SECTION 2

INTRODUCTION

This section provides an overview and outline of the Master Plan of Drainage Update for the City of Seal Beach (City). It includes a brief background description, past studies, objectives, scope of work, organization, and acknowledgments.

2-1 BACKGROUND

The City of Seal Beach was incorporated in 1917 and has been in operation under its own charter since 1964. It covers an area of 11.15 square miles along the Pacific coast in the northwest corner of Orange County. The City's total population was 24,157 in 2000 according to the Census information. The State Department of Finance data shows that the City's population was 25,962 as of May, 2007.

Originally called Bay City, Seal Beach was developed in the early 1900's as a resort destination for residents of the Los Angeles area. Its early growth was accelerated by the construction of the Pacific Electric Railway Trolley, which reached the City in 1906. The railway allowed visitors to reach the City more easily and in greater numbers to enjoy the many hotels, bathhouses and dance halls which were constructed for their recreation. Oil was discovered in the City in 1926, and the oil boom that followed resulted in the development of Seal Beach into the residential community it is today.

The City is subdivided into several distinct communities as shown on Figure 2-1, and described below.

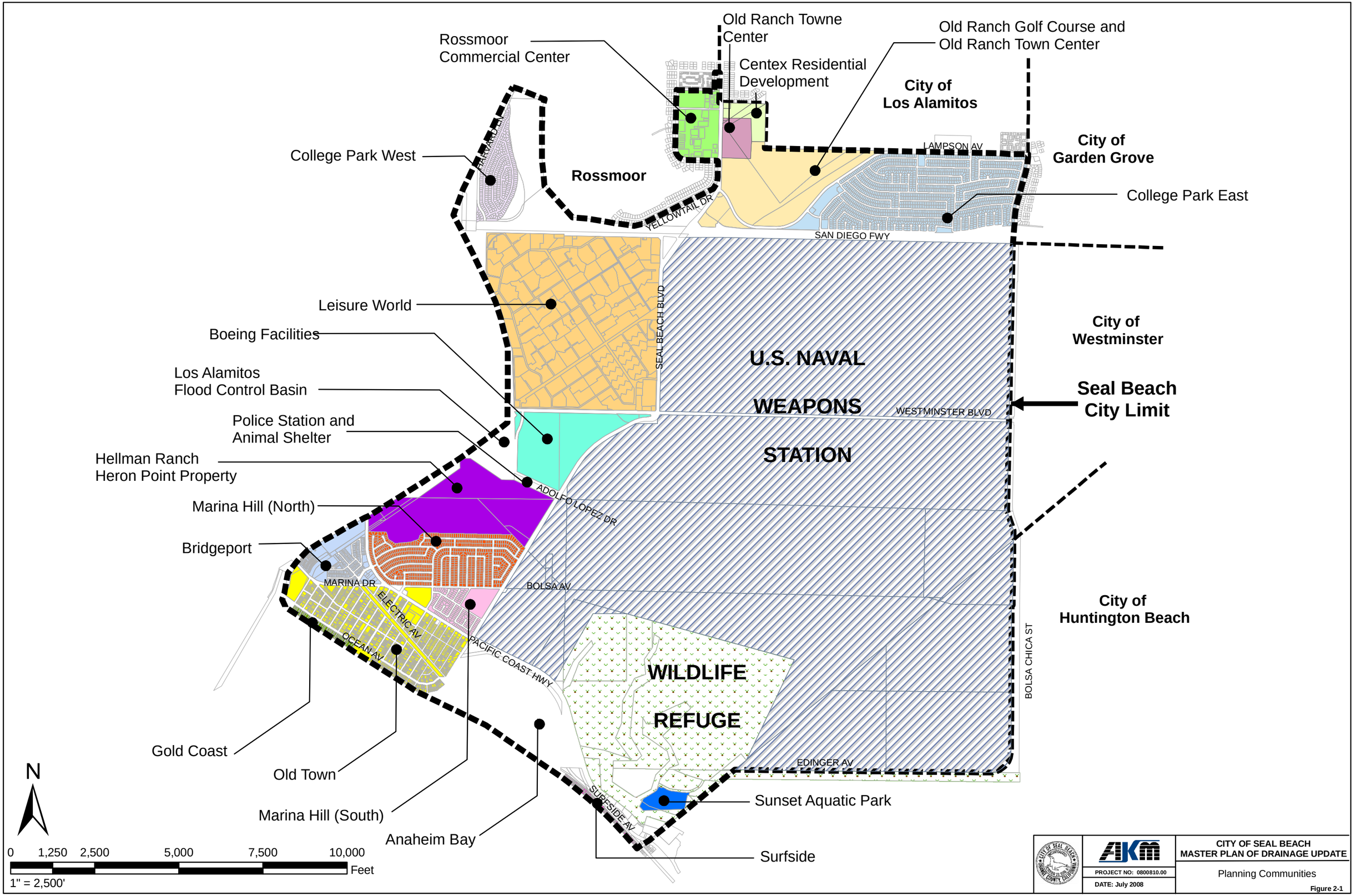
- **Old Town,** the area south of Electric Avenue and Marina Drive, between 1st Street and Seal Beach Boulevard, was developed in the 1920's and is the oldest area within the City's corporate limits. High density residential and commercial land uses are prevalent in this area. The Gold Coast District is located directly on the beach and consists of large single-family residential lots. The City's mile long beach in Old Town is used for surfing and swimming. The Seal Beach Pier, located at the end of Main Street, provides fishing facilities and a restaurant.

- **Bridgeport** is the area located west of Pacific Coast Highway and north of Marina Drive. It was primarily developed in the 1960's and consists of medium density and high density residential land uses such as Oakwood Apartments and Seal Beach Mobile Home Park.

- **Marina Hill** was developed in the 1950's and consists of single-family homes. This area is located north of Pacific Coast Highway, adjacent to the southerly edge of Gum Grove Nature Park.

- **Surfside**, a colony which was incorporated in the 1930's, became a part of Seal Beach in 1969. The area consists of single-family homes located on the south spit of Anaheim Bay. Although a gated community, pedestrian and bicycle access to the beach is available. Surfside is a popular location for surfing and swimming.

- **College Park East and College Park West** were both developed in the late 1960's. They are single-family residential communities located north of the San Diego Freeway.



CITY OF SEAL BEACH
MASTER PLAN OF DRAINAGE UPDATE

AKM

PROJECT NO: 0800810.00

DATE: July 2008

Planning Communities

Figure 2-1

- **The Rossmoor Commercial Center and the Old Ranch Towne Center** are located along Seal Beach Boulevard, on the northern limits of the City boundary. These centers include large anchor stores, as well as smaller community retail and service-use businesses.

- **Centex Development** is located between Plymouth Drive and the City of Los Alamitos, east of Seal Beach Boulevard. This development was completed in 2002 and includes 78 single-family homes.

- **The Leisure World Retirement Community** is located between Westminster Boulevard and the San Diego Freeway, west of Seal Beach Boulevard. This gated community was built in 1961. Leisure World is about 1,200 acres in size and includes 6,482 cooperative apartments, 126 condominiums housing, and an approximate population of 9,000. Leisure World provides a secure, serene environment for seniors 55 and older. Medical, religious, commercial and recreational facilities are all provided within the compound limits.

- **Boeing Facilities** occupies 107 acres southwest of Seal Beach Boulevard and Westminster Avenue. Currently, this area is occupied by the Boeing Campus, the Pacific Gateway Plaza, and the Pacific Gateway Business Center. The Boeing plant manufactures satellites and has laboratory and testing facilities to support Boeing's space program. Engineering and design operations are also conducted from this facility. The remaining area has been recently developed with a business park, a hotel, commercial, and light industrial uses.

- **Hellman Ranch/Heron Point** occupies 231-acre parcel of land located west of Seal Beach Boulevard, just north of the Marina Hill Community. The community includes 70 single-family residences, the Gum Grove Nature Park, restored wetlands, public access, oil resource production, civic/public land use, saltwater marsh wetlands, and freshwater wetlands.

- **U.S. Naval Weapons Station** was established in 1944. Comprising the majority of the City, it covers 5,256 acres bounded by the San Diego Freeway to the north, Bolsa Chica Road to the east, Pacific Coast Highway to the south, and Seal Beach Boulevard to the west. It encompasses the Anaheim Bay which consists of an outer harbor formed by jetties, an inner harbor dredged to accommodate oceangoing ships, and a wetland system of salt marshes and tidal channels. The Wildlife Refuge is also included in the U.S. Naval Weapons Station boundary.

- **The Seal Beach National Wildlife Refuge** was established in 1972 and preserves 920 acres of salt marsh and upland area within Anaheim Bay. The refuge is located within the boundaries of the U.S. Naval Weapons Station, and there is restricted access.

- **Sunset Aquatic Park** was annexed by the County in 1975 from the U.S. Navy. It encompasses 67 acres of Anaheim Bay and is the site of a public marina and park.

2-2 PAST STUDIES

In the past, studies and design plans were completed to formulate solutions for flooding problems within the City. The following sections describe the available information that was used throughout this study.

2-2.1 Regional Facilities

The regional facilities include Los Alamitos Channel (Facility No. C01), Los Alamitos Retarding Basin (Facility No. C01B01), Los Alamitos Pump Station (Facility No. C01PS1), Federal Storm Channel (Facility No. C01S06), Bixby Storm Channel (Facility No. C01S04), Montecito Storm Channel (Facility No. C01S03), Kempton Storm Channel (Facility No. C01S01), Rossmoor Retarding Basin (Facility No. C01B02) , and Seal Beach Pump Station (Facility No. C00PS1). The regional facilities are maintained by the Orange County Flood Control District. The previous studies for these facilities are listed below.

Preliminary Hydrology Report of Entire Drainage system of the Los Alamitos Channel, Facility No. C01.	July, 1996
Basis of Design Report, Los Alamitos Pump Station, Facility No. C01PS01 and Los Alamitos Retarding Basin, Facility No C01B01, Volume 1 of II	February, 2007
Preliminary Project Report, Federal Channel, Facility No. C01S06, from Los Alamitos Channel (C01) to The Garden Grove Freeway	March, 1998
Preliminary Project Report, Bixby Storm Channel, Facility No. C01S04, from Montecito Channel to Seal Beach Boulevard	April, 1998
Preliminary Project Report, Montecito Storm Channel, Facility No. C01S03, from Los Alamitos Channel to Montecito Road	April, 1998
Preliminary Project Report, Kempton Storm Channel, Facility No. C01S01, From Los Alamitos Channel to Montecito Road	April, 1998
Project Report, Facility No C01S02, Rossmoor Storm Channel from Rossmoor Retarding Basin to Mindora Street	September, 1994
Reconnaisaanace Level Study for the Engine/Pump Upgrade Proposal at Seal Beach Pump Station, Facility No. C00PS1	March, 1996
Hydrology Report, Seal Beach Storm Drain Facility No. C00P02, Entire Drainage System Including Pump Station	July, 1968
Hydrology Report, Seal Beach Storm Drain Facility No. C00P02, Seal Beach Pump Station Facility No. C00PS1	September, 1975

2-2.2 Local Facilities

The previous Master Plan of Drainage was completed in 1999. It evaluated the drainage system in general accordance with the 1986 Orange County Hydrology Manual.

In 2005, the Ad Hoc Street and Storm Drain Committee finalized the Street and Storm Drain Assessment Report. The Ad Hoc Street and Storm Drain Committee was formed after the City experienced major flooding on October 17, 2004. This report formalized six (6) high and eleven (11) moderate storm drain improvement projects and possible measures to fund these projects.

Along with these two reports, the drainage studies and reports listed in the following table were reviewed:

	Date	Title	Study Area	By	For
1	July ,1968	Hydrology Report Seal Beach Storm Drain Facility No. C00P02 Entire Drainage System Including Pump Station	Seal Beach Pump Station Tributary Area	Orange County Flood Control District	Orange County Flood Control District
2	September, 1975	Hydrology Report, Seal Beach Storm Drain Facility No. C00P02, Seal Beach Pump Station Facility NO. C00PS1	Seal Beach Pump Station Tributary Area	Orange County Flood Control District	Orange County Flood Control District
3	May, 1999	Master Plan of Drainage	City's Tributary Area	AKM Consulting Engineers	City of Seal Beach
4	July, 2000	Hydrology Map, Kitchell Development Company	Old Ranch Towne Center	SLS Engineering Associates	Kitchell Development Company
5	October 18, 2000	Hydrology Study for College Park East, Old Ranch Town Center	College Park East	Hunsaker & Associates	Bixby Ranch Company
6	November 6, 2000	Old Ranch Country Club, Clubhouse Hydrology and Hydraulic Analysis	Old Ranch Clubhouse	Incledon Kirk Engineers	Bixby Ranch Company
7	February, 2002	West End Pump Station Prelimary Design Report	West End Pump Station Tributary Area	AKM Consulting Engineers	City of Seal Beach
8	August 13, 2002	Hydrology and Hydraulic Analysis for Seal Beach Area "B" Offsite	Area "B" is bound by Lampson Ave, Bixby Channel, and the San Diego Freeway	Hunsaker & Associates	Bixby Ranch Company
9	June 13, 2003	Old Ranch Town Center AFRC Channel Hydraulic Calculations	Old Ranch Golf Course	Incledon Kirk Engineers	Bixby Ranch Company
10	September 17, 2003	Hydrology & Hydraulic Analysis for Tract 15797	East of Seal Beach Blvd, North of the Old Ranch Towne Center	Hunsaker & Associates	Centex Homes
11	May, 2005	Water Quality Management Plan	Pacific Gateway Business Center	Fuscoe Engineering	Boeing Realty Corporation
12	May, 2005	Storm Water Polution Prevention Plan	Pacific Gateway Business Center	Fuscoe Engineering	Boeing Realty Corporation
13	2005	Street and Storm Drain Assessment Report	City's Tributary Area	Ad Hoc Street and Storm Drain Committee	City of Seal Beach
14	June, 2006	San Gabriel River Corridor Master Plan	San Gabriel River	Moore Iacofano Goltsman, Inc	County of Los Angeles Department of Public Works
15	February, 2007	Seal Beach Townhomes Initial Study and Mitigated Negative Declaration	Boeing Facility, north of Adolfo Lopez Drive	RBF Consulting	City of Seal Beach

2-2.2 Federal Emergency Management Agency (FEMA) Studies

The Flood Insurance Rate Maps (FIRMs) for Orange County and the incorporated areas were published on February 18, 2004. The City limits are covered under the Panels 112, 115, 116, 118, 226, 227, and 231, which are included in Appendix A. The updated FIRM, Letter of Map Revision (LOMR), covering the Sunset Aquatic Park and Surfside areas is also included in Appendix A.

As indicated on the FIRMs, FEMA conducted flood hazard studies to a certain degree of detail. The FEMA studies evaluate flooding in major streams and rivers as well as flooding caused by storm-induced waves. The flooding areas for the local drainage systems are not included in the FEMA analyses.

According to the FEMA studies, several small portions of the City are in the 100-year flood hazard zone. For the most part, the City was mapped under the flood hazard zone labeled either "ZONE X (OTHER FLOOD AREAS)" or "ZONE X (OTHER AREAS)".

Zone X (Other Flood Areas) defines the areas where one of the following conditions may occur

- 0.2% annual chance of flooding (500-year flood);
- Areas of 1% annual chance flood (100-year flood) with average depths of less than one (1) foot
- Drainage areas less than one (1) square mile;
- Areas protected by levees from the 1% annual chance flood (100-year flood).

The northern portions of the City are categorized by Zone X (Other Flood Areas). College Park East, Rossmoor and Bixby Ranch Commercial Center, Bixby Old Ranch and Golf Course, College Park East, and the majority Leisure World are susceptible to flooding of events larger than 100-year flood.

Zone X (Other Areas) defines the areas where the following condition occurs

- 0.2% annual chance of flooding (500 year flood)

The southern portions of the City experience conditions categorized by Zone X (Other Areas). Boeing Facility, Hellman Ranch, Marina Hill, Bridgeport, and Old Town are susceptible to flooding with events larger than the 500-year flood.

Zone AE defines the areas subject to inundation during a 100-year flood. The base flood elevations are calculated and presented on the FIRMs. The City has several areas labeled in ZONE AE.

- Old Town area, generally bounded by 12th Street to the west, Landing Avenue to the North, Seal Beach Boulevard to the east, and Ocean Avenue to the south
- Along Seal Way between 12th Street and east of Dolphin Avenue
- Gold Coast Community between 2nd Street and 5th Street.
- Old Ranch Golf Course, which functions as a retarding basin for the tributary area to the north.

Zone A defines areas subject to inundation by the 100-year flood based on approximations. The base flood elevations for these zones were not calculated.

The County owned flood control facilities such as the Montecito Storm Channel, the Los Alamitos Retarding Basin, and the Bixby Storm Channel are mapped as “Zone A”.

2-3 OBJECTIVES AND SCOPE OF WORK

This Master Plan Update develops the baseline information for the drainage system, formulates service criteria, evaluates the capacity of the existing system, and provides recommendations for capacity improvements, as well as for extension of the existing drainage system. As a planning document, it is general in nature, and is predicated upon the best information available at this time. Detailed hydrologic and hydraulic studies will need to be conducted to develop the final design data for the improvements recommended by this Master Plan Update. The primary tasks involved in the preparation of this Master Plan of Drainage Update are as follows:

- Develop general flood protection and design criteria
- Develop an up-to-date inventory of the assets
- Update the storm runoff peak values per County’s rainfall data and methodology
- Evaluate the hydraulic capacity of the drainage system and its ability to convey the design discharges
- Identify system’s capacity deficiencies
- Identify inundation problem areas and formulate solutions
- Develop a comprehensive Capital Improvement Program with cost estimates
- Incorporate data from drawings and calculated results into a Geographic Information System (GIS)

The scope of work for the Storm Drain Master Plan consists of the following tasks:

1. Administration and Management

2. Data Collection and Preparation

   The primary sources of information used during the course of this study are as follows:

   - 1 foot contour maps completed in 2007, by Arrowhead Mapping Corp (Vertical Datum NAVD 1988)
   - As-built plans of the storm drain facilities
   - As-built plans of the storm drain facilities owned by the Orange County Flood Control District
   - Existing hydrology studies
   - Drainage system maintenance records from the City and Orange County Flood Control District
   - 1999 Master Plan of Drainage
   - Existing regional facility Project Reports and Design Memoranda from Orange County
   - GIS Database information (ArcView Files for parcels, land use, zoning, street centerlines)
   - 2003 General Plan

3. Conduct Interviews and Field Reviews

   Conduct interviews with the City Staff throughout the project to better understand maintenance practices, ascertain areas of concern, and identify the inundation problem areas. Conduct field reviews with City staff throughout the project to verify drainage system conditions.

4. Analysis of Storm Drain Systems

   Hydrology Study

   - Delineate the study area into major drainage areas
   - Subdivide the major drainage areas into sub-areas for each storm drain system
   - Calculate the design discharges in accordance with the 1986 OCFCD Hydrology Manual

   Develop Criteria

   - The OCFCD flood protection policy is utilized in developing the City's design criteria
   - The design discharges are based on the peak runoff from the 25-year storm.

   Hydraulic Analysis

   - The Los Angeles County Department of Public Works (LACDPW) Water Surface Pressure Gradient (WSPG) computer program is utilized for hydraulic analyses
   - The analyses include the existing and proposed drainage systems to meet the flood protection goals
   - Prioritize the recommended drainage system improvements
   - Evaluate the street capacity to determine where the storm drain systems should be extended to provide flood protection in accordance with the selected criteria

5. Capital Improvement Program

   Prepare a prioritized capital improvement program to mitigate the identified deficiencies. Develop cost estimates for each project, including design, construction, and administration. Review the recommended program with the City and refine it as directed by the City.

6. Master Plan Report

   Document the work, the results and the recommendations in a master plan report with clear exhibits of appropriate scale.

2-4 ORGANIZATION OF THE STORM DRAIN MASTER PLAN REPORT

This Master Plan of Drainage Update report presents the methodology, findings, and recommendations of a comprehensive study of the City of Seal Beach's drainage system. A brief outline of the report follows:

- Section 1: **Executive Summary** provides an overview of the methodology, existing system conditions, recommendations, and capital improvement program recommended by the study.
- Section 2: **Introduction** provides an overview and outline for the Storm Drain Master Plan.

- Section 3: **Study Area** describes the physical features, land use characteristics and population of the study area.

- Section 4: **Existing Drainage System** describes each existing storm drain system that is owned by the City as well as the LACFCD and the OCFCD regional facilities that receive runoff from the study area.

- Section 5: **Criteria** discuses the flood protection policies and standard methodology utilized in determining the design discharges, and conducting hydraulic analyses.

- Section 6: **Hydrology Study** describes standards and procedures utilized in developing the 10 and 25-year storm runoff.

- Section 7: **Hydraulic Analysis** describes the hydraulic model utilized and the results of the hydraulic analyses; identifies the hydraulically deficient segments of the existing system; and provides recommendations for the proposed system.

- Section 8: **Pump Station Analysis** evaluates the existing storm water pump stations, identifies deficiencies, and provides recommendations for improvements.

- Section 9: **Recommendations** describes the proposed solutions to eliminate or minimize the flooding and inundation problems.

- Section 10: **Capital Improvement Program** presents a prioritized capital improvement program for the recommended projects.

- **Appendices** contain background information and are referred to in the text as the location of supplementary facts and figures.

2-5 ACKNOWLEDGMENTS

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