquefiable. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop and liquefaction of susceptible soil to occur. If liquefaction occurs, and if the soil consolidates following liquefaction, then ground settlement and surface deformation may occur. The previous explorations at the site encountered sand and silty sand deposits that could potentially liquefy under seismic loading.

Shallow liquefiable soil is most likely to vent to the surface in the form of sand boils. Sand boils, if they occur, can result in localized voids in the subsurface and bearing failure of shallow foundations and utilities. Sand boils were observed in portions of the Naval Air Station Alameda in the 1989 Loma Prieta Earthquake.

We performed an evaluation of liquefaction potential on selected existing CPT data with the software program Cliq (version 1.7.1.6) applying the methodologies published by NCEER in 1998 and by Moss in 2006. We also analyzed selected existing boring data with the methodologies published by Youd et al. in 2001, Seed et al. in 2003 and Idriss and Boulanger in 2008. We assumed a groundwater level of 4 feet below existing ground surface, a peak ground acceleration (PGA) of 0.4g, and a moment magnitude (M_w) of 7.3. The PGA value corresponds to the 2010 California Building Code seismic design parameters. We evaluated the liquefaction potential for the soil encountered below the assumed water table. The results indicate that sand and silty sand fill material and native deposits are potentially liquefiable down to 40 feet below existing grades. Our analyses also indicate that the potentially liquefiable soil could settle as much 11 inches. Lateral spreading along the northern shoreline is likely following a design level earthquake. A plan showing the depth of liquefiable soil material is provided as Figure 2.

Liquefaction Mitigation

The amount of potential liquefaction settlement and lateral spreading are greater than typical structures and infrastructure can tolerate without mitigation. Ground improvement techniques will likely be necessary to reduce the liquefaction potential of the sandy deposits at the project site to levels that improvements can be designed to tolerate. Liquefiable soil can be mitigated by either dynamic impact/vibration to densify the soil or mixing with cement to create zones of non-liquefiable soil. The success of dynamic impact methods depends on the fines content of the sand and the depth of the liquefiable material.

- Deep Dynamic Compaction

Deep dynamic compaction (DDC) tends to be the most cost-effective method of liquefaction mitigation, where appropriate. DDC imparts impact energy to the soil by dropping a 10- to 15-ton weight from a height of 16 to 50 feet. Since interlayered clay deposits within the liquefiable soil can absorb the dynamic energy and reduce the effectiveness of the ground improvement, DDC is most effective only to depths as much as 35 feet below grade in sandy soil.

Because the method consists of dropping a significant weight from a significant height, DDC results in significant noise and vibration. Since, the vibration impacts typical of DDC will likely cause damage to adjacent structures and improvements, an appropriate setback should be established. DDC should begin in a portion of the site away from existing structures and improvements and vibrations should be monitored to establish a safe setback. Pre- and post-construction surveys of adjacent improvements conditions should be performed to establish if any damage was caused by DDC. A second ground improvement method may be necessary within any setback area. DDC should not be used over any existing utilities.

- Rapid Impact Compaction

An alternative to DDC is rapid impact compaction (RIC), which is a proprietary densification method where a 7- to 8-ton weight is dropped from 3 to 4 feet high on an approximately 5-foot-diameter hammer head. Because the energy imparted in RIC is significantly less than DDC, it can be used in closer proximity to existing structures and improvements. RIC is most effective in areas were the depth of the liquefiable material is 15 feet or less below the ground surface. Because the treated area is less than with DDC, RIC typically takes longer to treat an area and typically has a higher cost per square foot of area treated.

- Vibratory Replacement

Vibratory replacement methods densify the potentially liquefiable soil by inserting a vibrating probe into the ground and backfilling the shaft created with gravel. This method creates stone columns with densified soil between. The amount of vibration from this method is significantly less than with DDC and the depth of possible treatment is typically at least 35 feet. Unlike DDC and RIC, this method is not performed across the entire project footprint but on a grid of columns with equal spacing across the site. The spacing of the grid would be determined as part of a design-build process.

- Soil/cement Mixing

Soil/cement mixing includes numerous proprietary methods including grouting, grout-mixing, and deep soil mixing. Each of these methods involves mixing the subsurface soil with cement and water to create columns of stiffened soil. The columns can be oriented as individual columns or overlapped to create walls around unimproved soil. The untreated soil is not densified by this technique. This ground improvement method relies on the improved stiffness of the columns to raise the composite stiffness of the site and reduce liquefaction by concentrating the cyclic stresses imparted by the seismic event on the columns and reducing the increase in pore pressure in the soil.

This method of ground improvement results in significantly reduced construction vibrations versus the other alternatives. This method does result in spoils that will be rich in cement; because import is expected at this site, spoils could be mixed with onsite soil to reduce the cement content and used as structural fill once the cement has cured; using spoils as engineered fill will potentially improve performance as a stiffened cap can be constructed to assist in transferring loads to the individual columns. Depending on cement concentration and hydration time, the reaction of cement in the spoils could make conventional soil compaction techniques difficult. If spoils are used as structural fill, we recommend using a method specification to check that appropriate degrees of compaction are achieved.

Compressible Soil

Soft, highly compressible Yong Bay Mud deposits were encountered in the previous explorations at the project site. A plan showing the depth of the base of the Young Bay Mud is provided as Figure 3. The locations and thicknesses of these deposits are variable, ranging from nil to over 130 feet in thickness. The Yong Bay Mud can settle due to loading from any new fill or from new structures constructed at the site. The amount of settlement is a factor of load and thickness of Young Bay Mud. Assuming the Young Bay Mud is normally consolidated, settlement can be as great a ½ foot for each foot of fill placed over the thickest areas of Young Bay Mud. While the majority of settlement from new loads will happen in the first 1 to 2 years after construction, in the areas of the thickest Young Bay Mud, settlement can continue for a period of 50 years or more.

Compressible Soil Mitigation

Depending on the type of buildings planned at the project site, mitigation of the compressible Young Bay Bud deposits may be feasible. One measure that can be used to mitigate the loading from small, relatively lightweight structures is pre-consolidation of compressible material through a surcharge program. Surcharge fill is placed above design grade elevations in areas of the site where pre-consolidation measures are necessary to reduce settlement. The surcharge fill remains in place for a period sufficient to allow the desired degree of consolidation to be achieved, such that the risk of settlement is sufficiently reduced for the planned structure. Surcharging will induce some settlement in adjacent areas; therefore, it may not be feasible to use surcharge as a compressible soil mitigation method in areas near existing structures and utilities. Likewise, surcharging of initial phases of construction should be placed wider than the footprint of the construction area so that subsequent phases of surcharge do not cause settlement of already constructed areas. For planning purposes, we recommend assuming that surcharge areas of initial phases should be overbuilt by at least 20 feet laterally from the improvement area.

The amount of time necessary to effectively mitigate compressible soil through surcharge is directly related to the thickness of the compressible soil deposit. Where the Young Bay Mud is thicker than about 20 feet, it is likely that wick drains may be desired to shorten the drainage path of the compressible deposits and accelerate the surcharge program.

A surcharge program is generally not efficient for structures with bearing pressures over 750 to 1,000 pounds per square foot. In these cases deep foundation systems deriving support from below the Young Bay Mud could be suitable at the project site. Where deep foundations are used, utilities should incorporate flexible connections as the building will not settle with the surrounding soil.

Underground Utilities

Utility Trench Shoring

Due to the soft nature of the Young Bay Mud, excavations that extend into Young Bay Mud deposits may become unstable. Installation of temporary sheetpiles or the use of a shield or continuous hydraulic skeleton shoring should be anticipated for excavations that extend below a depth of about 3 to 5 feet.

Trench Dewatering

Shallow groundwater is expected at the site and trench excavations may encounter perched groundwater. Therefore, utility trench excavations may require temporary dewatering during construction to keep the excavation and working areas reasonably dry. In general, excavations should be dewatered such that water levels are maintained at least 2 feet below the bottom of the excavation prior to and continuously during shoring installation and the backfill process to control the tendency for the bottom of the excavation to heave under hydrostatic pressures and to reduce inflow of soil or water from beneath temporary shoring. We anticipate that dewatering for underground utility construction will be accomplished by pumping from sumps.

Utility trenches adjacent to existing improvements should include a low permeability cutoff to reduce the risk of inadvertent groundwater flow along permeable bedding or backfill. In these areas dewatering may not be an option; therefore, a relatively impervious shoring system of tight interlocking sheet piles, or other impervious wall type, can be utilized to reduce infiltration during construction.

In addition, possibility of encountering contaminated soil and groundwater should be considered during underground construction.

LAND PLANNING ZONES

The limits of the land planning zones discussed below are presented on Figure 4.

North Shore Line

We understand that a significant setback from the north shore is not feasible; therefore, strengthening of the shoreline will be needed to reduce potential lateral displacement. The most cost effective shoreline stabilization measure would likely be performing ground improvement such as soil/cement mixing. Because both the liquefiable fill and Young Bay Mud impact the seismic slope stability, the soil/cement mixing will need to extend about 40 feet below the ground surface to the bottom of the Young Bay Mud layer. Based on similar projects, we estimate that to appropriately improve shoreline stability the soil treatment may need to be performed on 15 to 30 percent of the soil volume over an area between 20 to 30 feet wide. Other shoreline improvement measures, such as a levee and flood protection system could be constructed in conjunction with the improvement area. An alternative to soil/cement mixing would be construction of a structure, such as a bulkhead wall.

We understand that a levee has been proposed as part of the flood protection system on the northern shoreline. The levee embankment should have a crest 12 feet wide with side slopes of approximately 3:1 (horizontal:vertical). We recommend that the material used for embankment construction consist of soil with at least 15 percent passing the No. 200 sieve and no particles greater than 6 inches in maximum dimension.

Adaptive Reuse Area

We understand that some portions of the site are planned for adaptive reuse. In these areas, liquefaction mitigation measures will be constrained by existing structures and utilities. Ground improvement techniques will not be available for existing buildings; therefore, potential liquefaction induced settlement must be mitigated structurally. Where new utilities are to be installed, RIC could be used to densify the top 15 feet of liquefiable material, and the utilities could be designed to withstand settlement up to 8 inches and differential settlement up to 4 inches. Alternatively, vibratory replacement or soil/cement mixing could be used in these areas to reduce settlement of utilities and other improvements; total and differential settlement using these approaches would be less than using RIC. Based on typical construction costs, ground improvement using RIC will likely be the most cost efficient solution though other ground improvement methods would be more effective in decreasing potential settlement where liquefiable soil is deeper than 15 feet. Existing utilities that will remain in place can be supported by grouting underneath the utility.

Liquefaction Hazard Area

This area is not planned for adaptive reuse, so DDC will be the most applicable and cost effective liquefaction mitigation method. DDC results in relatively large noise and vibration impacts, so a buffer zone of up to 100 feet may be necessary from any existing structures to minimize impacts. Inside this buffer zone, other ground improvement methods may be necessary.

Liquefaction and Compressible Soil Hazard Area

DDC will also be the most applicable and cost effective liquefaction mitigation method in this area. DDC results in relatively large noise and vibration impacts, so a buffer zone of up to 100 feet may be necessary from any existing structures to minimize impacts. Inside this buffer zone, other ground improvement methods may be necessary.

Structures constructed in this area that have bearing pressures greater than 750 to 1,000 pounds per square foot will likely need to be supported on deep foundations. A surcharge program could be used to mitigate the consolidation settlement caused by the construction of light buildings.

Outside of the building areas, additional fill from grading to raise the site out of the flood plain will also induce consolidation settlement of the Young Bay Mud, and we anticipate that other measures may be necessary to mitigate potential settlement that could adversely affect site improvements (i.e., streets, parking areas, drainage, underground utilities, concrete flatwork, etc.). The selected mitigation will partly depend on what level of risk is acceptable, and could range from: (1) acceptance of settlement risk and periodic maintenance, (2) implementation of a surcharge program to pre-consolidate the soil and reduce long term settlements, (3) use of lightweight fill as compensation load to reduce settlement or (4) critical utilities could be supported on cement/soil mixed columns.

The comments provided in this letter are professional opinions developed in accordance with current standards of geotechnical engineering practice; no warranty is expressed or implied. If you have any questions regarding our letter, please do not hesitate to contact us.

Sincerely,

ENGEO Incorporated

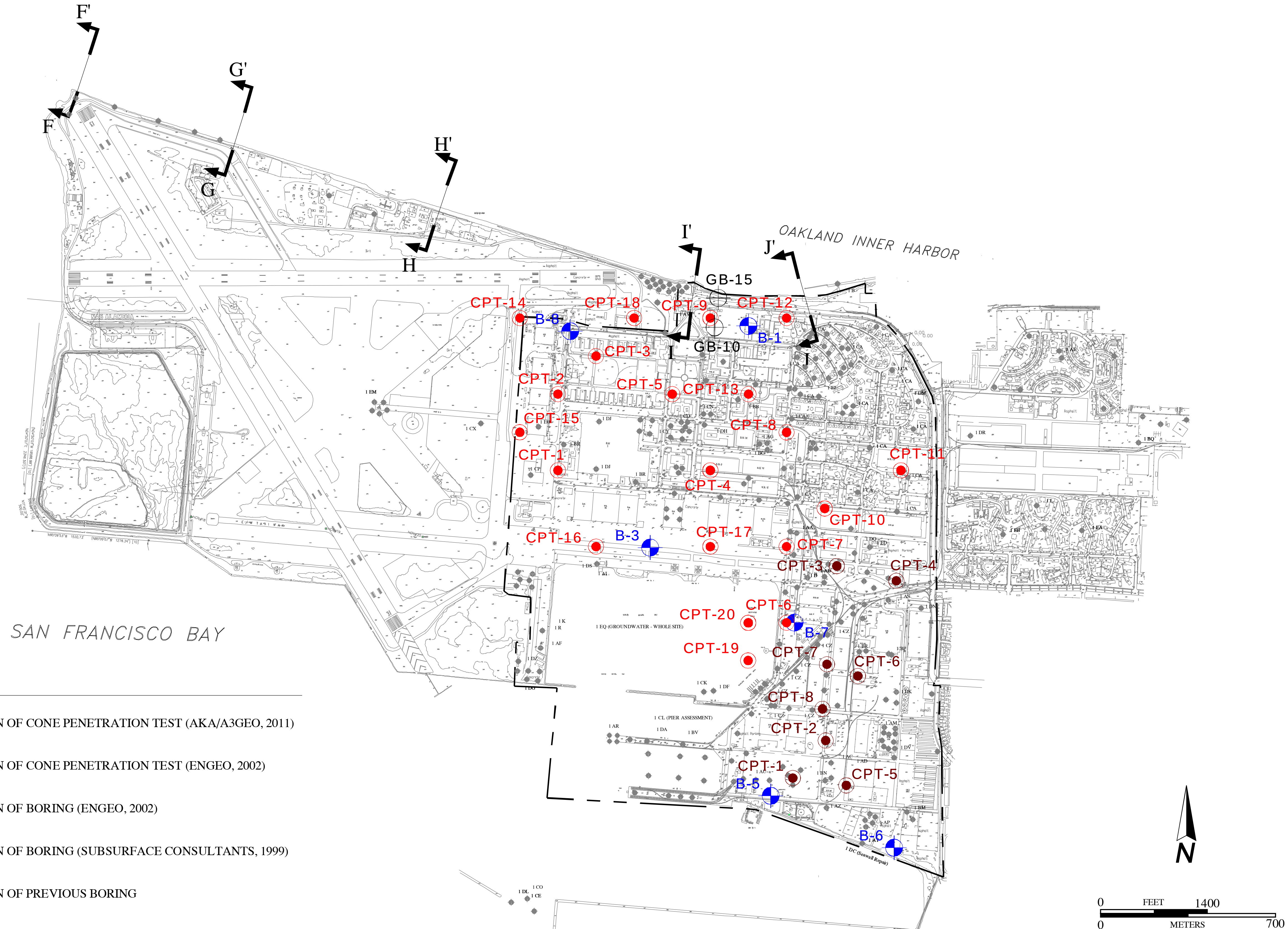
Siobhan O'Reilly-Shah

Jeff Fippin, GE

REGISTERED PROFESSIONAL ENGINEER
JEFFREY A. FIPPIN
No. 2631
Exp. 6/30/2013
GEOTECHNICAL
STATE OF CALIFORNIA

Daniel S. Haynosch, GE
sors/jf/dsh/jf

Attachments: Figure 1 - Site Plan
Figure 2 - Depth of Potentially Liquefiable Soil
Figure 3 - Thickness of Young Bay Mud
Figure 4 – Preliminary Constraints Mapping Based on Land Planning Zones
Appendix – Limited Slope Stability Calculations



EXPLANATION

CPT-8 APPROXIMATE LOCATION OF CONE PENETRATION TEST (AKA/A3GEO, 2011)

CPT-20 APPROXIMATE LOCATION OF CONE PENETRATION TEST (ENGEO, 2002)

B-8 APPROXIMATE LOCATION OF BORING (ENGEO, 2002)

GB-15 APPROXIMATE LOCATION OF BORING (SUBSURFACE CONSULTANTS, 1999)

APPROXIMATE LOCATION OF PREVIOUS BORING

1 AE APPROXIMATE LOCATION OF EXISTING NAVY GEX REPORT

J J' APPROXIMATE LOCATION OF CROSS SECTION EVALUATED BY SUBSURFACE CONSULTANTS

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO Expect Excellence

SITE PLAN
ALAMEDA POINT - INFRASTRUCTURE PLANNING
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.100.104	FIGURE NO. 1
SCALE: AS SHOWN	
DRAWN BY: SRP	CHECKED BY: JF

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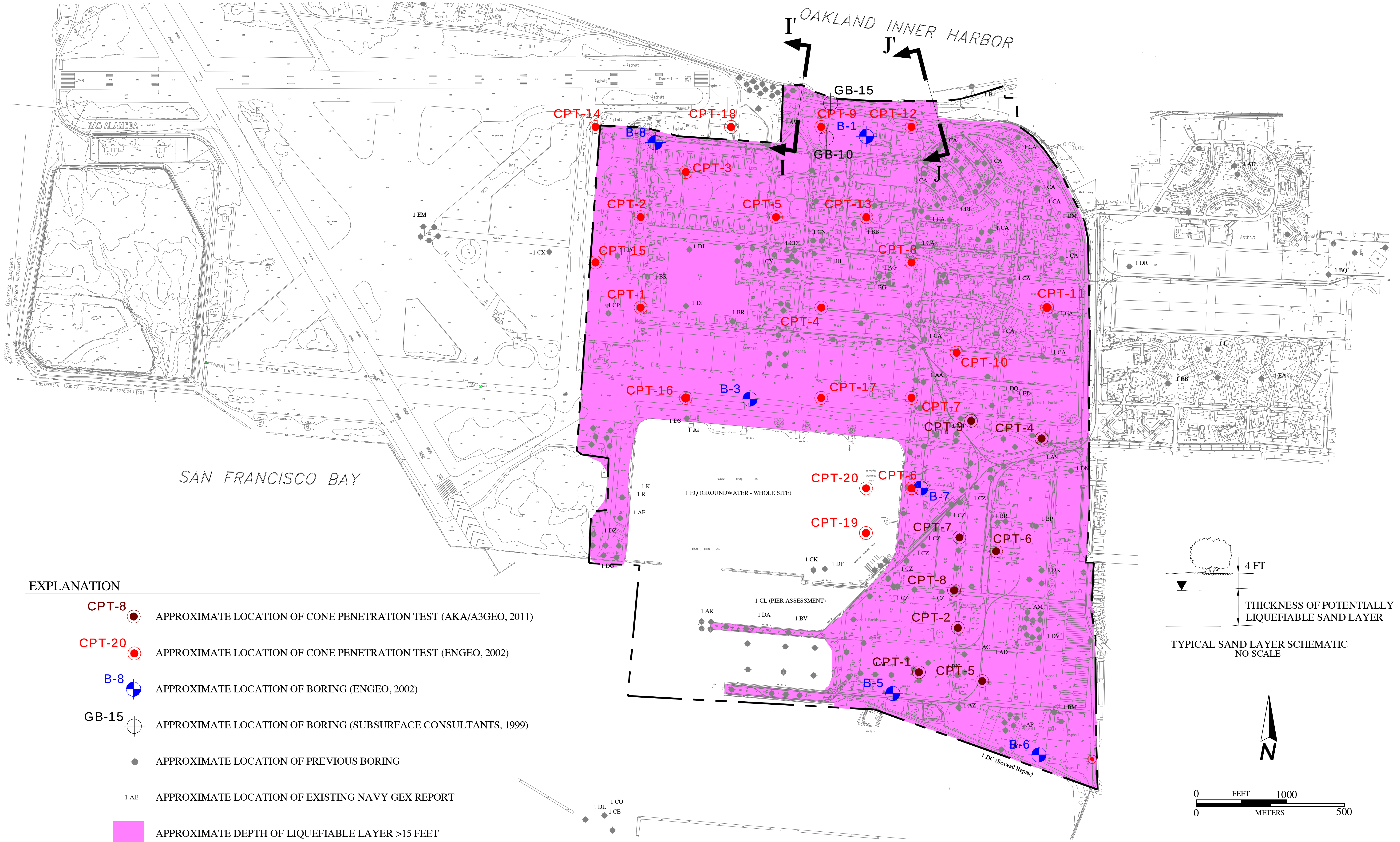
ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

CPT-8	APPROXIMATE LOCATION OF CONE PENETRATION TEST (AKA/A3GEO, 2011)
CPT-20	APPROXIMATE LOCATION OF CONE PENETRATION TEST (ENGEO, 2002)
B-8	APPROXIMATE LOCATION OF BORING (ENGEO, 2002)
GB-15	APPROXIMATE LOCATION OF BORING (SUBSURFACE CONSULTANTS, 1999)
	APPROXIMATE LOCATION OF PREVIOUS BORING
1 AE	APPROXIMATE LOCATION OF EXISTING NAVY GEX REPORT
	APPROXIMATE DEPTH OF LIQUEFIABLE LAYER >15 FEET
J J'	APPROXIMATE LOCATION OF CROSS SECTION

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO
Expect Excellence

DEPTH OF POTENTIALLY LIQUEFIABLE SOIL

ALAMEDA POINT - INFRASTRUCTURE PLANNING

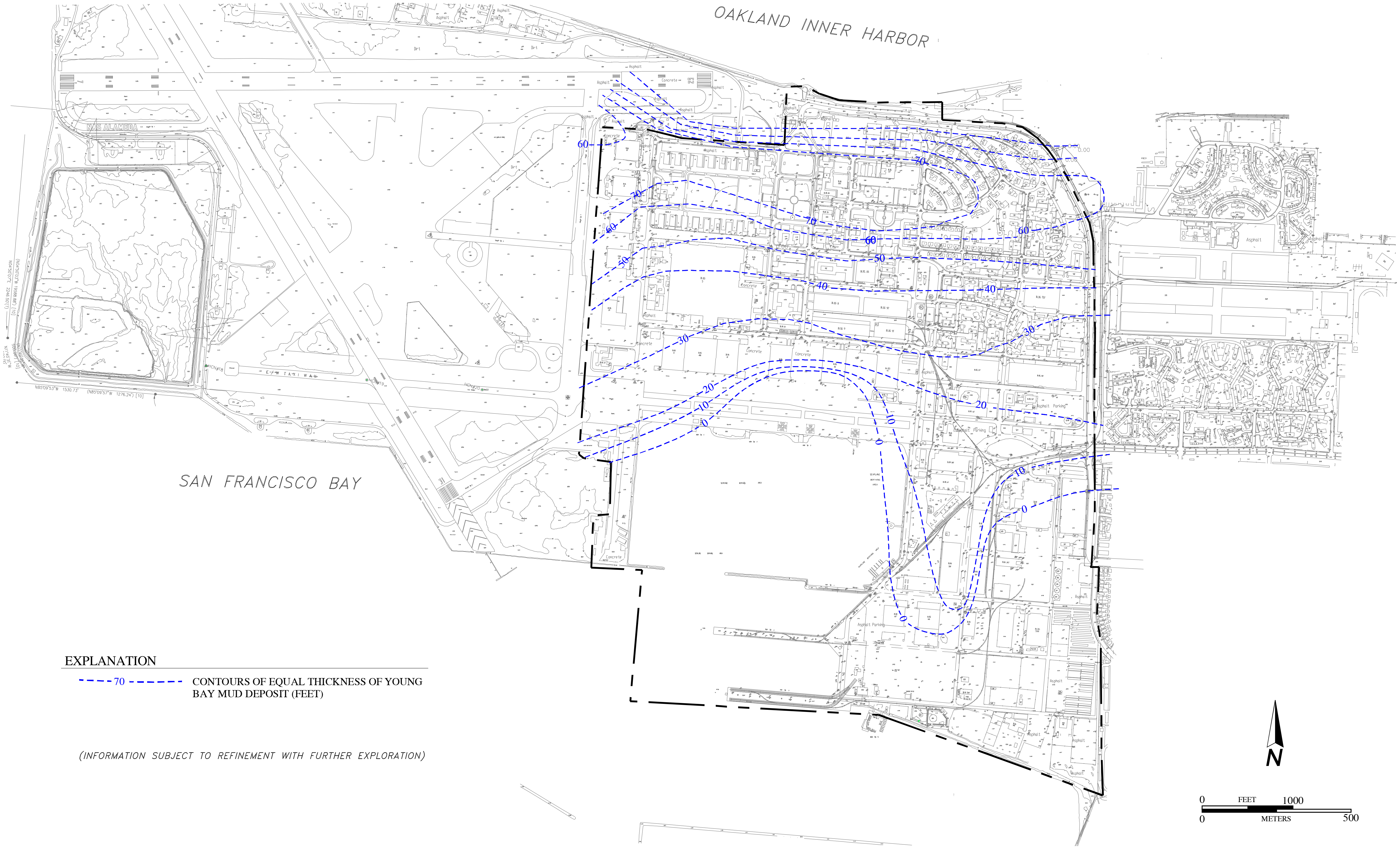
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.100.104

SCALE: AS SHOWN

DRAWN BY: SRP | CHECKED BY: JF

FIGURE NO. 2



EXPLANATION

- - - 70 - - - CONTOURS OF EQUAL THICKNESS OF YOUNG BAY MUD DEPOSIT (FEET)

(INFORMATION SUBJECT TO REFINEMENT WITH FURTHER EXPLORATION)

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

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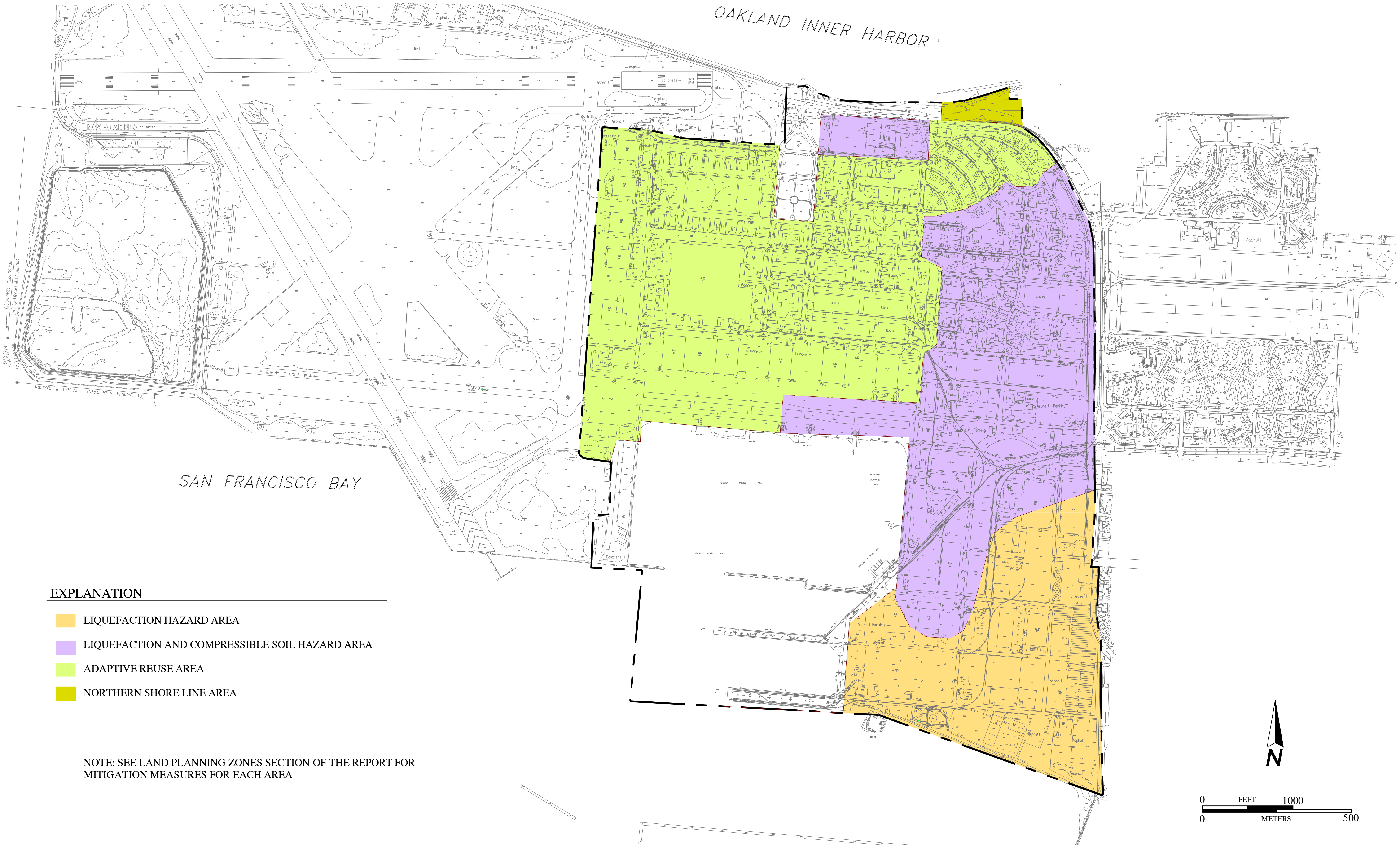
Expect Excellence

THICKNESS OF YOUNG BAY MUD
ALAMEDA POINT - INFRASTRUCTURE PLANNING
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.100.104		FIGURE NO.
SCALE: AS SHOWN		3
DRAWN BY: SRP	CHECKED BY: JF	

G:\Drafting\DRAFTING2_Dwg\5687\100\2013\5687100104-3-YoungBayMud-0113.dwg Plot Date: 1-15-13 SPATTERS

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

- LIQUEFACTION HAZARD AREA
- LIQUEFACTION AND COMPRESSIBLE SOIL HAZARD AREA
- ADAPTIVE REUSE AREA
- NORTHERN SHORE LINE AREA

NOTE: SEE LAND PLANNING ZONES SECTION OF THE REPORT FOR MITIGATION MEASURES FOR EACH AREA

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

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PRELIMINARY CONSTRAINTS MAPPING BASED ON LAND PLANNING ZONES
ALAMEDA POINT - INFRASTRUCTURE PLANNING
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.100.104	FIGURE NO. 4
SCALE: AS SHOWN	
DRAWN BY: SRP	CHECKED BY: JF

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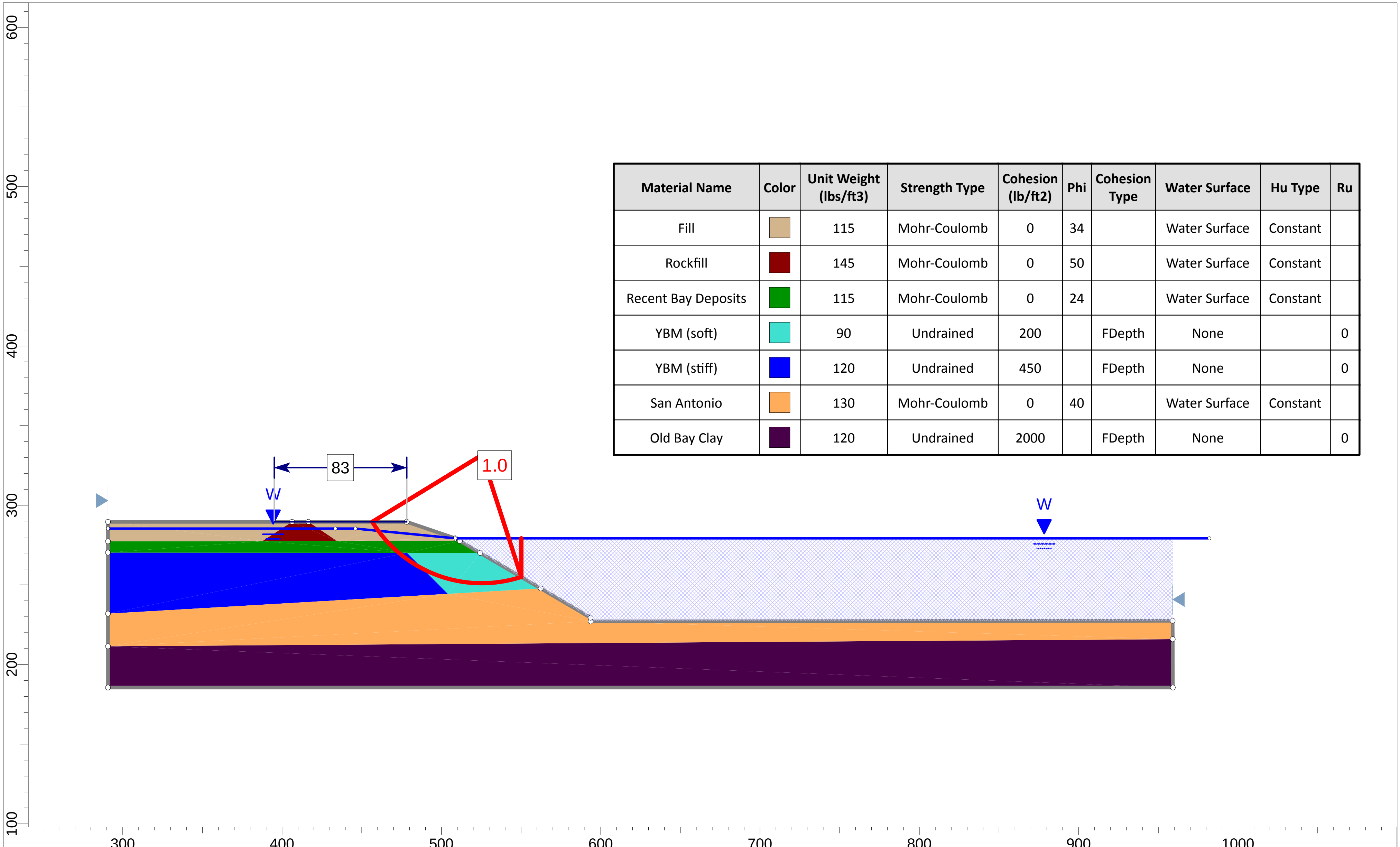
APPENDIX

Limited Slope Stability Calculations

5687.100.104
January 16, 2013
Revised January 30, 2013

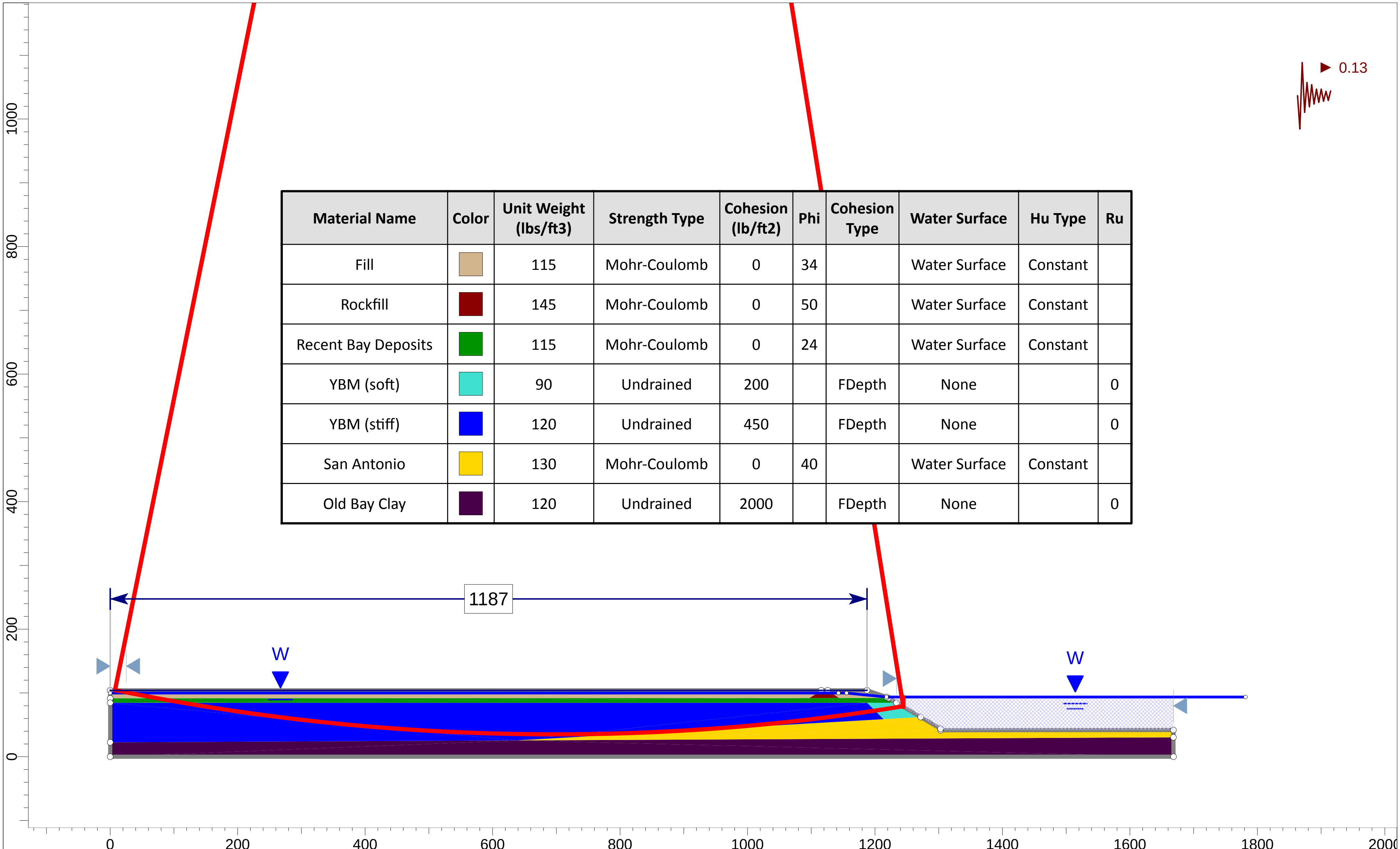


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Cohesion Type	Water Surface	Hu Type	Ru
Fill		115	Mohr-Coulomb	0	34		Water Surface	Constant	
Rockfill		145	Mohr-Coulomb	0	50		Water Surface	Constant	
Recent Bay Deposits		115	Mohr-Coulomb	0	24		Water Surface	Constant	
YBM (soft)		90	Undrained	200		FDepth	None		0
YBM (stiff)		120	Undrained	450		FDepth	None		0
San Antonio		130	Mohr-Coulomb	0	40		Water Surface	Constant	
Old Bay Clay		120	Undrained	2000		FDepth	None		0

ENGEO Expect Excellence 40 years

SLIDEINTERPRET 6.014

Project	Alameda Point
Analysis Description	Spencer
Drawn By	Siobhan O'Reilly-Shah
Scale	1:1000
Company	ENGEO
Date	12/12/2012, 10:36:05 AM
File Name	Static Slope Stability - xsec I-I'.slim



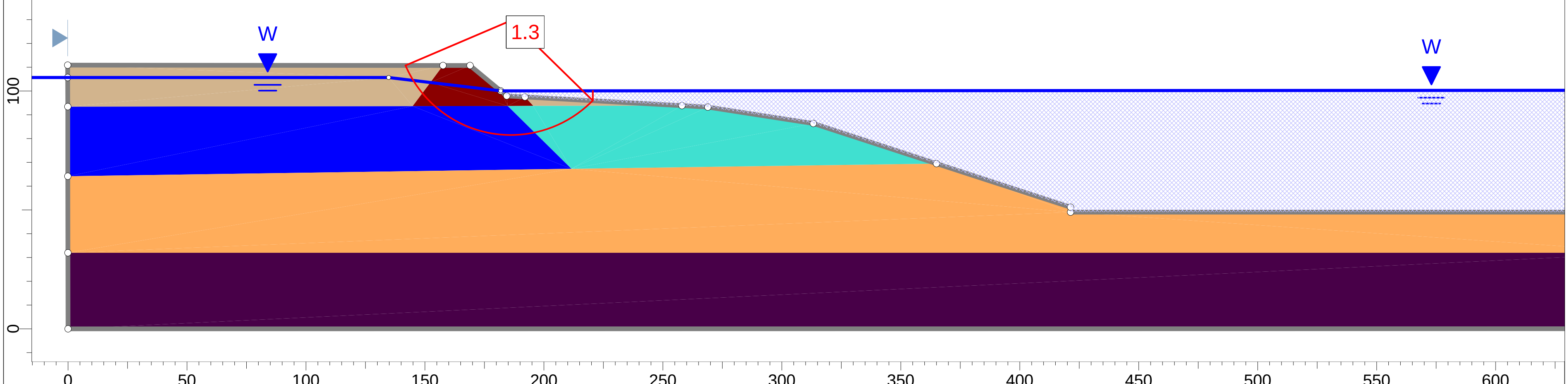
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Cohesion Type	Water Surface	Hu Type	Ru
Fill		115	Mohr-Coulomb	0	34		Water Surface	Constant	
Rockfill		145	Mohr-Coulomb	0	50		Water Surface	Constant	
Recent Bay Deposits		115	Mohr-Coulomb	0	24		Water Surface	Constant	
YBM (soft)		90	Undrained	200		FDepth	None		0
YBM (stiff)		120	Undrained	450		FDepth	None		0
San Antonio		130	Mohr-Coulomb	0	40		Water Surface	Constant	
Old Bay Clay		120	Undrained	2000		FDepth	None		0

ENGEO Expect Excellence 40 years

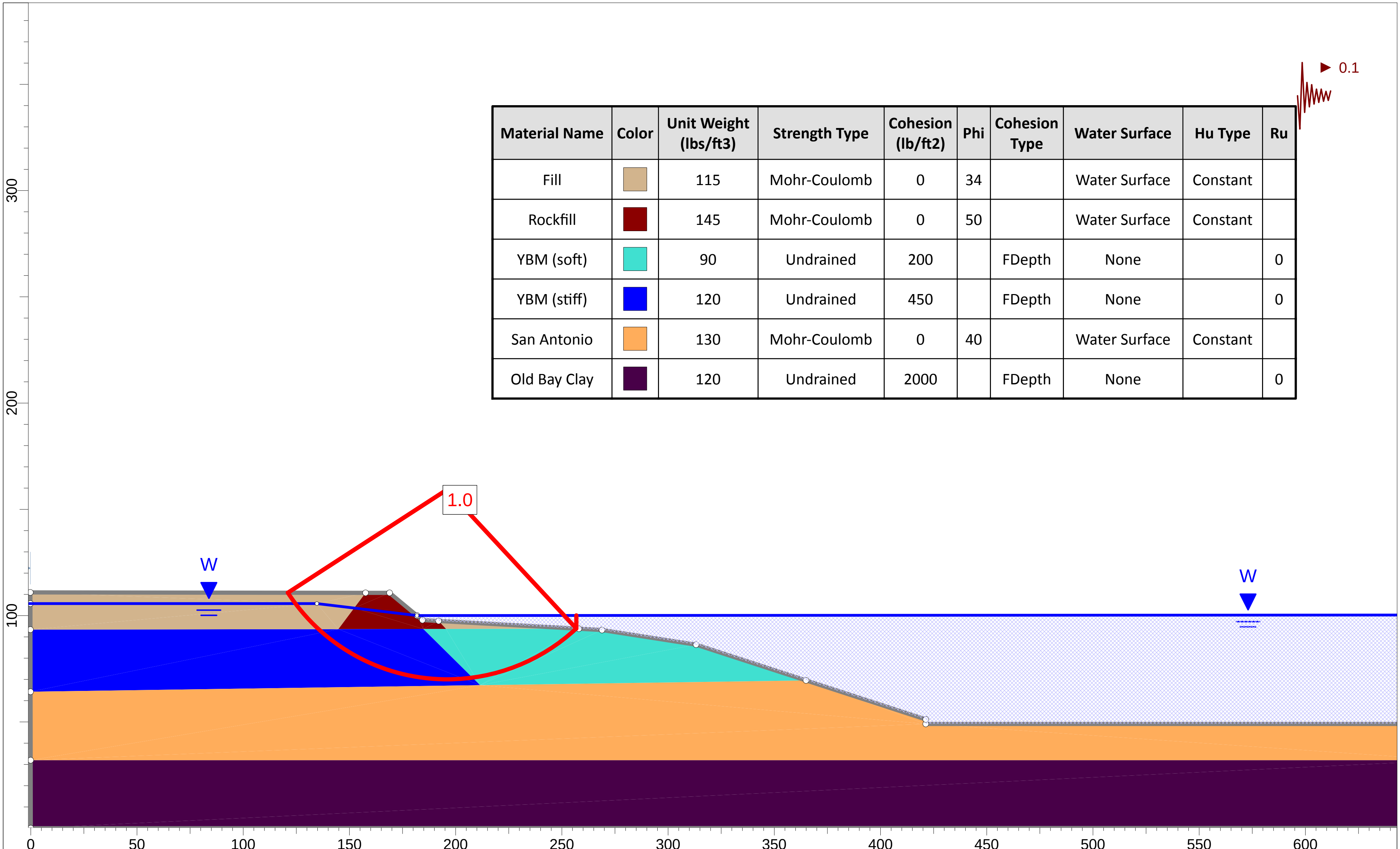
SLIDEINTERPRET 6.014

Project	Alameda Point		
Analysis Description	Spencer		
Drawn By Siobhan O'Reilly-Shah	*Scale* 1:2500	*Company*	ENGEO
Date	12/12/2012, 10:36:05 AM	*File Name*	Pseudo-Static Slope Stability - xsec I-I'.slim

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Cohesion Type	Water Surface	Hu Type	Ru
Fill		115	Mohr-Coulomb	0	34		Water Surface	Constant	
Rockfill		145	Mohr-Coulomb	0	50		Water Surface	Constant	
YBM (soft)		90	Undrained	200		FDepth	None		0
YBM (stiff)		120	Undrained	450		FDepth	None		0
San Antonio		130	Mohr-Coulomb	0	40		Water Surface	Constant	
Old Bay Clay		120	Undrained	2000		FDepth	None		0



ENGEO Expect Excellence 40 years	*Project* Alameda Point		
	Analysis Description Spencer		
	Drawn By Siobhan O'Reilly-Shah	*Scale* 1:750	*Company* ENGEO
SLIDEINTERPRET 6.014	*Date* 12/12/2012, 10:36:05 AM		*File Name* Static Slope Stability - xsec J-J'.slim



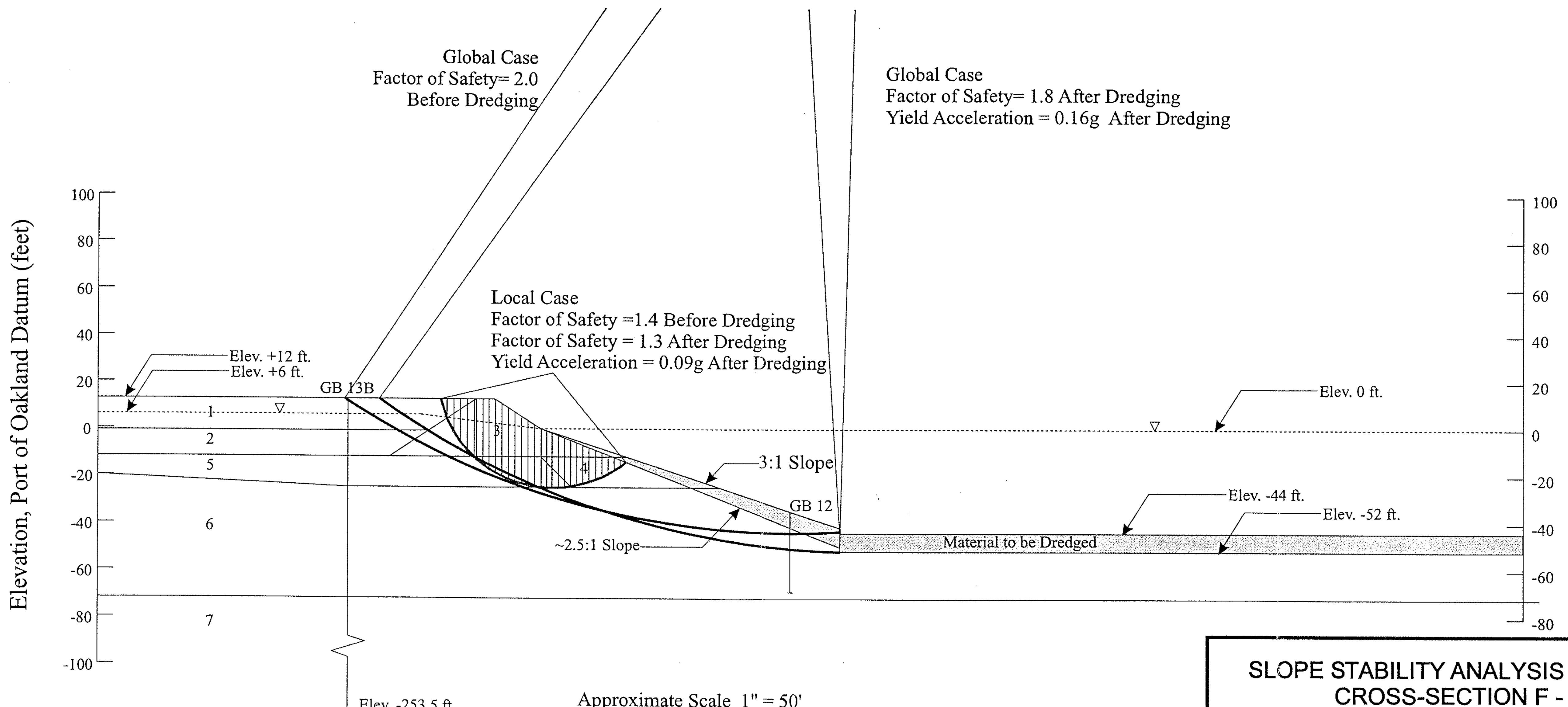
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Cohesion Type	Water Surface	Hu Type	Ru
Fill		115	Mohr-Coulomb	0	34		Water Surface	Constant	
Rockfill		145	Mohr-Coulomb	0	50		Water Surface	Constant	
YBM (soft)		90	Undrained	200		FDepth	None		0
YBM (stiff)		120	Undrained	450		FDepth	None		0
San Antonio		130	Mohr-Coulomb	0	40		Water Surface	Constant	
Old Bay Clay		120	Undrained	2000		FDepth	None		0

ENGEO Expect Excellence 40 years

SLIDEINTERPRET 6.014

Project	Alameda Point		
Analysis Description	Spencer		
Drawn By Siobhan O'Reilly-Shah	*Scale* 1:750	*Company*	ENGEO
Date 12/12/2012, 10:36:05 AM		*File Name*	Pseudo-Static Slope Stability - xsecJ-J''.slim

Layer No.	Soil Classification (Lithologic Unit)	Unit Weight (pcf)	Effective Friction Angle (degrees)	Effective Cohesion Intercept (psf)	Undrained Shear Strength (psf)
1	Loose Sand (Fill)	115	30	0	-
2	Soft to Medium Stiff Clay (Fill)	100	-	-	400 at top of layer, increasing 9 psf/ft.
3	Rockfill (Old Training Wall)	145	50	0	-
4	Soft Clay (Young Bay Mud)	95	-	-	250 at El. -12 ft., increasing 11 psf/ft
5	Medium Stiff Clay (Young Bay Mud)	100	-	-	500 at top of layer, increasing 11 psf/ft.
6	Very Dense Sand (San Antonio Formation)	130	40	0	-
7	Very Stiff Clay (Old Bay Mud)	120	-	-	2000 at top of layer, increasing 30 psf/ft



Notes:
1. Yield Acceleration was determined using a post-liquefaction residual strength of 300 psf for the submerged part of layer #1
2. If the new channel limit is moved 25 feet north, the -42 foot channel slope can be extended at a 3:1 slope so that the local stability case is not impacted by the proposed dredging.

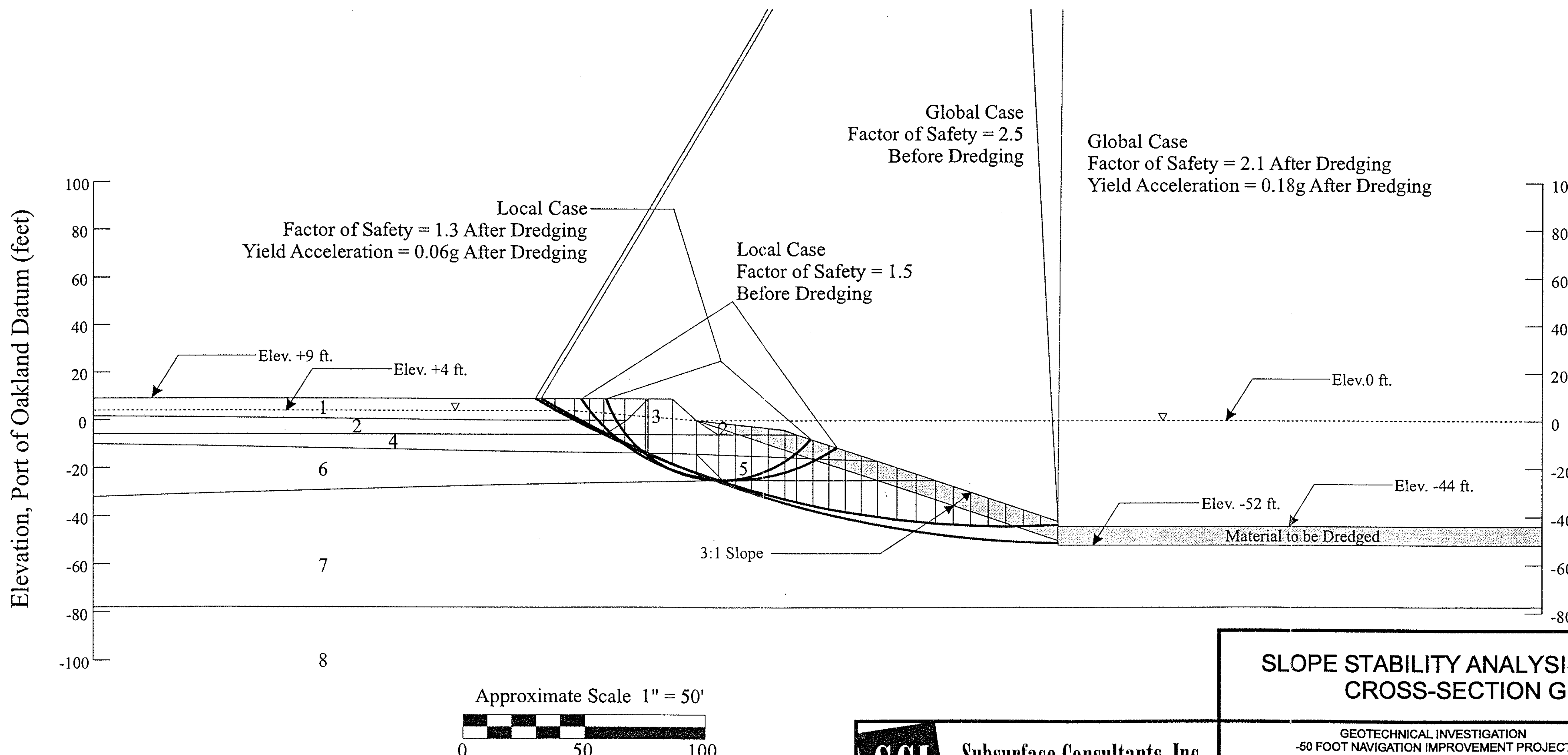
SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

SLOPE STABILITY ANALYSIS RESULTS
CROSS-SECTION F - F'

GEOTECHNICAL INVESTIGATION
-50 FOOT NAVIGATION IMPROVEMENT PROJECT
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
133.007	12/97	[signature]	37

Layer No.	Soil Classification (Lithologic Unit)	Unit Weight (pcf)	Effective Friction Angle (degrees)	Effective Cohesion Intercept (psf)	Undrained Shear Strength (psf)
1	Loose Sand (Fill)	115	30	0	-
2	Loose Sand (Fill)	115	30	0	-
3	Rockfill (Old Training Wall)	145	50	0	-
4	Interbedded Loose Sand and Soft Clay (Recent Bay Deposits)	115	30	0	-
5	Soft Clay (Young Bay Mud)	95	-	-	250 at El. -14 ft., increasing 11 psf/ft
6	Medium Stiff Clay (Young Bay Mud)	100	-	-	500 at top of layer, increasing 11 psf/ft.
7	Very Dense Sand (San Antonio Formation)	130	40	0	-
8	Very Stiff Clay (Old Bay Mud)	120	-	-	2000 at top of layer, increasing 30 psf/ft



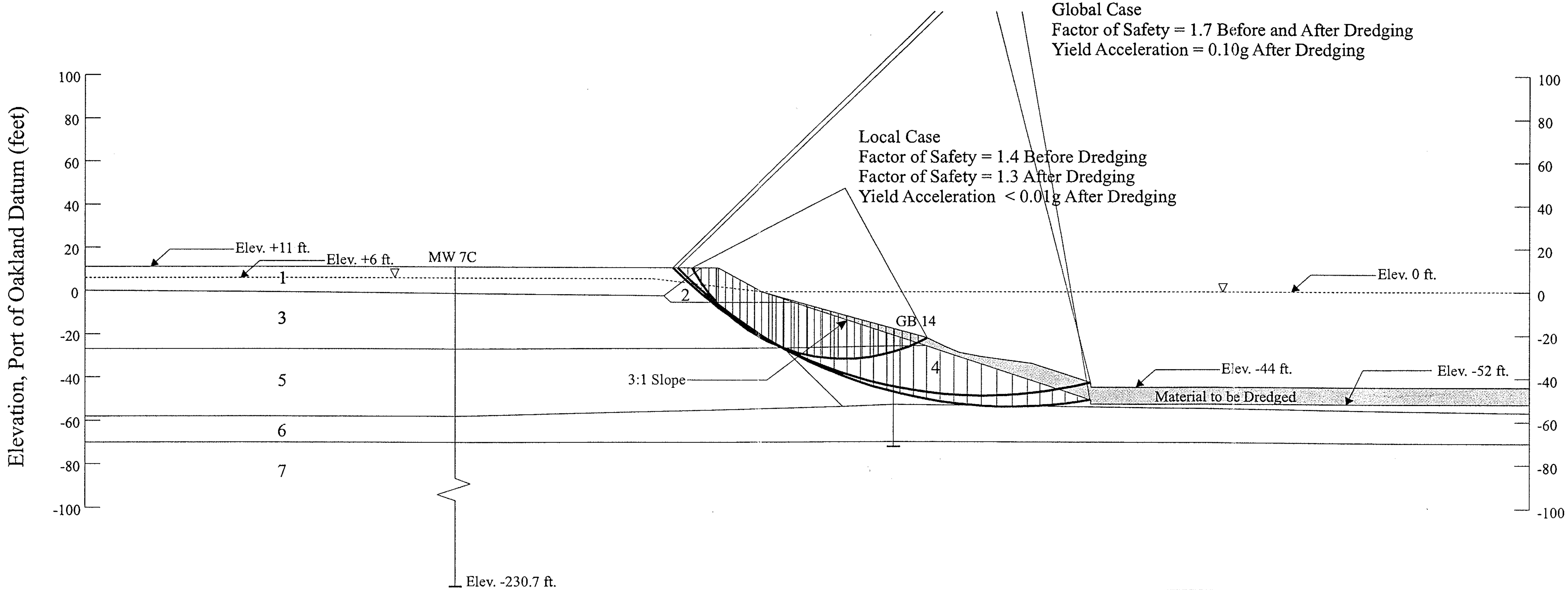
SLOPE STABILITY ANALYSIS RESULTS CROSS-SECTION G - G'

SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

GEOTECHNICAL INVESTIGATION
-50 FOOT NAVIGATION IMPROVEMENT PROJECT
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
133.007	12/97	[signature]	38

Layer No.	Soil Classification (Lithologic Unit)	Unit Weight (pcf)	Effective Friction Angle (degrees)	Effective Cohesion Intercept (degrees)	Undrained Shear Strength (psf)
1	Loose Sand (Fill)	115	30	0	-
2	Rockfill (Old Training Wall)	145	50	0	-
3	Interbedded Loose Sand and Soft Clay (Recent Bay Deposits)	115	30	0	-
4	Soft Clay (Young Bay Mud)	100	-	-	300 at El. -27 ft., increasing 11 psf/ft.
5	Interbedded Medium Stiff Clay and Medium Dense Clayey Sand (Young Bay Mud and San Antonio Formations)	105	-	-	500 at El. -27 ft., increasing 11 psf/ft.
6	Very Dense Sand (San Antonio Formation)	130	40	0	
7	Very Stiff Clay (Old Bay Clay)	120	-	-	2000 at top of layer, increasing 30 psf/ft.



SLOPE STABILITY ANALYSIS RESULTS CROSS-SECTION H - H'

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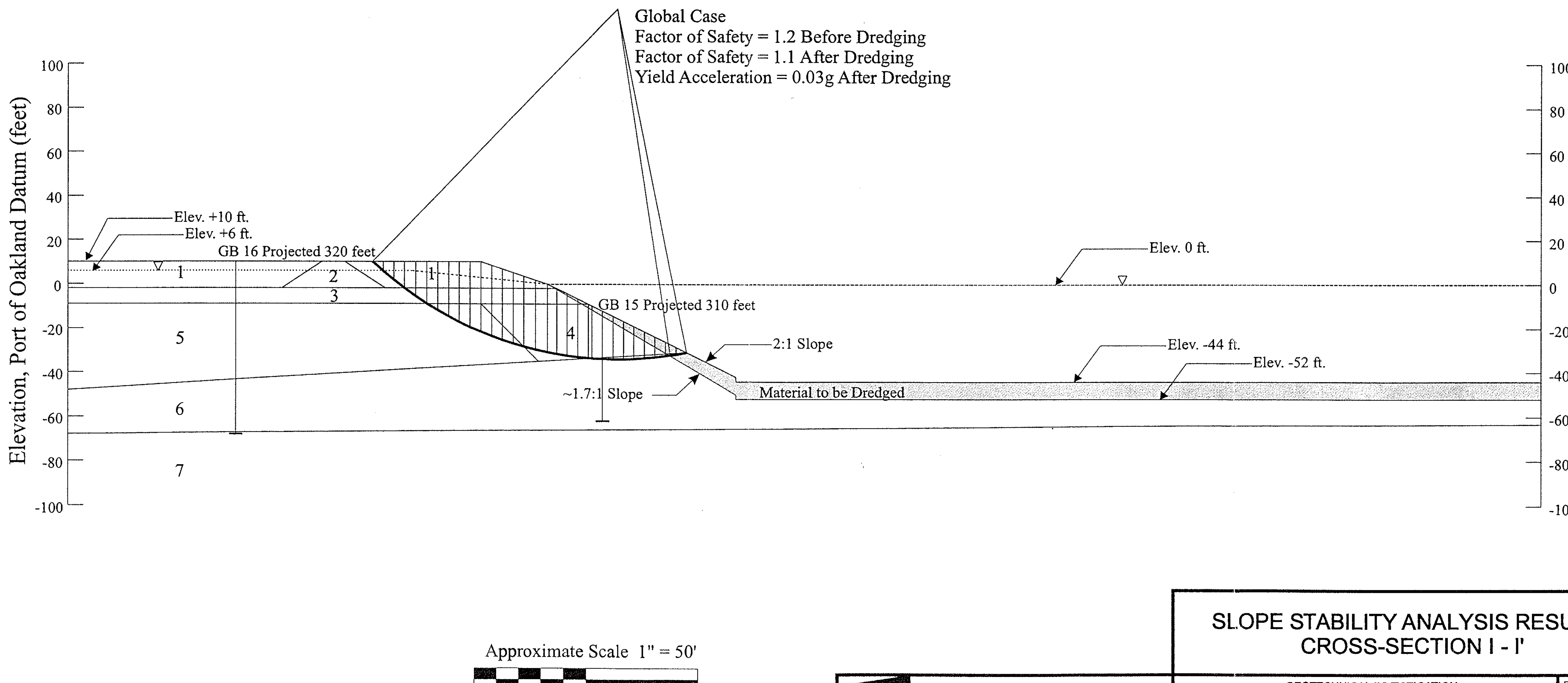
Geotechnical & Environmental Engineers

GEOTECHNICAL INVESTIGATION
-50 FOOT NAVIGATION IMPROVEMENT PROJECT
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
133.007	12/97	[signature]	39

Layer No.	Soil Classification (Lithologic Unit)	Unit Weight (pcf)	Effective Friction Angle (degrees)	Effective Cohesion Intercept (degrees)	Undrained Shear Strength (psf)
1	Medium Dense to Dense Sand (Fill)	115	34	0	-
2	Rockfill (Old Training Wall)	145	50	0	-
3	Medium Dense to Dense Sand (Recent Bay Deposits)	115	34	0	-
4	Soft Clay (Young Bay Mud)	90	-		200 at El. -27 ft., increasing 11 psf/ft.
5	Medium Stiff Clay (Young Bay Mud)	95	-	-	450 at El. -27 ft., increasing 11 psf/ft.
6	Very Dense Sand (San Antonio Formation)	130	40	0	-
7	Very Stiff Clay (Old Bay Clay)	120	-	-	2000 at top of layer, increasing 30 psf/ft.



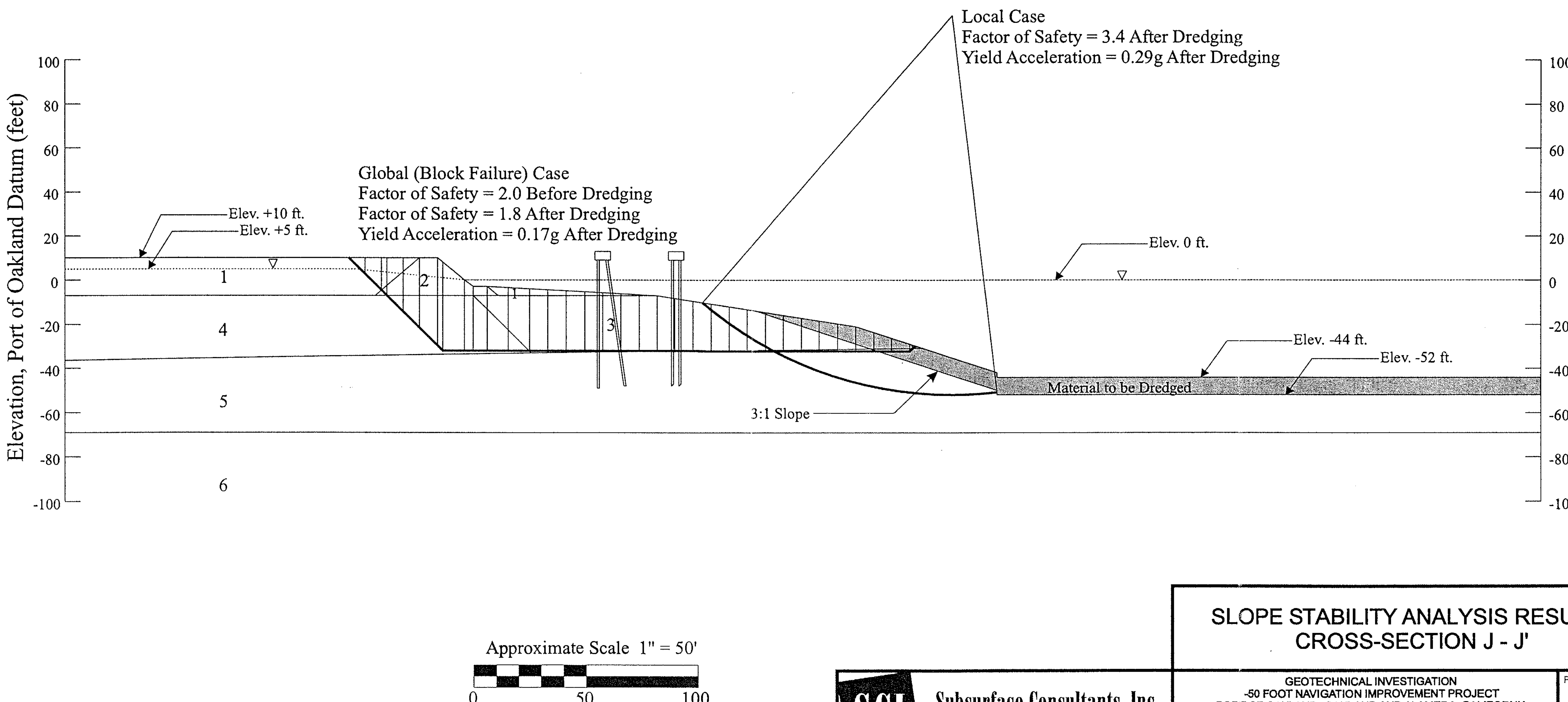
SLOPE STABILITY ANALYSIS RESULTS
CROSS-SECTION I - I'

SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

GEOTECHNICAL INVESTIGATION
-50 FOOT NAVIGATION IMPROVEMENT PROJECT
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
133.007	12/97	[signature]	40

Layer No.	Soil Classification (Lithologic Unit)	Unit Weight (pcf)	Effective Friction Angle (degrees)	Effective Cohesion Intercept (degrees)	Undrained Shear Strength (psf)
1	Loose to Medium Dense Sand (Fill)	115	30	0	-
2	Rockfill (Old Training Wall)	145	50	0	-
3	Soft Clay (Young Bay Mud)	90	-		170 at El. -7 ft., increasing 11 psf/ft.
4	Medium Stiff Clay (Young Bay Mud)	95	-	-	350 at El. -7 ft., increasing 11 psf/ft.
5	Very Dense Sand (San Antonio Formation)	130	40	0	-
6	Very Stiff Clay (Old Bay Clay)	120	-	-	2000 at top of layer, increasing 30 psf/ft.



SLOPE STABILITY ANALYSIS RESULTS
CROSS-SECTION J - J'

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

GEOTECHNICAL INVESTIGATION
-50 FOOT NAVIGATION IMPROVEMENT PROJECT
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
133.007	12/97	[signature]	41

APPENDICES

B) DETAILED UTILITY SCHEMATIC PLAN

DRAFT

ALAMEDA POINT
MASTER INFRASTRUCTURE PLAN
CONCEPTUAL UTILITY STUDY
BASE CASE - REUSE PLAN

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

cbg Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS
6111 BOLLINGER CANYON ROAD, SUITE 150
SAN RAMON, CALIFORNIA 94583
(925) 866-0322
FAX (925) 866-8575
SAN RAMON • LATHROP

0' 200' 600' 800'

SCALE: 1" = 200'

DATE: JULY, 2013

APPENDICES

C) WASTEWATER FLOW CALCULATIONS

DRAFT

ENGINEER'S PRELIMINARY CALCULATIONS
SEWAGE FLOW
BASE CASE - REUSE PLAN
ALAMEDA POINT
ALAMEDA, CALIFORNIA

July 31, 2013
Job No.: 1087-010

Total Unit Count: 1,425
Total Acres: 766.1
Total SF: 5,500,000

Sanitary Sewage Design Quantities based on **New** City of Alameda Standards:

Type of	Zoning	Base Usage	PF	Peak Usage		Usage		DU/acre Range
Residential Reuse	RE	240	2.0	480	gpd/unit	0.0007	cfs/unit	-
Very Low Density	R1	240	2.0	480	gpd/unit	0.0007	cfs/unit	< 8.7
Single Family	R2	240	2.0	480	gpd/unit	0.0007	cfs/unit	8.7 - 21.8
Office	O	0.1	2.0	0.20	gpd/sf	0.00000031	cfs/sf	-
Manufacturing/WH	M	0.02	2.0	0.04	gpd/sf	0.00000006	cfs/sf	-
Retail	R	0.1	2.0	0.20	gpd/sf	0.00000031	cfs/sf	-
Service	S	0.5	2.0	1.00	gpd/sf	0.00000155	cfs/sf	-
GWI and I/I	I	-	-	1,300	gpd/net acre	0.0020	cfs/net acre	-
Park	P	-	-	3,231	gpd/net acre	0.0050	cfs/net acre	-
VA	-	-	-	20,000	gpd	0.0310	cfs	-

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	Area Number	Product Type	Unit Count	Acreage	SF	Zoning	Usage based on Zoning	Peak Sewage Flow by	Peak Sewage Flow by area(cfs)
1	7.7	-0.15	7.2	**4**	8.0	-4.90	8 inch	1,355	0.0035	0.03	1.0 fps	14%	C-8	Park	-	6.6	-	P	3,231	0.0050	0.03
2	7.5	1.40	5.4	**4**	8.0	-4.90	8 inch	1,740	0.0035	0.24	1.8 fps	40%	C-4 (~50%)	Manufacturing/WH	-	11.9	205,000	M	0.04	0.00000006	0.01
													C-7	Office	-	14.6	300,000	O	0.20	0.00000031	0.09
													C-8	Park	-	17.0	-	P	3,231	0.0050	0.09
													GWI & I/I	GWI and I/I	-	26.5	-	I	1,300	0.0020	0.05
																					0.24
3	8.0	-1.60	8.9	**4**	8.0	-4.90	8 inch	915	0.0035	0.07	1.3 fps	21%	C-6	Office	-	10.1	175,000	O	0.20	0.00000031	0.05
													GWI & I/I	GWI and I/I	-	10.1	-	I	1,300	0.0020	0.02
																					0.07
4	8.0	-5.00	12.3	**LS 1**	8.0	-5.40	8 inch	80	0.0035	0.35	2.0 fps	49%	Node 1	-	-	-	-	-	-	-	0.03
													Node 2	-	-	-	-	-	-	-	0.24
													Node 3	-	-	-	-	-	-	-	0.07
																					0.35
LS 1	8.0	1.30	6.0	**6**	7.0	-2.50	8 inch	1,055	0.0035	0.35	2.0 fps	49%	LS 1	-	-	-	-	-	-	-	0.35
5	6.6	-2.10	8.0	**6**	7.0	-3.85	8 inch	505	0.0035	0.10	1.4 fps	25%	C-2	Manufacturing/WH	-	12.5	50,000	M	0.04	0.00000006	0.00
													C-2	Retail	-	-	100,000	R	0.20	0.00000031	0.03
													C-4 (~50%)	Manufacturing/WH	-	11.9	205,000	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	24.4	-	I	1,300	0.0020	0.05
																					0.10
6	7.0	-3.30	9.6	**7**	6.6	-4.85	8 inch	435	0.0035	0.45	2.2 fps	57%	LS 1	-	-	-	-	-	-	-	0.35
													Node 5	-	-	-	-	-	-	-	0.10
																					0.45
7	6.6	-4.95	10.6	**9**	6.1	-5.90	12 inch	465	0.0020	0.67	1.9 fps	45%	C-1	Office	-	11.1	250,000	O	0.20	0.00000031	0.08
													C-3	Office	-	19.1	250,000	O	0.20	0.00000031	0.08
													C-3	Manufacturing/WH	-	-	100,000	M	0.04	0.00000006	0.01
													Node 6	-	-	-	-	-	-	-	0.45
													GWI & I/I	GWI and I/I	-	30.2	-	I	1,300	0.0020	0.06
																					0.67

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	**Area Number**	**Product Type**	**Unit Count**	**Acreage**	**SF**	**Zoning**	**Usage based on Zoning**	**Peak Sewage Flow by**	**Peak Sewage Flow by area(cfs)**
8	6.7	-3.90	9.9	**9**	6.1	-5.90	8 inch	575	0.0035	0.13	1.6 fps	29%	C-5	Manufacturing/WH	-	10.0	435,000	M	0.04	0.00000006	0.03
													C-5	Park	-	15.7	-	P	3,231	0.0050	0.08
													GWI & I/I	GWI and I/I	-	10.0	-	I	1,300	0.0020	0.02
																					0.13
9	6.1	-6.00	11.1	**LS 2**	6.1	-5.90	12 inch	935	0.0020	0.81	2.0 fps	50%	B-3 (~50%)	Retail	-	0.3	12,500	R	0.20	0.00000031	0.00
													B-3 (~50%)	Park	-	2.8	-	P	3,231	0.0050	0.01
													Node 7	-	-	-	-	-	-	-	0.67
													Node 8	-	-	-	-	-	-	-	0.13
													GWI & I/I	GWI and I/I	-	0.3	-	I	1,300	0.0020	0.00
																					0.81
LS 2	6.1	0.00	5.1	**10**	6.1	-1.45	12 inch	665	0.0020	0.81	2.0 fps	50%	Node 9	-	-	-	-	-	-	-	0.81
																					0.81
10	6.1	-1.45	6.6	**18**	7.0	-2.85	12 inch	690	0.0020	0.92	2.1 fps	54%	B-2 (~50%)	Retail	-	1.625	37,500	R	0.20	0.00000031	0.01
													B-2 (~50%)	Service	-	1.625	60,000	S	1.00	0.00000155	0.09
													Node 10	-	-	-	-	-	-	-	0.81
													GWI & I/I	GWI and I/I	-	3.25	-	I	1,300	0.0020	0.01
																					0.92
11	6.5	-2.55	8.4	**14**	6.0	-4.15	8 inch	450	0.0035	0.09	1.4 fps	24%	B-4	Single Family	100	5.6	-	R2	480	0.0007 /Unit	0.07
													B-4	Retail	-	-	25,000	R	0.20	0.00000031	0.01
													GWI & I/I	GWI and I/I	-	5.6	-	I	1,300	0.0020	0.01
																					0.09
12	6.3	-2.75	8.4	**14**	6.0	-4.25	8 inch	430	0.0035	0.41	2.1 fps	54%	B-6	Single Family	100	11.2	-	R2	480	0.0007 /Unit	0.07
													B-6	Office	-	-	100,000	O	0.20	0.00000031	0.03
													B-6	Retail	-	-	25,000	R	0.20	0.00000031	0.01
													B-6	Service	-	-	90,000	S	1.00	0.00000155	0.14
													B-7	Single Family	100	11.2	-	R2	480	0.0007 /Unit	0.07
													B-7	Office	-	-	100,000	O	0.20	0.00000031	0.03
													B-7	Retail	-	-	25,000	R	0.20	0.00000031	0.01
													GWI & I/I	GWI and I/I	-	22.4	-	I	1,300	0.0020	0.05
																					0.41
13	5.6	-2.70	7.6	**14**	6.0	-4.15	8 inch	405	0.0035	0.09	1.4 fps	24%	B-5	Single Family	100	5.6	-	R2	480	0.0007 /Unit	0.07
													B-5	Retail	-	-	25,000	R	0.20	0.00000031	0.01
													GWI & I/I	GWI and I/I	-	5.6	-	I	1,300	0.0020	0.01
																					0.09
14	6.0	-4.25	9.3	**16**	6.0	-6.15	12 inch	935	0.0020	0.60	1.9 fps	42%	Node 11	-	-	-	-	-	-	-	0.09
													Node 12	-	-	-	-	-	-	-	0.41
													Node 13	-	-	-	-	-	-	-	0.09
																					0.60

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	**Area Number**	**Product Type**	**Unit Count**	**Acreage**	**SF**	**Zoning**	**Usage based on Zoning**	**Peak Sewage Flow by**	**Peak Sewage Flow by area(cfs)**
15	5.5	-3.25	8.1	**16**	6.0	-4.70	8 inch	405	0.0035	0.13	1.6 fps	29%	A-7 (~50%)	Very Low Density	48	6.5	-	R1	480	0.0007 /Unit	0.04
													A-9	Very Low Density	75	10.5	-	R1	480	0.0007 /Unit	0.06
													GWI & I/I	GWI and I/I	-	17.0	-	I	1,300	0.0020	0.03
																					0.13
16	6.0	-6.25	11.3	**LS 3**	6.0	-6.50	12 inch	80	0.0020	0.72	2.0 fps	47%	Node 14	-	-	-	-	-	-	-	0.60
													Node 15	-	-	-	-	-	-	-	0.13
																					0.72
LS 3	6.0	-1.00	6.0	**17**	6.5	-2.25	12 inch	560	0.0020	0.72	2.0 fps	47%	Node 16	-	-	-	-	-	-	-	0.72
17	6.5	-2.25	7.8	**18**	7.0	-3.35	12 inch	555	0.0020	0.87	2.1 fps	53%	LS 3	-	-	-	-	-	-	-	0.72
													A-6 (~50%)	Very Low Density	55	10.1	-	R1	480	0.0007 /Unit	0.04
													A-8	Very Low Density	80	12.7	-	R1	480	0.0007 /Unit	0.06
													GWI & I/I	GWI and I/I	-	22.8	-	I	1,300	0.0020	0.05
																					0.87
18	7.0	-3.45	9.0	**LS 4**	5.6	-4.50	18 inch	950	0.0010	1.80	1.9 fps	53%	Node 10	-	-	-	-	-	-	-	0.92
													Node 17	-	-	-	-	-	-	-	0.87
													D-13	Manufacturing/WH	-	2.3	21,500	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	2.3	-	I	1,300	0.0020	0.00
																					1.80
19	5.5	-2.00	6.8	**20**	5.9	-3.40	8 inch	400	0.0035	0.05	1.2 fps	18%	A-7 (~50%)	Very Low Density	47	6.5	-	R1	480	0.0007 /Unit	0.03
													GWI & I/I	GWI and I/I	-	6.5	-	I	1,300	0.0020	0.01
																					0.05
20	5.9	-4.50	9.7	**21**	6.1	-6.50	8 inch	600	0.0035	0.24	1.8 fps	40%	Node 19	-	-	-	-	-	-	-	0.05
													A-5	Single Family	200	13.8	-	R2	480	0.0007 /Unit	0.15
													A-5	Park	-	3.0	-	P	3,231	0.0050	0.02
													GWI & I/I	GWI and I/I	-	13.8	-	I	1,300	0.0020	0.03
																					0.24
21	6.1	-6.60	12.0	**LS 4**	5.0	-8.90	8 inch	660	0.0035	0.44	2.2 fps	56%	Node 20	-	-	-	-	-	-	-	0.24
													A-4	Very Low Density	135	18.8	-	R1	480	0.0007 /Unit	0.10
													A-6 (~50%)	Very Low Density	55	10.1	-	R1	480	0.0007 /Unit	0.04
													GWI & I/I	GWI and I/I	-	28.9	-	I	1,300	0.0020	0.06
																					0.44
LS 4	5.0	-2.00	5.0	**23**	6.5	-3.25	24 inch	1150	0.0010	2.32	2.0 fps	39%	Node 18	-	-	-	-	-	-	-	1.80
													Node 21	-	-	-	-	-	-	-	0.44
													D-9 (~50%)	Residential Reuse	38	5.7	-	RE	480	0.0007 /Unit	0.03
													D-9 (~50%)	Office	-	-	15,000	O	0.20	0.00000031	0.00
													D-9 (~50%)	Service	-	-	17,500	S	1.00	0.00000155	0.03
													D-13	Manufacturing/WH	-	3.7	36,000	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	9.4	-	I	1,300	0.0020	0.02
																					2.32
22	5.5	-0.80	5.6	**23**	6.5	-3.15	8 inch	665	0.0035	0.04	1.1 fps	16%	D-12 (~25%)	Manufacturing/WH	-	1.8	10,000	M	0.04	0.00000006	0.00
													D-13	Manufacturing/WH	-	13.0	173,000	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	14.8	-	I	1,300	0.0020	0.03
																					0.04

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	Area Number	Product Type	Unit Count	Acreage	SF	Zoning	Usage based on Zoning	Peak Sewage Flow by	Peak Sewage Flow by area(cfs)
23	6.5	-3.25	7.8	**35**	6.5	-7.80	24 inch	420	0.0108	2.38	4.8 fps	22%	LS 4	-	-	-	-	-	-	-	2.32
													Node 22	-	-	-	-	-	-	-	0.04
													D-7	Office	-	1.8	49,000	O	0.20	0.00000031	0.02
													D-12 (~25%)	Manufacturing/WH	-	1.8	10,000	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	3.6	-	I	1,300	0.0020	0.01
																					2.38
24	6.1	0.05	5.4	**26**	3.2	-5.15	8 inch	1480	0.0035	0.13	1.6 fps	29%	D-17	Manufacturing/WH	-	10.5	100,000	M	0.04	0.00000006	0.01
													D-20	Park	-	4.2	-	P	3,231	0.0050	0.02
													D-20	Office	-	1.1	50,000	O	0.20	0.00000031	0.02
													D-21	Park	-	8.6	-	P	3,231	0.0050	0.04
													D-21	Office	-	1.1	50,000	O	0.20	0.00000031	0.02
													GWI & I/I	GWI and I/I	-	12.7	-	I	1,300	0.0020	0.03
																					0.13
25	3.7	-4.60	7.6	**26**	3.2	-5.15	8 inch	150	0.0035	0.02	0.9 fps	12%	D-14	Office	-	7.0	18,500	O	0.20	0.00000031	0.01
													GWI & I/I	GWI and I/I	-	7.0	-	I	1,300	0.0020	0.01
																					0.02
26	3.2	-5.25	7.8	**29**	4.0	-9.80	8 inch	1305	0.0035	0.20	1.8 fps	36%	Node 24	-	-	-	-	-	-	-	0.13
													Node 25	-	-	-	-	-	-	-	0.02
													D-15 (~50%)	Manufacturing/WH	-	8.25	112,500	M	0.04	0.00000006	0.01
													D-18	Office	-	5.8	58,000	O	0.20	0.00000031	0.02
													GWI & I/I	GWI and I/I	-	14.1	-	I	1,300	0.0020	0.03
																					0.20
27	5.4	-1.30	6.0	**28**	4.0	-4.90	8 inch	1000	0.0035	0.11	1.5 fps	26%	B-1	Residential Reuse	90	15.5	-	RE	480	0.0007 /Unit	0.07
													D-13	Manufacturing/WH	-	4.3	39,500	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	19.8	-	I	1,300	0.0020	0.04
																					0.11
28	4.0	-5.00	8.3	**29**	4.0	-6.75	8 inch	490	0.0035	0.27	1.9 fps	43%	Node 27	-	-	-	-	-	-	-	0.11
													B-2 (~50%)	Retail	-	1.625	37,500	R	0.20	0.00000031	0.01
													B-2 (~50%)	Service	-	1.625	60,000	S	1.00	0.00000155	0.09
													B-3 (~50%)	Retail	-	0.3	12,500	R	0.20	0.00000031	0.00
													B-3 (~50%)	Park	-	2.8	-	P	3,231	0.0050	0.01
													D-16 (~50%)	Manufacturing/WH	-	2.25	53,000	M	0.04	0.00000006	0.00
													D-19	Park	-	1.6	-	P	3,231	0.0050	0.01
													D-21	Park	-	4.0	-	P	3,231	0.0050	0.02
													GWI & I/I	GWI and I/I	-	5.8	-	I	1,300	0.0020	0.01
																					0.27
29	4.0	-9.80	13.1	**LS 5**	4.0	-10.00	8 inch	30	0.0035	0.47	2.2 fps	59%	Node 26	-	-	-	-	-	-	-	0.20
													Node 28	-	-	-	-	-	-	-	0.27
																					0.47
LS 5	4.0	-2.00	5.3	**31**	5.2	-4.20	8 inch	605	0.0035	0.48	2.2 fps	60%	Node 29	-	-	-	-	-	-	-	0.47
													D-16 (~50%)	Manufacturing/WH	-	2.25	53,000	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	2.25	-	I	1,300	0.0020	0.00
																					0.48

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	Area Number	Product Type	Unit Count	Acreage	SF	Zoning	Usage based on Zoning	Peak Sewage Flow by	Peak Sewage Flow by area(cfs)
30	5.0	-1.00	5.3	**31**	5.2	-4.20	8 inch	910	0.0035	0.05	1.2 fps	18%	D-11 (~20%)	Office	-	5.4	6,000	O	0.20	0.00000031	0.00
													D-11 (~20%)	Manufacturing/WH	-	-	174,000	M	0.04	0.00000006	0.01
													D-15 (~50%)	Manufacturing/WH	-	8.25	112,500	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	13.65	-	I	1,300	0.0020	0.03
																					0.05
31	5.2	-4.30	8.5	**35**	6.3	-6.25	12 inch	980	0.0020	0.56	1.8 fps	41%	LS 5	-	-	-	-	-	-	-	0.48
													Node 30	-	-	-	-	-	-	-	0.05
													D-11 (~20%)	Office	-	5.4	6,000	O	0.20	0.00000031	0.00
													D-11 (~20%)	Manufacturing/WH	-	-	174,000	M	0.04	0.00000006	0.01
													D-12 (~50%)	Manufacturing/WH	-	3.7	19,500	M	0.04	0.00000006	0.00
													GWI & I/I	GWI and I/I	-	9.10	-	I	1,300	0.0020	0.02
																					0.56
32	5.0	-0.30	4.6	**33**	7.0	-2.40	8 inch	600	0.0035	0.10	1.4 fps	25%	D-2	Manufacturing/WH	-	23.1	260,000	M	0.04	0.00000006	0.02
													D-10	Manufacturing/WH	-	7.1	70,000	M	0.04	0.00000006	0.00
													D-11 (~20%)	Office	-	5.4	6,000	O	0.20	0.00000031	0.00
													D-11 (~20%)	Manufacturing/WH	-	-	174,000	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	35.6	-	I	1,300	0.0020	0.07
																					0.10
33	7.0	-2.40	8.7	**36**	6.0	-6.15	8 inch	1065	0.0035	0.19	1.7 fps	35%	Node 32	-	-	-	-	-	-	-	0.10
													D-3 (~20%)	Residential Reuse	20	4.4	-	RE	480	0.0007 /Unit	0.01
													D-3 (~20%)	Office	-	-	18,400	O	0.20	0.00000031	0.01
													D-3 (~20%)	Manufacturing/WH	-	-	25,000	M	0.04	0.00000006	0.00
													D-3 (~20%)	Service	-	-	18,400	S	1.00	0.00000155	0.03
													D-11 (~20%)	Office	-	5.4	6,000	O	0.20	0.00000031	0.00
													D-11 (~20%)	Manufacturing/WH	-	-	174,000	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	9.8	-	I	1,300	0.0020	0.02
																					0.19
34	2.5	-4.60	6.1	**35**	2.0	-5.80	12 inch	600	0.0020	0.03	0.8 fps	10%	VA	-	-	-	-	-	-	-	0.03
													E-1	Park	-	158.5	-	P	3,231	0.0050	Not Included
																					0.03
35	2.0	-5.80	6.8	**36**	2.5	-6.15	12 inch	170	0.0020	0.31	1.6 fps	30%	Node 34	-	-	-	-	-	-	-	0.03
													E-2	Park	-	55.5	-	P	3,231	0.0050	0.28
																					0.31
36	2.5	-6.25	7.8	**44**	1.7	-9.00	12 inch	1380	0.0020	0.61	1.9 fps	43%	Node 33	-	-	-	-	-	-	-	0.19
													Node 35	-	-	-	-	-	-	-	0.31
													D-3 (~40%)	Residential Reuse	40	8.7	-	RE	480	0.0007 /Unit	0.03
													D-3 (~40%)	Office	-	-	36,800	O	0.20	0.00000031	0.01
													D-3 (~40%)	Manufacturing/WH	-	-	50,000	M	0.04	0.00000006	0.00
													D-3 (~40%)	Service	-	-	36,800	S	1.00	0.00000155	0.06
													GWI & I/I	GWI and I/I	-	8.7	-	I	1,300	0.0020	0.02
																					0.61

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	**Area Number**	**Product Type**	**Unit Count**	**Acreage**	**SF**	**Zoning**	**Usage based on Zoning**	**Peak Sewage Flow by**	**Peak Sewage Flow by area(cfs)**
35	6.0	-7.90	11.9	**44**	1.7	-9.00	24 inch	1065	0.0010	3.09	2.2 fps	46%	Node 23	-	-	-	-	-	-	-	2.38
													Node 31	-	-	-	-	-	-	-	0.56
													D-4	Park	-	8.0	-	P	3,231	0.0050	Not Included
													D-5	Park	-	1.8	-	P	3,231	0.0050	Not Included
													D-6	Park	-	3.6	-	P	3,231	0.0050	Not Included
													D-3 (~40%)	Residential Reuse	40	8.7	-	RE	480	0.0007 /Unit	0.03
													D-3 (~40%)	Office	-	-	36,800	O	0.20	0.00000031	0.01
													D-3 (~40%)	Manufacturing/WH	-	-	50,000	M	0.04	0.00000006	0.00
													D-3 (~40%)	Service	-	-	36,800	S	1.00	0.00000155	0.06
													D-11 (~20%)	Office	-	5.5	6,000	O	0.20	0.00000031	0.00
													D-11 (~20%)	Manufacturing/WH	-	-	174,000	M	0.04	0.00000006	0.01
													GWI & I/I	GWI and I/I	-	14.2	-	I	1,300	0.0020	0.03
																					3.09
38	3.5	-1.65	4.5	**40**	1.0	-6.45	8 inch	1345	0.0035	0.04	1.1 fps	16%	A-3	Residential Reuse	12	14.2	-	RE	480	0.0007 /Unit	0.01
													GWI & I/I	GWI and I/I	-	14.2	-	I	1,300	0.0020	0.03
																					0.04
39	2.6	-2.80	4.7	**40**	1.0	-6.35	8 inch	985	0.0035	0.04	1.1 fps	16%	A-3	Residential Reuse	11	6.0	-	RE	480	0.0007 /Unit	0.01
													D-8 (~10%)	Office	-	3.8	7,500	O	0.20	0.00000031	0.00
													D-8 (~10%)	Service	-	-	7,500	S	1.00	0.00000155	0.01
													GWI & I/I	GWI and I/I	-	9.8	-	I	1,300	0.0020	0.02
																					0.04
40	1.0	-6.45	6.8	**LS 6**	2.0	-6.60	8 inch	35	0.0035	0.08	1.4 fps	22%	Node 38	-	-	-	-	-	-	-	0.04
													Node 39	-	-	-	-	-	-	-	0.04
																					0.08
LS 6	2.0	-3.40	4.7	**41**	2.3	-6.15	8 inch	760	0.0035	0.24	1.8 fps	40%	Node 40	-	-	-	-	-	-	-	0.08
													A-2	Service	-	3.1	100,000	S	1.00	0.00000155	0.15
													GWI & I/I	GWI and I/I	-	3.1	-	I	1,300	0.0020	0.01
																					0.24
41	2.3	-6.15	7.8	**43**	2.1	-7.55	8 inch	400	0.0035	0.36	2.1 fps	50%	LS 6	-	-	-	-	-	-	-	0.24
													A-1	Very Low Density	42	7.3	-	R1	480	0.0007 /Unit	0.03
													D-8 (~45%)	Office	-	3.7	33,750	O	0.20	0.00000031	0.01
													D-8 (~45%)	Service	-	-	33,750	S	1.00	0.00000155	0.05
													GWI & I/I	GWI and I/I	-	11.0	-	I	1,300	0.0020	0.02
																					0.36

From Node	Rim	Invert Out	Cover (Ft)	To Node	Rim	Invert In	Pipe Diameter (Inches)	Pipe Length (Feet)	Pipe Slope (Ft / Ft)	Peak Flow (cfs)	Velocity (fps)	Percent Capacity	**Area Number**	**Product Type**	**Unit Count**	**Acreage**	**SF**	**Zoning**	**Usage based on Zoning**	**Peak Sewage Flow by**	**Peak Sewage Flow by area(cfs)**
42	2.5	-5.40	7.2	**43**	2.1	-7.45	8 inch	580	0.0035	0.14	1.6 fps	30%	D-8 (~45%)	Office	-	3.7	33,750	O	0.20	0.00000031	0.01
													D-8 (~45%)	Service	-	-	33,750	S	1.00	0.00000155	0.05
													D-9 (~50%)	Residential Reuse	37	5.6	-	RE	480	0.0007 /Unit	0.03
													D-9 (~50%)	Office	-	-	15,000	O	0.20	0.00000031	0.00
													D-9 (~50%)	Service	-	-	17,500	S	1.00	0.00000155	0.03
													GWI & I/I	GWI and I/I	-	9.3	-	I	1,300	0.0020	0.02
																					0.14
43	2.1	-7.45	8.9	**44**	1.7	-9.00	8 inch	415	0.0035	0.50	2.2 fps	62%	Node 41	-	-	-	-	-	-	-	0.36
													Node 42	-	-	-	-	-	-	-	0.14
													D-1	Park	-	14.9	-	P	3,231	0.0050	Not Included
																					0.50
44	1.7	-9.10	8.8	**PS 1**	3.6	-9.50	24 inch	365	0.0010	4.20	2.4 fps	55%	Node 35	-	-	-	-	-	-	-	3.09
													Node 36	-	-	-	-	-	-	-	0.61
													Node 43	-	-	-	-	-	-	-	0.50
																					4.20

APPENDICES

D) SANITARY SEWER FLOW ESTIMATES AND MODELING (RMC)

Technical Memorandum - DRAFT

Subject: **Alameda Point Sanitary Sewer Flow Estimates and Modeling**

Prepared for: Barbara Hawkins and Jennifer Ott, City of Alameda

Prepared by: Gisa Ju

Date: June 28, 2013

This Technical Memorandum (TM) summarizes the results of hydraulic modeling of the proposed Alameda Point sewer system as developed for the Draft Alameda Pont Master Infrastructure Plan (MIP) prepared by Carlson, Barbee & Gibson (CBG) for the City of Alameda. The modeling was conducted pursuant to an agreement between RMC and the City of Alameda dated April 3, 2013. The purpose of the modeling work is to confirm the design wastewater flow projections for the proposed Alameda Point redevelopment and estimate the flows at interim stages of development. The information in this TM will also provide information for the assessment of downstream flow impacts to be addressed in the Alameda Point Draft Environmental Impact Report.

1 Model Network

The model of the proposed Alameda Point sewer system was developed in InfoWorks™ CS, the same hydraulic modeling software used for the City's system-wide Sanitary Sewer System Hydraulic Analysis (May 2010) previously prepared by RMC. The configuration and alignment of the proposed Alameda Point sewer system and the proposed land uses and their associated "load points" to the sewer network were provided by CBG in the form of an AutoCAD map showing the proposed sewer network, and an Excel spreadsheet listing the sewer network data (pipe diameters, lengths, slopes, rim and invert elevations) and associated loading (land uses) to each manhole in the network. The model only includes the "trunk system" network, i.e., smaller diameter pipes and manholes that were not indicated as loading nodes on the CBG map were not included in the model. CBG also provided information (approximate pumping capacities and wet well dimensions) as needed for modeling of the six proposed lift stations in the system.

The CBG map divides the system into "blocks" with associated land uses and acreages. Since some of these blocks load to more than one model node, those blocks were further subdivided as necessary to create individual "subcatchments" for model loading.

Figure 1 depicts the modeled sewer network. Note that all flow in both the existing and proposed Alameda Point sewer system is conveyed to the pump station owned and operated by the East Bay Municipal Utility District (EMBUD) on the north side of the site, from where the flow is pumped through a 20-inch force main to the inlet structure of EBMUD's Alameda siphons. The siphons, which convey all flow from the City of Alameda, cross the Oakland Estuary and connect to EBMUD's South Interceptor, which conveys flow to EBMUD's Main Wastewater Treatment Plant located near the eastern terminus of the San Francisco-Oakland Bay Bridge. Note that EBMUD's Alameda Point pump station, known as Pump Station R, is called Pump Station 1 in the MIP. See Figure 30 of the Draft MIP for a depiction of the off-site EBMUD wastewater conveyance facilities.

Figure 1: Alameda Point Proposed Sewer System - Modeled Network

J:\Projects\0232-009 Alameda Point Sewer Evaluation\G. GIS_MXD\AlamedaPoint_Overview.mxd

2 Model Scenarios

The development of Alameda Point is expected to take place in stages, with the portion identified as the "Development Area", largely located on the eastern side of the site, being developed first with all new sewer infrastructure (see Draft MIP Figure 31). Development of the remainder of the site, called the "Reuse Area," would proceed incrementally over time, initially making use of the existing infrastructure with some rehabilitation to address existing deficiencies and reduce infiltration/inflow (I/I) (see Draft MIP Figure 32). Ultimately, new sewer infrastructure would also be constructed in the Reuse Areas as well (Draft MIP Figure 33).

Accordingly, three modeling scenarios were analyzed for this TM:

- **Scenario A –** Full development in the Development Area with new sewer infrastructure conveying flow to Pump Station 1; existing uses in the Reuse Area utilizing existing sewer infrastructure but tying into major trunks constructed as part of the Development Area to convey flow to Pump Station 1.
- **Scenario B –** Scenario A plus additional development in the Reuse Area, but still utilizing existing sewer infrastructure with some rehabilitation to address deficiencies and reduce I/I.
- **Scenario C -** Full development and all new sewer infrastructure in both the Development and Reuse Areas.

Note that although there is existing mapping for the existing Alameda Point sewer system, there is not sufficient sewer attribute information (e.g., rim and invert elevations, etc.) to hydraulically model the system. Therefore, for Scenarios A and B, the Reuse Area model subcatchments were loaded at the nodes on the Scenario A new trunk system to which the flows from those subcatchments would ultimately be conveyed. This was considered a reasonable approximation for purposes of estimating the total flow in the system conveyed to Pump Station 1 under each scenario.

3 Model Loads

Flow inputs to the model are represented in terms of average base wastewater flow (BWF) for residential and non-residential land uses, groundwater infiltration rates, and rainfall-dependent I/I hydrograph parameters for each loading area, called " subcatchments" in the model.

3.1 Base Wastewater Flow

Using the spreadsheet provided by CBG, the land uses loading to each subcatchment were quantified and converted to average BWF for residential and non-residential land uses. The unit flow rates as applied to the land use information were the same as those used for the City's 2010 Hydraulic Analysis, except some flow was also allocated to parks. The average BWF unit factors are shown in **Table 1**.

In addition to the land use-based loads, the model also includes the proposed load from the proposed Veterans Affairs (VA) facility on the western end of the site (flows from the VA facility would be pumped east to the Alameda Point sewer system). CBG estimated the peak flow for the VA facility at 20,000 gallons per day (gpd). For purposes of the model, this was converted to an average BWF non-residential load of 12,000 gpd and was included in all three model scenarios.

Table 1: Average Base Wastewater Flow Unit Factors

Land Use	Zoning Designation	Unit	Average BWF Factor (gpd/unit)
Residential Reuse	RE	Dwelling unit	240
Very Low Density	R2	Dwelling unit	240
Single Family	R2	Dwelling unit	240
Office	O	Building square feet	0.1
Manufacturing/Warehouse	M	Building square feet	0.02
Retail	R	Building square feet	0.1
Service	S	Building square feet	0.5
Park	P	Each	3,000
Park w/Sports Complex	P	Each	45,000
VA Facility	VA	Each	12,000

The model computes the diurnal BWF for each subcatchment by applying diurnal profiles for residential and non residential uses, as shown in **Figure 2**. The non-residential diurnal profile was applied for parks and for the VA facility

3.2 Infiltration/Inflow

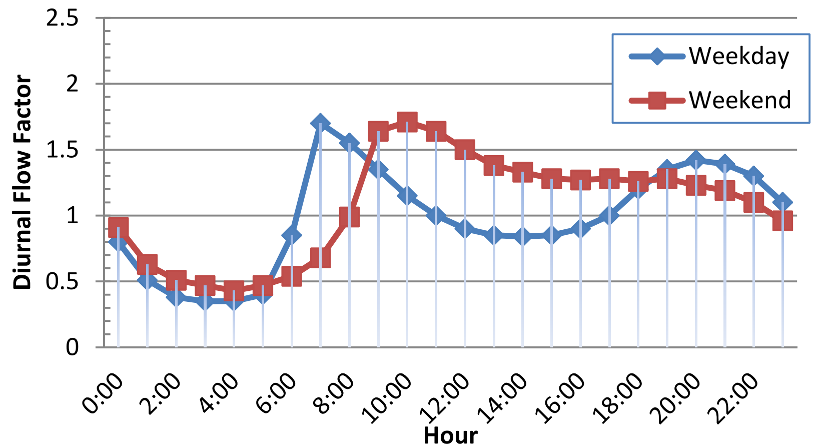
I/I flows include groundwater infiltration (GWI) and rainfall-dependent I/I (RDI/I). GWI is groundwater that enters the system from the ground through defects in sewer pipelines, manholes, and building laterals. GWI is typically greatest during the winter and early spring, and is represented as a constant flow during both non-rainfall and rainfall periods. RDI/I is stormwater that enters the sewer system through direct inflow connections (e.g., roof downspouts or area drains directly connected to the sanitary sewer system) or through infiltration through the soil to pipe and manhole defects. RDI/I is represented as a hydrograph that follows the pattern of rainfall, typically producing a peak flow response directly related to the rainfall intensity. For purposes of the analysis in this TM, I/I was quantified for a "design" condition assumed to represent maximum GWI and RDI/I for a 5-year design storm event falling under saturated soil conditions. The 5-year event is the specific storm event developed for EBMUD and its Satellite systems as part of studies conducted during the 1980s and known as the "EBMUD Design Storm" event.

Assumed I/I rates were based on the factors used for the City's Hydraulic Analysis as well as existing flows developed by EBMUD as part of its Flow Modeling and Limits Report (FMLR) prepared in compliance with its Stipulated Order for Preliminary Relief with the U.S. EPA. The FMLR analyses were based on flow monitoring conducted by EBMUD during the 2009/10 and 2010/11 wet weather seasons in order to quantify flows from each area discharging to its interceptor system (called Interceptor Tributary Areas, or ITAs). The monitoring included a meter located on the influent pipe to Pump Station R (Pump Station 1), representing the existing flow from the Alameda Point area (identified by EBMUD as ITA 90-2). EBMUD also utilized winter water use data to help quantify base wastewater flows for the ITAs. Based on the FMLR analyses, the existing flows from ITA 90-2 were quantified as follows:

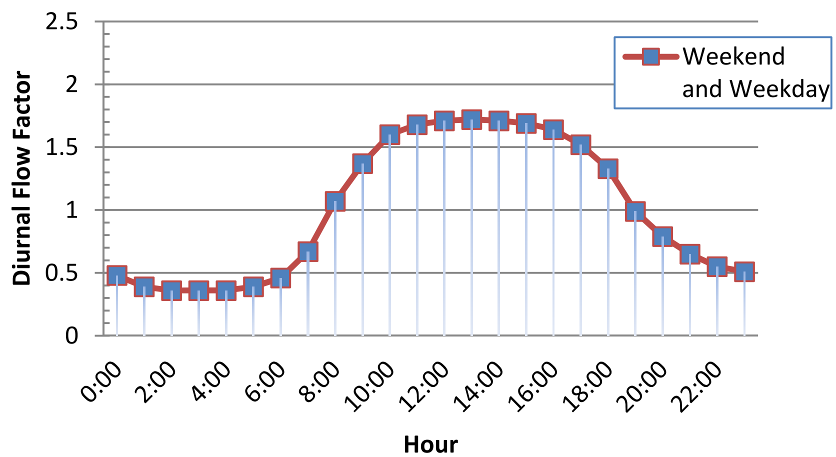
- Average BWF 0.20 mgd (~500 gpd/acre)
- Maximum GWI 0.27 mgd (~600 gpd/acre)
- Peak RDI/I (5-year design event) 1.32 mgd (~3,000 gpd/acre)

For purposes of modeling the flow contribution from the Reuse Area prior to redevelopment and construction of new sewer infrastructure, the existing BWF, GWI, and peak RDI/I flows were converted to unit flow rates (gpd/acre) based on the total Alameda Point non-park development acreage estimated by CBG (approximately 450 acres). The calculated unit flow rates (rounded up) are also shown above.

Figure 2: Base Wastewater Flow Diurnal Profiles



Residential BWF Profile



Non-Residential BWF Profile

Construction of new sewer infrastructure is expected to reduce I/I flows in the future. Under Scenario C, an assumed GWI rate of 300 pgd/acre was used, based on the value assumed for new development for the City's 2010 Hydraulic Analysis. For RDI/I, the rate documented in EBMUD's FMLR for a nearby, relatively newer area of the Alameda (ITA 90-3, which comprises the Marina Village area), was used. The 5-year design event peak RDI/I for this area was calculated to be approximately 1,000 gpd/acre.

For the Reuse Area under Scenario B, the following assumptions were made to reflect interim development and partial rehabilitation of the existing sewer infrastructure:

- BWF equivalent to 50 percent of buildout development
- GWI of 450 gpd/acre
- Peak RDI/I of approximately 2,000 gpd/acre

Note that for all scenarios, hydrograph parameters to represent the volume and rate of flow response to rainfall were developed for the model based roughly on those developed for the EBMUD FMLR. The parameters were set so as to generate the expected peak RDI/I rates noted above. Furthermore, as in the City's Hydraulic Analysis, the timing of the design storm was set to produce a peak RDI/I flow roughly coincident with the peak diurnal BWF.

4 Model Results

Table 2 summarizes the resultant flows to Pump Station 1 for each of the scenarios and for existing conditions. As indicated in the table, redevelopment of Alameda Point and construction of new sewer infrastructure is projected to result in a net 12 percent (0.23 mgd) increase in the design storm PWWF.

Table 2: Summary of Alameda Point Flows

Scenario	Alameda Point Flow to PS 1 (mgd)				
	Avg. BWF	Max. GWI	PDWF	Peak RDI/I	PWWF
Existing*	0.20	0.27	0.61	1.32	1.93
Scenario A	0.60	0.21	1.20	0.91	2.10
Scenario B	0.76	0.17	1.42	0.68	2.11
Scenario C	0.95	0.14	1.71	0.46	2.16
Overall change (mgd)	0.75	-0.13	1.10	-0.86	0.23
Overall change (%)	373%	-49%	180%	-65%	12%

* ABWF, Max. GWI, and Peak RDI/I from EBMUD FMLR for ITA 90-2
PDWF = Peak BWF + Max. GWI
PWWF = PDWF + Peak RDI/I

APPENDICES

E) STORMWATER PROTOTYPICAL WATERSHED MODEL

Memo

To: Angeleo Obertello, P.E. (Carlson, Barbee & Gibson)

From: Edward Ballman, P.E. CFM

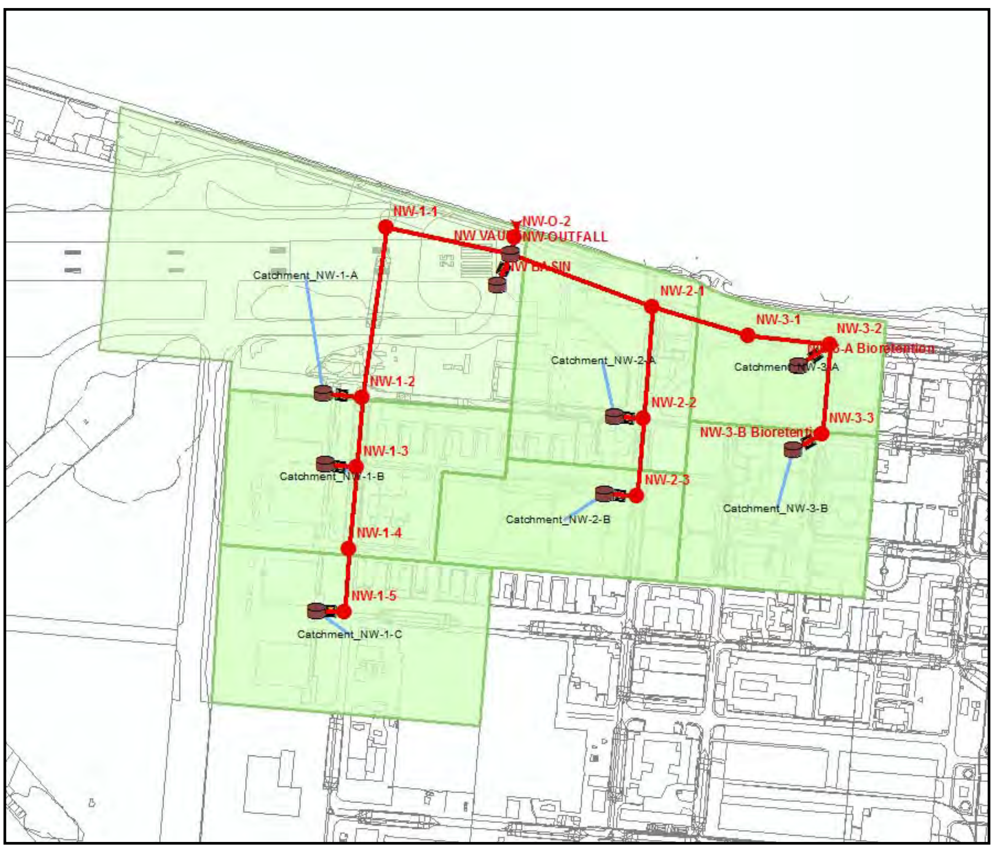
Date: June 13, 2013

Subject: Mike URBAN Modeling Output for the Northwest Drainage Area, Alameda Point, City of Alameda

Attached are output summaries from the Mike URBAN modeling of a prototypical storm drain, basin, and pump configuration for the low-lying northwest portion of the Alameda Point site.

All modeling was done using protocols established in the City's storm drain master planning project. Attachment A presents output for the present case (e.g. no sea level rise). Attachment B presents output for future conditions with 4.6 feet (55 inches) of sea level rise. Both output files include references to the southeast basin as well, which were originally included in the model domain, but were not optimized when it became clear that higher elevations in that drainage area were far less constraining and that the prototypical approaches framed in the northwest area could readily be adapted to other locations at the site. The catchments include small storage elements that represent the stormwater detention volume that will be provided by LID infrastructure in the final configuration of the drainage network.

The modeling domain is illustrated below:



Attachment A

MOUSE HD Computation Engine x64 v2012 Release Version (13.0.0.6270)

MOUSE Pipe Flow Simulation --- Status Report ---Dynamic Wave

Index of summary

File Overview

Working dir :	P:\2012\212082 CBG Alameda Point\212082 Modeling\URBAN Modeling Current\		-
Sewer network data (UND) :	25-yr Design StormBase.mex	1/2/2013 8:20:56 AM	
Hydrological data (HGF) :	25-yr Design StormBase.mex	1/2/2013 8:20:56 AM	
Additional parameters file (ADP) :	-	-	
Dry weather flow data (DWF) :	25-yr Design StormBase.mex	1/2/2013 8:20:56 AM	
Repetitive profile data (RPF) :	-	-	
Runoff Hydrographs (CRF) :	25-yr Design StormBase.CRF	1/1/2013 12:47:12 PM	
Hotstart file (PRF) :	-	-	
Result File (PRF) :	25-yr Design StormBase.PRF	1/2/2013 8:21:04 AM	
Reduced result file (PRF) :		-	-

Time Overview

Simulation start date :	2050-01-01 00:00:00	Calculation started :	2013-01-02 08:20:59
Simulation end date :	2050-01-01 23:50:00	Calculation ended :	2013-01-02 08:21:30
Save time step [hh:mm:ss] :	0:02:00	Calculation time [hh:mm:ss] :	0:00:31
Maximum time step [sec] :	1	Hotstart start date :	-
Minimum time step [sec] :	1		

Input Summary

Number of Manholes:	27
Number of Basins:	17
Number of Outlets:	2
Number of Storage Nodes:	0
Number of Circular Pipes:	48
Number of Rectangular pipes:	5
Number of CRS defined pipes:	0
Number of Pumps:	1
Number of Controlled Pumps:	0
Number of Weirs/Orifices:	15
Number of Controlled Weirs/Gates:	0
Number of Valves:	0
Number of Controlled Valves:	0

Nodes

Min Invert Level	NW-O-2	-8.00 ft
Max Invert Level	SE-1-A Bioret	2.50 ft
Min Ground Level	NW-3-1	1.90 ft
Max Ground Level	SE-2-2	7.80 ft
Min X Coordinate	NW-1-C Bioret	6.039E06 ft
Max X Coordinate	SE-1-6	6.0441E06 ft
Min Y Coordinate	SE-1-2	2.1081E06 ft

Max Y Coordinate	NW-1-1	2.1156E06 ft
Total Manhole Volume		9541.2 ft3
Total Basin Volume		1557066.6 ft3

Links

Total Circular Volume	174941.2 ft3
Total CRS Volume	30045.0 ft3
Total Length	18529.00 ft

Simulation Result Summary

Continuity Balance

1 :	**Start volume in Pipes, Manholes and Structures**			**98538.4 ft3**
2 :	**End volume in Pipes, Manholes and Structures**			**422305.5 ft3**
3 :	**Total inflow volume**			
	Specified inflows			
	Runoff :	3084599.2 ft3		
	Non-specified inflows			
	Outlets (inflow) :	13566.4 ft3		
		3098165.6 ft3	**-->**	**3098165.6 ft3**
4 :	**Total diverted volume**			
	Operational, non-specified outflows			
	Outlets :	2263159.6 ft3		
	Pumps :	489385.9 ft3		
		2752545.5 ft3	**-->**	**2752545.5 ft3**
5 :	**Water generated in empty parts of the system :**			**2122.8 ft3**
6 :	**Continuity Balance = (2-1) - (3-4+5) :**			**-23975.7 ft3**
	Continuity Balance max value :		0.0 ft3	
	Continuity Balance min value :		-25077.4 ft3	

Boundary Connections

Outlet levels

Boundary Condition ID	Location	Temporal variation	Value/TS name	Validity	Minimum Value	Maximum Value
					ft	ft
NW 25-yr Tide	NW-OUTFALL	Time Series	\\192.168.1.152\pacific\2012\212082 CBG Alameda Point\212082 Modeling\URBAN Modeling Current\25-yr Coincident Tide.dfs0	Unlimited	-3.84	1.71

Nodes - Water level

G : Max level exceeds ground level

W : Max level exceeds weir crest level

C : Max level exceeds critical level

	Minimum	Maximum	Ground Level	Ground Level - Maximum	Time - Minimum	Time - Maximum	Note
	[ft]	[ft]	[ft]	[ft]			
NW-OUTFALL	-8.00	1.71	2.40	0.69	2050-01-01 00:00:00	2050-01-01 00:00:00	
NW-O-2	-8.00	0.50	2.40	1.90	2050-01-01 00:00:00	2050-01-01 13:10:00	
NW VAULT	-6.00	1.64	3.00	1.36	2050-01-01 00:00:00	2050-01-01 13:00:00	W
NW-2-1	-8.00	1.75	2.00	0.25	2050-01-01 00:00:00	2050-01-01 13:00:00	
NW-1-1	-6.00	1.93	2.40	0.47	2050-01-01 00:00:00	2050-01-01 13:02:00	
NW BASIN	-2.00	1.62	3.00	1.38	2050-01-01 00:00:00	2050-01-01 13:00:00	
NW-2-2	-6.00	1.77	2.00	0.23	2050-01-01 00:00:00	2050-01-01 13:00:00	
NW-3-1	-6.00	1.76	1.90	0.14	2050-01-01 00:00:00	2050-01-01 13:00:00	
NW-1-2	-5.00	2.31	2.50	0.19	2050-01-01 00:00:00	2050-01-01 13:04:00	
NW-2-3	-6.00	2.03	2.20	0.17	2050-01-01 00:00:00	2050-01-01 12:38:00	
NW-2-A Bioret	-1.50	2.14	2.50	0.36	2050-01-01 00:00:00	2050-01-01 12:34:00	W

NW-3-2	**-6.00**	**1.88**	**2.50**	**0.62**	**2050-01-01 00:00:00**	**2050-01-01 12:38:00**	
NW-1-3	**-5.00**	**2.39**	**2.50**	**0.11**	**2050-01-01 00:00:00**	**2050-01-01 13:06:00**	
NW-1-A Bioret	**-1.50**	**2.36**	**2.50**	**0.14**	**2050-01-01 00:00:00**	**2050-01-01 13:04:00**	**W**
NW-2-B Bioret	**-1.50**	**2.12**	**2.50**	**0.38**	**2050-01-01 00:00:00**	**2050-01-01 12:38:00**	**W**
NW-3-3	**-6.00**	**2.30**	**2.70**	**0.40**	**2050-01-01 00:00:00**	**2050-01-01 12:42:00**	
NW-3-A Bioret	**-0.50**	**3.10**	**3.50**	**0.40**	**2050-01-01 00:00:00**	**2050-01-01 12:34:00**	**W**
NW-1-B Bioret	**-1.50**	**2.41**	**2.50**	**0.09**	**2050-01-01 00:00:00**	**2050-01-01 13:06:00**	**W**
NW-1-4	**-4.00**	**2.40**	**4.20**	**1.80**	**2050-01-01 00:00:00**	**2050-01-01 13:06:00**	
NW-3-B Bioret	**-0.50**	**2.32**	**3.50**	**1.18**	**2050-01-01 00:00:00**	**2050-01-01 12:42:00**	**W**
NW-1-5	**-4.00**	**2.52**	**7.00**	**4.48**	**2050-01-01 00:00:00**	**2050-01-01 13:08:00**	
NW-1-C Bioret	**-1.50**	**2.54**	**2.50**	**-0.04**	**2050-01-01 00:00:00**	**2050-01-01 13:08:00**	**G W**

Number of Critical level exceedings : 0

Number of Ground level exceedings : 1

Number of Weir Crest level exceedings : 8

Nodes - Volume spilled

No Spilling Nodes were found in the network

Weir/Orifice-Gate/Valve Discharge

	Minimum	Maximum	Flow - Accumulated	Time - Minimum	Time - Maximum
	[cfs]	[cfs]	[ft3]		
NW VAULT+BASIN	**-43.306**	**47.295**	**7237.0**	**2050-01-01 13:04:00**	**2050-01-01 13:02:00**
NW-1-A Overflow	**0.000**	**52.657**	**308463.3**	**2050-01-01 00:00:00**	**2050-01-01 13:06:00**
NW-1-B Overflow	**0.000**	**27.374**	**61820.3**	**2050-01-01 00:00:00**	**2050-01-01 13:08:00**
NW-1-C Overflow	**0.000**	**26.231**	**66073.9**	**2050-01-01 00:00:00**	**2050-01-01 13:26:00**
NW-2-A Overflow	**0.000**	**28.739**	**102237.9**	**2050-01-01 00:00:00**	**2050-01-01 12:34:00**

NW-2-B Overflow	0.000	19.570	80375.9	2050-01-01 00:00:00	2050-01-01 12:34:00
NW-3-A Overflow	0.000	17.322	44889.9	2050-01-01 00:00:00	2050-01-01 12:34:00
NW-3-B Overflow	0.000	21.531	71842.3	2050-01-01 00:00:00	2050-01-01 12:52:00

Pumps - Discharge

	Minimum	Maximum	Flow - Accumulated	Time - Minimum	Time - Maximum	Pump starts	Dry stops (1)	Speed	Operation total
	[cfs]	[cfs]	[ft3]			[Count]	[Count]		[Hr:Min:Sec]
NW PUMP	0.000	44.595	489385.9	2050-01-01 00:00:00	2050-01-01 12:08:00	2	0	Constant	3:02:54

(1) : Pump stops due to dry pump well.

Links - Result summary

LinkID	From Node	To Node	Qf	Hmax	Qmax	Hmax /D	Qmax/ Qf	Flow - Accumulated	Time - Hmax	Time - Qmax
			[cfs]	[ft]	[cfs]			[ft3]		
NW-1-1+V (1)	NW-1-1	NW VAULT	50.225	1.79	38.891	1.909	0.774	362221.6	2050-01-01 13:02:00	2050-01-01 13:08:00
NW-1-1+V (2)	NW-1-1	NW VAULT	50.225	1.79	38.891	1.909	0.774	362221.6	2050-01-01 13:02:00	2050-01-01 13:08:00
NW-1-2+1 (1)	NW-1-2	NW-1-1	50.002	2.20	38.868	1.829	0.777	370094.3	2050-01-01 13:02:00	2050-01-01 13:08:00
NW-1-2+1 (2)	NW-1-2	NW-1-1	50.002	2.20	38.868	1.829	0.777	370094.3	2050-01-01 13:02:00	2050-01-01 13:08:00
NW-1-3+2	NW-1-3	NW-1-2	50.071	2.34	40.251	1.703	0.804	415719.3	2050-01-01 13:04:00	2050-01-01 13:14:00
NW-1-4+3	NW-1-4	NW-1-3	50.082	2.39	26.438	1.638	0.528	223640.6	2050-01-01 13:06:00	2050-01-01 13:26:00
NW-1-5+4	NW-1-5	NW-1-4	23.395	2.45	26.565	2.054	1.136	226418.1	2050-01-01 13:08:00	2050-01-01 13:26:00
NW-1-A+2	NW-1-A Bioret	NW-1-2	0.692	2.36	0.850	14.194	1.228	34124.7	2050-01-01 13:04:00	2050-01-01 22:46:00
NW-1-B+3	NW-1-B Bioret	NW-1-3	2.391	2.40	2.881	8.736	1.205	133550.0	2050-01-01 13:06:00	2050-01-01 14:46:00

NW-1-C+5	NW-1-C Bioret	NW-1-5	2.664	2.53	3.555	7.376	1.334	161729.7	2050-01-01 13:08:00	2050-01-01 14:48:00
NW-2-1+V (1)	NW-2-1	NW VAULT	50.210	1.68	42.094	1.909	0.838	236461.0	2050-01-01 13:00:00	2050-01-01 12:34:00
NW-2-1+V (2)	NW-2-1	NW VAULT	50.210	1.68	42.094	1.909	0.838	236461.0	2050-01-01 13:00:00	2050-01-01 12:34:00
NW-2-2+1 (1)	NW-2-2	NW-2-1	50.144	1.75	24.432	1.746	0.487	120268.0	2050-01-01 13:00:00	2050-01-01 12:34:00
NW-2-2+1 (2)	NW-2-2	NW-2-1	50.144	1.75	24.432	1.746	0.487	120268.0	2050-01-01 13:00:00	2050-01-01 12:34:00
NW-2-3+2	NW-2-3	NW-2-2	23.343	1.80	19.653	2.153	0.842	99955.4	2050-01-01 12:38:00	2050-01-01 12:34:00
NW-2-A+2	NW-2-A Bioret	NW-2-2	0.992	2.05	1.142	13.453	1.152	49339.6	2050-01-01 12:38:00	2050-01-01 14:46:00
NW-2-B+3	NW-2-B Bioret	NW-2-3	0.388	2.11	0.504	17.595	1.300	21608.5	2050-01-01 12:38:00	2050-01-01 14:46:00
NW-3-1+2-1 (1)	NW-3-1	NW-2-1	49.834	1.75	17.927	1.746	0.360	127132.3	2050-01-01 13:00:00	2050-01-01 12:30:00
NW-3-1+2-1 (2)	NW-3-1	NW-2-1	49.834	1.75	17.927	1.746	0.360	127132.3	2050-01-01 13:00:00	2050-01-01 12:30:00
NW-3-2+1	NW-3-2	NW-3-1	50.397	1.79	35.897	1.629	0.712	263581.9	2050-01-01 13:00:00	2050-01-01 12:30:00
NW-3-3+2	NW-3-3	NW-3-2	23.147	2.13	21.752	2.080	0.940	163562.1	2050-01-01 12:40:00	2050-01-01 12:52:00
NW-3-A+2	NW-3-A Bioret	NW-3-2	1.091	2.91	1.241	12.998	1.138	58896.7	2050-01-01 12:38:00	2050-01-01 14:46:00
NW-3-B+3	NW-3-B Bioret	NW-3-3	1.948	2.31	2.078	10.206	1.067	93840.6	2050-01-01 12:42:00	2050-01-01 14:48:00
NW-B-V	NW BASIN	NW VAULT	158.570	1.64	11.851	1.034	0.075	7542.0	2050-01-01 13:00:00	2050-01-01 13:34:00
NW-O-2+OUT	NW-O-2	NW-OUTFALL	261.394	1.71	103.068	1.382	0.394	680727.7	2050-01-01 00:00:00	2050-01-01 12:40:00
NW-O-V+2 (1)	NW VAULT	NW-O-2	111.465	1.40	51.544	1.475	0.462	348366.4	2050-01-01 13:00:00	2050-01-01 12:40:00
NW-O-V+2 (2)	NW VAULT	NW-O-2	111.465	1.40	51.544	1.475	0.462	348366.4	2050-01-01 13:00:00	2050-01-01 12:40:00

Links - Data

LinkID	From Node	To Node	Up - Invert Level	Down - Invert Level	Length	Dimension (Max Height)	Slope	Qf

			[ft]	[ft]	[ft]	[ft]	[‰]	[]
NW-1-1+V (1)	NW-1-1	NW VAULT	-5.38	-6.00	618.00	4.00	1.003	50.225
NW-1-1+V (2)	NW-1-1	NW VAULT	-5.38	-6.00	618.00	4.00	1.003	50.225
NW-1-2+1 (1)	NW-1-2	NW-1-1	-4.50	-5.38	885.00	4.00	0.994	50.002
NW-1-2+1 (2)	NW-1-2	NW-1-1	-4.50	-5.38	885.00	4.00	0.994	50.002
NW-1-3+2	NW-1-3	NW-1-2	-4.16	-4.50	341.00	4.00	0.997	50.071
NW-1-4+3	NW-1-4	NW-1-3	-3.76	-4.16	401.00	4.00	0.998	50.082
NW-1-5+4	NW-1-5	NW-1-4	-3.45	-3.76	307.00	3.00	1.010	23.395
NW-1-A+2	NW-1-A Bioret	NW-1-2	-1.50	-4.50	193.00	0.48	15.544	0.692
NW-1-B+3	NW-1-B Bioret	NW-1-3	-1.50	-4.16	155.00	0.75	17.161	2.391
NW-1-C+5	NW-1-C Bioret	NW-1-5	-1.50	-3.45	138.00	0.81	14.130	2.664
NW-2-1+V (1)	NW-2-1	NW VAULT	-5.24	-6.00	758.00	4.00	1.003	50.210
NW-2-1+V (2)	NW-2-1	NW VAULT	-5.24	-6.00	758.00	4.00	1.003	50.210
NW-2-2+1 (1)	NW-2-2	NW-2-1	-4.69	-5.24	550.00	4.00	1.000	50.144
NW-2-2+1 (2)	NW-2-2	NW-2-1	-4.69	-5.24	550.00	4.00	1.000	50.144
NW-2-3+2	NW-2-3	NW-2-2	-4.31	-4.69	378.00	3.00	1.005	23.343
NW-2-A+2	NW-2-A Bioret	NW-2-2	-1.50	-4.69	100.00	0.48	31.900	0.992
NW-2-B+3	NW-2-B Bioret	NW-2-3	-1.50	-4.13	100.00	0.35	26.300	0.388
NW-3-1+2-1 (1)	NW-3-1	NW-2-1	-4.76	-5.24	486.00	4.00	0.988	49.834
NW-3-1+2-1 (2)	NW-3-1	NW-2-1	-4.76	-5.24	486.00	4.00	0.988	49.834
NW-3-2+1	NW-3-2	NW-3-1	-4.36	-4.76	396.00	4.00	1.010	50.397
NW-3-3+2	NW-3-3	NW-3-2	-3.93	-4.36	435.00	3.00	0.989	23.147
NW-3-A+2	NW-3-A Bioret	NW-3-2	-0.50	-4.36	100.00	0.48	38.600	1.091
NW-3-B+3	NW-3-B Bioret	NW-3-3	-0.50	-3.93	100.00	0.61	34.300	1.948
NW-B-V	NW BASIN	NW VAULT	-2.00	-2.50	50.00	4.00	10.000	158.570
NW-O-2+OUT	NW-O-2	NW-OUTFALL	-4.92	-5.20	55.00	5.00	5.091	261.394
NW-O-V+2 (1)	NW VAULT	NW-O-2	-4.50	-4.92	85.00	4.00	4.941	111.465
NW-O-V+2 (2)	NW VAULT	NW-O-2	-4.50	-4.92	85.00	4.00	4.941	111.465

Attachment B

MOUSE HD Computation Engine x64 v2012 Release Version (13.0.0.6270)

MOUSE Pipe Flow Simulation --- Status Report ---Dynamic Wave

Index of summary

File Overview

Working dir :	P:\2012\212082 CBG Alameda Point\212082 Modeling\URBAN Modeling Current\	-
Sewer network data (UND) :	25-yr Design StormBase.mex	1/1/2013 6:01:06 PM
Hydrological data (HGF) :	25-yr Design StormBase.mex	1/1/2013 6:01:06 PM
Additional parameters file (ADP) :	-	-
Dry weather flow data (DWF) :	25-yr Design StormBase.mex	1/1/2013 6:01:06 PM
Repetitive profile data (RPF) :	-	-
Runoff Hydrographs (CRF) :	25-yr Design StormBase.CRF	1/1/2013 12:47:12 PM
Hotstart file (PRF) :	-	-
Result File (PRF) :	25-yr Design StormBase.PRF	1/1/2013 6:01:14 PM
Reduced result file (PRF) :	-	-

Time Overview

Simulation start date :	2050-01-01 00:00:00	Calculation started :	2013-01-01 18:01:09
Simulation end date :	2050-01-01 23:50:00	Calculation ended :	2013-01-01 18:01:43
Save time step [hh:mm:ss] :	0:02:00	Calculation time [hh:mm:ss] :	0:00:33
Maximum time step [sec] :	1	Hotstart start date :	-
Minimum time step [sec] :	1		

Input Summary

Number of Manholes:	27
Number of Basins:	17
Number of Outlets:	2
Number of Storage Nodes:	0
Number of Circular Pipes:	48
Number of Rectangular pipes:	5
Number of CRS defined pipes:	0
Number of Pumps:	1
Number of Controlled Pumps:	0
Number of Weirs/Orifices:	15
Number of Controlled Weirs/Gates:	0
Number of Valves:	0
Number of Controlled Valves:	0

Nodes

Min Invert Level	NW-O-2	-8.00 ft
Max Invert Level	SE-1-A Bioret	2.50 ft
Min Ground Level	NW-3-1	1.90 ft
Max Ground Level	SE-2-2	7.80 ft
Min X Coordinate	NW-1-C Bioret	6.039E06 ft
Max X Coordinate	SE-1-6	6.0441E06 ft
Min Y Coordinate	SE-1-2	2.1081E06 ft

Max Y Coordinate	NW-1-1	2.1156E06 ft
Total Manhole Volume		9541.2 ft3
Total Basin Volume		1930225.0 ft3

Links

Total Circular Volume	174941.2 ft3
Total CRS Volume	30045.0 ft3
Total Length	18529.00 ft

Simulation Result Summary

Continuity Balance

1 :	**Start volume in Pipes, Manholes and Structures**			**26565625.0 ft3**
2 :	**End volume in Pipes, Manholes and Structures**			**17610862.1 ft3**
3 :	**Total inflow volume**			
	Specified inflows			
	Runoff :	3084599.2 ft3		
	Non-specified inflows			
	Outlets (inflow) :	3480.3 ft3		
		3088079.5 ft3	-->	**3088079.5 ft3**
4 :	**Total diverted volume**			
	Operational, non-specified outflows			
	Outlets :	10937389.2 ft3		
	Pumps :	1175279.8 ft3		
		12112669.0 ft3	-->	**12112669.0 ft3**
5 :	**Water generated in empty parts of the system :**			**833.2 ft3**
6 :	**Continuity Balance = (2-1) - (3-4+5) :**			**68993.5 ft3**
	Continuity Balance max value :		69993.0 ft3	
	Continuity Balance min value :		0.0 ft3	

Boundary Connections

Outlet levels

Boundary Condition ID	Location	Temporal variation	Value/TS name	Validity	Minimum Value	Maximum Value
					ft	ft
NW 25-yr Tide	NW-OUTFALL	Time Series	\\192.168.1.152\pacific\2012\212082 CBG Alameda Point\212082 Modeling\URBAN Modeling Current\25-yr Coincident Tide SLR=4.6.dfs0	Unlimited	0.76	6.31

Nodes - Water level

G : Max level exceeds ground level

W : Max level exceeds weir crest level

C : Max level exceeds critical level

	Minimum	Maximum	Ground Level	Ground Level - Maximum	Time - Minimum	Time - Maximum	Note
	[ft]	[ft]	[ft]	[ft]			
NW-OUTFALL	-8.00	6.31	2.40	-3.91	2050-01-01 00:00:00	2050-01-01 00:00:00	G
NW-O-2	-8.00	1.88	2.40	0.52	2050-01-01 00:00:00	2050-01-01 14:06:00	
NW VAULT	-6.00	1.88	3.00	1.12	2050-01-01 00:00:00	2050-01-01 13:52:00	W
NW-2-1	-8.00	1.89	2.00	0.11	2050-01-01 00:00:00	2050-01-01 13:50:00	
NW-1-1	-6.00	2.00	2.40	0.40	2050-01-01 00:00:00	2050-01-01 13:40:00	
NW BASIN	-2.00	1.88	3.00	1.12	2050-01-01 00:00:00	2050-01-01 13:52:00	
NW-2-2	-6.00	1.89	2.00	0.11	2050-01-01 00:00:00	2050-01-01 13:50:00	
NW-3-1	-6.00	1.89	1.90	0.01	2050-01-01 00:00:00	2050-01-01 13:50:00	
NW-1-2	-5.00	2.22	2.50	0.28	2050-01-01 00:00:00	2050-01-01 13:18:00	
NW-2-3	-6.00	2.09	2.20	0.11	2050-01-01 00:00:00	2050-01-01 12:36:00	
NW-2-A Bioret	-1.50	2.14	2.50	0.36	2050-01-01 00:00:00	2050-01-01 12:34:00	W
NW-3-2	-6.00	1.90	2.50	0.60	2050-01-01 00:00:00	2050-01-01 13:50:00	

NW-1-3	-5.00	2.34	2.50	0.16	2050-01-01 00:00:00	2050-01-01 13:06:00	
NW-1-A Bioret	-1.50	2.27	2.50	0.23	2050-01-01 00:00:00	2050-01-01 13:06:00	W
NW-2-B Bioret	-1.50	2.15	2.50	0.35	2050-01-01 00:00:00	2050-01-01 12:36:00	W
NW-3-3	-6.00	2.34	2.70	0.36	2050-01-01 00:00:00	2050-01-01 12:42:00	
NW-3-A Bioret	-0.50	3.10	3.50	0.40	2050-01-01 00:00:00	2050-01-01 12:34:00	W
NW-1-B Bioret	-1.50	2.36	2.50	0.14	2050-01-01 00:00:00	2050-01-01 13:06:00	W
NW-1-4	-4.00	2.37	4.20	1.83	2050-01-01 00:00:00	2050-01-01 13:06:00	
NW-3-B Bioret	-0.50	2.36	3.50	1.14	2050-01-01 00:00:00	2050-01-01 12:42:00	W
NW-1-5	-4.00	2.52	7.00	4.48	2050-01-01 00:00:00	2050-01-01 13:08:00	
NW-1-C Bioret	-1.50	2.53	2.50	-0.03	2050-01-01 00:00:00	2050-01-01 13:08:00	G W

Number of Critical level exceedings : 0

Number of Ground level exceedings : 2

Number of Weir Crest level exceedings : 8

Nodes - Volume spilled

No Spilling Nodes were found in the network

Weir/Orifice-Gate/Valve Discharge

	Minimum	Maximum	Flow - Accumulated	Time - Minimum	Time - Maximum
	[cfs]	[cfs]	[ft3]		
NW VAULT+BASIN	-16.453	106.318	160280.5	2050-01-01 15:48:00	2050-01-01 12:40:00
NW-1-A Overflow	0.000	47.887	312129.3	2050-01-01 00:00:00	2050-01-01 12:46:00
NW-1-B Overflow	0.000	20.644	75158.2	2050-01-01 00:00:00	2050-01-01 12:38:00
NW-1-C Overflow	0.000	12.193	81817.2	2050-01-01 00:00:00	2050-01-01 12:50:00
NW-2-A Overflow	0.000	28.781	107383.9	2050-01-01 00:00:00	2050-01-01 12:34:00
NW-2-B Overflow	0.000	19.101	82680.7	2050-01-01 00:00:00	2050-01-01 12:38:00

NW-3-A Overflow	0.000	17.347	48534.7	2050-01-01 00:00:00	2050-01-01 12:34:00
NW-3-B Overflow	0.000	21.244	81157.5	2050-01-01 00:00:00	2050-01-01 12:46:00

Pumps - Discharge

	Minimum	Maximum	Flow - Accumulated	Time - Minimum	Time - Maximum	Pump starts	Dry stops (1)	Speed	Operation total
	[cfs]	[cfs]	[ft3]			[Count]	[Count]		[Hr:Min:Sec]
NW PUMP	0.000	44.595	1175279.8	2050-01-01 00:00:00	2050-01-01 11:08:00	6	0	Constant	7:19:20

(1) : Pump stops due to dry pump well.

Links - Result summary

LinkID	From Node	To Node	Qf	Hmax	Qmax	Hmax/D	Qmax/Qf	Flow - Accumulated	Time - Hmax	Time - Qmax
			[cfs]	[ft]	[cfs]			[ft3]		
NW-1-1+V (1)	NW-1-1	NW VAULT	50.225	1.94	37.495	1.969	0.747	360803.4	2050-01-01 13:44:00	2050-01-01 12:46:00
NW-1-1+V (2)	NW-1-1	NW VAULT	50.225	1.94	37.495	1.969	0.747	360803.4	2050-01-01 13:44:00	2050-01-01 12:46:00
NW-1-2+1 (1)	NW-1-2	NW-1-1	50.002	2.14	37.510	1.846	0.750	368740.9	2050-01-01 13:26:00	2050-01-01 12:46:00
NW-1-2+1 (2)	NW-1-2	NW-1-1	50.002	2.14	37.510	1.846	0.750	368740.9	2050-01-01 13:26:00	2050-01-01 12:46:00
NW-1-3+2	NW-1-3	NW-1-2	50.071	2.27	27.862	1.680	0.556	414200.8	2050-01-01 13:10:00	2050-01-01 12:40:00
NW-1-4+3	NW-1-4	NW-1-3	50.082	2.36	12.377	1.626	0.247	222614.1	2050-01-01 13:06:00	2050-01-01 12:50:00
NW-1-5+4	NW-1-5	NW-1-4	23.395	2.44	12.382	2.045	0.529	225801.6	2050-01-01 13:08:00	2050-01-01 12:50:00
NW-1-A+2	NW-1-A Bioret	NW-1-2	0.692	2.27	0.851	14.001	1.230	30178.8	2050-01-01 13:08:00	2050-01-01 20:30:00
NW-1-B+3	NW-1-B Bioret	NW-1-3	2.391	2.36	2.883	8.671	1.206	120081.3	2050-01-01 13:06:00	2050-01-01 17:24:00
NW-1-C+5	NW-1-C	NW-1-5	2.664	2.53	3.535	7.372	1.327	145586.0	2050-01-01	2050-01-01

	Bioret								13:08:00	17:26:00
NW-2-1+V (1)	NW-2-1	NW VAULT	50.210	1.88	40.915	1.969	0.815	235563.2	2050-01-01 13:50:00	2050-01-01 12:36:00
NW-2-1+V (2)	NW-2-1	NW VAULT	50.210	1.88	40.915	1.969	0.815	235563.2	2050-01-01 13:50:00	2050-01-01 12:36:00
NW-2-2+1 (1)	NW-2-2	NW-2-1	50.144	1.89	23.947	1.782	0.478	120056.8	2050-01-01 13:50:00	2050-01-01 12:34:00
NW-2-2+1 (2)	NW-2-2	NW-2-1	50.144	1.89	23.947	1.782	0.478	120056.8	2050-01-01 13:50:00	2050-01-01 12:34:00
NW-2-3+2	NW-2-3	NW-2-2	23.343	1.89	19.181	2.193	0.822	99950.3	2050-01-01 13:50:00	2050-01-01 12:40:00
NW-2-A+2	NW-2-A Bioret	NW-2-2	0.992	2.06	1.143	13.705	1.153	44294.6	2050-01-01 12:36:00	2050-01-01 18:50:00
NW-2-B+3	NW-2-B Bioret	NW-2-3	0.388	2.14	0.506	17.766	1.305	19349.8	2050-01-01 12:36:00	2050-01-01 18:50:00
NW-3-1+2-1 (1)	NW-3-1	NW-2-1	49.834	1.89	17.530	1.782	0.352	126613.8	2050-01-01 13:50:00	2050-01-01 12:42:00
NW-3-1+2-1 (2)	NW-3-1	NW-2-1	49.834	1.89	17.530	1.782	0.352	126613.8	2050-01-01 13:50:00	2050-01-01 12:42:00
NW-3-2+1	NW-3-2	NW-3-1	50.397	1.89	35.136	1.662	0.697	263038.8	2050-01-01 13:50:00	2050-01-01 12:42:00
NW-3-3+2	NW-3-3	NW-3-2	23.147	2.17	21.411	2.087	0.925	163342.8	2050-01-01 12:40:00	2050-01-01 12:46:00
NW-3-A+2	NW-3-A Bioret	NW-3-2	1.091	2.92	1.240	13.041	1.137	55235.7	2050-01-01 12:36:00	2050-01-01 17:24:00
NW-3-B+3	NW-3-B Bioret	NW-3-3	1.948	2.36	2.074	10.280	1.065	84509.7	2050-01-01 12:42:00	2050-01-01 17:26:00
NW-B-V	NW BASIN	NW VAULT	158.570	1.88	27.397	1.094	0.173	156262.7	2050-01-01 13:52:00	2050-01-01 16:08:00
NW-O-2+OUT	NW-O-2	NW-OUTFALL	261.394	6.31	-0.327	2.302	-0.001	-0.3	2050-01-01 00:00:00	2050-01-01 00:18:00
NW-O-V+2 (1)	NW VAULT	NW-O-2	111.465	1.88	0.112	1.700	0.001	929.7	2050-01-01 14:06:00	2050-01-01 07:18:00
NW-O-V+2 (2)	NW VAULT	NW-O-2	111.465	1.88	0.112	1.700	0.001	929.7	2050-01-01 14:06:00	2050-01-01 07:18:00

Links - Data

LinkID	From Node	To Node	Up - Invert Level	Down - Invert Level	Length	Dimension (Max Height)	Slope	Qf

			[ft]	[ft]	[ft]	[ft]	[‰]	[]
NW-1-1+V (1)	NW-1-1	NW VAULT	-5.38	-6.00	618.00	4.00	1.003	50.225
NW-1-1+V (2)	NW-1-1	NW VAULT	-5.38	-6.00	618.00	4.00	1.003	50.225
NW-1-2+1 (1)	NW-1-2	NW-1-1	-4.50	-5.38	885.00	4.00	0.994	50.002
NW-1-2+1 (2)	NW-1-2	NW-1-1	-4.50	-5.38	885.00	4.00	0.994	50.002
NW-1-3+2	NW-1-3	NW-1-2	-4.16	-4.50	341.00	4.00	0.997	50.071
NW-1-4+3	NW-1-4	NW-1-3	-3.76	-4.16	401.00	4.00	0.998	50.082
NW-1-5+4	NW-1-5	NW-1-4	-3.45	-3.76	307.00	3.00	1.010	23.395
NW-1-A+2	NW-1-A Bioret	NW-1-2	-1.50	-4.50	193.00	0.48	15.544	0.692
NW-1-B+3	NW-1-B Bioret	NW-1-3	-1.50	-4.16	155.00	0.75	17.161	2.391
NW-1-C+5	NW-1-C Bioret	NW-1-5	-1.50	-3.45	138.00	0.81	14.130	2.664
NW-2-1+V (1)	NW-2-1	NW VAULT	-5.24	-6.00	758.00	4.00	1.003	50.210
NW-2-1+V (2)	NW-2-1	NW VAULT	-5.24	-6.00	758.00	4.00	1.003	50.210
NW-2-2+1 (1)	NW-2-2	NW-2-1	-4.69	-5.24	550.00	4.00	1.000	50.144
NW-2-2+1 (2)	NW-2-2	NW-2-1	-4.69	-5.24	550.00	4.00	1.000	50.144
NW-2-3+2	NW-2-3	NW-2-2	-4.31	-4.69	378.00	3.00	1.005	23.343
NW-2-A+2	NW-2-A Bioret	NW-2-2	-1.50	-4.69	100.00	0.48	31.900	0.992
NW-2-B+3	NW-2-B Bioret	NW-2-3	-1.50	-4.13	100.00	0.35	26.300	0.388
NW-3-1+2-1 (1)	NW-3-1	NW-2-1	-4.76	-5.24	486.00	4.00	0.988	49.834
NW-3-1+2-1 (2)	NW-3-1	NW-2-1	-4.76	-5.24	486.00	4.00	0.988	49.834
NW-3-2+1	NW-3-2	NW-3-1	-4.36	-4.76	396.00	4.00	1.010	50.397
NW-3-3+2	NW-3-3	NW-3-2	-3.93	-4.36	435.00	3.00	0.989	23.147
NW-3-A+2	NW-3-A Bioret	NW-3-2	-0.50	-4.36	100.00	0.48	38.600	1.091
NW-3-B+3	NW-3-B Bioret	NW-3-3	-0.50	-3.93	100.00	0.61	34.300	1.948
NW-B-V	NW BASIN	NW VAULT	-2.00	-2.50	50.00	4.00	10.000	158.570
NW-O-2+OUT	NW-O-2	NW-OUTFALL	-4.92	-5.20	55.00	5.00	5.091	261.394
NW-O-V+2 (1)	NW VAULT	NW-O-2	-4.50	-4.92	85.00	4.00	4.941	111.465
NW-O-V+2 (2)	NW VAULT	NW-O-2	-4.50	-4.92	85.00	4.00	4.941	111.465

APPENDICES

F) POTABLE WATER SYSTEM MODEL (FILES INCLUDED ON SEPARATE CD)

APPENDICES

G) DETAILED BACKBONE INFRASTRUCTURE CONSTRUCTION COST ESTIMATE SUMMARY

UPDATED DRAFT
Backbone Infrastructure
Engineer's Preliminary Construction
Cost Estimate Summary

Alameda Point
ALAMEDA, CALIFORNIA

October 31, 2013

Prepared For:

SEAL OF THE CITY OF ALAMEDA, CA
PROSPERITAS TERRA MARI QUE
INCORPORATED 1854

Prepared By:

Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS

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Assumptions / Exclusions

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
KEY ASSUMPTIONS & EXCLUSIONS
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description
	GENERAL
1	This estimate is based on information available at this time. Carlson, Barbee & Gibson, Inc. (CBG) assumes no liability for changes in prices, fees or costs due to unforeseen conditions or changes required by Governing Agencies, Market Conditions, or other issues beyond the control of this office.
2	This estimate is based upon the Draft Master Infrastructure Plan, dated October 31, 2013. This estimate is also being prepared concurrently with the Alameda Point Planning Guide, Draft Environmental Impact Report, Zoning Amendment, Town Center & Waterfront Master Plan and Regional Transit Access Study (RTAS). This estimate is intended to be updated through the community review process of the documents listed above.
3	This estimate includes the construction costs of the backbone infrastructure described in the Draft MIP. All in-tract or on-site improvements interior to the development blocks are assumed to be future development costs and are excluded from this estimate.
4	This estimate excludes costs associated with Environmental Remediation. This estimate assumes that all environmental remediation will be completed by the Navy prior to transfer of the property to the City.
5	This estimate excludes the costs associated with the extension of infrastructure to the VA Project west of Monarch Street.
6	This estimate excludes improvements to the existing piers and wharfs in the southeast portion of the site, such as utility replacements, seismic retrofits, etc.
7	This estimate applies and includes a 25% contingency to all backbone infrastructure construction costs. The contingency is not applied to the soft costs.
8	This estimate includes Construction Administration (4%), Professional Services (15%) and Plan Check & Inspection Fees (4%). The soft costs are applied to the backbone infrastructure hard costs without contingency excluding the Regional Transit Costs which are assumed to already include soft costs.
9	This estimate excludes all costs associated with the maintenance and operations of the backbone infrastructure.
	DEMOLITION
10	This estimate includes the costs associated with the Demolition and Abatement of the existing buildings within the Development Areas. The following typical unit costs for demolition and abatement are assumed in this estimate: • Single Family Residential Structures = $50,000 per structure • Multi-Family Residential Structures = $100,000 per structure • Industrial / Warehouse Structures *(north of W. Atlantic Ave)* = $7.50 per square foot • Industrial / Warehouse Structures *(south of W. Atlantic Ave)* = $15 per square foot
11	This estimate assumes the existing utilities within the public right of ways will be removed. The existing utilities within the Development Parcels are assumed to be 50% slurry filled and 50% removed.
12	This estimate assumes the existing on-site concrete and pavement materials will be processed and reused on-site for future street base rock, utility trench backfill and other uses as approved by the City and project geotechnical engineers.

Item	Description
13	This estimate assumes a budget of $15M to relocate supportive housing (Alameda Point Collaborative, Building Futures for Women and Children, and Operation Dignity) to the northeast corner of the project site. This cost is included in Phase 2.

GRADING

14 This estimate assumes the Flood and Sea Level Rise Protection will be provided by the following improvements: *(Please see the enclosed exhibit depicting the Flood Protection Concept for Alameda Point)*

- Development Areas = The elevation of the development pads and streets will be elevated to be above the required elevation for flood and sea level rise protection.
- Reuse Areas = A system of perimeter flood and sea level protection measures will be constructed including elevated sea walls, berms and revetments.

15 This estimate assumes the Northern Shoreline will be stabilized. The Northern Shoreline will be stabilized for all areas where Flood Protection measures are proposed within 200' of the shoreline.

16 This estimate includes costs for liquefaction remediation for Development Areas, roadway and utility corridors and areas within Flood Protection measures.

17 This estimate includes costs for importing material ($25/CY) for the following areas:

- Flood Protection Berms & Revetments
- Replacement of pavement and concrete within Residential Development Areas
- Raise Development Areas that are below the Flooding Criteria *(northeast corner of site)*
- Anticipated settlement associated with liquefaction remediation
- Anticipated settlement associated with new structural loads within areas that previously had no structures

18 This estimate includes a budget to accelerate the settlement within areas where differential settlement are anticipated. This is intended to include a surcharge program and/or wick drains.

DEWATERING

19 This estimate includes costs for a dewatering operation during utility construction.

20 This estimate includes a budget to address contaminated groundwater that maybe encountered during construction dewatering. The budget included assumes only minor occurrences of groundwater contaminates will be encountered.

UTILITIES

21 This estimate assumes that all existing utilities within the project site will be replaced with new systems that are consistent with current codes and regulations. This includes utility replacements within the backbone streets within the Reuse Areas.

22 This estimate excludes the costs associated with interim rehabilitation improvements to the existing utility systems within the Reuse Areas. These interim improvements are anticipated to be completed by proposed development projects that utilize the existing utilities prior to their replacement.

23 This estimate assumes that utilidors will be constructed for all utilities within 50% of W. Atlantic Ave. and within the roadways south and east of Building 5.

24 This estimate includes budgets within each phase to maintain utility services to existing buildings and future phases throughout construction.

25 This estimate assumes that initial sub-phases within Phases 1 and 2 will initially connect to the existing sanitary sewer system between each phase and Pump Station 1. This estimate includes costs associated with rehabilitation improvements to this portion of the existing system, such as pipe lining. The ultimate sanitary sewer system connecting to Pump Station 1 is assumed to be constructed with subsequent phases.

Item	Description
26	Sanitary sewer system must be a grid system of collection pipelines that connect the upstream pipe ends of separate sewer zones.
27	This estimate includes costs for point of source water quality facilities, such as roadside vegetated swales, to provide water quality treatment for the proposed streets only. All other on-site water quality solutions for the Development Areas are excluded and assumed to be on-site / in-tract costs.
28	This estimate assumes that the existing 115 kV poles adjacent to Main Street will remain in their existing locations.
29	This estimate excludes costs associated with upgrading the existing Cartwright Substation.
	ON-SITE STREET WORK
30	This estimate assumes the street cross sections of the backbone roadway framework are consistent with those depicted in the Draft MIP.
31	This estimate includes budgets within each phase to maintain access to existing buildings and future phases throughout construction.
	TRANSPORTATION
32	This estimate includes costs for the following off-site street and intersection improvements outlined in the DEIR Mitigation Measures.
33	This estimate excludes the costs associated with completing the Stargell Ave Widening to 4 Lanes *(from Main St to 5th St)* and the extension of Mitchell Ave *(from Main St to the western boundary of Alameda Landing)*
34	This estimate includes an assumed budget of $1.75M for Off-Island Mitigations.
35	This estimate includes costs for the following transit costs: • Bus Rapid Transit - Option W-2-B from the RTAS *(Assumed to be constructed in Phase 2) This estimate assumes a 25% project share of the estimate from the RTAS of $20M.* • Shuttle Service *(Assumed to be implemented in Phase 1) This estimate utilizes the initial start-up estimate cost from the RTAS of $1M.* • Ferry Terminal Parking Lot Expansion @ Ex Terminal *(Assumed to be constructed in Phase 1)* • Ferry Terminal New @ Seaplane Lagoon (Assumed to be constructed in Phase 2) This estimate assumes a budget of $10M. • Transit Center (Assumed to be constructed in Phases 1 and 2) This estimate assumes a budget of $1.5M. • Broadway / Jackson Project Share (Assumed to be spread across Phases 1 and 2) This estimate utilizes a previous estimate by others of $4.5M. • TDM Costs (Assumed to be spread across the Phases 1 and 2) This estimate utilizes a previous estimate by others of $4.2M. • Cross Alameda Trail (Assumed to be constructed in Phase 2) This estimate utilizes a previous estimate by others of $1.9M.
	LANDSCAPING
36	This estimate includes the costs associated with constructing the backbone park and open space system as outlined in the Draft MIP, unless otherwise noted below.
37	This estimate includes a budget of $20M for the construction of the Sports Complex. This cost is assumed to be spread across Phases 1 and 2.
38	This estimate includes costs associated with improvement to approximately half of Enterprise Park. The remainder is assumed to be maintained in its existing condition or improved by others.
39	This estimate includes costs for constructing the Bay Trail adjacent to the project site frontages to the Sea Plane Lagoon, San Francisco Bay and Oakland Inner Harbor.

Item Description

PUBLIC BENEFITS

40 This estimate includes costs for the following public benefit costs:

- Fire Station (Assumed to be constructed in Phase 2) *This estimate assumes a budget of $4.5M.*
- Bay Trail NW Territories & VA Property *(Assumed to be constructed in Phase 2)*
- Pro-Rata Share of Satellite Corporation Yard *(Assumed to be constructed in Phase 2) This estimate assumes a budget of $1M.*

41 This estimate excludes costs associated with other Public Benefits, such as Enhanced Sports Complex, NW Territories Open Space, Wetland Creation / Restoration, Marina, Library, School, Sustainability Programs, etc. These Public Benefit costs are assumed to be provided by others.

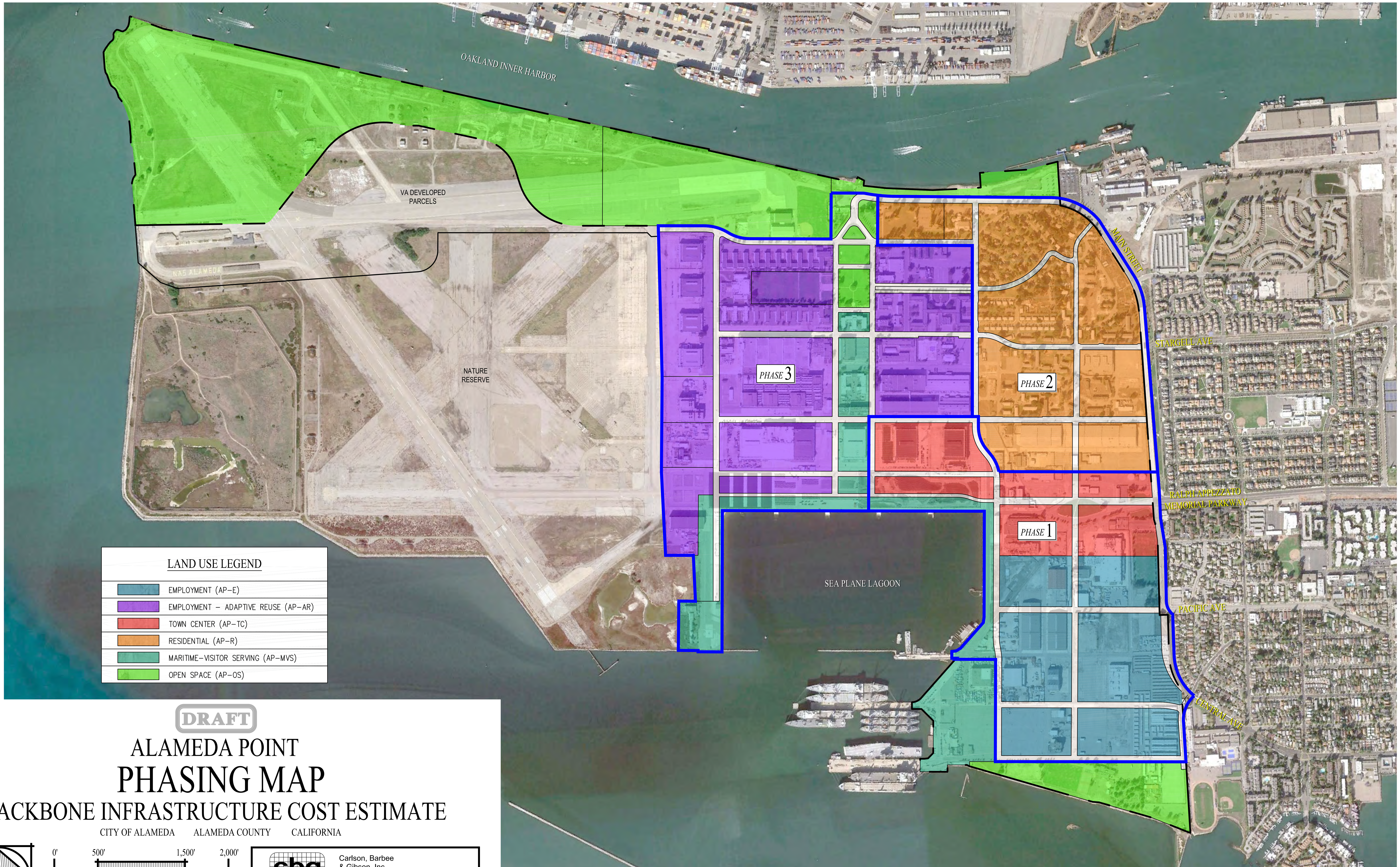
Overall Summary

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
COST ESTIMATE SUMMARY - OVERALL
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

	Description	PHASE 1	PHASE 2	PHASE 3	TOTAL
	BACKBONE INFRASTRUCTURE				
1	DEMOLITION / SITE PREPARATION	$ 33,919,000	$ 42,064,000	$ 1,946,000	$ 77,929,000
2	ENVIRONMENTAL REMEDIATION	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS
3	FLOOD PROTECTION AND SITE GRADING	$ 41,483,000	$ 40,343,000	$ 23,573,000	$ 105,399,000
4	DEWATERING	$ 3,740,000	$ 2,955,000	$ 2,680,000	$ 9,375,000
5	SANITARY SEWER	$ 12,657,000	$ 3,255,000	$ 4,497,000	$ 20,409,000
6	STORM DRAIN	$ 13,325,000	$ 8,408,000	$ 10,250,000	$ 31,983,000
7	POTABLE WATER	$ 5,314,000	$ 4,405,000	$ 6,110,000	$ 15,829,000
8	RECYCLED WATER	$ 1,470,000	$ 506,250	$ 876,000	$ 2,852,250
9	DRY UTILITIES	$ 7,201,000	$ 6,149,000	$ 6,491,000	$ 19,841,000
10	ON-SITE STREET WORK	$ 23,455,000	$ 19,904,000	$ 13,411,000	$ 56,770,000
11	TRANSPORTATION	$ 10,400,000	$ 34,206,000	$ -	$ 44,606,000
12	PARKS AND OPEN SPACE	$ 28,990,000	$ 15,898,000	$ 20,030,000	$ 64,918,000
13	PUBLIC BENEFITS	$ 1,250,000	$ 16,038,000	$ -	$ 17,288,000
	SUBTOTAL BACKBONE INFRASTRUCTURE CONSTRUCTION COST ***(to nearest $10,000)***	**$ 183,200,000**	**$ 194,130,000**	**$ 89,860,000**	**$ 467,200,000**
	SOFT COSTS				
14	CONSTRUCTION ADMIN	$ 5,862,000	$ 6,212,000	$ 2,876,000	$ 14,950,000
15	PROFESSIONAL SERVICES	$ 21,984,000	$ 23,296,000	$ 10,783,000	$ 56,063,000
16	FEES	$ 7,720,000	$ 7,784,000	$ 4,694,000	$ 20,198,000
17	IMPROVEMENT ACCEPTANCE	$ 733,000	$ 777,000	$ 359,000	$ 1,869,000
	SUBTOTAL SOFT COST ***(to nearest $10,000)***	**$ 36,300,000**	**$ 38,070,000**	**$ 18,710,000**	**$ 93,080,000**
	TOTAL BACKBONE INFRASTRUCTURE COST ***(to nearest $10,000)***	**$ 219,500,000**	**$ 232,200,000**	**$ 108,570,000**	**$ 560,280,000**

Exhibits



DRAFT

ALAMEDA POINT
PHASING MAP
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA   ALAMEDA COUNTY   CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'   DATE: JULY, 2013

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SAN RAMON • LATHROP

NOTE:
ROADWAY FRAMEWORK IS BASED UPON THE PRELIMINARY DEVELOPMENT CONCEPT (PDC)

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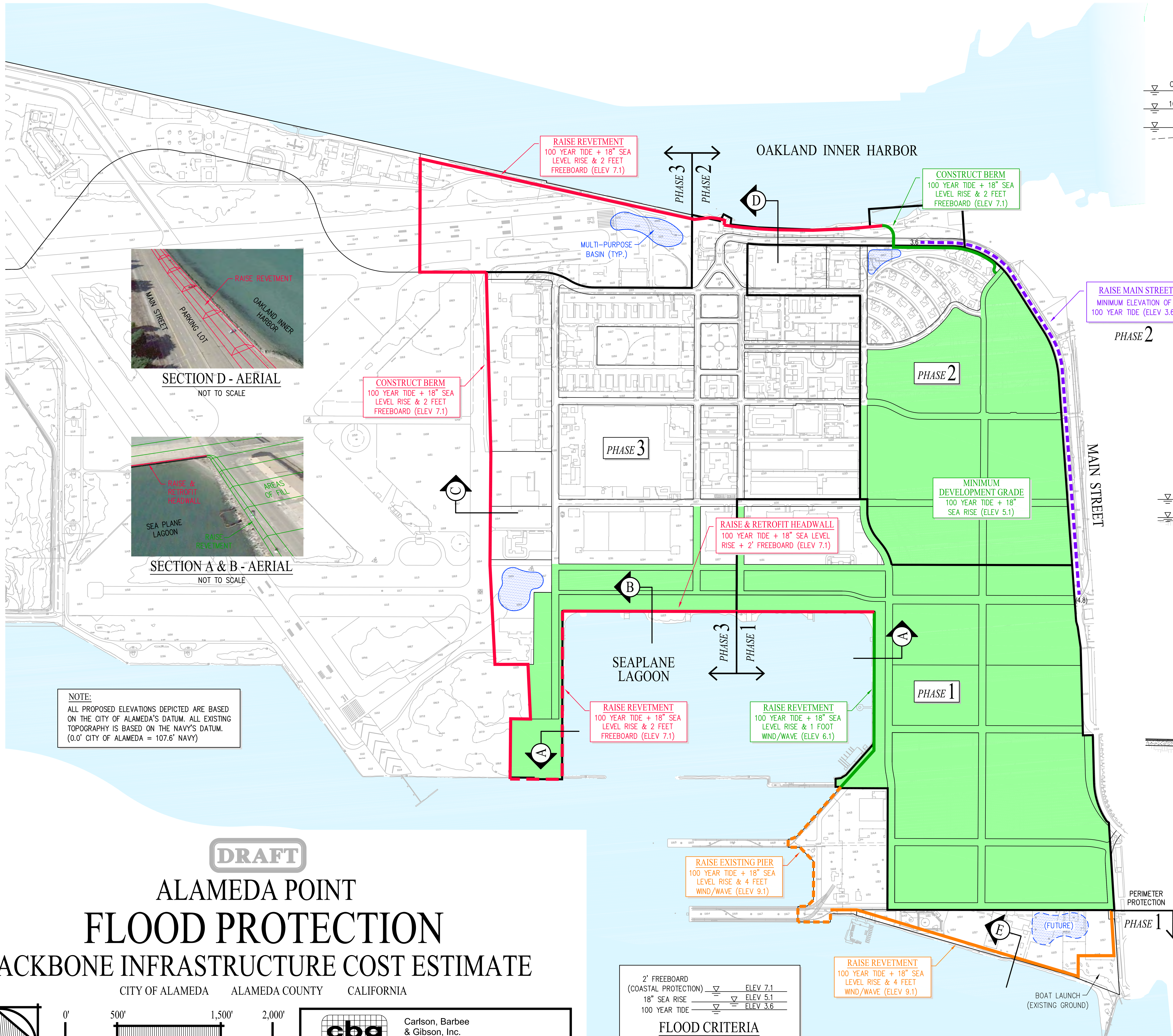

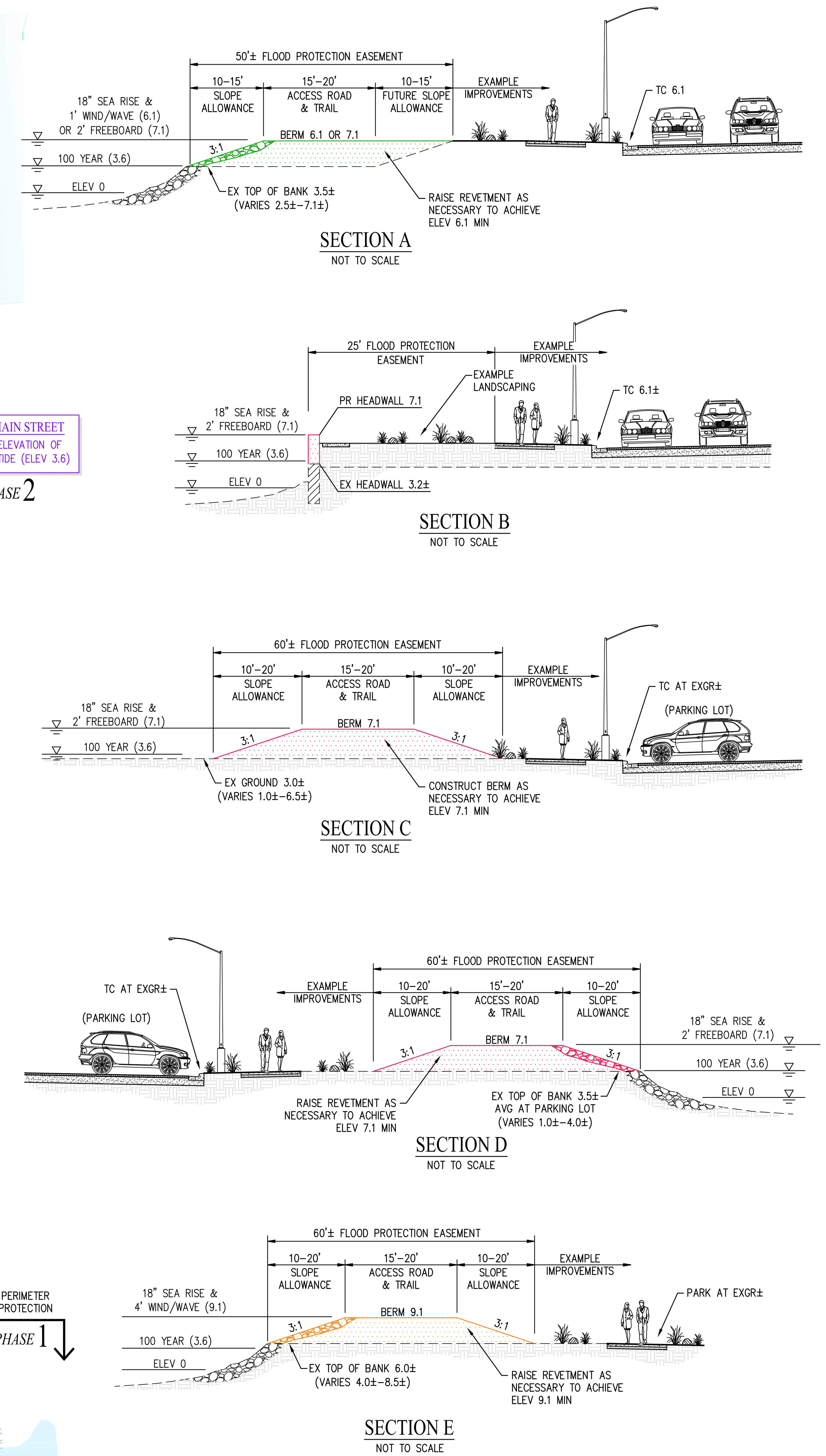

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ALAMEDA POINT
FLOOD PROTECTION
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA   ALAMEDA COUNTY   CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'   DATE: JULY, 2013

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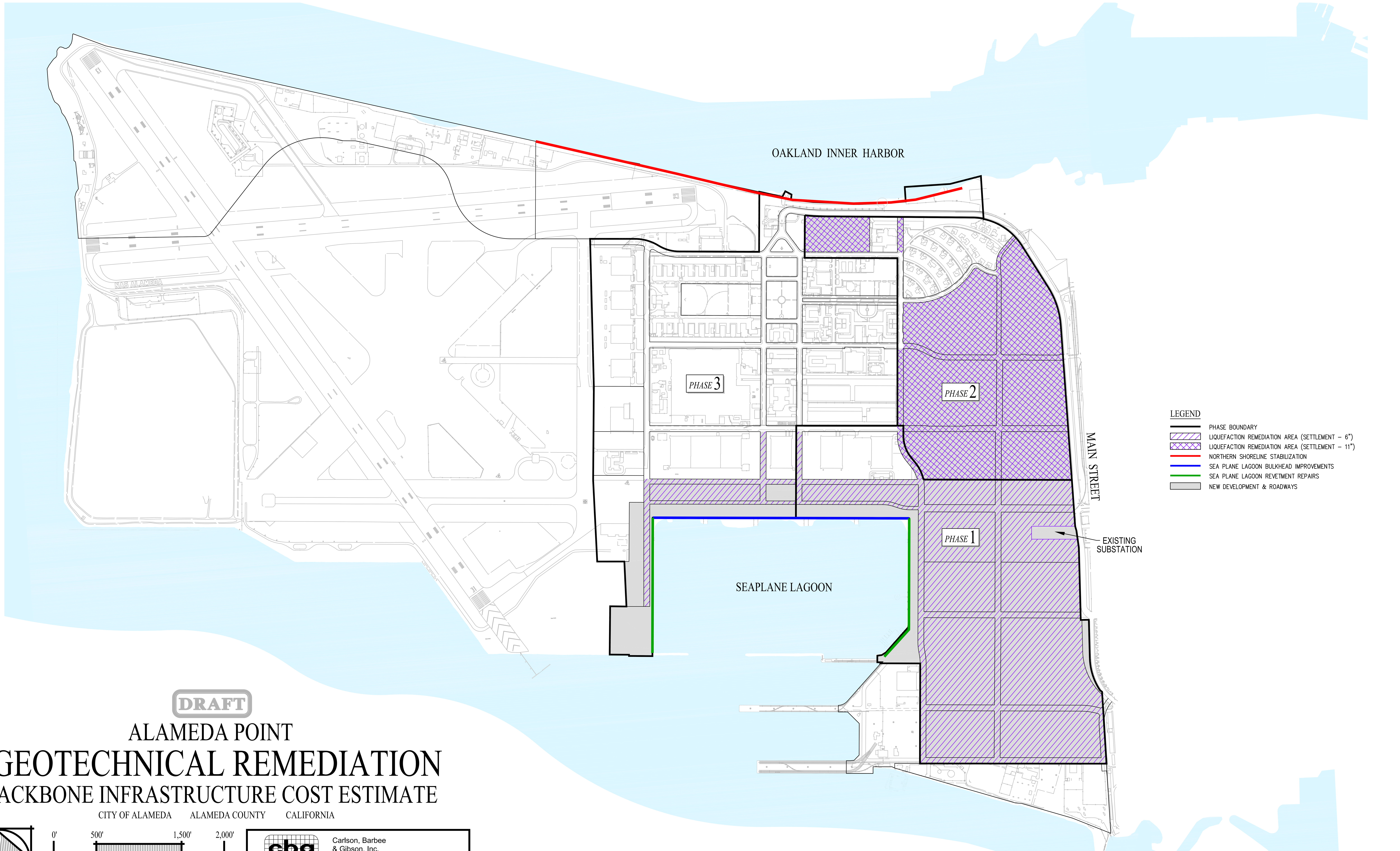

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ALAMEDA POINT
GEOTECHNICAL REMEDIATION
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'

DATE: JULY, 2013

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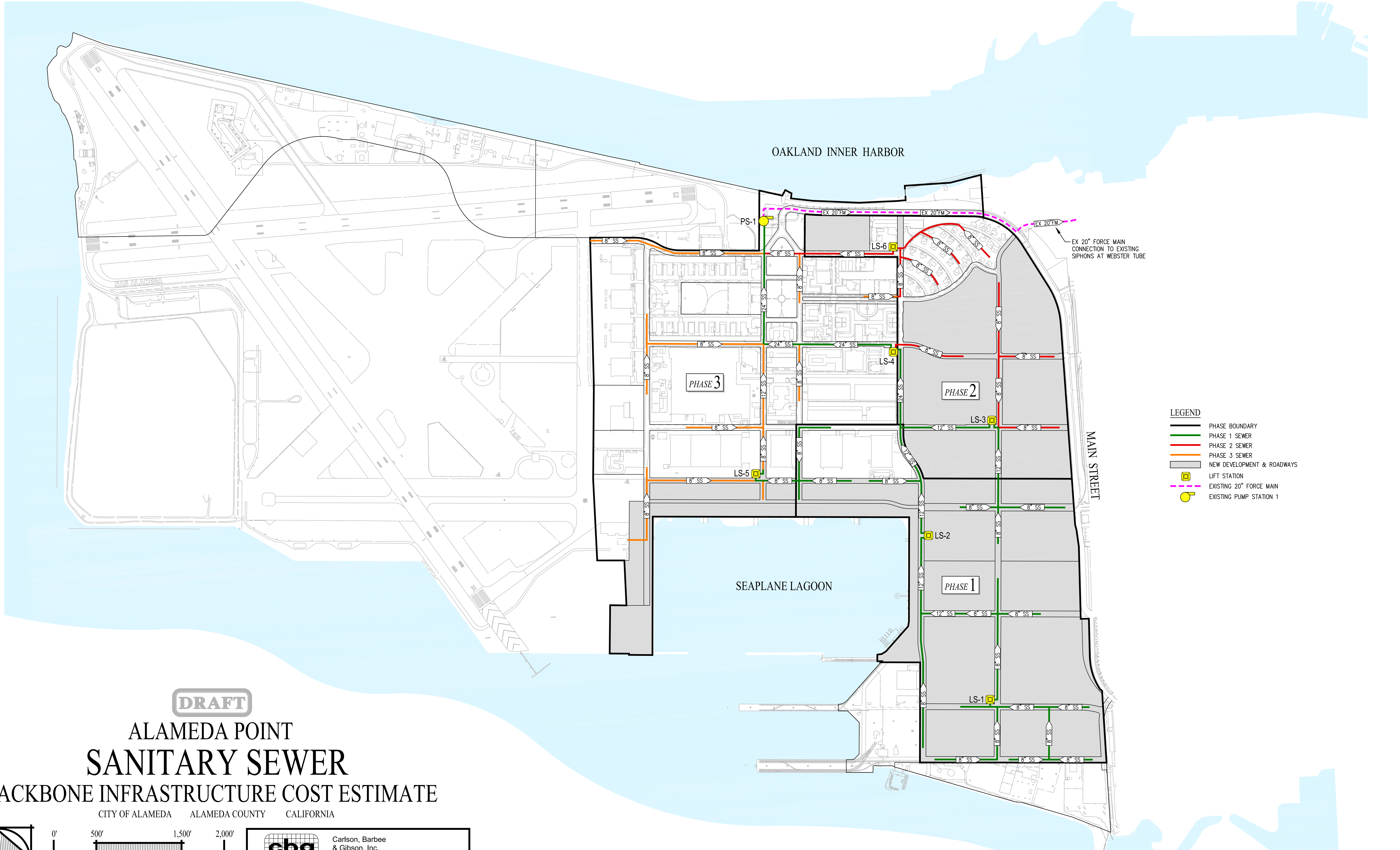

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ALAMEDA POINT

SANITARY SEWER

BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'

DATE: JULY, 2013

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ALAMEDA POINT
STORM DRAIN
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'

DATE: JULY, 2013

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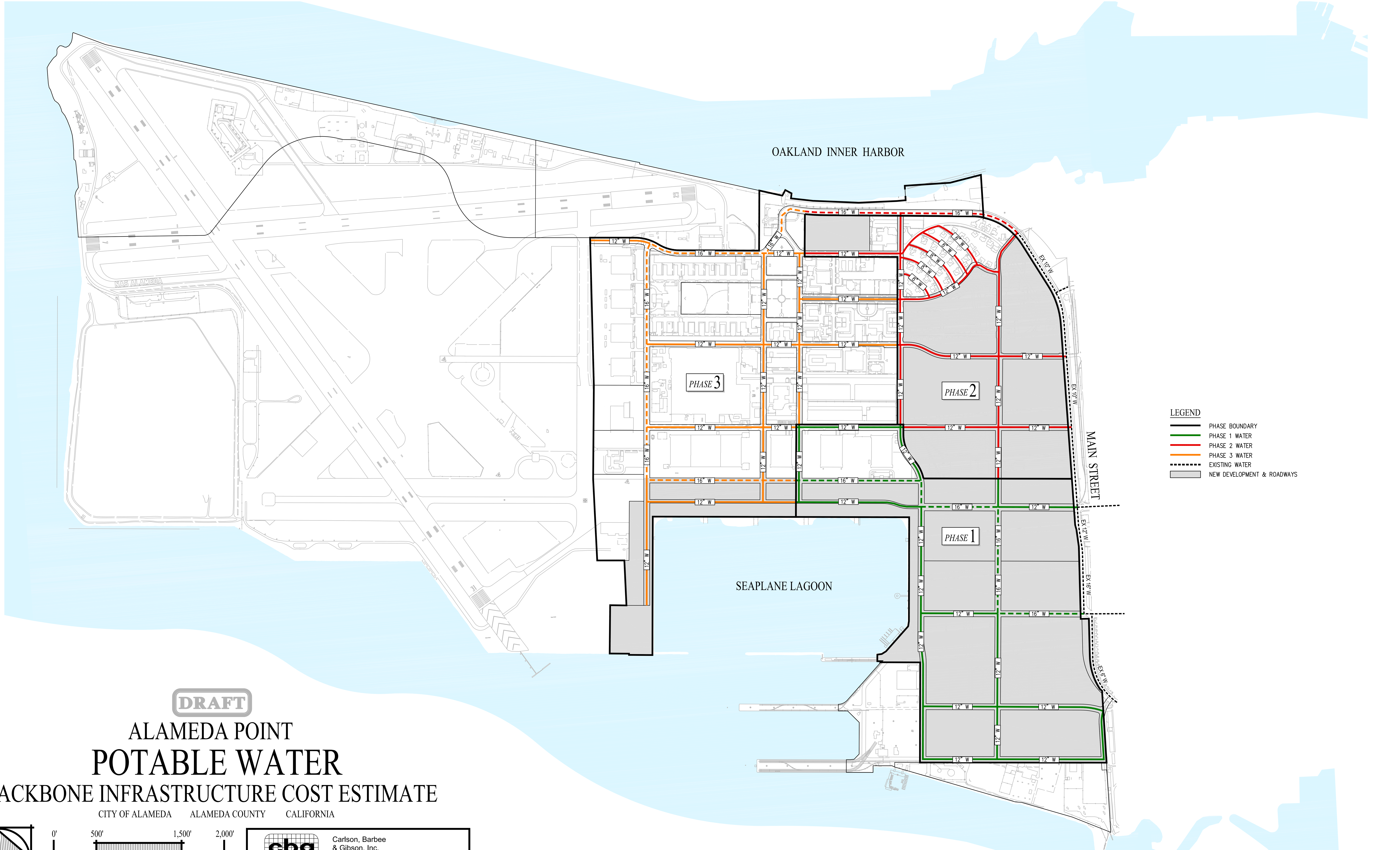

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ALAMEDA POINT

POTABLE WATER

BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA   ALAMEDA COUNTY   CALIFORNIA

0'   500'   1,500'   2,000'

SCALE: 1" = 500'   DATE: JULY, 2013

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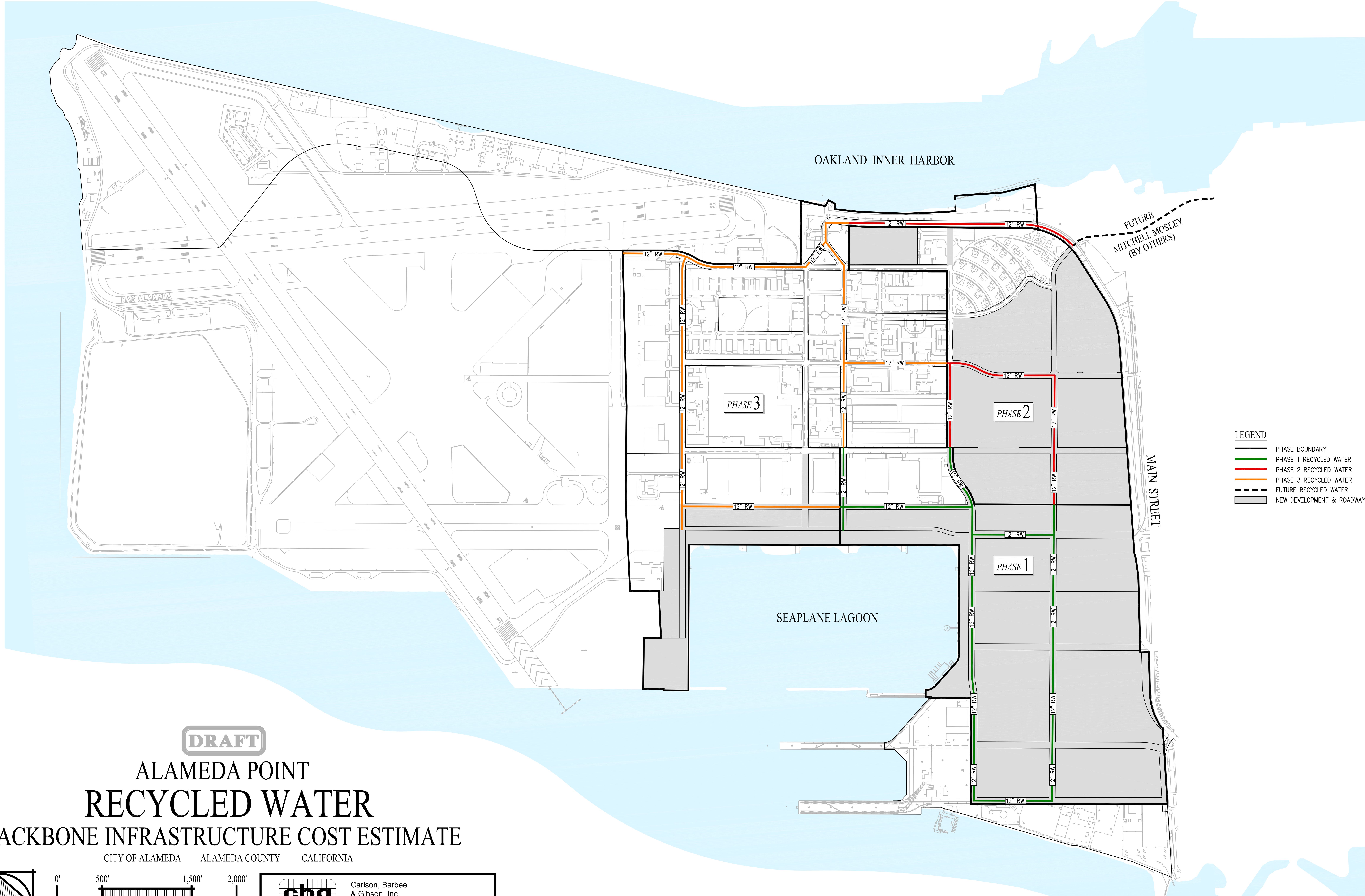

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ALAMEDA POINT
RECYCLED WATER
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'

DATE: JULY, 2013

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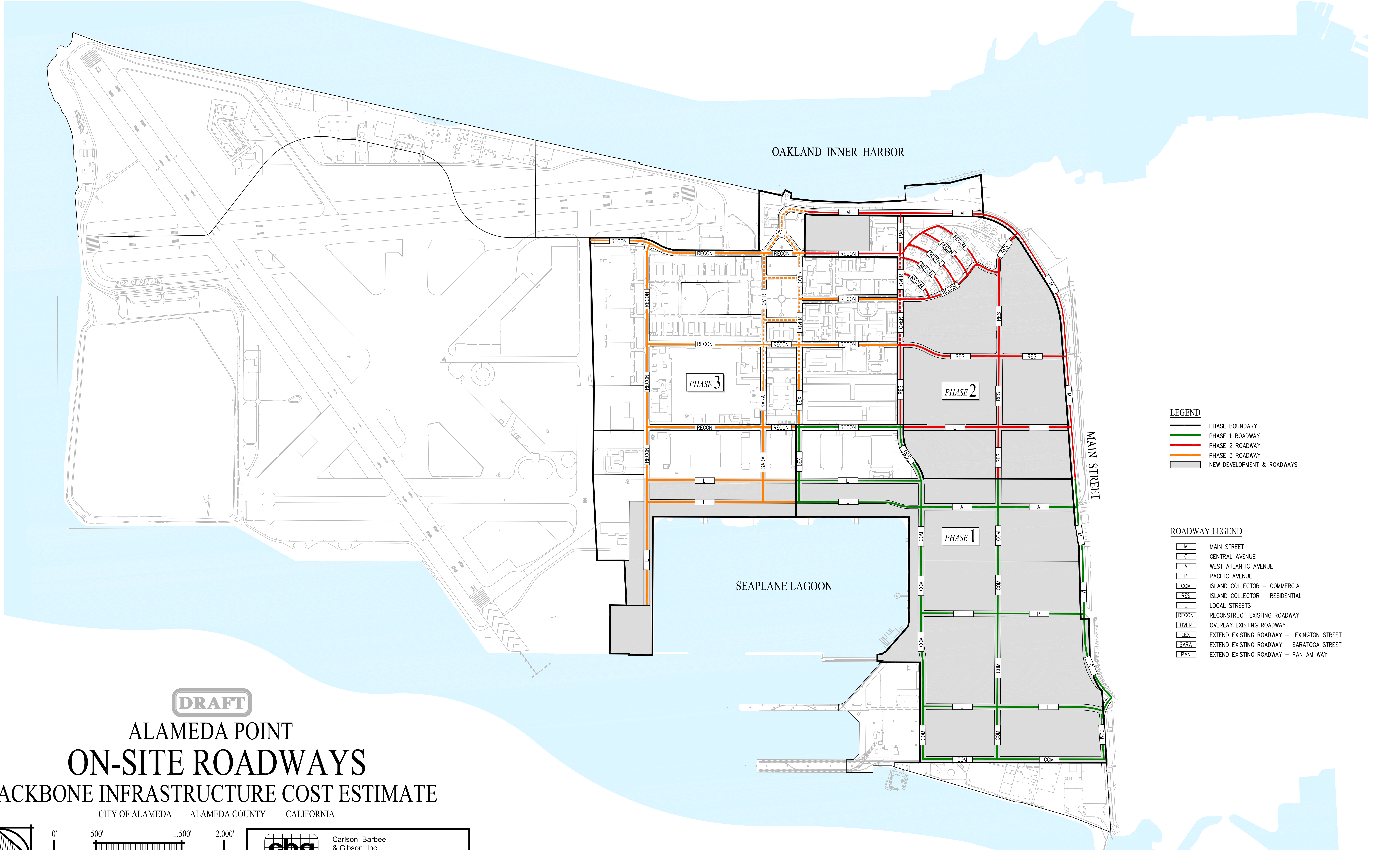

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ALAMEDA POINT

ON-SITE ROADWAYS

BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA   ALAMEDA COUNTY   CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500'   DATE: JULY, 2013

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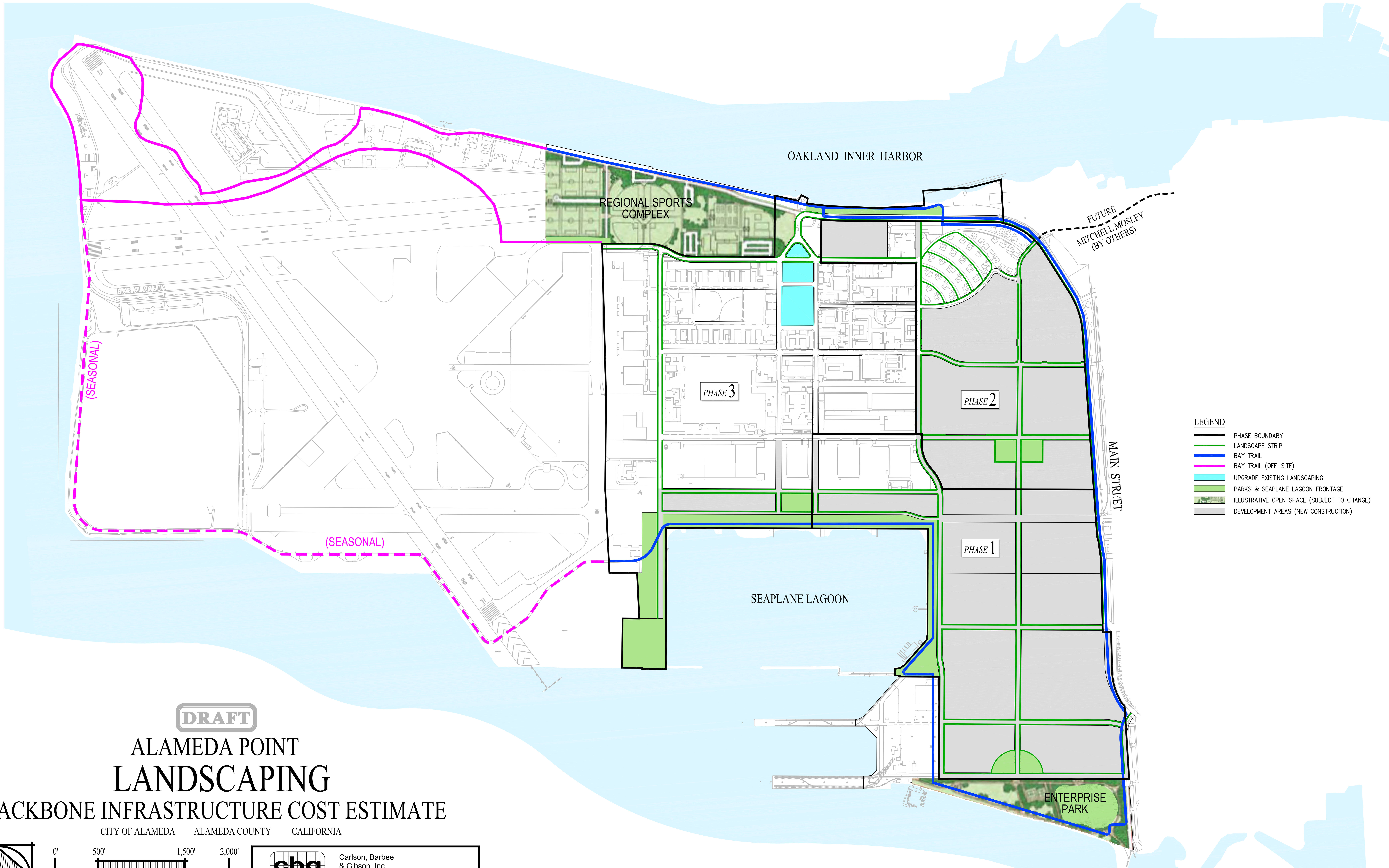

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ALAMEDA POINT
LANDSCAPING
BACKBONE INFRASTRUCTURE COST ESTIMATE

CITY OF ALAMEDA ALAMEDA COUNTY CALIFORNIA

0' 500' 1,500' 2,000'

SCALE: 1" = 500' DATE: JULY, 2013

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& Gibson, Inc.
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Estimate Summary

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
COST ESTIMATE SUMMARY
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description		Amount
	BACKBONE INFRASTRUCTURE		
1	DEMOLITION / SITE PREPARATION	$	77,929,000
2	ENVIRONMENTAL REMEDIATION		BY OTHERS
3	FLOOD PROTECTION AND SITE GRADING	$	105,398,000
4	DEWATERING	$	9,375,000
5	SANITARY SEWER	$	20,408,000
6	STORM DRAIN	$	31,984,000
7	POTABLE WATER	$	15,829,000
8	RECYCLED WATER	$	2,853,000
9	DRY UTILITIES	$	19,841,000
10	ON-SITE STREET WORK	$	56,771,000
11	TRANSPORTATION	$	44,606,000
12	PARKS AND OPEN SPACE	$	64,918,000
13	PUBLIC BENEFITS	$	17,288,000
	SUBTOTAL BACKBONE INFRASTRUCTURE CONSTRUCTION COSTS *(to nearest $10,000)*	**$**	**467,200,000**
	SOFT COSTS		
14	CONSTRUCTION ADMIN	$	14,950,000
15	PROFESSIONAL SERVICES	$	56,064,000
16	FEES	$	20,200,000
17	IMPROVEMENT ACCEPTANCE	$	1,869,000
	SUBTOTAL SOFT COSTS *(to nearest $10,000)*	**$**	**93,080,000**
	TOTAL BACKBONE INFRASTRUCTURE COSTS *(to nearest $10,000)*	**$**	**560,280,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
DEMOLITION / SITE PREPARATION
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	DEMOLITION / SITE PREPARATION						
1	Demo & Abatement of Ex Structures - *Resd Bldgs*	63	EA	$	50,000	$	3,150,000
2	Demo & Abatement of Ex Structures - *Multi-Family Bldgs*	63	EA	$	100,000	$	6,300,000
3	Demo & Abatement of Ex Structures - *Industrial (N)*	541,500	SF	$	7.50	$	4,061,250
4	Demo & Abatement of Ex Structures - *Industrial (S)*	1,186,000	SF	$	15.00	$	17,790,000
5	Demolition of Existing Pavement and Concrete *(Assume to be recycled and stockpiled)*	8,498,000	SF	$	0.75	$	6,373,500
6	Demolition of Ex Sea Plane Lagoon Ramps	4	EA	$	100,000	$	400,000
7	Clearing and Grubbing - *Open Space areas only*	65	AC	$	2,000	$	129,000
8	Slurry Fill Existing Utilities - *Development Parcels*	146,400	LF	$	10	$	1,464,000
9	Remove Existing Utilities - *Development Parcels*	141,900	LF	$	35	$	4,966,500
10	Remove Existing Utilities - *Within Proposed R/W's*	69,250	LF	$	35	$	2,423,750
11	Demolition of Ex Railroad Spurs	11,400	LF	$	25	$	285,000
12	Relocate Collaborative Housing	1	LS	$	15,000,000	$	15,000,000
	SUBTOTAL DEMOLITION / SITE PREPARATION COSTS					**$**	**62,343,000**
	25% CONTINGENCY					**$**	**15,585,750**
	TOTAL DEMOLITION / SITE PREPARATION COSTS					**$**	**77,929,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
ENVIRONMENTAL REMEDIATION
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit	Unit Price	Amount
	ENVIRONMENTAL REMEDIATION				
				SUBTOTAL ENVIRONMENTAL REMEDIATION COSTS	**BY OTHERS**
				25% CONTINGENCY	**BY OTHERS**
				TOTAL ENVIRONMENTAL REMEDIATION COSTS	**BY OTHERS**

Carlson, Barbee & Gibson, Inc.
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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
FLOOD PROTECTION AND SITE GRADING
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	FLOOD PROTECTION AND SITE GRADING						
	Assumes: The flood protection solution for the project site incorporates raised development areas and a perimeter system of raised roadways (berms) to protect Adaptive Reuse areas. These facilities are to provide protection from 100 year tide, plus 18" of sea level rise, and include the appropriate freeboard.						
	GEOTECHNICAL REMEDIATION						
1	Northern Shoreline Stabilization - *DDC*	255,000	SF	$	1	$	255,000
2	Northern Shoreline Stabilization - *Concrete Piles*	5,100	LF	$	2,500	$	12,750,000
3	Sea Plane Lagoon - *Northern Headwall*	3,020	LF	$	3,000	$	9,060,000
4	Sea Plane Lagoon - *Revetment Repairs*	1,800	LF	$	200	$	360,000
5	Sea Plane Lagoon - *Floodwall on Wharf*	2,200	LF	$	500	$	1,100,000
6	Liquefaction Remediation *- DDC Dev Areas & Roadways*	12,050,000	SF	$	1	$	12,050,000
7	Liquefaction Remediation *- DDC Berm*	741,550	SF	$	1	$	741,550
	Subtotal Geotechnical Remediation					$	36,316,550
	EARTHWORK						
8	Import - *Berms*						
	Raise to Flood Protection Elevation	82,200	CY	$	25	$	2,055,000
	Settlement due to DDC *- Assume 1'*	37,700	CY	$	25	$	942,500
	Settlement due to Increased Load *- Assume 1'*	37,700	CY	$	25	$	942,500
9	Import - *Replace Ex Pav and Concrete - Residential Parcels* *(Assume 1' Depth over Ex Pave / Concrete Demo)*	84,000	CY	$	25	$	2,100,000
10	Import - *Development Areas*						
	Raise Above Flood Plain	546,500	CY	$	25	$	13,662,500
	Settlement due to Fill	273,250	CY	$	25	$	6,831,250
	Settlement due to DDC *- Excludes Parks*	297,700	CY	$	25	$	7,442,500
	Settlement due to Increased Structure Load *- Assume 1'*	230,750	CY	$	25	$	5,768,750
11	Rough Grade *- Assume 1' across Development Areas*	491,500	CY	$	3.50	$	1,720,250
12	Rock Slope Protection	10,550	LF	$	200	$	2,110,000
13	Finish Super Pad	237	AC	$	10,000	$	2,370,000
14	Settlement Acceleration Program *- Budget*	1	LS	$	450,000	$	450,000
15	Retaining Walls *- Budget*	1	LS	$	375,000	$	375,000
16	Erosion Control - *Phases 1 and 2*	302	AC	$	3,500	$	1,057,000
17	Erosion Control - *Phase 3*	17,435	LF	$	10	$	174,350
	Subtotal Earthwork					$	48,001,600
	SUBTOTAL FLOOD PROTECTION AND SITE GRADING COSTS					**$**	**84,318,150**
	25% CONTINGENCY					**$**	**21,079,538**
	TOTAL FLOOD PROTECTION AND SITE GRADING COSTS					**$**	**105,398,000**

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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
DEWATERING
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	DEWATERING						
1	Dewatering - *On-Site Roadways & Main Street*	57,995	LF	$	100	$	5,799,500
2	Groundwater Contamination Treatment - *Budget*	1	LS	$	1,700,000	$	1,700,000
					SUBTOTAL DEWATERING COSTS	**$**	**7,500,000**
					25% CONTINGENCY	**$**	**1,875,000**
					TOTAL DEWATERING COSTS	**$**	**9,375,000**

Carlson, Barbee & Gibson, Inc.
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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
SANITARY SEWER
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	SANITARY SEWER						
1	36" Sanitary Sewer - *In existing pavement*	365	LF	$	275	$	100,375
2	24" Sanitary Sewer - *In existing pavement*	3,550	LF	$	250	$	887,500
3	24" Sanitary Sewer	50	LF	$	150	$	7,500
4	12" Sanitary Sewer - *In existing pavement*	3,305	LF	$	140	$	462,700
5	12" Sanitary Sewer	2,735	LF	$	70	$	191,450
6	8" Sanitary Sewer - *In existing pavement (to Lift Station)*	1,075	LF	$	100	$	107,500
7	8" Sanitary Sewer	30,970	LF	$	50	$	1,548,500
8	Manholes *(Assume 1 every 300')*	140	EA	$	6,000	$	840,000
9	Stubs to Future Development	101	EA	$	2,000	$	202,000
10	Lift Stations - *With back-up power*	6	EA	$	750,000	$	4,500,000
11	Temporary Lift Station - *Budget*	1	EA	$	500,000	$	500,000
12	Connect to Ex Pump Station 1	1	LS	$	100,000	$	100,000
13	Connect New Main to Existing Trunk Main	8	EA	$	10,000	$	80,000
14	Rehabilitate Existing Trunk Main - *Budget*	6,650	LF	$	20	$	133,000
15	Utilidors	2,575	LF	$	1,000	$	2,575,000
16	Maintain Service to Ex Buildings & Future Phases	3	LS	$	750,000	$	2,250,000
17	Connect Existing Lateral to New Main	79	EA	$	10,000	$	790,000
18	Replace Bay Mud - *Within Utility Trenches*	42,050	CY	$	25	$	1,051,250
					SUBTOTAL SANITARY SEWER COSTS	**$**	**16,326,775**
					25% CONTINGENCY	**$**	**4,081,694**
					TOTAL SANITARY SEWER COSTS	**$**	**20,408,000**

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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
STORM DRAIN
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	STORM DRAIN						
1	60" Storm Drain	2,845	LF	$	240	$	682,800
2	60" Storm Drain *- In existing pavement*	3,950	LF	$	360	$	1,422,000
3	48" Storm Drain	8,405	LF	$	192	$	1,613,760
4	48" Storm Drain *- In existing pavement*	375	LF	$	288	$	108,000
5	36" Storm Drain	8,775	LF	$	144	$	1,263,600
6	36" Storm Drain *- In existing pavement*	1,100	LF	$	216	$	237,600
7	24" Storm Drain	14,425	LF	$	96	$	1,384,800
8	18" Storm Drain	10,550	LF	$	72	$	759,600
9	Manholes *(Assume 1 every 300')*	168	EA	$	6,000	$	1,008,000
10	Multi-Purpose Basin						
	Excavation	45,000	CY	$	5	$	225,000
	Inlet / Outlet	3	EA	$	250,000	$	750,000
	Passive Landscaping	290,000	SF	$	2	$	580,000
	Access Road	44,000	SF	$	5	$	220,000
11	Force Mains *(12-24")*	1,100	LF	$	144	$	158,400
12	Emergency & Treatment Flow Pump Station *With Back-up Power*	1	EA	$	2,500,000	$	2,500,000
13	Retrofit Ex Outlets to Sea Plane Lagoon / Inner Harbor	5	EA	$	250,000	$	1,250,000
14	Mitigation for Storm Drain Outfall Retrofit	5	EA	$	100,000	$	500,000
15	Utilidors	3,125	LF	$	1,000	$	3,125,000
16	Interim Drainage to Existing Parcels to Remain *(Budget)*	1	LS	$	1,300,000	$	1,300,000
17	Stubs to Future Development *(Budget)*	104	EA	$	2,000	$	208,000
18	Existing Main Street Storm Drain Pump Modification	1	LS	$	250,000	$	250,000
19	Roadside Vegetated Swales / Water Quality Facilities	101,940	LF	$	40	$	4,077,600
20	Replace Bay Mud *- Within Utility Trenches*	78,500	CY	$	25	$	1,962,500
					SUBTOTAL STORM DRAIN COSTS	**$**	**25,587,000**
					25% CONTINGENCY	**$**	**6,396,750**
					TOTAL STORM DRAIN COSTS	**$**	**31,984,000**

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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
POTABLE WATER
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	POTABLE WATER						
1	16" Water Pipe *(Including appurtenances)*	11,220	LF	$	140	$	1,570,800
2	16" Water Pipe *(Including appurtenances) - In Ex Pavement*	2,875	LF	$	280	$	805,000
3	12" Water Pipe *(Including appurtenances)*	42,385	LF	$	120	$	5,086,200
4	8" Water Pipe *(Including appurtenances) - Big Whites*	3,975	LF	$	60	$	238,500
5	Stubs to Future Development	107	EA	$	2,000	$	214,000
6	Connect to Ex Waterline *(Including Meter & Backflow)*	59	EA	$	15,000	$	885,000
7	Fire Hydrants *(Assume 1 every 500')*	126	EA	$	4,000	$	504,000
8	Irrigation Services *(Assume 1 every 0.33 Mile)*	41	EA	$	2,000	$	82,000
9	Utilidors	3,450	LF	$	250	$	862,500
10	Maintain Service to Ex Buildings & Future Phases	1	LS	$	1,350,000	$	1,350,000
11	Connect Existing Lateral to New Main *(Includes Meter)*	104	EA	$	10,000	$	1,040,000
12	Reconnect Coast Guard Housing Pipeline	1	LS	$	25,000	$	25,000
					SUBTOTAL POTABLE WATER COSTS	**$**	**12,663,000**
					25% CONTINGENCY	**$**	**3,165,750**
					TOTAL POTABLE WATER COSTS	**$**	**15,829,000**

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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
RECYCLED WATER
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	RECYCLED WATER						
1	12" Recycled Water Pipe *(Including appurtenances)*	28,855	LF	$	60	$	1,731,300
2	Stubs to Future Development	52	EA	$	2,000	$	104,000
3	Irrigation Services	21	EA	$	2,500	$	52,500
4	Utilidors	1,575	LF	$	250	$	393,750
					SUBTOTAL RECYCLED WATER COSTS	**$**	**2,282,000**
					25% CONTINGENCY	**$**	**570,500**
					TOTAL RECYCLED WATER COSTS	**$**	**2,853,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
DRY UTILITIES
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	DRY UTILITIES						
1	Relocate Elec Transmission (115 kV) Poles - *Main St*	0	EA	$	50,000		N.I.C.
2	Relocate Exiting Street Lights - *Main St*	40	EA	$	5,000	$	200,000
3	Joint Trench Facilities - *Main St*	6,100	LF	$	120	$	732,000
4	Joint Trench Facilities - *Off-Site (to Substation)*	3,950	LF	$	240	$	948,000
5	Joint Trench Facilities - *On-Site*	58,645	LF	$	120	$	7,037,400
6	Additional Facilities for Multiple Utility Companies	59,495	LF	$	20	$	1,189,900
7	Electroliers - *Assume 1 every 120'*	483	EA	$	4,000	$	1,932,000
8	Utilidors	3,575	LF	$	250	$	893,750
9	Maintain Service to Ex Buildings - *During Construction*	1	LS	$	1,350,000	$	1,350,000
10	Establish New Connection to Historic Buildings to Remain	119	EA	$	10,000	$	1,190,000
11	Connect to Existing Substation	4	EA	$	100,000	$	400,000
					SUBTOTAL DRY UTILITIES COSTS	**$**	**15,873,050**
					25% CONTINGENCY	**$**	**3,968,263**
					TOTAL DRY UTILITIES COSTS	**$**	**19,841,000**

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ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
ON-SITE STREET WORK
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit	Unit Price	Amount
	ON-SITE STREET WORK				
	Please see Appendix for the linear footage cost breakdowns				
1	Main Street Reconstruction				
	Pacific to Atlantic	1,150	LF	$ 750	$ 862,500
	Atlantic to Main Gate	5,875	LF	$ 985	$ 5,786,875
	Intersection Modification - *Atlantic Ave / Main St*	1	LS	$ 100,000	$ 100,000
	Intersection Modification - *Stargell Ave / Main St*	1	LS	$ 100,000	$ 100,000
	Intersection Modification - *Singleton Ave / Main St*	1	LS	$ 100,000	$ 100,000
	Intersection Modification - *Pacific / Main St*	1	LS	$ 500,000	$ 500,000
	Transition to Ex Roadway - *At Northern Boundary*	1	LS	$ 400,000	$ 400,000
	Transition to Ex Roadway - *At Southern Boundary*	0	LS	$ 100,000	$ -
	Traffic Signal Modification - *Atlantic Ave / Main St*	1	LS	$ 150,000	$ 150,000
	Traffic Signal Modification - *Stargell Ave / Main St*	1	LS	$ 150,000	$ 150,000
	Traffic Signal Modification - *Singleton Ave / Main St*	1	LS	$ 150,000	$ 150,000
	Traffic Signal Modification - *Pacific / Main St*	1	LS	$ 350,000	$ 350,000
	Relocate Ferry Entrance - *Including Signal*	1	LS	$ 500,000	$ 500,000
2	On-Site Streets				
	West Atlantic Avenue - *New*	1,750	LF	$ 860	$ 1,505,000
	Pacific Avenue - *New*	1,900	LF	$ 565	$ 1,073,500
	Island Collector - Bike Lanes - *New*	1,635	LF	$ 490	$ 801,150
	Island Collector - Bikeway - *New*	1,975	LF	$ 520	$ 1,027,000
	Local Streets - Sharrows - *New*	1,875	LF	$ 405	$ 759,375
	Local Streets - Bike Lanes - *New*	2,700	LF	$ 465	$ 1,255,500
	Local Streets - Bike Lanes (Protected) - *New*	4,375	LF	$ 465	$ 2,034,375
	Seaplane (East) - *New*	2,800	LF	$ 665	$ 1,862,000
	Seaplane (North) - *New*	3,045	LF	$ 575	$ 1,750,875
	West Hornet Avenue - *New*	2,200	LF	$ 480	$ 1,056,000
	West Midway Avenue - *New*	1,900	LF	$ 445	$ 845,500
	West Redline Avenue - *Reconstruction*	3,650	LF	$ 525	$ 1,916,250
	Essex Drive - *Reconstruction*	1,115	LF	$ 650	$ 724,750
	West Midway Avenue - *Reconstruction*	2,775	LF	$ 520	$ 1,443,000
	Tower Avenue - *Reconstruction*	2,775	LF	$ 540	$ 1,498,500
	Monarch Street - *Reconstruction*	3,175	LF	$ 630	$ 2,000,250
	Big Whites - *Reconstruction*	4,900	LF	$ 300	$ 1,470,000
	Lexington Street - *Reconstruction*	1,450	LF	$ 480	$ 696,000
	Lexington Street - *New*	1,025	LF	$ 460	$ 471,500
	Saratoga Street - *Reconstruction*	1,450	LF	$ 480	$ 696,000
	Saratoga Street - *New*	1,025	LF	$ 460	$ 471,500
	Pan Am Way - *Reconstruction*	1,050	LF	$ 465	$ 488,250
	Pan Am Way - *New*	425	LF	$ 395	$ 167,875
	Roadway Resurfacing	1,750	LF	$ 250	$ 437,500

Item	Description	Quantity	Unit		Unit Price		Amount
3	Central Avenue Realignment	1	LS	$	2,000,000	$	2,000,000
4	Traffic Signals - *On-Site (Budget)*	3	EA	$	250,000	$	750,000
5	Conform to Ex Intersections - *Budget During Construction*	33	EA	$	100,000	$	3,300,000
6	Temporary Access Roads to Ex Bldg's - *During Construction*	1	LS	$	1,500,000	$	1,500,000
7	Misc Frontage Improvements to Ex Bldg's to Remain	10,900	LF	$	100	$	1,090,000
8	Driveways - *Residential Alleys & Commercial Parking lots*	130	EA	$	1,000	$	130,000
9	Temp Barricades - *At Entrances to Future Development*	97	EA	$	1,500	$	145,500
10	Traffic Calming Budget	1	LS	$	650,000	$	650,000
11	Roundabout	1	EA	$	250,000	$	250,000
	SUBTOTAL ON-SITE STREET WORK COSTS					**$**	**45,417,000**
	25% CONTINGENCY					**$**	**11,354,250**
	TOTAL ON-SITE STREET WORK COSTS					**$**	**56,771,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TRANSPORTATION
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Improvement Amount	Project Pro-Rata Share	Project Amount
	OFF-SITE PROJECT IMPROVEMENTS			
	VEHICLE IMPROVEMENTS			
1	Fernside Blvd / Otis Dr - *Intersection & Signal Improvements*	$ 300,000	100%	$ 300,000
2	Main St / Pacific Ave - *Signal Improvements*		*Included in Main Street Estimate*	
3	Webster St / RAMP - *Signal Improvements*	$ 50,000	100%	$ 50,000
4	Park St / Otis Dr - *Signal Improvements*	$ 50,000	100%	$ 50,000
5	Broadway / Tilden Way - *Signal Improvements*	$ 50,000	100%	$ 50,000
6	High St / Fernside Blvd - *Signal Improvements*	$ 50,000	100%	$ 50,000
7	Atlantic Ave / Constitution Way - *Signal Modification*	$ 150,000	100%	$ 150,000
	BICYCLE IMPROVEMENTS			
8	Stargell Avenue Class I Trail - *Main St to 5th Street*	$ 400,000	100%	$ 400,000
9	Main St Class I Trail - *RAMP to Pacific Ave*		*Included in Main Street Estimate*	
10	Central Ave Class I & II Trail - *Pacific Ave to 4th St*	N.I.C.	100%	N.I.C.
	Subtotal Off-Site Project Improvements			$ 1,050,000
	OFF-SITE PROJECT CONTRIBUTIONS - *Pro-Rata Share*			
	VEHICLE IMPROVEMENTS			
11	Park St / Clement Ave - *Intersection Improvements*	$ 550,000	10%	$ 55,000
12	Park St / Encinal Ave - *Intersection Improvements*	$ 200,000	8%	$ 16,000
13	Broadway / Otis Dr - *Intersection Improvements*	$ 275,000	9%	$ 24,750
14	Tilden Way / Blanding Ave / Fernside Blvd - *Intersection Imp's*	$ 350,000	5%	$ 17,500
15	High St / Fernside Blvd - *Signal Improvements / Transit Priority*	$ 100,000	30%	$ 30,000
16	High St / Otis Dr - *Intersection Improvements*	$ 275,000	14%	$ 38,500
17	Island Dr / Otis Dr / Doolittle Dr - *Intersection Improvements*	$ 550,000	7%	$ 38,500
18	Fernside Blvd / Otis Dr - *Signal Improvements*	$ 50,000	10%	$ 5,000
19	Park St / Blanding Ave - *Intersection Improvements*	$ 215,000	12%	$ 25,800
20	Challenger Dr/Atlantic Ave - *Signal Improvements / Transit Priority*	$ 100,000	4%	$ 4,000
21	Park St / Lincoln Ave - *Signal Improvements / Transit Priority*	$ 100,000	10%	$ 10,000
	PEDESTRIAN IMPROVEMENTS			
22	Main St / Pacific Ave - *Signal Improvements*		*Included in Main Street Estimate*	
23	Webster St / RAMP - *Signal Improvements / Transit Priority*	$ 250,000	100%	$ 250,000
24	High St / Fernside Blvd - *Intersection Improvements*		*Included in Item #15*	
25	Atlantic Ave / Constitution Way - *Signal Modification*		*Included in Item #7*	

Item	Description	Improvement Amount	Project Pro-Rata Share	Project Amount
	TRANSIT IMPROVEMENTS			
26	Park St Transit Signal Priority - *Blanding Ave to Otis Dr*	$ 500,000	13%	$ 65,000
27	RAMP Transit Corridor Improvements - *Main St to Webster St*	$ 4,750,000	10%	$ 475,000
	(incl. transit signal priority, exclusive transit lane eastbound)			
28	Stargell Ave Queue Jump Lanes - *Main St & 5th St Intersections*	$ 3,000,000	100%	$ 3,000,000
	BICYCLE IMPROVEMENTS			
29	Stargell Avenue Class I Trail - *Main St to 5th Street*		*Included in Item #8*	
30	Main St Class I Trail - *RAMP to Pacific Ave*		*Included in Main Street Estimate*	
31	Central Ave Class I & II Trail - *Pacific Ave to 4th St*		*Included in Item #10*	
32	Oak Street Bicycle Blvd - *Santa Clara Ave to Central Ave*	$ 100,000	10%	$ 10,000
	Subtotal Off-Site Project Contributions			$ 4,065,050
	ADDITIONAL PROJECT IMPROVEMENTS			
33	BRT - *Project Contribution*	$ 20,000,000	25%	$ 5,000,000
34	Shuttle Service	$ 1,000,000	100%	$ 1,000,000
35	Ferry Terminal - *Expand Pkg Lot @ Existing Terminal*	$ 570,000	100%	$ 570,000
36	Ferry Terminal - *New Terminal @ Seaplane Lagoon*	$ 10,000,000	100%	$ 10,000,000
37	Transit Center	$ 1,500,000	100%	$ 1,500,000
38	TDM Costs - *Establish Program & Monitoring*	$ 4,200,000	100%	$ 4,200,000
39	Cross Alameda Trail - *Class I Trail along RAMP from Main St to Constitution Way*	$ 1,900,000	100%	$ 1,900,000
40	Other Potential Project Improvements	$ 6,250,000	100%	$ 6,250,000
41	Wayfinding Directional Signage	$ 150,000	100%	$ 150,000
	Subtotal Additional Project Improvements			$ 30,570,000
			SUBTOTAL TRANSPORTATION COSTS	**$ 35,685,050**
			25% CONTINGENCY	**$ 8,921,263**
			TOTAL TRANSPORTATION COSTS	**$ 44,606,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
PARKS AND OPEN SPACE
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	PARKS AND OPEN SPACE						
1	Upgrade Existing Landscaping	6.0	AC	$	217,500	$	1,305,000
2	Primary Open Spaces	19.2	AC	$	435,000	$	8,352,000
3	Seaplane Lagoon Landscaping	15.4	AC	$	650,000	$	10,010,000
4	Sports Complex	1	LS	$	20,000,000	$	20,000,000
5	Enterprise Park *("Southeast Park")*	16.0	AC	$	350,000	$	5,600,000
6	Landscaping Buffer for Substation	25,000	SF	$	8	$	200,000
7	Bay Trail - *Main Street, Berms & Seaplane Lagoon*	503,400	SF	$	8	$	4,027,200
8	Northern Shoreline Parking & Landscaping	2.0	AC	$	350,000	$	700,000
9	Flood Protection Berm Landscaping	8.0	AC	$	217,500	$	1,740,000
	SUBTOTAL PARKS AND OPEN SPACE COSTS					**$**	**51,934,000**
	25% CONTINGENCY					**$**	**12,983,500**
	TOTAL PARKS AND OPEN SPACE COSTS					**$**	**64,918,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
PUBLIC BENEFITS
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit	Unit Price	Amount
	PUBLIC BENEFITS				
1	Fire Station	1	LS	$ 4,500,000	$ 4,500,000
2	Marina	0	LS	BY OTHERS	BY OTHERS
3	Wetland Restoration / Creation	0	LS	BY OTHERS	BY OTHERS
4	Northwest Territories Open Space	0	LS	BY OTHERS	BY OTHERS
5	Corporation Yard - *Pro-Rata Share*	1	LS	$ 1,000,000	$ 1,000,000
6	Bay Trail - *NW Territories & VA Property*	1	LS	$ 8,330,000	$ 8,330,000
				SUBTOTAL PUBLIC BENEFITS COSTS	**$ 13,830,000**
				25% CONTINGENCY	**$ 3,457,500**
				TOTAL PUBLIC BENEFITS COSTS	**$ 17,288,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
CONSTRUCTION ADMIN
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	CONSTRUCTION ADMIN						
1	Construction Admin *(4% costs)*	0.04	LS	$	373,760,000	$	14,950,400
					SUBTOTAL CONSTRUCTION ADMIN COSTS	**$**	**14,950,000**
					25% CONTINGENCY		**N.I.C.**
					TOTAL CONSTRUCTION ADMIN COSTS	**$**	**14,950,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
PROFESSIONAL SERVICES
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	PROFESSIONAL SERVICES						
1	Professional Services *(15% costs)*	0.15	LS	$	373,760,000	$	56,064,000
					SUBTOTAL PROFESSIONAL SERVICES COSTS	**$**	**56,064,000**
					25% CONTINGENCY		**N.I.C.**
					TOTAL PROFESSIONAL SERVICES COSTS	**$**	**56,064,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
FEES
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Fee		Amount
	ENTITLEMENT FEES			
1	Entitlement Fees	*Not Included*		N.I.C.
	Subtotal Entitlement Fees			N.I.C.
	CITY PLAN CHECK & INSPECTION FEES			
2	Grading and Improvement Plan Review	*Assume 1% of Infrastructure Costs*	$	3,737,600
3	Grading and Improvement Bond	*Assume 1% of Infrastructure Costs*	$	3,737,600
4	Inspection Fee	*Assume 2% of Infrastructure Costs*	$	7,475,200
	Subtotal City Plan Check & Inspection Fees		$	14,950,400
	EBMUD FEES			
5	System Capacity Charge (Potable):			
	5/8"	($22,260 / unit x 0 units)	$	-
	1"	($55,760 / unit x 41 units	$	2,286,160
	1-1/2"	($111,520 / unit x 0 units)	$	-
	2"	($178,430 / unit x 0 units)	$	-
6	Design and Inspection Fee	$11,964 + $39 / LF x 60455 LF	$	2,369,709
7	Connection Fee:			
	5/8"	$1,114 / unit x 0 units	$	-
	1"	$1,114 / unit x 41 units	$	45,674
	1-1/2"	$3,001 / unit x 0 units	$	-
	2"	$3,306 / unit x 0 units	$	-
8	Fire Hydrant Fee	($3,012 / hydrant x 126 hydrants $16 / LF x 20 LF x 126)	$	419,832
9	EBMUD Bond	(1% of Water Costs)	$	126,630
10	Account Fee	($38 / unit x 41 units)	$	1,558
	Subtotal EBMUD Fees		$	5,249,563
		SUBTOTAL FEES	**$**	**20,200,000**
		25% CONTINGENCY		**N.I.C.**
		TOTAL FEES	**$**	**20,200,000**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
IMPROVEMENT ACCEPTANCE
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Amount
	IMPROVEMENT ACCEPTANCE						
1	Improvement Acceptance *(0.5% Costs)*	0.005	LS	$	373,760,000	$	1,868,800
	SUBTOTAL IMPROVEMENT ACCEPTANCE COSTS					**$**	**1,868,800**
	25% CONTINGENCY						**N.I.C.**
	TOTAL IMPROVEMENT ACCEPTANCE COSTS					**$**	**1,869,000**

Appendix

Typical Unit Costs

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL UNIT CONSTRUCTION COSTS
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Unit		Unit Price
	DEMOLITION			
1	Demo of Existing Pavement and Concrete	SF	$	0.75
2	Demolition of Existing Sea Plane Lagoon Ramps	EA	$	100,000.00
3	Clearing and Grubbing	AC	$	2,000.00
4	Slurry Fill Existing Utilities - *Development Parcels*	LF	$	10.00
5	Remove Existing Utilities - *Development Parcels*	LF	$	35.00
6	Remove Existing Utilities - *Within Proposed R/W's*	LF	$	35.00
7	Demolition of Ex Railroad Spurs	LF	$	25.00
	GRADING			
8	Northern Shoreline Stabilization - *DDC*	SF	$	1.00
9	Northern Shoreline Stabilization - *Concrete Piles*	LF	$	2,750.00
10	Sea Plane Lagoon - *Northern Headwall*	LF	$	3,000.00
11	Sea Plane Lagoon - *Revetment Repairs*	LF	$	200.00
12	Liquefaction Remediation - *DDC Dev Areas and Roadways*	SF	$	1.00
13	Liquefaction Remediation - *DDC Berm*	SF	$	1.00
14	Import	CY	$	25.00
15	Rough Grade - *Assume 1' across Development Areas*	CY	$	3.50
16	Rock Slope Protection	LF	$	200.00
17	Finish Super Pad	AC	$	10,000.00
18	Erosion Control	AC	$	3,500.00
	DEWATERING			
19	Dewatering Budget	LF	$	100.00
	SANITARY SEWER			
20	36" Sanitary Sewer - *In existing pavement*	LF	$	275
21	24" Sanitary Sewer - *In existing pavement*	LF	$	250
22	24" Sanitary Sewer	LF	$	150
23	12" Sanitary Sewer - *In existing pavement*	LF	$	140
24	12" Sanitary Sewer	LF	$	70
25	8" Sanitary Sewer	LF	$	50
26	Manholes *(Assume 1 every 300')*	EA	$	6,000.00
27	Stubs to Future Development	EA	$	2,000.00
28	Lift Stations *(With Back-Up Power)*	EA	$	750,000.00
29	Temporary Lift Station	EA	$	500,000.00
30	Connect New Main to Existing Trunk Main	EA	$	10,000.00
31	Connect Existing Lateral to New Main	EA	$	10,000.00
32	Utilidors	LF	$	1,000.00
33	Replace Bay Mud - *Within Utility Trenches*	CY	$	25.00

Item	Description	Unit		Unit Price
	STORM DRAIN			
34	60" Storm Drain	LF	$	240.00
35	60" Storm Drain *- In existing pavement*	LF	$	360.00
36	48" Storm Drain	LF	$	192.00
37	48" Storm Drain *- In existing pavement*	LF	$	288.00
38	36" Storm Drain	LF	$	144.00
39	36" Storm Drain *- In existing pavement*	LF	$	216.00
40	24" Storm Drain	LF	$	96.00
41	18" Storm Drain	LF	$	72.00
42	Catch Basins	EA	$	3,200.00
43	Manholes *(Assume 1 every 500')*	EA	$	6,000.00
	Multi-Purpose Basin	CY	$	5.00
44	Excavation	EA	$	50,000.00
45	Inlet / Outlet	SF	$	3.00
46	Passive Landscaping	SF	$	5.00
47	Access Road			
48	Treatment Flow Force Mains *(12-24")*	LF	$	144.00
49	Emergency and Treatment Flow Pump Station *(With Back-Up Power)*	EA	$	1,000,000.00
50	Retrofit Ex Outlets to Sea Plane Lagoon / Inner Harbor	EA	$	250,000.00
51	Mitigation for Storm Drain Outfall Retrofit	EA	$	100,000.00
52	Utilidors	LF	$	1,000.00
53	Stubs to Future Development *(Budget)*	EA	$	2,000.00
54	Roadside Vegetated Swales / Water Quality Facilities	LF	$	40.00
55	Replace Bay Mud - *Within Utility Trenches*	CY	$	25.00
	POTABLE WATER			
56	16" Water Pipe *(Including appurtenances)*	LF	$	140.00
57	12" Water Pipe *(Including appurtenances)*	LF	$	120.00
58	8" Water Pipe *(Including appurtenances)*	LF	$	60.00
59	Stubs to Future Development	EA	$	2,000.00
60	Connect to Existing Waterline *(Including Meter and Backflow)*	EA	$	15,000.00
61	Fire Hydrants *(Assume 1 every 500')*	EA	$	4,000.00
62	Irrigation Services *(Assume 1 every 0.33 Mile)*	EA	$	2,000.00
63	Utilidors	LF	$	250.00
64	Connect Existing Lateral to New Main *(Includes Meter)*	EA	$	10,000.00
	RECLAIMED WATER			
65	8" Recycled Water Pipe *(Including appurtenances)*	LF	$	60.00
66	Stubs to Future Development	EA	$	2,000.00
67	Irrigation Services	EA	$	2,500.00
68	Utilidors	LF	$	250.00

Item	Description	Unit		Unit Price
	STREET WORK			
69	Clearing and Grubbing	LF	$	2.50
70	Demo Existing Pavement and Concrete	SF	$	1.00
71	Demo Existing Curb and Gutter	LF	$	10.00
72	Sawcut Existing Pavement	LF	$	4.00
73	Rough Grading	CY	$	10.00
74	Fine Grading	SF	$	0.50
75	AC Paving	SF-IN	$	0.55
76	Aggregate Base - *Assume On-Site Reuse*	SF-IN	$	0.10
77	2" AC Overlay	SF	$	2.00
78	SubGrade Fabric	SF	$	0.35
79	Pavement Sealant	SF	$	0.05
80	Curb and Gutter	LF	$	25.00
81	Median Curb	LF	$	20.00
82	Sidewalk	SF	$	5.00
83	Handicap Ramps *(Assume 1 every 500')*	LF	$	6.00
84	Signing / Striping / Monuments *- Budget (Main Street)*	LF	$	10.00
85	Signing / Striping / Monuments *- Budget (In-Tract)*	LF	$	5.00
86	Parkway Landscaping and Irrigation	SF	$	7.50
87	Median Landscaping and Irrigation	SF	$	7.50
88	Roadside Vegetated Swales	LF	$	40.00
89	Traffic Control	LF	$	40.00
90	Construction Sequencing	LF	$	20.00
91	Electroliers *(Assume 1 every 150')*	LF	$	26.67
92	Traffic Signals - *On-Site (Budget)*	EA	$	250,000.00
93	Conform to Existing Intersections	EA	$	100,000.00
94	Driveways *- Residential Alleys and Commercial Parking Lots*	EA	$	1,000.00
95	Temp Barricades *- At Entrances to Future Development*	EA	$	1,500.00
96	Roundabout	EA	$	250,000.00
97	Roadway Resurfacing	LF	$	120.00
	DRY UTILITIES			
98	Relocate Elec Transmission (115 kV) Poles - *Main St (Replace with Steel Poles)*	EA	$	50,000.00
99	Relocate Exiting Street Lights *- Main St*	LF	$	300.00
100	Joint Trench Facilities *- Main St*	LF	$	120.00
101	Joint Trench Facilities *- Off-Site (to Substation)*	LF	$	240.00
102	Joint Trench Facilities *- On-Site*	LF	$	120.00
103	Additional Facilities for Multiple Utility Companies	LF	$	20.00
104	Electroliers - *Assume 1 every 150'*	EA	$	4,000.00
105	Utilidors	LF	$	250.00
106	Establish New Connection to Historic Buildings to Remain	EA	$	10,000.00
	LANDSCAPING			
107	Upgrade Existing Landscaping	AC	$	217,500.00
108	Parks / Open Space	AC	$	435,000.00
109	Sea Plane Lagoon Landscaping	AC	$	650,000.00
110	Entry Monuments *(Budget)*	EA	$	100,000.00
111	Enterprise Park *("Southeast Park")*	AC	$	350,000.00
112	Landscaping Buffer for Substation	SF	$	8.00
113	Bay Trail - *Main Street and Berms*	SF	$	8.00
114	Northern Shoreline Parking and Landscaping	AC	$	350,000.00
115	Flood Protection Berm Landscaping	AC	$	217,500.00

Street Linear Footage Costs

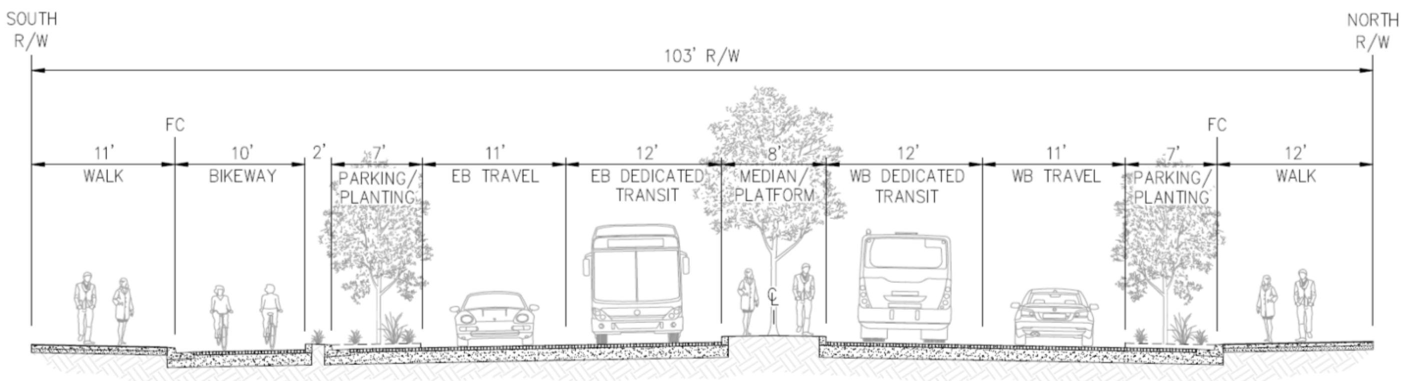
Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

WEST ATLANTIC AVENUE

Note: Costs below assume an even split of roadway parking/planting and 2' median platform planting.



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	103	SF	$	0.50	$	51.50
4	5" AC	50	SF	$	2.75	$	137.50
5	22" AB *(Assume On-Site Re-Use)*	50	SF	$	2.20	$	110.00
6	SubGrade Fabric	53	SF	$	0.35	$	18.55
7	Pavement Sealant	50	SF	$	0.05	$	2.50
8	Curb & Gutter	3	LF	$	25.00	$	75.00
9	Median Curb	3	LF	$	20.00	$	60.00
10	Sidewalk	29	SF	$	6.50	$	188.50
11	Bike Path	8.5	SF	$	3.00	$	25.50
12	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
13	Signing / Striping / Monuments	1	LF	$	10.00	$	10.00
14	Median Irrigation and Landscaping	4	SF	$	7.50	$	30.00
15	Parkway Irrigation and Landscaping	7	SF	$	7.50	$	52.50
16	Roadway Low Points *(2 Filter Boxes & 18" x-ing per 300')*	1	LF	$	85.87	$	85.87
17	Electroliers						*Included in Dry Utilities*
	TOTAL WEST ATLANTIC AVENUE LINEAR FOOT COSTS					**$**	**859.42**
					SAY	**$**	**860.00**

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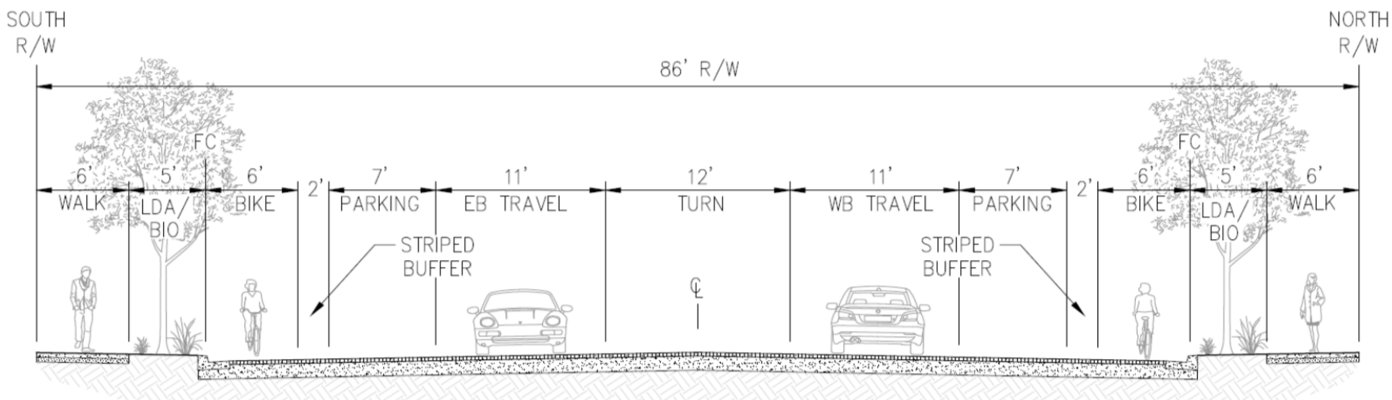
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Cost per LF**

PACIFIC AVENUE



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Grading				*Included in Grading*
2	Remove Existing Pavement / Median				*Included in Demolition*
3	Fine Grading	86	SF	$ 0.50	$ 43.00
4	4" AC	61	SF	$ 2.20	$ 134.20
5	16" AB *(Assume On-Site Re-Use)*	61	SF	$ 1.60	$ 97.60
6	SubGrade Fabric	64	SF	$ 0.35	$ 22.40
7	Pavement Sealant	61	SF	$ 0.05	$ 3.05
8	Curb & Gutter	2	LF	$ 25.00	$ 50.00
9	Sidewalk	12	SF	$ 6.50	$ 78.00
10	Handicap Ramps *(assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
11	Signing / Striping / Monuments	1	LF	$ 10.00	$ 10.00
12	Parkway Irrigation and Landscaping	10	SF	$ 7.50	$ 75.00
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 37.89	$ 37.89
14	Electroliers				*Included in Dry Utilities*

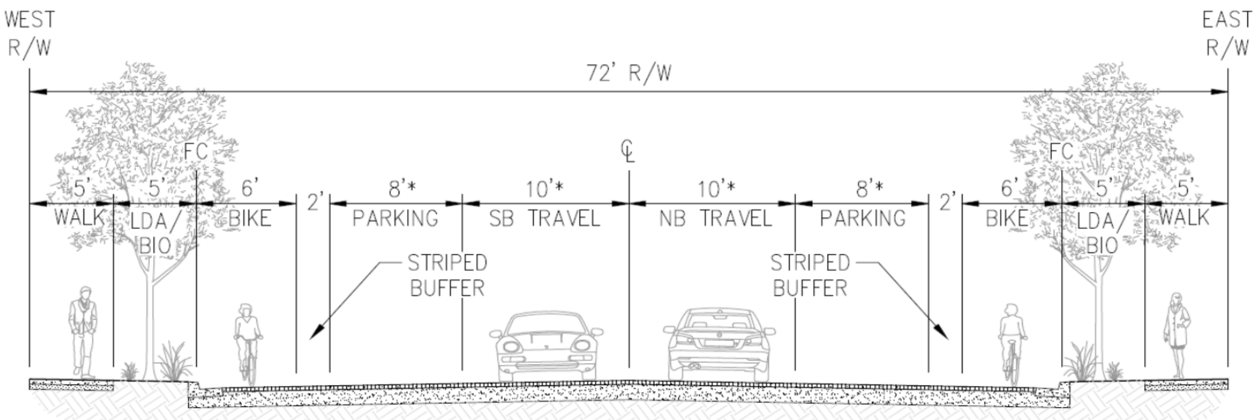
TOTAL PACIFIC AVENUE LINEAR FOOT COSTS $ 563.14

SAY $ 565.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

<u>ISLAND COLLECTOR - BIKE LANES</u>



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Grading				*Included in Grading*
2	Remove Existing Pavement				*Included in Demolition*
3	Fine Grading	72	SF	$ 0.50	$ 36.00
4	4" AC	49	SF	$ 2.20	$ 107.80
5	16" AB *(Assume On-Site Re-Use)*	49	SF	$ 1.60	$ 78.40
6	SubGrade Fabric	52	SF	$ 0.35	$ 18.20
7	Pavement Sealant	49	SF	$ 0.05	$ 2.45
8	Curb & Gutter	2	LF	$ 25.00	$ 50.00
9	Sidewalk	10	SF	$ 6.50	$ 65.00
10	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
11	Signing / Striping / Monuments	1	LF	$ 7.50	$ 7.50
12	Parkway Irrigation and Landscaping	10	SF	$ 7.50	$ 75.00
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 35.01	$ 35.01
14	Electroliers				*Included in Dry Utilities*

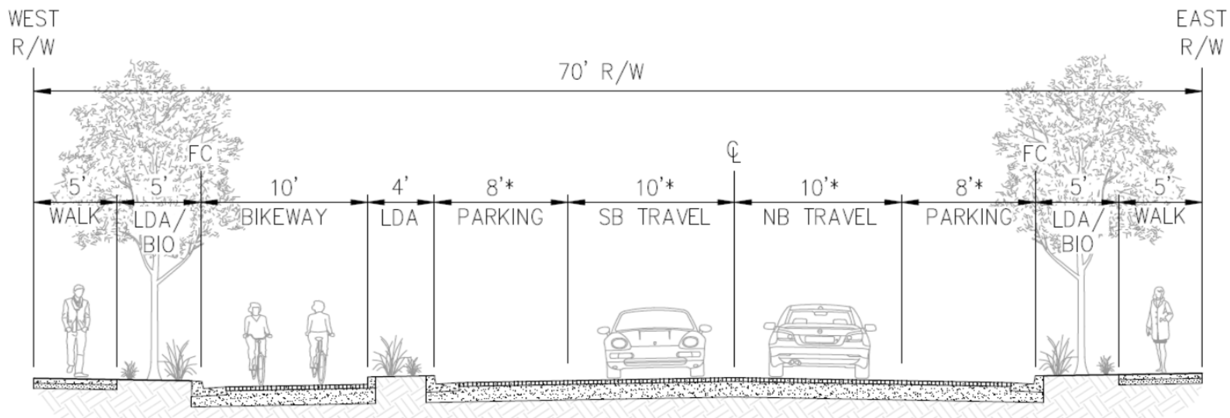
TOTAL ISLAND COLLECTOR - BIKE LANES LINEAR FOOT COSTS $ 487.36

SAY $ 490.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

ISLAND COLLECTOR - BIKEWAY



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Grading				*Included in Grading*
2	Remove Existing Pavement				*Included in Demolition*
3	Fine Grading	70	SF	$ 0.50	$ 35.00
4	4" AC	33	SF	$ 2.20	$ 72.60
5	16" AB *(Assume On-Site Re-Use)*	33	SF	$ 1.60	$ 52.80
6	SubGrade Fabric	36	SF	$ 0.35	$ 12.60
7	Pavement Sealant	33	SF	$ 0.05	$ 1.65
8	Curb & Gutter	3	LF	$ 25.00	$ 75.00
9	Median Curb	1	LF	$ 20.00	$ 20.00
10	Sidewalk	10	SF	$ 6.50	$ 65.00
11	Bike Path	8.5	SF	$ 3.00	$ 25.50
12	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
13	Signing / Striping / Monuments	1	LF	$ 7.50	$ 7.50
14	Median Irrigation and Landscaping	4	SF	$ 7.50	$ 30.00
15	Parkway Irrigation and Landscaping	10	SF	$ 7.50	$ 75.00
16	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 34.53	$ 34.53
17	Electroliers				*Included in Dry Utilities*

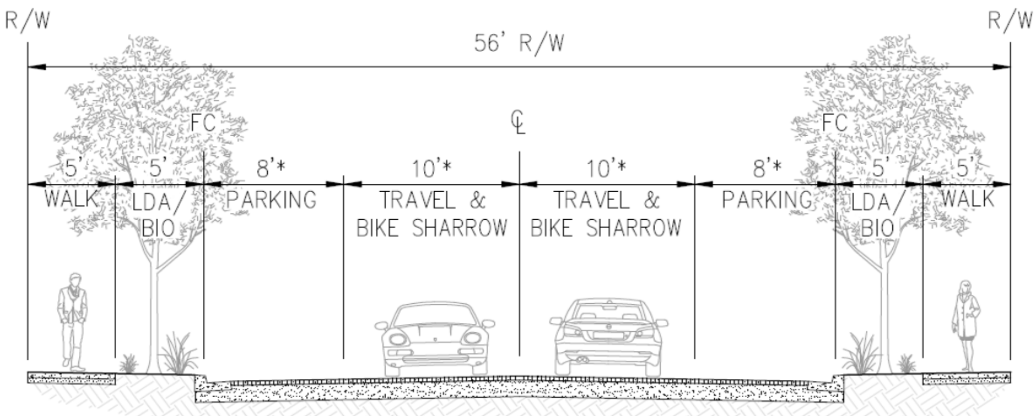
TOTAL ISLAND COLLECTOR - BIKEWAY LINEAR FOOT COSTS $ 519.18

SAY $ 520.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

LOCAL STREETS - SHARROWS



Item	Description	Quantity	Unit	Unit Price		Cost per LF	
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	56	SF	$	0.50	$	28.00
4	4" AC	33	SF	$	2.20	$	72.60
5	16" AB *(Assume On-Site Re-Use)*	33	SF	$	1.60	$	52.80
6	SubGrade Fabric	36	SF	$	0.35	$	12.60
7	Pavement Sealant	33	SF	$	0.05	$	1.65
8	Curb & Gutter	2	LF	$	25.00	$	50.00
9	Sidewalk	10	SF	$	6.50	$	65.00
10	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
11	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
12	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	31.17	$	31.17
14	Electroliers						*Included in Dry Utilities*

TOTAL LOCAL STREETS - SHARROWS STREET LINEAR FOOT COSTS $ 405.82

SAY $ 405.00

Carlson, Barbee & Gibson, Inc.

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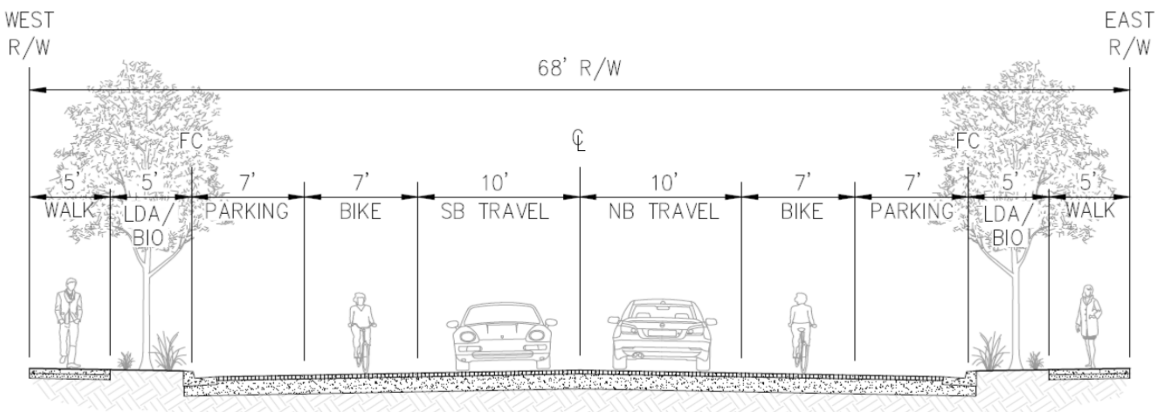
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

LOCAL STREETS - BIKE LANES



Item	Description	Quantity	Unit	Unit Price		Cost per LF	
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	68	SF	$	0.50	$	34.00
4	4" AC	45	SF	$	2.20	$	99.00
5	16" AB *(Assume On-Site Re-Use)*	45	SF	$	1.60	$	72.00
6	SubGrade Fabric	48	SF	$	0.35	$	16.80
7	Pavement Sealant	45	SF	$	0.05	$	2.25
8	Curb & Gutter	2	LF	$	25.00	$	50.00
9	Sidewalk	10	SF	$	6.50	$	65.00
10	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
11	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
12	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	34.05	$	34.05
14	Electroliers						*Included in Dry Utilities*

TOTAL LOCAL STREETS - BIKE LANES LINEAR FOOT COSTS $ 465.10

SAY $ 465.00

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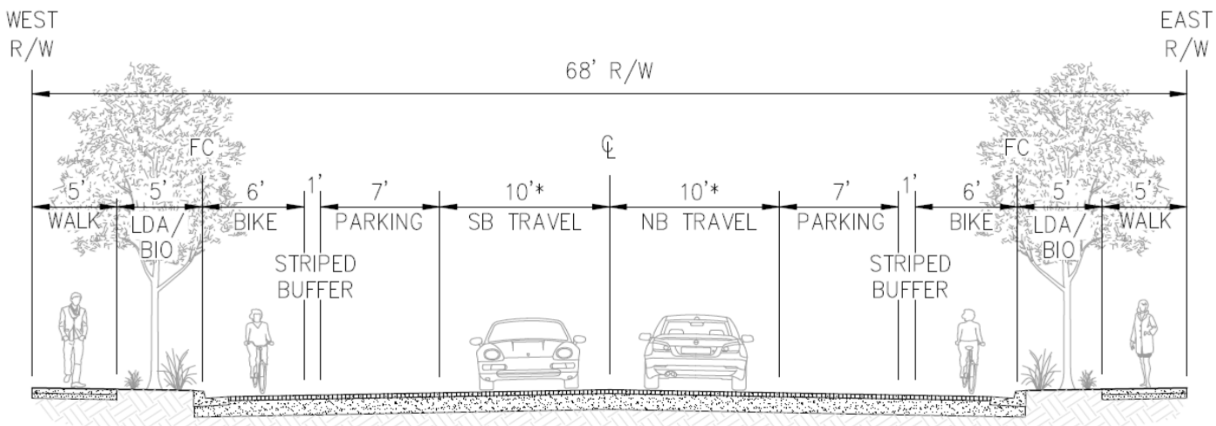
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

LOCAL STREETS - PROTECTED BIKE LANES



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	68	SF	$	0.50	$	34.00
4	4" AC	45	SF	$	2.20	$	99.00
5	16" AB *(Assume On-Site Re-Use)*	45	SF	$	1.60	$	72.00
6	SubGrade Fabric	48	SF	$	0.35	$	16.80
7	Pavement Sealant	45	SF	$	0.05	$	2.25
8	Curb & Gutter	2	LF	$	25.00	$	50.00
9	Sidewalk	10	SF	$	6.50	$	65.00
10	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
11	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
12	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	34.05	$	34.05
14	Electroliers						*Included in Dry Utilities*

TOTAL LOCAL STREETS - PROTECTED BIKE LANES LINEAR FOOT COSTS $ 465.10

SAY $ 465.00

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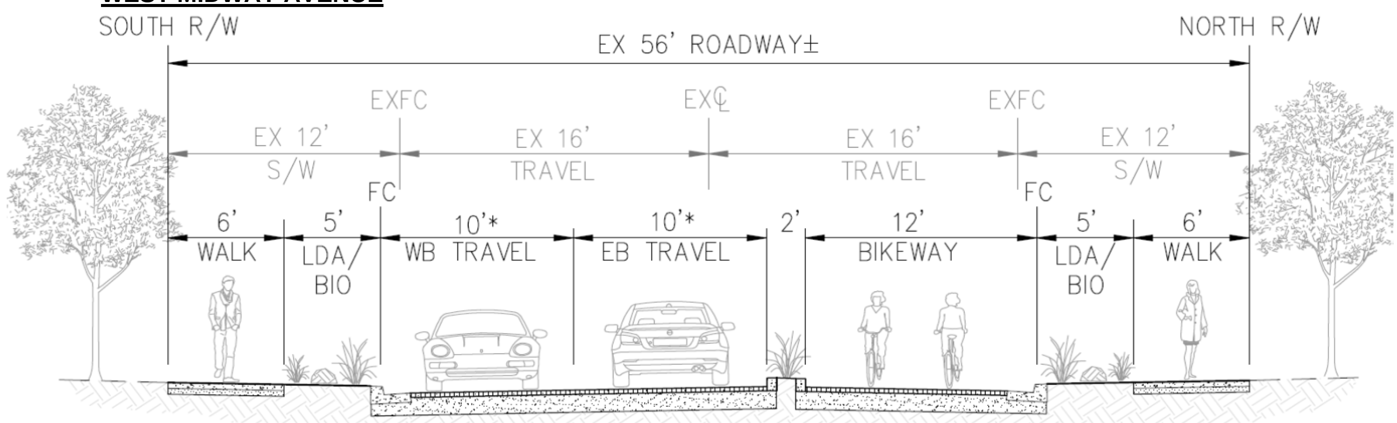
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit	Unit Price	Cost per LF
	WEST MIDWAY AVENUE				



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Grading				*Included in Grading*
2	Remove Existing Pavement				*Included in Demolition*
3	Fine Grading	56	SF	$ 0.50	$ 28.00
4	4" AC	18.5	SF	$ 2.20	$ 40.70
5	16" AB *(Assume On-Site Re-Use)*	18.5	SF	$ 1.60	$ 29.60
6	SubGrade Fabric	20	SF	$ 0.35	$ 7.00
7	Pavement Sealant	18.5	SF	$ 0.05	$ 0.93
8	Curb & Gutter	2	LF	$ 25.00	$ 50.00
9	Median Curb	2	LF	$ 20.00	$ 40.00
10	Sidewalk	12	SF	$ 6.50	$ 78.00
11	Bike Path	10.5	SF	$ 3.00	$ 31.50
12	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
13	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
14	Median Irrigation and Landscaping	2	SF	$ 7.50	$ 15.00
15	Parkway Irrigation and Landscaping	10	SF	$ 7.50	$ 75.00
16	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$ 30.69	$ 30.69
17	Electroliers				*Included in Dry Utilities*

TOTAL WEST MIDWAY AVENUE LINEAR FOOT COSTS $ 443.42

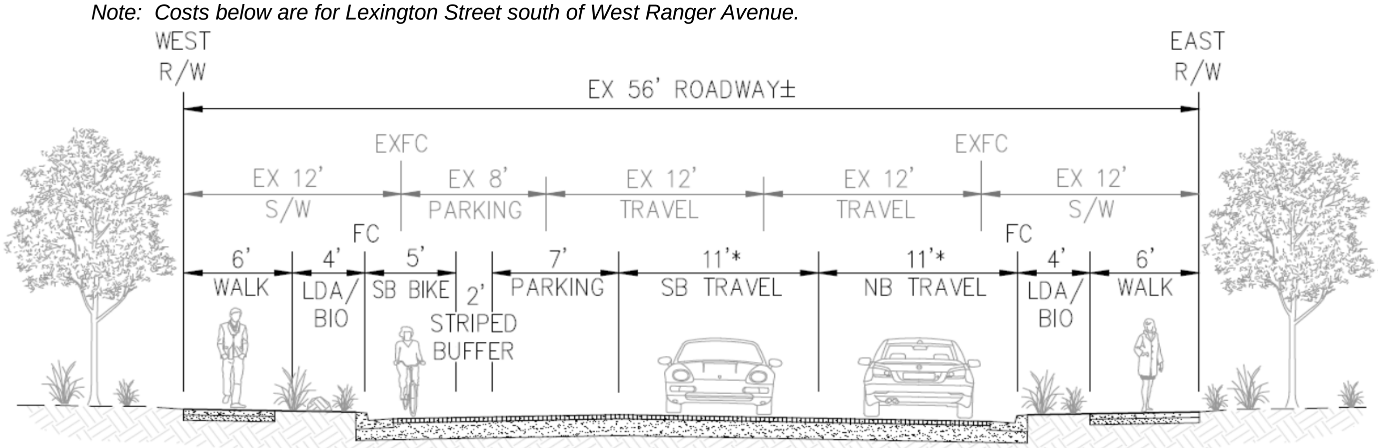
SAY $ 445.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

LEXINGTON STREET

Note: Costs below are for Lexington Street south of West Ranger Avenue.



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Clearing & Grubbing	0	LF	$ 2.50	$ -
2	Remove Existing Pavement / Concrete	56	SF	$ 1.00	$ 56.00
3	Demo Ex Curb & Gutter	0	LF	$ 10.00	$ -
4	Fine Grading	56	SF	$ 0.50	$ 28.00
5	4" AC	33	SF	$ 2.20	$ 72.60
6	16" AB *(Assume On-Site Re-Use)*	33	SF	$ 1.60	$ 52.80
7	SubGrade Fabric	36	SF	$ 0.35	$ 12.60
8	Pavement Sealant	33	SF	$ 0.05	$ 1.65
9	Curb & Gutter	2	LF	$ 25.00	$ 50.00
10	Sidewalk	12	SF	$ 6.50	$ 78.00
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
12	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
13	Parkway Irrigation and Landscaping	8	SF	$ 7.50	$ 60.00
14	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$ 30.93	$ 30.93
15	Electroliers				*Included in Dry Utilities*

TOTAL LEXINGTON STREET LINEAR FOOT COSTS $ 459.58

SAY $ 460.00

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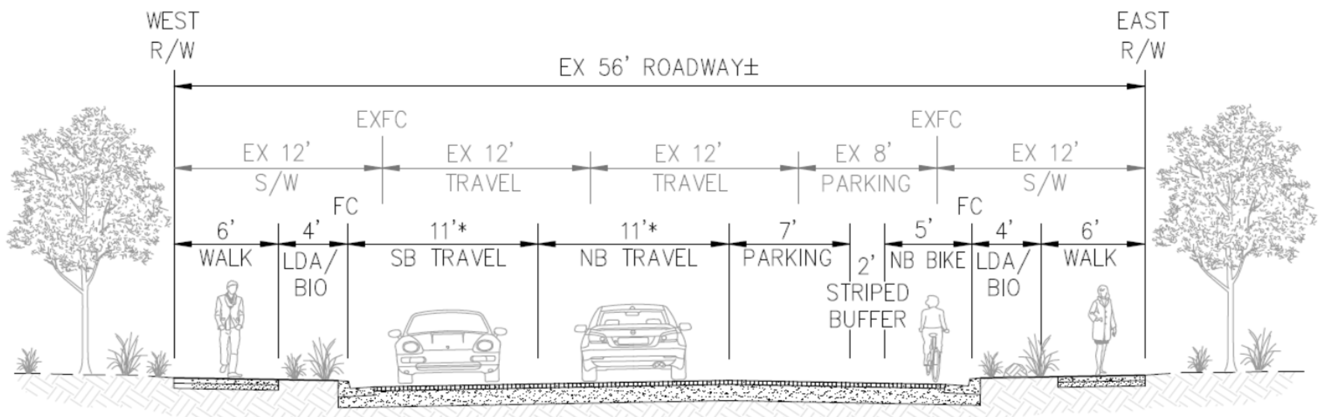
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

SARATOGA STREET

Note: Costs below are for Saratoga Street south of West Ranger Avenue.



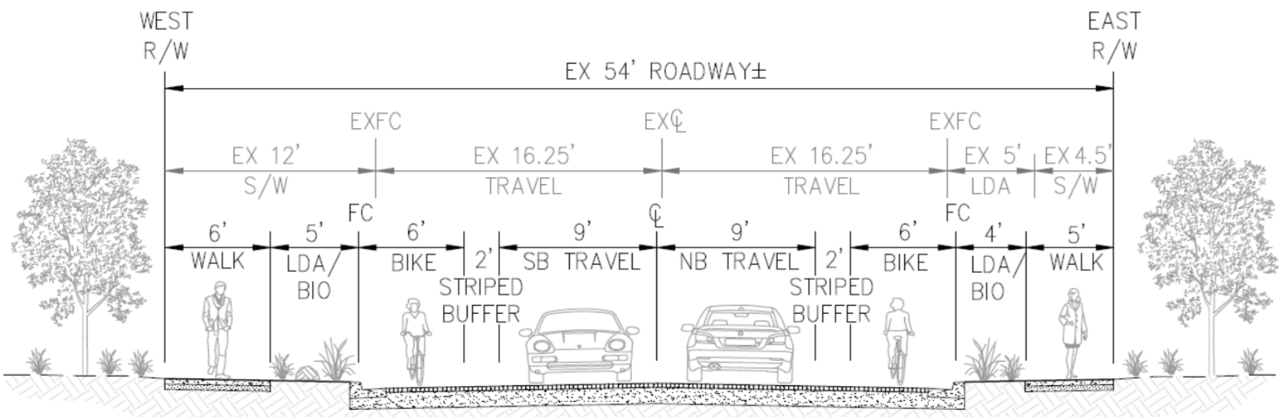
Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Clearing & Grubbing	0	LF	$ 2.50	$ -
2	Remove Existing Pavement / Concrete	56	SF	$ 1.00	$ 56.00
3	Demo Ex Curb & Gutter	0	LF	$ 10.00	$ -
4	Fine Grading	56	SF	$ 0.50	$ 28.00
5	4" AC	33	SF	$ 2.20	$ 72.60
6	16" AB *(Assume On-Site Re-Use)*	33	SF	$ 1.60	$ 52.80
7	SubGrade Fabric	36	SF	$ 0.35	$ 12.60
8	Pavement Sealant	33	SF	$ 0.05	$ 1.65
9	Curb & Gutter	2	LF	$ 25.00	$ 50.00
10	Sidewalk	12	SF	$ 6.50	$ 78.00
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
12	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
13	Parkway Irrigation and Landscaping	8	SF	$ 7.50	$ 60.00
14	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$ 30.93	$ 30.93
15	Electroliers				*Included in Dry Utilities*
	TOTAL SARATOGA STREET LINEAR FOOT COSTS				**$ 459.58**
	SAY				**$ 460.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

PAN AM WAY

Note: Costs below are for Pan Am Way north of West Redline Avenue.



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Grading				*Included in Grading*
2	Remove Existing Pavement				*Included in Demolition*
3	Fine Grading	54	SF	$ 0.50	$ 27.00
4	4" AC	31	SF	$ 2.20	$ 68.20
5	16" AB *(Assume On-Site Re-Use)*	31	SF	$ 1.60	$ 49.60
6	SubGrade Fabric	34	SF	$ 0.35	$ 11.90
7	Pavement Sealant	31	SF	$ 0.05	$ 1.55
8	Curb & Gutter	2	LF	$ 25.00	$ 50.00
9	Sidewalk	11	SF	$ 6.50	$ 71.50
10	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
11	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
12	Parkway Irrigation and Landscaping	9	SF	$ 7.50	$ 67.50
13	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 30.57	$ 30.57
14	Electroliers				*Included in Dry Utilities*

TOTAL PAN AM WAY LINEAR FOOT COSTS $ 394.82

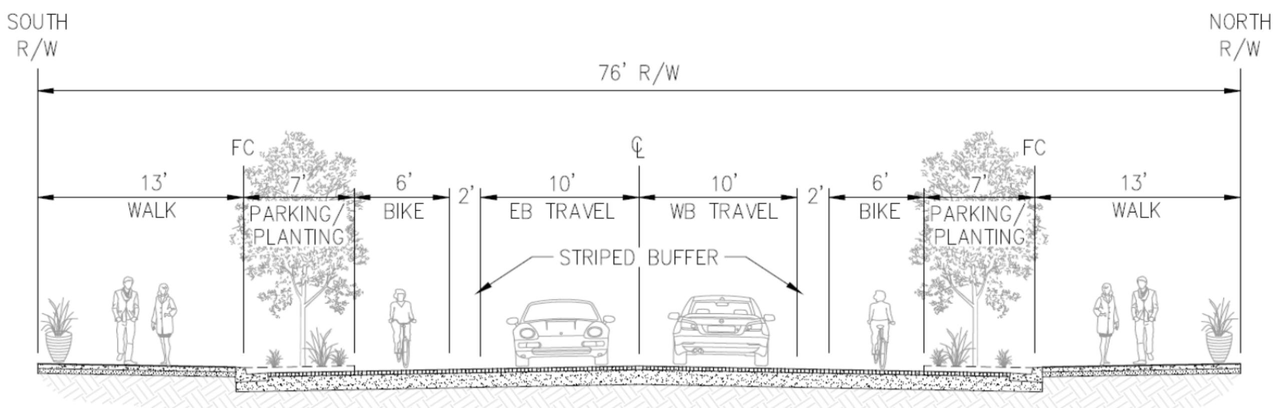
SAY $ 395.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

SEAPLANE (NORTH)

Note: Costs below assume an even split of roadway parking/planting.



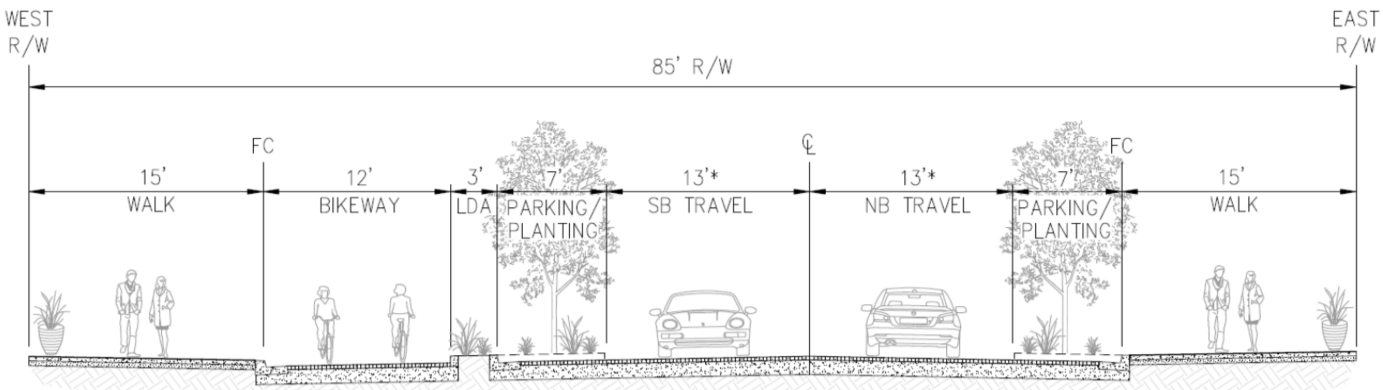
Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	76	SF	$	0.50	$	38.00
4	4" AC	40	SF	$	2.20	$	88.00
5	16" AB *(Assume On-Site Re-Use)*	40	SF	$	1.60	$	64.00
6	SubGrade Fabric	43	SF	$	0.35	$	15.05
7	Pavement Sealant	40	SF	$	0.05	$	2.00
8	Curb & Gutter	2	LF	$	25.00	$	50.00
9	Median Curb	0	LF	$	20.00	$	-
10	Sidewalk	26	SF	$	6.50	$	169.00
11	Bike Path	0	SF	$	3.00	$	-
12	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
13	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
14	Median Irrigation and Landscaping	0	SF	$	7.50	$	-
15	Parkway Irrigation and Landscaping	7	SF	$	7.50	$	52.50
16	Roadway Low Points *(2 Filter Boxes & 18" x-ing per 300')*	1	LF	$	78.67	$	78.67
17	Electroliers						*Included in Dry Utilities*
	TOTAL SEAPLANE (NORTH) LINEAR FOOT COSTS					**$**	**574.22**
					SAY	**$**	**575.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

SEAPLANE (EAST)

Note: Costs below assume an even split of roadway parking/planting.



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	85	SF	$	0.50	$	42.50
4	4" AC	30	SF	$	2.20	$	66.00
5	16" AB *(Assume On-Site Re-Use)*	30	SF	$	1.60	$	48.00
6	SubGrade Fabric	33	SF	$	0.35	$	11.55
7	Pavement Sealant	30	SF	$	0.05	$	1.50
8	Curb & Gutter	3	LF	$	25.00	$	75.00
9	Median Curb	1	LF	$	20.00	$	20.00
10	Sidewalk	30	SF	$	6.50	$	195.00
11	Bike Path	10.5	SF	$	3.00	$	31.50
12	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
13	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
14	Median Irrigation and Landscaping	3	SF	$	7.50	$	22.50
15	Parkway Irrigation and Landscaping	7	SF	$	7.50	$	52.50
16	Roadway Low Points *(2 Filter Boxes & 18" x-ing per 300')*	1	LF	$	79.87	$	79.87
17	Electroliers						*Included in Dry Utilities*
	TOTAL SEAPLANE (EAST) LINEAR FOOT COSTS					**$**	**662.92**
	SAY					**$**	**665.00**

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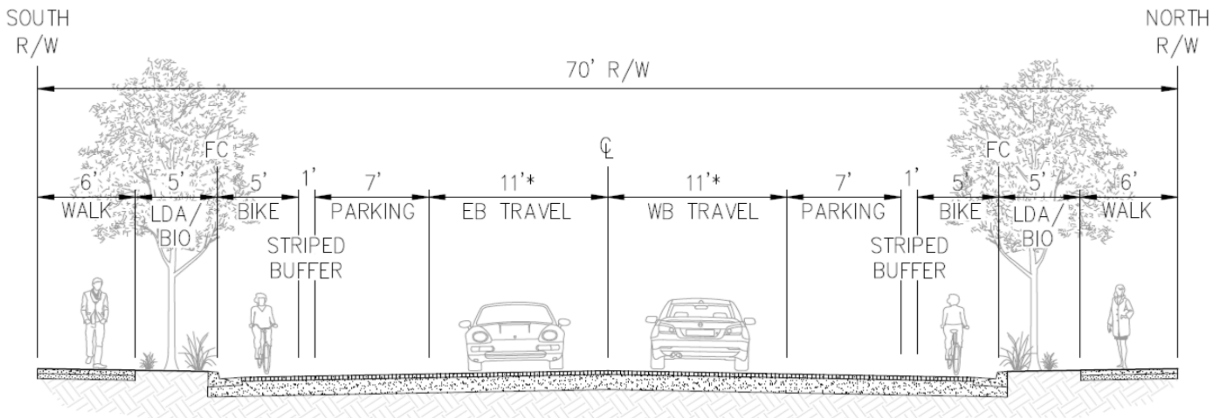
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (NEW)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

WEST HORNET

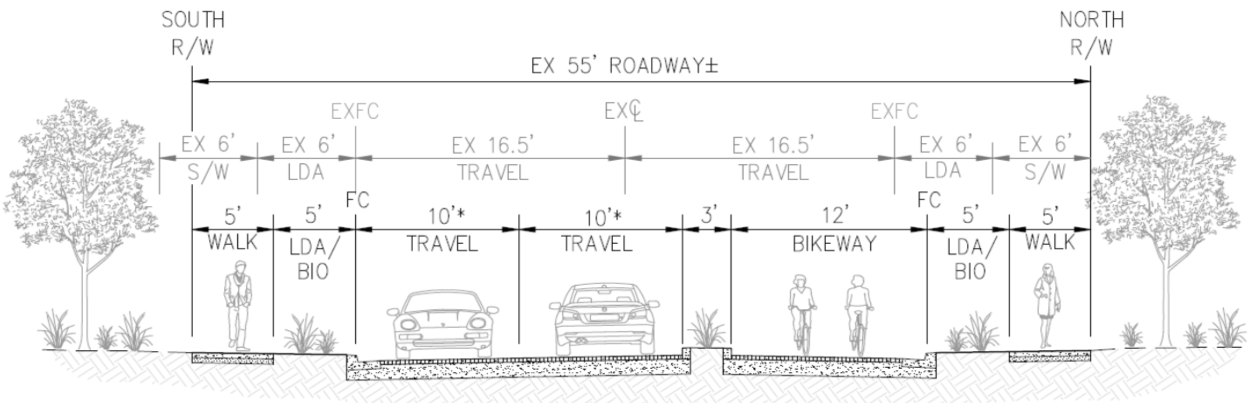


Item	Description	Quantity	Unit	Unit Price		Cost per LF	
1	Grading						*Included in Grading*
2	Remove Existing Pavement						*Included in Demolition*
3	Fine Grading	70	SF	$	0.50	$	35.00
4	4" AC	45	SF	$	2.20	$	99.00
5	16" AB *(Assume On-Site Re-Use)*	45	SF	$	1.60	$	72.00
6	SubGrade Fabric	48	SF	$	0.35	$	16.80
7	Pavement Sealant	45	SF	$	0.05	$	2.25
8	Curb & Gutter	2	LF	$	25.00	$	50.00
9	Median Curb	0	LF	$	20.00	$	-
10	Sidewalk	12	SF	$	6.50	$	78.00
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
12	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
13	Median Irrigation and Landscaping	0	SF	$	7.50	$	-
14	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
15	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	34.05	$	34.05
16	Electroliers						*Included in Dry Utilities*
	TOTAL WEST HORNET LINEAR FOOT COSTS					**$**	**479.10**
					SAY	**$**	**480.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit		Unit Price		Cost per LF
	WEST REDLINE AVENUE - RECONSTRUCTION						



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	1	LF	$	2.50	$	2.50
2	Remove Existing Pavement / Concrete	42	SF	$	1.00	$	42.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	55	SF	$	0.50	$	27.50
5	4" AC	18.5	SF	$	2.20	$	40.70
6	16" AB *(Assume On-Site Re-Use)*	18.5	SF	$	1.60	$	29.60
7	SubGrade Fabric	20	SF	$	0.35	$	7.00
8	Pavement Sealant	18.5	SF	$	0.05	$	0.93
9	Curb & Gutter	3	LF	$	25.00	$	75.00
10	Median Curb	2	LF	$	20.00	$	40.00
11	Sidewalk	10	SF	$	6.50	$	65.00
12	Bike Path	10.5	SF	$	3.00	$	31.50
13	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
14	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
15	Median Irrigation and Landscaping	3	SF	$	7.50	$	22.50
16	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
17	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	30.93	$	30.93
18	Electroliers						*Included in Dry Utilities*
	TOTAL WEST REDLINE AVENUE LINEAR FOOT COSTS					**$**	**527.16**
					SAY	**$**	**525.00**

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ALAMEDA POINT
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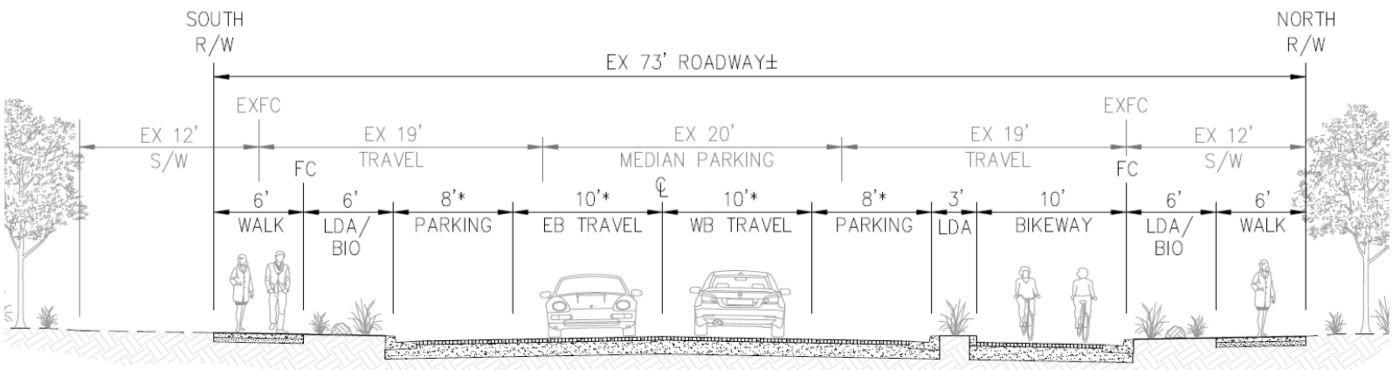
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

ESSEX DRIVE - RECONSTRUCTION



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	0	LF	$	2.50	$	-
2	Remove Existing Pavement / Concrete	90	SF	$	1.00	$	90.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	73	SF	$	0.50	$	36.50
5	4" AC	33	SF	$	2.20	$	72.60
6	16" AB *(Assume On-Site Re-Use)*	33	SF	$	1.60	$	52.80
7	SubGrade Fabric	36	SF	$	0.35	$	12.60
8	Pavement Sealant	33	SF	$	0.05	$	1.65
9	Curb & Gutter	3	LF	$	25.00	$	75.00
10	Median Curb	1	LF	$	20.00	$	20.00
11	Sidewalk	12	SF	$	6.50	$	78.00
12	Bike Path	8.5	SF	$	3.00	$	25.50
13	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
14	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
15	Median Irrigation and Landscaping	3	SF	$	7.50	$	22.50
16	Parkway Irrigation and Landscaping	12	SF	$	7.50	$	90.00
17	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$	34.53	$	34.53
18	Electroliers						*Included in Dry Utilities*
					TOTAL ESSEX DRIVE LINEAR FOOT COSTS	**$**	**648.68**
					SAY	**$**	**650.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
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October 31, 2013
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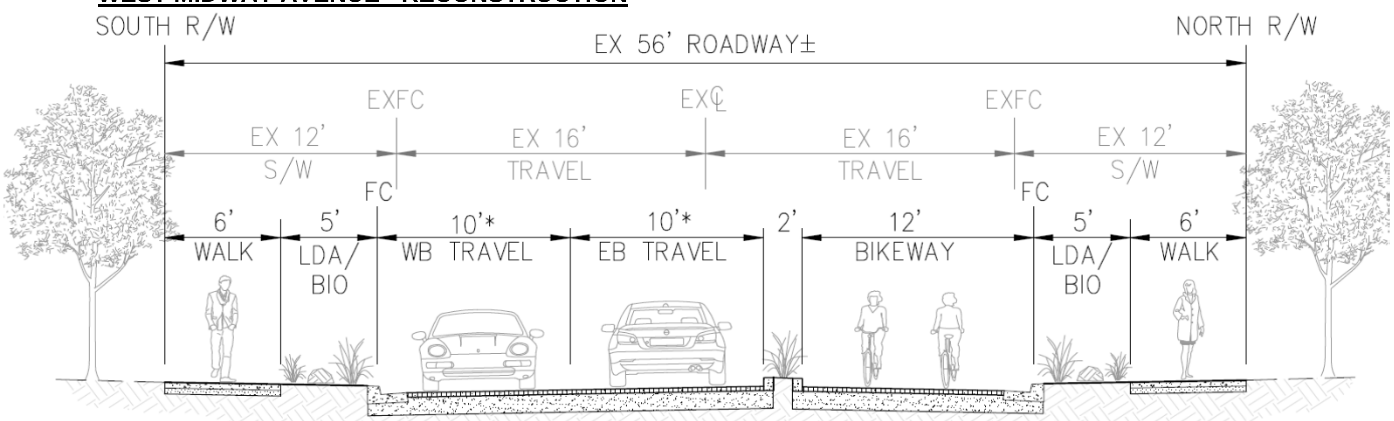
WEST MIDWAY AVENUE - RECONSTRUCTION



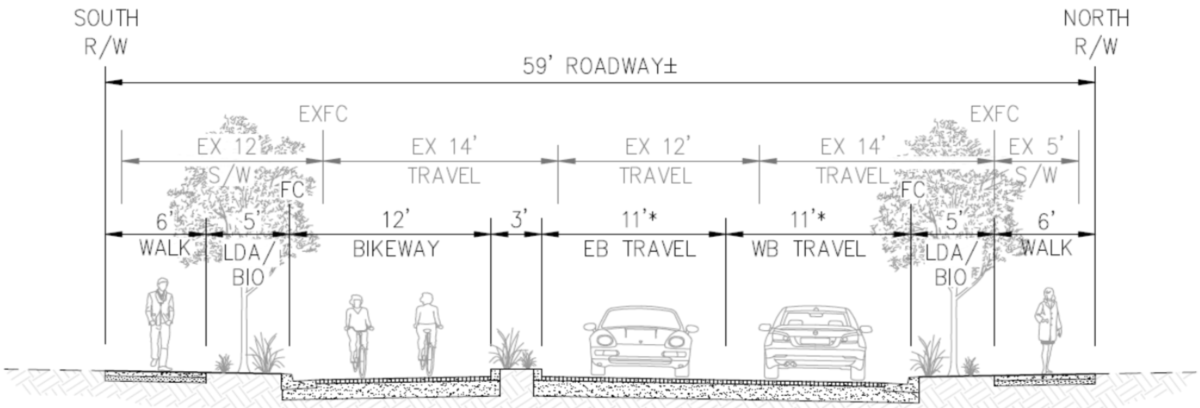
Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	0	LF	$	2.50	$	-
2	Remove Existing Pavement / Concrete	56	SF	$	1.00	$	56.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	56	SF	$	0.50	$	28.00
5	4" AC	18.5	SF	$	2.20	$	40.70
6	16" AB *(Assume On-Site Re-Use)*	18.5	SF	$	1.60	$	29.60
7	SubGrade Fabric	20	SF	$	0.35	$	7.00
8	Pavement Sealant	18.5	SF	$	0.05	$	0.93
9	Curb & Gutter	2	LF	$	25.00	$	50.00
10	Median Curb	2	LF	$	20.00	$	40.00
11	Sidewalk	12	SF	$	6.50	$	78.00
12	Bike Path	10.5	SF	$	3.00	$	31.50
13	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
14	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
15	Median Irrigation and Landscaping	2	SF	$	7.50	$	15.00
16	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
17	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$	30.69	$	30.69
18	Electroliers						*Included in Dry Utilities*

TOTAL WEST MIDWAY AVENUE LINEAR FOOT COSTS	**$**	**519.42**
SAY	**$**	**520.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

TOWER AVENUE - RECONSTRUCTION



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	0	LF	$	2.50	$	-
2	Remove Existing Pavement / Concrete	59	SF	$	1.00	$	59.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	59	SF	$	0.50	$	29.50
5	4" AC	20.5	SF	$	2.20	$	45.10
6	16" AB *(Assume On-Site Re-Use)*	20.5	SF	$	1.60	$	32.80
7	SubGrade Fabric	22	SF	$	0.35	$	7.70
8	Pavement Sealant	20.5	SF	$	0.05	$	1.03
9	Curb & Gutter	2	LF	$	25.00	$	50.00
10	Median Curb	2	LF	$	20.00	$	40.00
11	Sidewalk	12	SF	$	6.50	$	78.00
12	Bike Path	10.5	SF	$	3.00	$	31.50
13	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
14	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
15	Median Irrigation and Landscaping	3	SF	$	7.50	$	22.50
16	Parkway Irrigation and Landscaping	10	SF	$	7.50	$	75.00
17	Roadway Low Points *(2 CB's & 18" x-ing per 300')*	1	LF	$	31.41	$	31.41
18	Electroliers *(assume 1 every 150')*						*Included in Dry Utilities*
	TOTAL TOWER AVENUE LINEAR FOOT COSTS					**$**	**540.54**
					SAY	**$**	**540.00**

Carlson, Barbee & Gibson, Inc.

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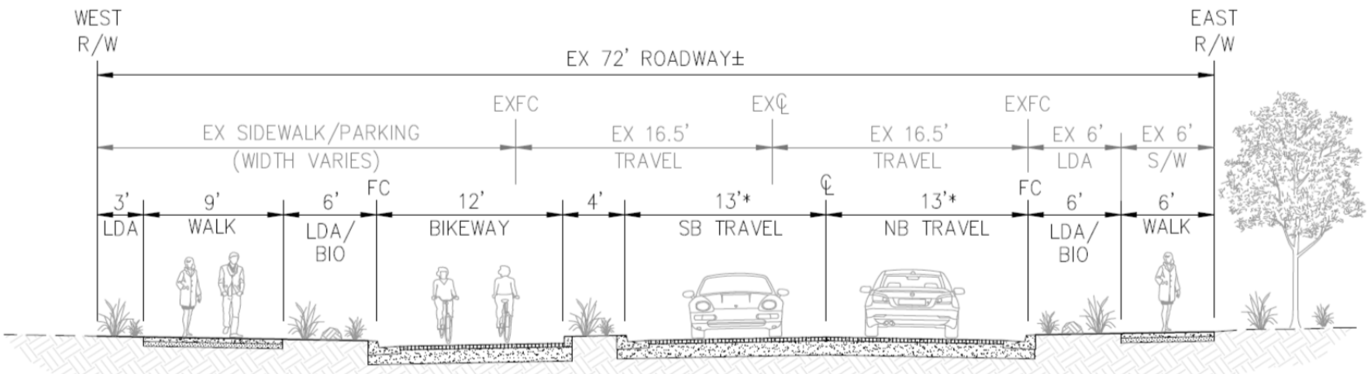
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

MONARCH STREET - RECONSTRUCTION



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Clearing & Grubbing	1	LF	$ 2.50	$ 2.50
2	Remove Existing Pavement / Concrete	72	SF	$ 1.00	$ 72.00
3	Demo Ex Curb & Gutter	1	LF	$ 10.00	$ 10.00
4	Fine Grading	72	SF	$ 0.50	$ 36.00
5	4" AC	23	SF	$ 2.20	$ 50.60
6	16" AB *(Assume On-Site Re-Use)*	23	SF	$ 1.60	$ 36.80
7	SubGrade Fabric	26	SF	$ 0.35	$ 9.10
8	Pavement Sealant	23	SF	$ 0.05	$ 1.15
9	Curb & Gutter	3	LF	$ 25.00	$ 75.00
10	Median Curb	1	LF	$ 20.00	$ 20.00
11	Sidewalk	15	SF	$ 6.50	$ 97.50
12	Bike Path	10.5	SF	$ 3.00	$ 31.50
13	Handicap Ramps *(Assume 1 every 500')*	1	LF	$ 6.00	$ 6.00
14	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
15	Median Irrigation and Landscaping	4	SF	$ 7.50	$ 30.00
15	Parkway Irrigation and Landscaping	15	SF	$ 7.50	$ 112.50
16	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 32.85	$ 32.85
17	Electroliers				*Included in Dry Utilities*

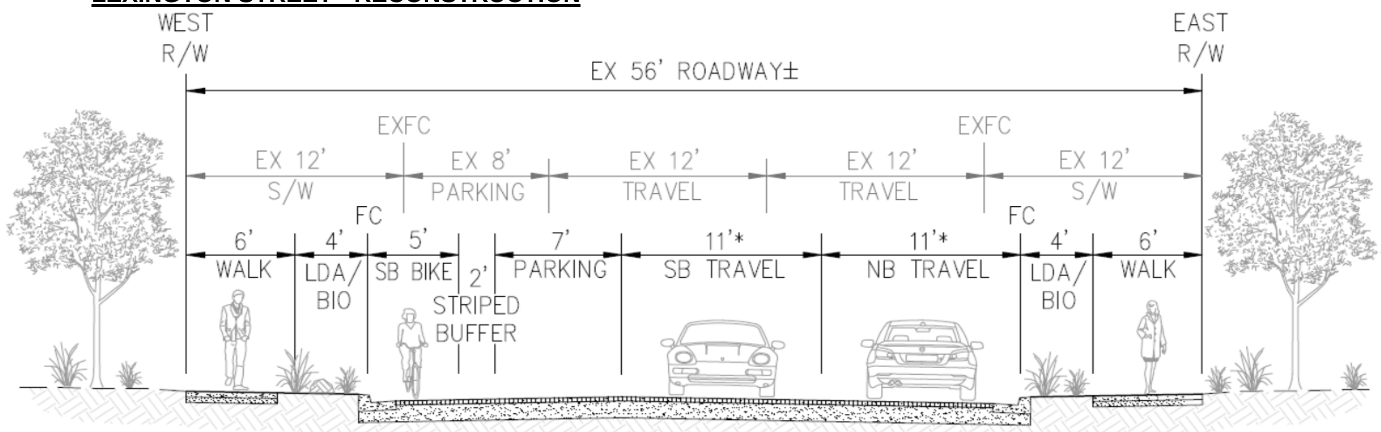
TOTAL MONARCH STREET LINEAR FOOT COSTS $ 628.50

SAY $ 630.00

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

LEXINGTON STREET - RECONSTRUCTION



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Clearing & Grubbing	0	LF	$ 2.50	$ -
2	Remove Existing Pavement / Concrete	56	SF	$ 1.00	$ 56.00
3	Demo Ex Curb & Gutter	2	LF	$ 10.00	$ 20.00
4	Fine Grading	56	SF	$ 0.50	$ 28.00
5	4" AC	33	SF	$ 2.20	$ 72.60
6	16" AB *(Assume On-Site Re-Use)*	33	SF	$ 1.60	$ 52.80
7	SubGrade Fabric	36	SF	$ 0.35	$ 12.60
8	Pavement Sealant	33	SF	$ 0.05	$ 1.65
9	Curb & Gutter	2	LF	$ 25.00	$ 50.00
10	Sidewalk	12	SF	$ 6.50	$ 78.00
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
12	Signing / Striping / Monuments	1	LF	$ 5.00	$ 5.00
13	Parkway Irrigation and Landscaping	8	SF	$ 7.50	$ 60.00
14	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$ 30.93	$ 30.93
15	Electroliers				*Included in Dry Utilities*

TOTAL LEXINGTON STREET LINEAR FOOT COSTS $ 479.58

SAY $ 480.00

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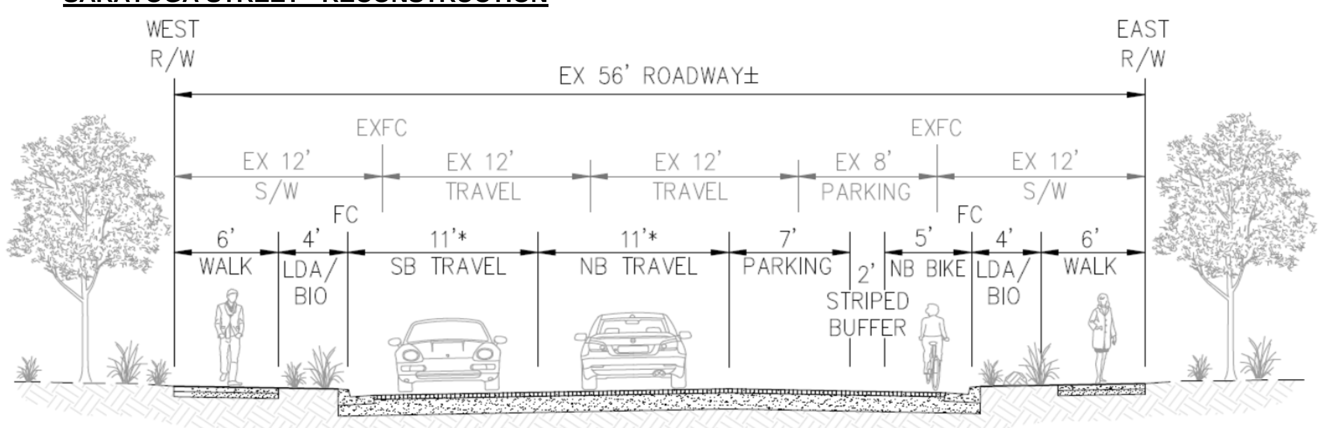
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

SARATOGA STREET - RECONSTRUCTION



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	0	LF	$	2.50	$	-
2	Remove Existing Pavement / Concrete	56	SF	$	1.00	$	56.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	56	SF	$	0.50	$	28.00
5	4" AC	33	SF	$	2.20	$	72.60
6	16" AB *(Assume On-Site Re-Use)*	33	SF	$	1.60	$	52.80
7	SubGrade Fabric	36	SF	$	0.35	$	12.60
8	Pavement Sealant	33	SF	$	0.05	$	1.65
9	Curb & Gutter	2	LF	$	25.00	$	50.00
10	Sidewalk	12	SF	$	6.50	$	78.00
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
12	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
13	Parkway Irrigation and Landscaping	8	SF	$	7.50	$	60.00
14	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	30.93	$	30.93
15	Electroliers						*Included in Dry Utilities*
					TOTAL SARATOGA STREET LINEAR FOOT COSTS	**$**	**479.58**
					SAY	**$**	**480.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
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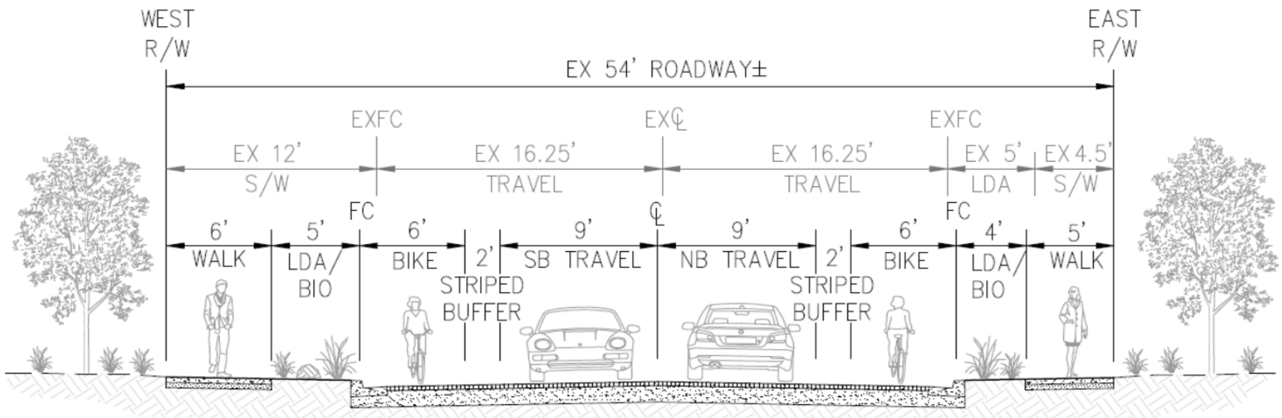
PAN AM WAY - RECONSTRUCTION



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	1	LF	$	2.50	$	2.50
2	Remove Existing Pavement / Concrete	49	SF	$	1.00	$	49.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	54	SF	$	0.50	$	27.00
5	4" AC	31	SF	$	2.20	$	68.20
6	16" AB *(Assume On-Site Re-Use)*	31	SF	$	1.60	$	49.60
7	SubGrade Fabric	34	SF	$	0.35	$	11.90
8	Pavement Sealant	31	SF	$	0.05	$	1.55
9	Curb & Gutter	2	LF	$	25.00	$	50.00
10	Sidewalk	11	SF	$	6.50	$	71.50
11	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
12	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
13	Parkway Irrigation and Landscaping	9	SF	$	7.50	$	67.50
14	Roadway Low Points *(2 CB's & 18" crossing every 300')*	1	LF	$	30.57	$	30.57
15	Electroliers						*Included in Dry Utilities*

TOTAL PAN AM WAY LINEAR FOOT COSTS $ 466.32

SAY $ 465.00

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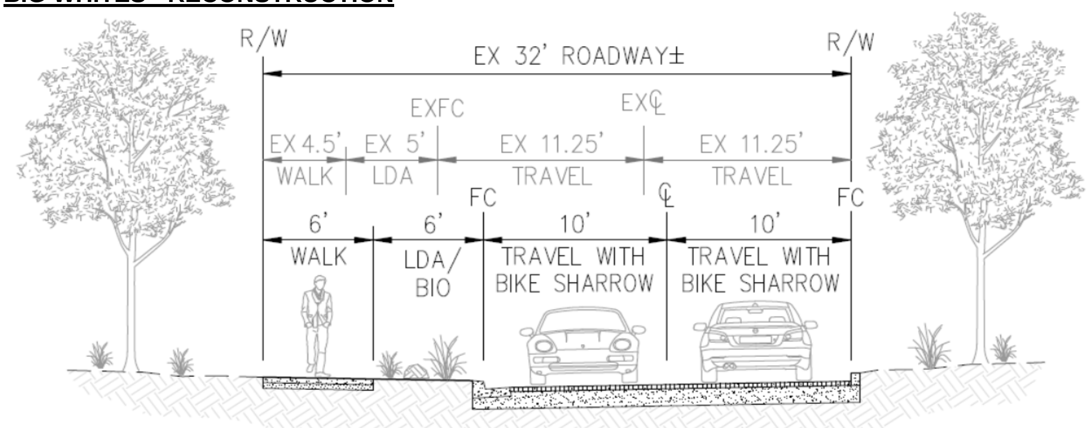
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS (RECONSTRUCTION)
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

BIG WHITES - RECONSTRUCTION



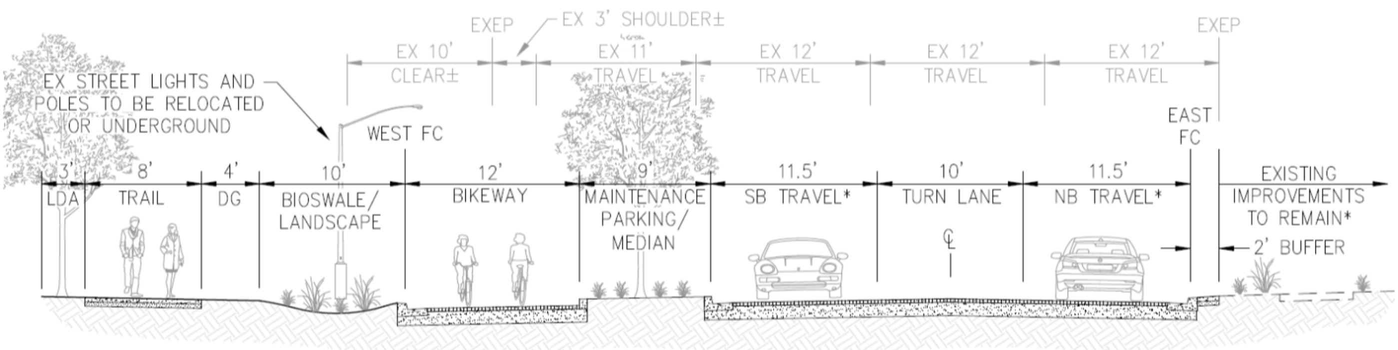
Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	1	LF	$	2.50	$	2.50
2	Remove Existing Pavement / Concrete	27	SF	$	1.00	$	27.00
3	Demo Ex Curb & Gutter	2	LF	$	10.00	$	20.00
4	Fine Grading	32	SF	$	0.50	$	16.00
5	4" AC	18.5	SF	$	2.20	$	40.70
6	16" AB *(Assume On-Site Re-Use)*	18.5	SF	$	1.60	$	29.60
7	SubGrade Fabric	20	SF	$	0.35	$	7.00
8	Pavement Sealant	18.5	SF	$	0.05	$	0.93
9	Curb & Gutter	1	LF	$	25.00	$	25.00
10	Vertical Curb	1	LF	$	20.00	$	20.00
11	Sidewalk	6	SF	$	6.50	$	39.00
12	Handicap Ramps *(Assume 1 every 500')*	1	LF	$	6.00	$	6.00
13	Signing / Striping / Monuments	1	LF	$	5.00	$	5.00
14	Parkway Irrigation and Landscaping	6	SF	$	7.50	$	45.00
15	Roadway Low Points *(1 CB & 18" crossing every 300')*	1	LF	$	13.79	$	13.79
16	Electroliers						*Included in Dry Utilities*
	TOTAL BIG WHITES LINEAR FOOT COSTS					**$**	**297.51**
					SAY	**$**	**300.00**

ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

MAIN STREET - ATLANTIC AVENUE TO MAIN GATE

Note: Bay Trail & Buffer included in In-Tract costs



Item	Description	Quantity	Unit		Unit Price		Cost per LF
1	Clearing & Grubbing	1	LF	$	2.50	$	2.50
2	Grading	6	CY	$	10.00	$	60.00
3	Fine Grading	66	SF	$	0.50	$	33.00
4	Sawcut Existing Pavement	0	LF	$	4.00	$	-
5	Remove Existing Pavement / Concrete	50	SF	$	1.00	$	50.00
6	Demo Ex Curb & Gutter	0	LF	$	10.00	$	-
7	5" AC	30	SF	$	2.75	$	82.50
8	22" AB *(Assume On-Site Re-Use)*	30	SF	$	2.20	$	66.00
9	SubGrade Fabric	33	SF	$	0.35	$	11.55
10	Pavement Sealant	30	SF	$	0.05	$	1.50
11	Curb & Gutter	3	LF	$	25.00	$	75.00
12	Median Curb	1	LF	$	20.00	$	20.00
13	Sidewalk	2	SF	$	6.50	$	13.00
14	Bike Path	10.5	SF	$	3.00	$	31.50
15	Handicap Ramps *(Assume 2 every 500')*	1	LF	$	12.00	$	12.00
16	Signing / Striping / Monuments	1	LF	$	10.00	$	10.00
17	Local Storm Drain *(24" main & 18" crossings every 300')*	1	LF	$	110.00	$	110.00
18	Storm Drain Catch Basins *(Assume 1 every 300')*	1	LF	$	10.67	$	10.67
19	Storm Drain Filter Boxes *(Assume 2 every 300')*	1	LF	$	66.67	$	66.67
20	Roadside Vegetated Swales	1	LF	$	60.00	$	60.00
21	Median Irrigation and Landscaping	9	SF	$	7.50	$	67.50
22	Parkway Irrigation and Landscaping	19	SF	$	7.50	$	142.50
23	Traffic Control	1	LF	$	40.00	$	40.00
24	Construction Sequencing	1	LF	$	20.00	$	20.00
25	Electroliers						*Included in Dry Utilities*
	TOTAL MAIN STREET - ATLANTIC AVENUE TO MAIN GATE LINEAR FOOT COSTS					**$**	**985.88**
					SAY	**$**	**985.00**

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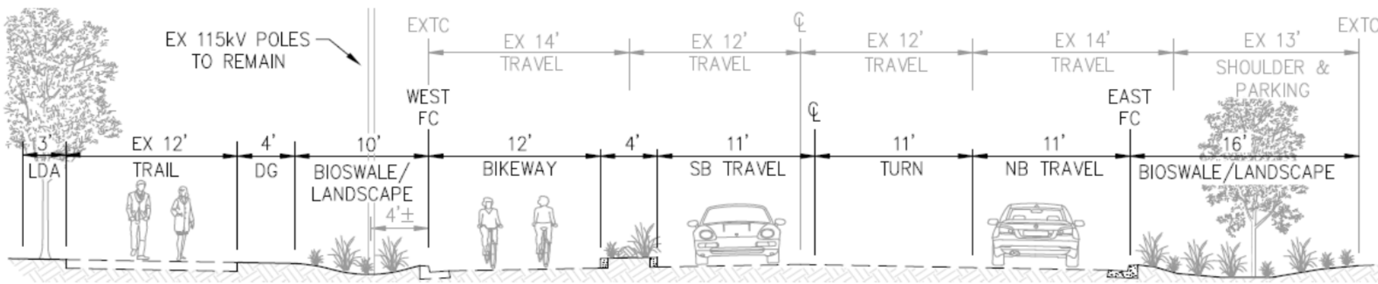
ALAMEDA POINT
BACKBONE INFRASTRUCTURE
ENGINEER'S PRELIMINARY CONSTRUCTION COST ESTIMATE
TYPICAL PER FOOT STREET COSTS
ALAMEDA, CALIFORNIA

October 31, 2013
Job No.: 1087-010

Item	Description	Quantity	Unit	Unit Price	Cost per LF
	MAIN STREET - PACIFIC AVENUE TO ATLANTIC AVENUE				
	Note: Bay Trail & Buffer included in In-Tract costs				



Item	Description	Quantity	Unit	Unit Price	Cost per LF
1	Clearing & Grubbing	0	LF	$ 2.50	$ -
2	Grading	0	CY	$ 10.00	$ -
3	Fine Grading	0	SF	$ 0.50	$ -
4	Sawcut Existing Pavement	3	LF	$ 4.00	$ 12.00
5	Remove Existing Pavement / Concrete	21.5	SF	$ 1.00	$ 21.50
6	Demo Ex Curb & Gutter	1	LF	$ 10.00	$ 10.00
7	5" AC	0	SF	$ 2.75	$ -
8	22" AB *(Assume On-Site Re-Use)*	0	SF	$ 2.20	$ -
9	2" AC Overlay Existing Pavement	42	SF	$ 2.00	$ 84.00
10	SubGrade Fabric	0	SF	$ 0.35	$ -
11	Pavement Sealant	0	SF	$ 0.05	$ -
12	Curb & Gutter	1	LF	$ 25.00	$ 25.00
13	Median Curb	2	LF	$ 20.00	$ 40.00
14	Sidewalk	0	SF	$ 6.50	$ -
15	Bike Path *(Existing Pavement to Remain)*	0	SF	$ 3.00	$ -
16	Handicap Ramps *(Assume 2 every 500')*	1	LF	$ 12.00	$ 12.00
17	Signing / Striping / Monuments	1	LF	$ 10.00	$ 10.00
18	Local Storm Drain *(24" main & 18" crossings every 300')*	1	LF	$ 110.00	$ 110.00
19	Storm Drain Catch Basins *(Assume 2 every 300')*	1	LF	$ 21.33	$ 21.33
20	Roadside Vegetated Swales	2	LF	$ 60.00	$ 120.00
21	Median Irrigation and Landscaping	4	SF	$ 7.50	$ 30.00
22	Parkway Irrigation and Landscaping	26	SF	$ 7.50	$ 195.00
23	Traffic Control	1	LF	$ 40.00	$ 40.00
24	Construction Sequencing	1	LF	$ 20.00	$ 20.00
25	Electroliers				*Included in Dry Utilities*
	TOTAL MAIN STREET - PACIFIC AVENUE TO ATLANTIC AVENUE LINEAR FOOT COSTS				**$ 750.83**
				SAY	**$ 750.00**

APPENDICES

H) FISCAL ANALYSIS (WILLDAN FINANCIAL SERVICES)

To be presented to the City Council at the November 19, 2013 public hearing.