DEPARTMENT OF PLANNING AND PERMITTING
**CITY AND COUNTY OF HONOLULU**
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

FILE COPY

MAY 08 2012

2011/ED-14(BLB)

April 16, 2012

RECEIVED
'12 APR 17 P1:49
OFC. OF ENVIRONMENTAL QUALITY CONTROL

The Honorable Gary Hooser, Director
Office of Environmental Quality Control
State of Hawaii
State Office Tower, Room 702
235 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Hooser:

Subject: Chapter 343, Hawaii Revised Statutes
Environmental Assessment (EA) Determination
Finding of No Significant Impact

| | |
|---|---|
| Project: | Western Kapolei Regional Drainage System |
| Applicant: | Aina Nui Corporation, an affiliate of the James Campbell Company LLC |
| Agent: | SSFM International, Inc. (Jared Chang) |
| Location: | Kapolei – Ewa |
| Tax Map Keys: | 9-1-14: 2, 26 and 27; 9-1-15: 2, 4 and 20; and 9-1-74: 36 |
| Proposal: | Special Management Area Use Permit and Shoreline Setback Variance to allow the construction of a regional drainage system in accordance with the Western Kapolei Regional Drainage Plan |
| Determination: | Finding of No Significant Impact |

Attached and incorporated by reference is the Final EA prepared by the Applicant for the project. Based on the significance criteria outlined in Title 11, Chapter 200, Hawaii Administrative Rules, we have determined that preparation of an Environmental Impact Statement is not required.

We have enclosed a completed OEQC Bulletin Publication Form and the Final EA (document and a compact disk in PDF format). If you have any questions, please contact Blake La Benz of our staff at 768-8016.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:hd
Encls.
cc: SSFM International, Inc.

**Publication Form**
**The Environmental Notice**
**Office of Environmental Quality Control**

Instructions: Please submit one hardcopy of the document along a with determination letter from the agency. On a compact disk, put an electronic copy of this publication form in MS Word and a PDF of the EA or EIS. Please make sure that your PDF documents are ADA compliant. Mahalo.

| | |
|---|---|
| **Project Name:** | Western Kapolei Regional Drainage System |
| **Applicable Law:** | Chapter 343, Hawai‘i Revised Statutes |
| **Type of Document:** | Final Environmental Assessment/FONSI |
| **Island:** | Oahu |
| **District:** | ‘Ewa |
| **TMK:** | (1) 9-1-014: 002, 026, and 027; (1) 9-1-015: 002, 004, and 020; (1) 9-1-074: 036 |
| **Permits Required:** | Department of Army Permit (Section 10 and 404)<br>Section 401 Water Quality Certification<br>Conservation District Use Permit (CDUP)<br>Special Management Area (SMA) Permit<br>Shoreline Setback Variance (SSV)<br>Stream Channel Alteration Permit (SCAP)<br>NPDES Permit<br>Grading Permit |
| **Applicant:** | Aina Nui Corporation, an affiliate of the James Campbell Co. LLC |
| Address | 1001 Kamokila Blvd., Suite 250, Kapolei, HI 96707 |
| Contact & Phone | Mr. Steve Kelly, AICP<br>Phone: (808) 674-3540 |
| **Approving Agency:** | City and County of Honolulu, Department of Planning and Permitting |
| Address | 650 South King Street, 7th Floor, Honolulu, HI 96813 |
| Contact & Phone | Mr. Blake La Benz<br>Phone: 768-8016 |
| **Consultant:** | SSFM International, Inc. |
| Address | 501 Sumner Street, Suite 620, Honolulu, HI 96817 |
| Contact & Phone | Mr. Jared Chang<br>Phone: 356-1242 |

**Project Summary**: Summary of the direct, indirect, secondary, and cumulative impacts of the proposed action (less than 200 words). Please keep the summary brief and on this one page.

Aina Nui Corporation, an affiliate of James Campbell Company LLC, is proposing to design and construct a regional drainage system in accordance with the Western Kapolei Regional Drainage Plan. The regional drainage system will collect the runoff from multiple individual drainage systems located within the drainage contributing area comprised of approximately 2,700 acres.

This project is an essential component to continuing the successful expansion of Kapolei as O‘ahu’s second urban center. The proposed Western Kapolei Regional Drainage System will significantly improve the current drainage conditions of West Kapolei that are frequently subject to flooding during heavy rain storms. The project will serve two main purposes: 1) support the development of planned projects within the drainage basin; and 2) mitigate existing flooding currently occurring at low lying areas developed within the drainage basin.

The Regional Drainage Plan for Western Kapolei was completed for the project in February 2012 by Engineering Concepts, Inc. This plan was approval by the City Department of Planning and Permitting, Civil Engineering Branch and is included in Appendix B of the Final Environmental Assessment.

# Western Kapolei Regional Drainage System
# Kapolei, Oahu, Hawai‘i

**FINAL ENVIRONMENTAL ASSESSMENT**

***Prepared Pursuant to:***
**Chapter 343, Hawai‘i Revised Statutes and**
**Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules**

***Approving Agency:***
**City and County of Honolulu**
**Department of Planning and Permitting**

***Submitted by:***
**Aina Nui Corporation, an affiliate of the James Campbell Company LLC**

***Prepared by:***

SSFM INTERNATIONAL

**April 9, 2012**

***THIS PAGE INTENTIONALLY LEFT BLANK***

# Table of Contents

**PROJECT SUMMARY ..... III**

**CHAPTER 1: INTRODUCTION ..... - 1 -**

**CHAPTER 2: PROJECT DESCRIPTION AND LOCATION ..... - 5 -**

2.1 PROJECT LOCATION ..... - 5 -
2.2 EXISTING AND SURROUNDING USES ..... - 5 -
2.3 PROJECT DESCRIPTION ..... - 6 -
*2.3.1 Proposed Project ..... - 6 -*
*2.3.2 Project Cost and Schedule ..... - 18 -*
2.4 PROJECT PURPOSE AND OBJECTIVES ..... - 18 -

**CHAPTER 3: DESCRIPTION OF THE EXISTING ENVIRONMENT, PROJECT IMPACTS & MITIGATION MEASURES .. - 20 -**

3.1 CLIMATE ..... - 20 -
3.2 FLORA AND FAUNA ..... - 20 -
*3.2.1 Existing Conditions ..... - 20 -*
*3.2.2 Project Impacts and Mitigation ..... - 22 -*
3.3 MARINE ENVIRONMENT ..... - 23 -
*3.3.1 Existing Conditions ..... - 23 -*
*3.3.2 Project Impacts and Mitigation ..... - 25 -*
3.4 GEOGRAPHY, TOPOGRAPHY AND SOILS ..... - 27 -
*3.4.1 Existing Conditions ..... - 27 -*
*3.4.2 Project Impacts and Mitigation ..... - 28 -*
3.5 AIR QUALITY ..... - 30 -
*3.5.1 Existing Conditions ..... - 30 -*
*3.5.2 Project Impacts and Mitigation ..... - 30 -*
3.6 STREAMS AND AQUATIC RESOURCES ..... - 31 -
*3.6.1 Existing Conditions ..... - 31 -*
*3.6.2 Wetlands ..... - 33 -*
*3.6.3 Project Impacts and Mitigation ..... - 33 -*
3.7 ARCHAEOLOGICAL, HISTORICAL AND CULTURAL RESOURCES ..... - 34 -
*3.7.1 Existing Conditions ..... - 34 -*
*3.7.2 Project Impacts and Mitigation ..... - 37 -*
3.8 FLOOD AND TSUNAMI HAZARD ..... - 38 -
*3.8.1 Existing Conditions ..... - 38 -*
*3.8.2 Project Impacts and Mitigation ..... - 38 -*
3.9 ROADWAYS ..... - 39 -
*3.9.1 Existing Conditions ..... - 39 -*
*3.9.2 Project Impacts and Mitigation ..... - 39 -*
3.10 WATER SYSTEM ..... - 39 -
*3.10.1 Existing Conditions ..... - 39 -*
*3.10.2 Project Impacts and Mitigation ..... - 39 -*
3.11 WASTEWATER DISPOSAL ..... - 39 -
*3.11.1 Existing Conditions ..... - 39 -*
*3.11.2 Project Impacts and Mitigation ..... - 39 -*

**CHAPTER 4: CONFORMANCE WITH LAWS, PLANS AND POLICIES ..... - 41 -**

4.1 FEDERAL ..... - 41 -
*4.1.1 Clean Water Act ..... - 41 -*
*4.1.2 Coastal Zone Management Act ..... - 41 -*
4.2 STATE OF HAWAIʻI ..... - 42 -
*4.2.1 Hawaiʻi Revised Statutes, Chapter 343 ..... - 42 -*
*4.2.2 Hawaiʻi State Plan ..... - 42 -*
*4.2.3 State Land Use Law ..... - 46 -*
*4.2.4 State Water Code ..... - 46 -*
4.3 CITY AND COUNTY OF HONOLULU ..... - 46 -
*4.3.1 General Plan ..... - 46 -*
*4.3.2 ʻEwa Development Plan ..... - 48 -*
*4.3.3 Land Use Ordinance ..... - 50 -*
4.4 SPECIAL MANAGEMENT AREA ..... - 50 -
*4.4.1 Conformance with CZM Objectives and Policies ..... - 50 -*
*4.4.2 Conformance with SMA Guidelines ..... - 57 -*
4.5 SHORELINE SETBACK AREA ..... - 63 -
*4.5.1 Certified Shoreline and 40-foot Setback Line ..... - 63 -*
*4.5.2 Criteria for Granting a Variance ..... - 64 -*
*4.5.3 Shoreline –dependent Facility Standard ..... - 64 -*
*4.5.4 Public Interest Standard ..... - 64 -*
*4.5.5 Flood Hazard Districts Compliance Certification ..... - 64 -*
*4.5.6 Analysis of Public Impacts ..... - 65 -*

**CHAPTER 5: ALTERNATIVES TO THE PROPOSED ACTION ..... - 70 -**

5.1 NO-ACTION ALTERNATIVE ..... - 70 -
5.2 DIVERT RUNOFF INTO KALAELOA BARBER POINT HARBOR ..... - 70 -
5.3 DIVERT RUNOFF INTO EXISTING EASTERN DRAINAGE CHANNEL ..... - 70 -
5.4 RETAIN RUNOFF IN RETENTION BASINS ..... - 71 -
5.5 OTHER ALTERNATIVES TO CONCRETE-LINED CHANNEL ..... - 71 -

**CHAPTER 6: REQUIRED PERMITS AND APPROVALS ..... - 72 -**

**CHAPTER 7: FINDINGS AND DETERMINATION ..... - 73 -**

7.1 FINDINGS ..... - 73 -
7.2 DETERMINATION ..... - 78 -

**CHAPTER 8: AGENCY AND PUBLIC CONSULTATION ..... - 79 -**

8.1 PRE-ASSESSMENT CONSULTATION ..... - 79 -
8.2 DRAFT ENVIRONMENTAL ASSESSMENT CONSULTATION ..... - 80 -

**CHAPTER 9: REFERENCES ..... 82**

# Listing of Figures

FIGURE 1 PROJECT LOCATION MAP ..... - 11 -
FIGURE 2 MAJOR DEVELOPMENTS IN WESTERN KAPOLEI ..... - 12 -
FIGURE 3 PROJECT SECTIONS ..... - 13 -
FIGURE 4 MAP KEY TO PHOTOS ..... - 14 -
FIGURE 5A SITE PHOTOS 1-4 ..... - 15 -
FIGURE 5B SITE PHOTOS 5-8 ..... - 16 -
FIGURE 5C SITE PHOTOS 9-12 ..... - 17 -
FIGURE 6 SOIL SURVEY ..... - 29 -
FIGURE 7 HISTORICAL PROPERTIES NEAR PROJECT ..... - 35 -
FIGURE 9 STATE LAND USE DISTRICTS ..... - 66 -
FIGURE 10 ‘EWA DEVELOPMENT PLAN LAND USE MAP ..... - 67 -
FIGURE 11 SPECIAL MANAGEMENT AREA ..... - 68 -
FIGURE 12 CITY AND COUNTY ZONING ..... - 69 -

# Listing of Appendices

Appendix A-1 Pre-Assessment Consultation Comments and Responses
Appendix A-2 Draft EA Consultation Comments and Responses
Appendix B-1 DPP Approval Notice for Regional Drainage Plan dated February 22, 2012
Appendix B-2 Final Regional Drainage Plan for Western Kapolei dated January 2012
Appendix C AECOS reconnaissance biological surveys of the marine environment fronting a drainage channel in Campbell Industrial Park, Kapolei, O‘ahu, Hawai‘i dated May 9, 2011
Appendix D Memorandum of Agreement for Compensatory Mitigation dated December 1997
Appendix E-1 SHPD Preservation Plan Acceptance Notice dated April 28, 2011
Appendix E-2 Correspondence relating to O.R.&L. Railroad Right-of-Way crossings dated March 2008
Appendix F EKNA update of Stormwater Flow Modeling dated September 24, 2010
Appendix G Previously proposed Certified Shoreline Map and 40-setback line dated 2008

# PROJECT SUMMARY

| | |
|---|---|
| **Project Name:** | Western Kapolei Regional Drainage System |
| **Project Location:** | Kapolei, O‘ahu, Hawai‘i |
| **Tax Map Keys:** | The drainage system traverses the following TMKs:<br>(1) 9-1-014: 002, 026, and 027<br>(1) 9-1-015: 002, 004, and 020<br>(1) 9-1-074: 036 |
| **Proposed Action:** | Aina Nui Corporation is proposing to design and construct a regional drainage system serving Western Kapolei. The project involves the construction and use of a new drainage channel to serve existing and planned development in Western Kapolei. The regional drainage system will collect the runoff from multiple individual drainage systems located within the drainage contributing area comprised of approximately 2,700 acres and stretching across three (3) major watersheds. The design and construction of individual drainage systems contributing to the regional system will be the responsibility of entities proposing land development actions within the contributing area.<br><br>The purpose of this project is to support the development of planned projects within the drainage basin; and to mitigate flooding that currently occurs at low lying areas developed within the drainage basin.<br><br>The drainage system is currently approved in concept by the City and County of Honolulu, Department of Planning and Permitting. A copy of DPP’s approval letter dated February 22, 2012 and the Final Regional Drainage Plan for Western Kapolei are included in Appendix B of this Final Environmental Assessment. Design of the regional drainage system is underway. The project is currently being designed in accordance with all applicable rules and regulations of the City and County of Honolulu.<br><br>Following completion of the project, Aina Nui Corporation will continue the necessary actions for future dedication of this drainage system to the City and County of Honolulu. |
| **EA Determination:** | Finding of No Significant Impact (FONSI) |

| | |
|---|---|
| **Approving Agency:** | City and County of Honolulu<br>Department of Planning and Permitting<br>650 South King Street, 7th Floor<br>Honolulu, Hawai'i 96813<br>Contact: Mr. Blake La Benz<br>Phone: (808) 768-8016<br>Email: blabenz@honolulu.gov |
| **Proposing Applicant:** | Aina Nui Corporation, an affiliate of the James Campbell Co. LLC<br>Contact: Mr. Steve Kelly, AICP<br>Email: stevek@kapolei.com |
| **EA Preparer:** | SSFM International, Inc.<br>501 Sumner Street, Suite 620<br>Honolulu, Hawai'i 96817<br>Contact: Mr. Jared Chang<br>Phone: (808) 531-1308<br>Email: jchang@ssfm.com |
| **Project Site Existing Land Use Designations:** | The proposed project is consistent with the uses allowed in each of the existing land use designations.<br>State Land Use Classification: Urban, Agricultural, and Conservation<br>City and County Zoning: Industrial Waterfront (I-3), Industrial Intensive (I-2), Preservation, General (P-2), Industrial-Commercial Mixed Use (IMX-1), Apartment Mixed Use, Medium-Density (AMX-2) Apartment, Low-Density (A-1)<br>'Ewa Development Plan: Industrial, Parks and Golf Courses<br>Special Management Area: Within SMA (portion)<br>Shoreline Setback Area: Within 40-foot shoreline setback (portion) |
| **Permits and Approvals:** | • Department of the Army, Section 10 and 404 Permits<br>• Department of Health (DOH), Section 401 Water Quality Certification<br>• DOH, National Pollutant Discharge Elimination System Permit<br>• DOH, Antidegredation Analysis<br>• Department of Land and Natural Resources (DLNR), Conservation District Use Permit<br>• DLNR, Land acquisition easement<br>• DLNR, Stream Channel Alteration Permit<br>• Department of Planning and Permitting (DPP), Special Management Area (SMA) Permit<br>• DPP, Shoreline Setback Variance (SSV)<br>• DPP, Grading Permit |

# CHAPTER 1: INTRODUCTION

Aina Nui Corporation, an affiliate of James Campbell Company LLC, is proposing to design and construct a regional drainage system in accordance with the Western Kapolei Regional Drainage Plan. This project is an essential component to continuing the successful expansion of Kapolei as O‘ahu’s second urban center. The proposed Western Kapolei Regional Drainage System (hereinafter referred to as the “project”) will significantly improve the current drainage conditions of West Kapolei that are frequently subject to flooding during heavy rain storms. The project will serve two main purposes:

1) Support the development of planned projects within the drainage basin; and
2) Mitigate existing flooding currently occurring at low lying areas developed within the drainage basin.

In addition, uncontrolled runoff from mauka areas has negatively impacted Kalaeloa Barbers Point Harbor. While some of these runoff problems have been handled through interim solutions, such as temporary retention basins, the permanent solution for flood mitigation is a regional drainage plan for Western Kapolei. A Regional Drainage Plan for Western Kapolei was completed for the project in January 2012 by Engineering Concepts, Inc. and was reviewed for approval by the City Department of Planning and Permitting, Civil Engineering Branch (DPP-CEB). This plan was approved by DPP-CEB in a letter dated February 22, 2012. The DPP approval letter and final plan is included as Appendix B of this Final Environmental Assessment.

## Project Background

The City of Kapolei is the core of O‘ahu’s secondary urban center and is developing with significant home and job increases in accordance with the 2030 visions articulated in O‘ahu’s General Plan and the ‘Ewa Development Plan. Western Kapolei will account for a major share of O‘ahu’s future expansion involving residential, commercial and industrial uses. Development projects proposed for Western Kapolei have completed separate environmental studies to address their anticipated environmental and social impacts.

The introduction of numerous major and minor projects in Western Kapolei will collectively alter the hydrologic characteristics of watersheds spanning over approximately 2,700 acres of once undeveloped lands. The construction of new infrastructure and buildings will increase the imperviousness nature of these lands, resulting in higher peak flows and storm water runoff volumes. Therefore, a regional drainage system is being designed to accommodate the planned changes for Western Kapolei.

A Final Environmental Impact Statement (EIS) was prepared by the Estate of James Campbell in 1990 to support a Development Plan amendment for the Kapolei Business-Industrial Park (KBIP). The 1990 Final EIS included an assessment of the environmental impacts associated with the same proposed drainage channel, identified as the project in this environmental assessment. Subsequently, a Supplemental EIS was prepared in 1991 to support Special Management Area and Shoreline Setback Variance permits for the section of the proposed drainage channel extending from the KBIP development to the coastline.

The proposed Western Kapolei Regional Drainage System project is substantially the same project as originally addressed in the 1990 EIS and 1991 Supplemental EIS. The Estate of James Campbell (Aina Nui Corporation's predecessor in interest) had applied for and received a Special Management Area Use Permit and Shoreline Setback Variance for the regional drainage project in 1993 (Resolution No. 93-259, CD-1).

On January 22, 2007, the DPP issued a determination letter indicating that the 1991 Supplemental EIS was sufficient for processing a new Special Management Area (SMA) permit and Shoreline Setback Variance (SMA). By letter dated August 8, 2008, the Department of Land and Natural Resources (DLNR) stated that the 1991 Supplemental EIS was sufficient for processing a new Conservation District Use Permit (CDUP) application for the drainage channel.

Based on the above determinations by DPP and DLNR and under §11-200-26 of the Hawai'i Administrative Rules (HAR), a new Supplemental EIS is not warranted "to the extent that the action has not changed substantively in size, scope, intensity, use, location or timing, among other things." The project is in the same location, has the same physical footprint, serves the same drainage basin, and is designed to the handle the same 100 year storm capacity, as disclosed in the original environmental review documents of 1990 and 1991.

## Purpose of this Environmental Assessment

This EA is has been prepared in good faith to ensure that current rules and regulations are being followed for the design and construction of the regional drainage system. In a separate case before the DPP for a subdivision application, known as *Kuilima*, the Hawai'i Supreme Court provided new legal guidance on the issue of timing and changed circumstances as to when an Supplemental EIS is required under HAR §11-200-26. In light of this case and with concurrences from the State Office of Environmental Quality Control and City Department of Planning and Permitting, this environmental assessment is being prepared to disclose a summary of updated studies and overall mitigations currently associated with the Western Kapolei Regional Drainage System project. The information in this EA will be used to supplement new applications for Special Management Area Use Permit and Shoreline Setback Variance (SSV) approvals for applicable sections of the Regional Drainage System.

Aina Nui Corporation will pursue the necessary permits and approvals to implement the regional drainage system serving lands located in Western Kapolei. The proposed project will involve several discretionary land use permits.

- Special Management Area (SMA) Permit
- Shoreline Setback Variance (SSV) approval
- Conservation District Use Permit (CDUP)

Each of these permit approvals require compliance with Chapter 343 of the Hawai‘i Revised Statutes (HRS) and Title 11, Chapter 200 of the State Department of Health Administrative Rules (HAR). Furthermore, the use of City or State owned lands also triggers the need for HRS Chapter 343 compliance.

Since Aina Nui Corporation is the private entity proposing the project, this action qualifies as an “applicant action” under HRS 343. The action will require approval of the public agency issuing the major permit which has oversight over the proposed activity. The City and County of Honolulu, Department of Planning and Permitting will function as the “approving agency” responsible for submitting both the Draft EA and Final EA to the State Office of Environmental Quality Control (OEQC) on behalf of the applicant, Aina Nui Corporation. This environmental assessment was prepared to address any associated environmental impacts of the project and to fulfill the requirements of the Chapter 343 of the Hawai‘i Revised Statutes (HRS) and Title 11, Chapter 200 of the Hawai‘i Administrative Rules (HAR).

The Draft EA included detailed descriptions of the proposed use and discussions of the probable environmental impacts of the project, as well as, the associated mitigation measures to ensure that any potential adverse impacts are minimized or mitigated. Notification on the availability of the Draft EA was provided on December 23, 2011 in the Office of Environmental Quality Control’s (OEQC) *The Environmental Notice*. The Draft EA was sent to Federal, State and local agencies for review and comment and also made publicly available online through the OEQC’s website.

Following the Draft EA’s publication on December 23, 2011, a 30-day public review and comment period was opened to ensure that the public and agency stakeholders had adequate opportunity to review the Draft EA and provide comments that would be included as part of the official administrative record. Consequently, this Final Environmental Assessment (Final EA) was prepared to disclose the agency comments received and any additional mitigation to be incorporated in the project design.

## Project Description Summary

The proposed Western Kapolei Regional Drainage System is made up of the following Project Sections listed below. Each section is described in detail in Chapter 2: Project Description. The overall project is divided into six (6) Project Sections for the purpose of discussion throughout this document. They are numbered in sequence starting at the coastline and moving upland.

1) Drainage Outlet: The Drainage Outlet, makai (seaward) of Malakole Street, will be a concrete lined drainage outfall which will continue into the shoreline and ocean.

2) Malakole Street Culvert: A multi-cell drainage culvert will cross under Malakole Street.

3) Drainage Channel: Heading upland from the Malakole Street Culvert, the drainage channel configuration transitions into a trapezoidal coral swale. This section of the drainage system is unlined.

4) OR&L Culvert: From Farrington Highway, the future Kapolei West Golf Course will be utilized as a natural drainage way to convey runoff to an existing drainage channel culvert at the O‘ahu Railway and Land Company (OR&L) railroad right-of-way (ROW) crossing between Kapolei West and Kapolei Harborside.

5) Golf Course: An approximate 50-foot wide multi-cell drainage structure is being proposed to cross the OR&L ROW and connect to the Drainage Channel located within Kapolei Harborside. This section of the drainage system will be incorporated into the golf course design as an unlined natural drainage way.

6) Farrington Highway Culverts: The project’s mauka (inland) terminus includes eight (8) existing drainage culvert collection points crossing under Farrington Highway. Future expansion improvements at these culverts may be needed to accommodate drainage flows from the Makaiwa Hills development.

## Future Dedication to the City

Upon completion of the project, Aina Nui Corporation will propose dedication of the Drainage Outlet, Malakole Street Culvert and Drainage Channel to the City and County of Honolulu (City).

# CHAPTER 2: PROJECT DESCRIPTION AND LOCATION

## 2.1 PROJECT LOCATION

The proposed regional drainage channel is located in Western Kapolei on the island of Oʻahu. A project location map is provided as Figure 1. Beginning at the shoreline, the project corridor stretches approximately 1,750 feet from west to east until reaching Malakole Street. This portion of the project is defined by Tax Map Key (TMK) (1) 9-1-014: 002 which is designated and set aside for drainage purposes.

The project corridor then crosses under Makakole Street via an existing drainage culvert and proceeds northeast into undeveloped lands adjacent to the future Kapolei Harborside industrial development. The corridor then continues in a northeast direction until reaching the OR&L railroad and connecting with an existing drainage channel that traverses the future Kapolei West development. The existing drainage channel proceeds north towards the Farrington Highway until it connects with a series of culverts crossing the highway. This section is within the parcel identified as TMK (1) 9-1-015: 004.

The project traverses through several more TMK parcels identified as: (1) 9-1-014: 002, 026, and 027; (1) 9-1-015: 002, 004, and 020; and (1) 9-1-074: 036.

## 2.2 EXISTING AND SURROUNDING USES

Western Kapolei is located within three (3) major watersheds: Awanui Gulch watershed, Pālailai Gulch watershed, and Makaiwa Gulch watershed. The three watersheds extend from the coastline near Ko Olina Resort, Kalaeloa Barbers Point Harbor and Campbell Industrial Park up to the Waiʻanae Mountain Range. From ocean to mountain, these watersheds stretch for a distance of about 6 miles and cover approximately 2700 acres. The majority of these lands are currently developed, or undeveloped but planned for development through several projects including Makaiwa Hills, Kapolei West, Kapolei Harborside, Kapolei Commons, West Kalaeloa Business Park and the Kapolei Maritime Industrial project. The boundaries of these major projects are shown in Figure 2.

**Description of Onsite Development Drainage Systems**

Individual phases within the larger land developments will be required to address the water quality impacts from their actions. It is within these phases, or in the case of the Kapolei Harborside development within each lot, that alternatives such as vegetated swales, bioretention systems, would be encouraged and required, if necessary.

Each of the surrounding development projects described above will be required to incorporate "onsite" drainage systems to suit the specific development conditions. In general, onsite systems are likely to consist of catch basins/inlets, manholes, and drain pipes or swales and channels. Onsite systems will carry runoff to the regional drainage system in Western Kapolei that ultimately discharges in the ocean. Detailed drainage analyses of each onsite drainage system will be performed for the individual projects. All drainage systems within roadways will be designed in accordance with City standards for dedication. Swales and channels will also be designed according to City standards for runoff quantities.

All proposed developments in Western Kapolei will be required to address stormwater quality. Site specific water quality issues will be addressed according to current State and City standards. A separate water quality study will be required for each individual project.

## 2.3 PROJECT DESCRIPTION

### 2.3.1 Proposed Project

The proposed project consists of a regional drainage system to improve conveyance of storm runoff to the ocean and to prevent flooding of existing and future development. A Regional Drainage Plan for Western Kapolei was completed for the project in January 2012 by Engineering Concepts, Inc. This plan is included as Appendix B. The regional drainage system is being designed to accommodate a 100-year storm event with a peak runoff capacity of 5,200 cubic feet per second. The basis of design was developed in accordance with current City and County of Honolulu (City) storm drainage standards. Using the City standards, an engineering assessment of peak flows indicate that a 2(H)-to-1(V) side slope trapezoidal drainage channel with a bottom width of about 150-feet and depth of 15-feet would adequately handle regional drainage through Kapolei Harborside.

The overall project is divided into six (6) Project Sections for the purpose of discussion throughout this document. They are numbered in sequence starting at the coastline and moving upland. The Project Sections are shown on Figure 3. Photos of the project site and surrounding areas are provided in Figure 4 (Photo Key) and Figures 5A, 5B, and 5C.

**1) Drainage Outlet**

Channel Design Discharge: 4,540 cfs
Drainage Basin: 2,565 acres plus 800 sq. ft. (.01 acre) at the shoreline outlet portion

The drainage outlet section will consist of a trapezoidal channel approximately 1,750 feet long and 150 feet wide. The channel will be constructed primarily of concrete generally at or below existing grade. The average bottom width of the channel will measure approximately 126 feet

wide when finished. At the shoreline, the channel will extend an additional 165 feet makai of the shoreline setback but will consist of an unlined channel excavated to -5 feet mean sea level (MSL) at the most seaward point. Upon completion, tidal influence within the channel is anticipated to extend approximately 3,700 feet inland (beyond Malakole Road).

Two (2) ten-foot wide service roads made of paved asphalt concrete will be constructed along both banks of the concrete lined channel from Malakole Street to the shoreline. A new six-foot high chain link fence will be constructed along the outer boundaries of the channel from the Malakole Street to the shoreline.

A concrete pedestrian bridge, approximately four-feet wide will be constructed just mauka of the shoreline. An existing underground gas line, which crosses the makai end of this section, will be relocated either under the drainage channel invert or above ground, possibly alongside the pedestrian bridge.

A total of approximately 310,000 cubic yards of material will be excavated to construct this section. 1,500 cubic yards of that total will be excavated within the shoreline setback area and will be removed. Excavation will be conducted under "dry conditions" meaning that the channel will not be opened to the ocean until the land based excavation is completed.

This entire section of the drainage system project is located within the City Special Management Area (SMA). The makai (seaward) portion of this section is located within the State Conservation District (makai of the certified shoreline) and City shoreline setback area (between the certified shoreline and 40-foot setback line). These improvements will occur within U.S. navigable waters under the jurisdiction of the U.S. Army Corps of Engineers (USACE).

**2) <u>Malakole Street Culvert</u>**

Channel Design Discharge: 4,540 cfs
Drainage Basin: 2,565 acres

This section of the project and the remaining upland Project Sections are outside of the City SMA. Improvements at the Malakole Street Culvert will involve the construction of a multi-cell drainage structure consisting of a culvert crossing under Malakole Street. At this location, the 100-year peak flow is approximately 4,540 cubic feet per second. The final drainage structure design and sizing of culverts will be confirmed during the detailed design stage.

Construction of the new drainage structure will involve removal of the existing two (2) 30-inch reinforced concrete pipe culverts under Malakole Street. A Maintenance of Traffic Plan would be prepared during design to address vehicle traffic on Malakole Street during construction.

**3) <u>Drainage Channel</u>**

Channel Design Discharge: 3,700 to 4,190 cfs
Drainage Basin: 2,565 acres

This section is located within the proposed Kapolei Harborside development between the Malakole Street Culvert and OR&L Culvert. Kapolei Harborside is a future commercial and industrial project comprised of approximately 351 acres.

The drainage channel through this section will consist of 300-foot wide trapezoidal channel approximately 7,000 feet long with a bottom width of 150 feet and a depth of 15 feet. The channel will be excavated in hard coral and will not require concrete lining throughout the majority of its length. Certain sections of the channel may require energy dissipaters, concrete or riprap lining, especially where high velocities or high erosion potential exists. The channel configurations have been conceptually developed in the <u>Regional Drainage Plan for Western Kapolei</u> and approved by the City Department of Planning and Permitting, Civil Engineering Branch. The detailed design phase will start in February 2012.

The drainage channel section will be lined in coral which has many benefits over a concrete-lined channel. The coral lining would be beneficial to the eventual discharge environment by reducing the speed of flow of storm water runoff and allowing percolation of discharge prior to reaching the ocean. This approach reduces the levels of freshwater, sediments and other land-generated pollutants that will enter the ocean.

**4) <u>OR&L Culvert</u>**

Culvert Design Discharge: 3,700 cfs
Drainage Basin: 1,980 acres

This section of the project crosses the O‘ahu Railroad and Land (OR&L) historical right-of-way. Improvements at the OR&L Culvert will involve the construction of a multi-cell drainage structure. An approximate 50-foot wide multi-cell drainage structure is being proposed for this crossing. The final drainage structure design and sizing of culverts will be confirmed during the detailed design stage.

A Memorandum of Agreement (MOA) will be completed for the OR&L historical right-of-way between the State Historic Preservation Officer (SHPO), the State Department of Transportation (landowner of right-of-way) and the Hawaiian Railway Society. The MOA will detail the type of crossing that will be made across the tracks and any reconstruction, if necessary. The MOA would also stipulate the obligations and time frames for any work to be undertaken. An update of correspondences is provided in Section 3.7 of this Final EA.

**5) <u>Golf Course</u>**

Channel Design Discharge: 3,700 cfs
Drainage Basin: 1,840 acres

This section is located within the proposed Kapolei West development between the OR&L Culvert and Farrington Highway Culverts. Kapolei West (formerly called Ko Olina Phase II) is a future golf course and residential community project comprised of approximately 519 acres. About 140 acres of Kapolei West will utilize the project for storm water runoff.

Since Kapolei West will be a golf course residential community, similar to the Ko Olina Golf Course, the golf course is also planned to be used as part of the regional drainage system. A hydraulic analysis on this drainageway will be performed during design of the golf course. The required flood controls and storm water quality treatments will be incorporated in accordance with the City's storm drainage standards.

Drainage improvements through this section will utilize the golf course as a means to convey the regional flow through Kapolei West and will provide flow control to the OR&L Culvert. Detention based and flow-through based water quality controls are being proposed for the Kapolei West development, such as water quality basins, vegetated swales, and hydrodynamic particle separation devices.

**6) <u>Farrington Highway Culverts</u>**

Channel Design Discharge: 3,700 cfs
Drainage Basin: 1,768 acres

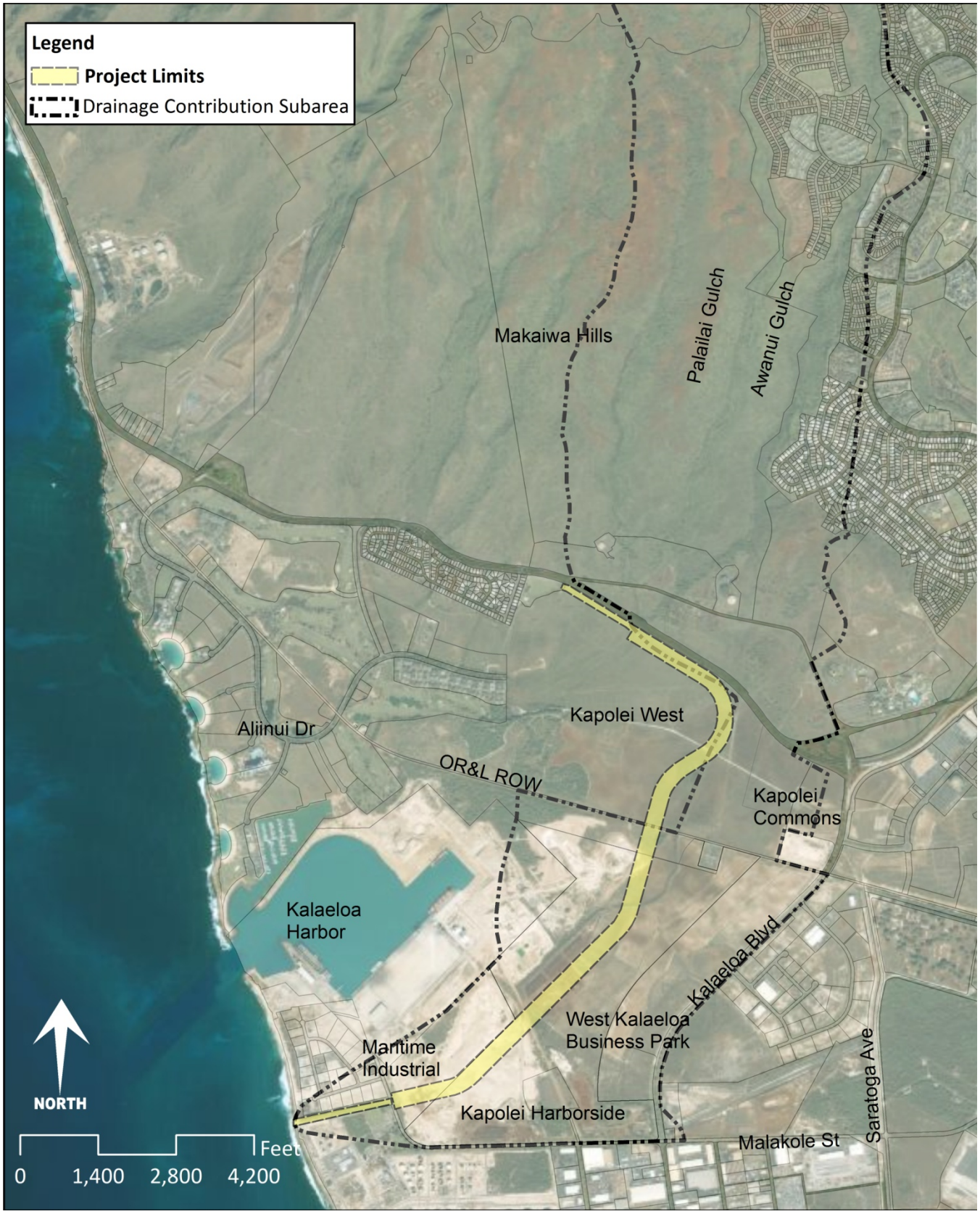
This section marks the inland endpoint of the project at Farrington Highway. The future Makaiwa Hills development will be located on the mauka side of Farrington Highway across of Kapolei West and Ko Olina. Makaiwa Hills is a future mixed residential and commercial project comprised of approximately 1,850 acres. About 726 acres of Makaiwa Hills will utilize this project for storm water runoff.

There are currently seventeen (17) culvert crossings along this stretch of Farrington Highway. These culverts will convey storm water from Makaiwa Hills to the Ko Olina drainage system and this project. These culverts are labeled sequentially from west to east beginning with "D1." 50-year and 100-year peak flow runoff estimates for each culvert is shown in Appendix B, Table 3.

There are eight (8) culverts (D10, D11, D12, D13, D14, D15, D16, and D17) that will convey storm water into the project. State DOT drainage standards require the capacities of culverts under the highway to handle the 50-year peak since none of the drainage courses involved are

covered by the National Flood Insurance Program. The eight (8) culverts connected to this project are adequate for peak flows based on State DOT standards.

The City requires drainage areas larger than 100 acres to be design in accordance with Plate 6 of the City's storm drainage standards. Peak flows from Plate 6 were considered for culverts D11, D12 and D13 since each tributary area was larger than 100 acres. The D11 crossing currently consists of two (2) 120-inch plate pipes. The D12 and D13 crossing currently consists of two (2) 108-inch plate pipes and a 24-inch reinforced concrete pipe, respectively. If the City's drainage standards were to govern design, then culverts D11, D12, and D13 may need to be upgraded to accommodate estimated 100-year peak runoff flows.



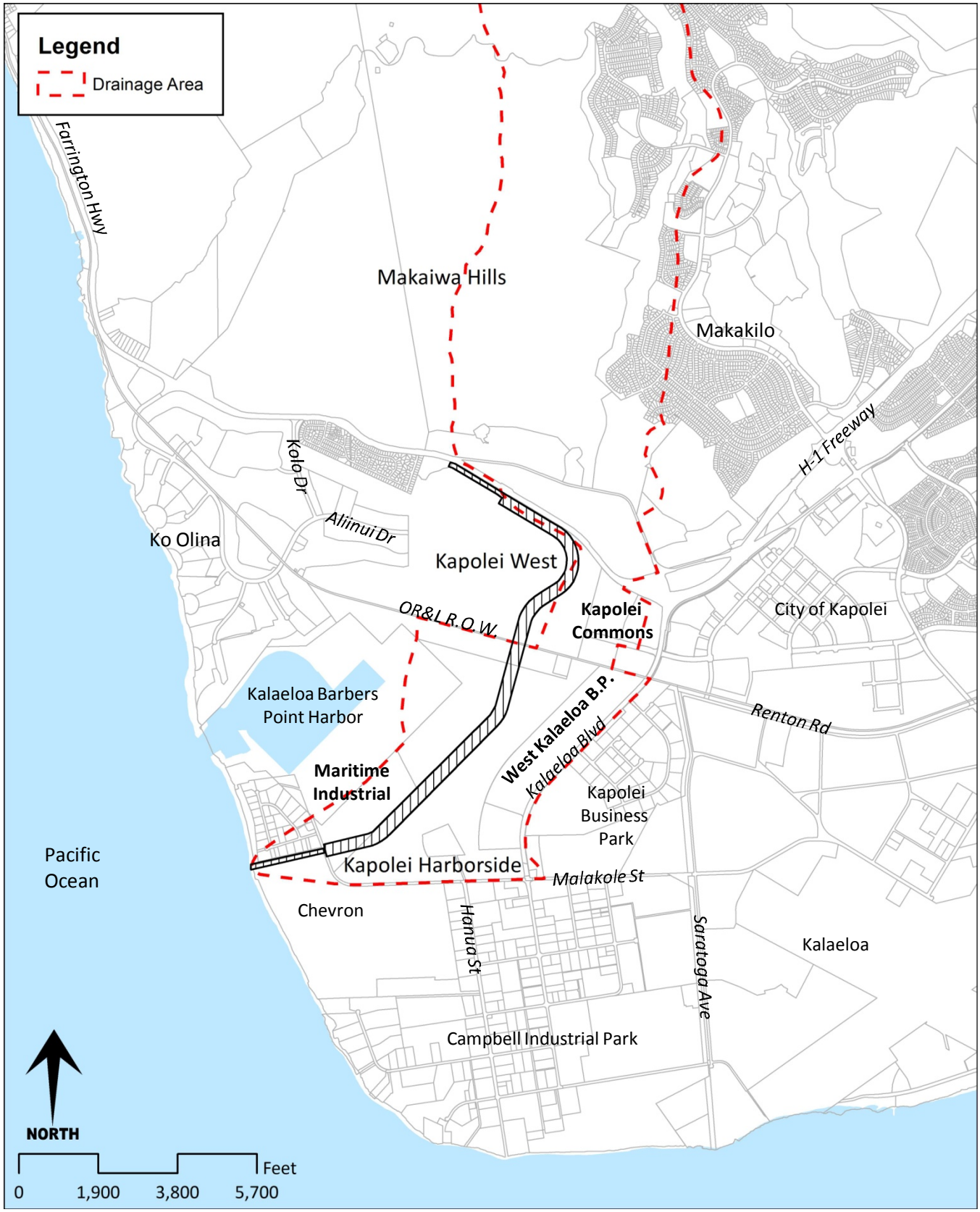

# PROJECT LOCATION MAP

**FIGURE 1**

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Data Sources:
Bing Maps (Aerial)
Engineering Concepts Inc.




| MAJOR DEVELOPMENTS IN WESTERN KAPOLEI | FIGURE 2 |
|---|---|
| Western Kapolei Regional Drainage System<br>Aina Nui Corporation<br>SSFM INTERNATIONAL | Data Sources:<br>Engineering Concepts Inc.<br>State GIS Database, O'ahu Tax Map Key Layer |

| PROJECT SECTIONS | FIGURE 3 |
|---|---|
| Western Kapolei Regional Drainage System<br>Aina Nui Corporation<br>SSFM INTERNATIONAL | Data Sources:<br>Engineering Concepts Inc.<br>State GIS Database, O'ahu Tax Map Key Layer |

| MAP KEY TO PHOTOS | FIGURE 4 |
|---|---|
| Western Kapolei Regional Drainage System<br>Aina Nui Corporation | Data Source:<br>Photos taken by SSFM International, Inc. on July 14, 2011 |

Photo 1: North view of shoreline at mouth of channel

Photo 2: East view of access road along south border of channel

Photo 3: West view of channel access road

Photo 4: West view of channel from Malakole Street

# PHOTOS 1-4

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

**FIGURE 5A**

Source:
Photos taken by SSFM International, Inc. on July 14, 2011

Photo 5: West view of 36-inch culverts under Malakole Street

Photo 6: East view of proposed drainage area

Photo 7: South view of channel and quarry stockpiles in background

Photo 8: East view of channel and quarry stockpiles

# PHOTOS 5-8

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

**FIGURE 5B**

Source:
Photos taken by SSFM International, Inc. on July 14, 2011

Photo 9: East view of pipeline and roadway in drainage area

Photo 10: Northeast view of undeveleped drainage channel area

Photo 11: Southeast view of undeveloped drainage channel area

Photo 12: Northwest view of drainage area near Farrington Highway

# PHOTOS 9-12

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

**FIGURE 5C**

Source:
Photos taken by SSFM International, Inc. on July 14, 2011

### 2.3.2 Project Cost and Schedule

The cost of construction for the regional drainage system is undetermined at this time. Construction cost estimates will be prepared concurrently with design of the system. The preliminary schedule for design and construction of each section of project is shown below:

| | |
|---|---|
| 1) Drainage Outlet | 2013 to 2014 |
| 2) Malakole Street Culvert | 2012 to 2016 |
| 3) Drainage Channel | 2012 to 2016 |
| 4) OR&L Culvert | 2012 to 2016 |
| 5) Golf Course | 2012 to 2016 |
| 6) Farrington Highway Culverts | TBD |

Note that the above schedule is preliminary and will be updated as plans for the different developments progresses. Detailed drainage studies shall be conducted for each individual project and submitted to the government agencies for approval to ensure compliance with requirements. The specific construction schedules will be addressed in individual drainage reports for each development.

## 2.4 PROJECT PURPOSE AND OBJECTIVES

The Western Kapolei Regional Drainage System project is an essential component to continuing the successful expansion of Kapolei into O‘ahu’s second urban center. As described in the project background, the drainage system will serve two main purposes:

1) Support the development of planned projects within the drainage basin; and
2) Mitigate existing flooding currently occurring at low lying areas near the intersection of Kalaeloa Boulevard and Malakole Street and near the northwest corner of the existing Chevron USA refinery, adjacent to Malakole Street.

The City of Kapolei is the core of O‘ahu’s secondary urban center and is planning for significant home and job increases in accordance with the 2030 visions of O‘ahu’s General Plan and ‘Ewa Development Plan. Western Kapolei will account for a major share of this future expansion involving residential, commercial and industrial uses.

The collective impact from several major and minor projects in Western Kapolei will alter the hydrologic characteristics of three (3) watersheds spanning over approximately 2,700 acres of undeveloped lands. The construction of new infrastructure and buildings will increase the imperviousness of these lands, resulting in higher peak flows and storm water runoff volumes. Therefore, this project is being proposed to follow the drainage objectives set forth in the ‘Ewa Development Plan.

As described in the 'Ewa Development Plan, the expansion planning for Makaiwa Hills, Kapolei Business Park, and industrial areas closest to Kalaeloa Barbers Point Harbor will require a new major drainage system consisting of a concrete-lined channel to convey storm waters to an ocean outlet just south of the harbor. The development plan provides general policies and planning principles for all new drainage systems in 'Ewa. From these it is implied that drainage systems shall strive for the following objectives:

- Be designed to emphasize flood control and minimize non-point source pollution.
- Emphasize the use of retention basins.
- Implement where appropriate, detention of storm water on-site and in appropriate open space and wetland areas.
- Use storm water as a potential irregular source of water for recharge of the aquifer that should be retained for absorption rather than quickly moved to coastal waters.
- Use natural and man-made vegetated drainage ways and retention basins as the preferred solution to drainage problems.
- Use concrete-lined channels, despite the potential for adverse environmental impacts, if there is no other feasible alternative to meet specific design challenges.

Implementation of this project should significantly improve the current drainage conditions of Western Kapolei that are frequently subject to flooding during heavy rain storms. Uncontrolled runoff from the mauka areas has also negatively impacted Kalaeloa Harbor. While some of the runoff problems have been handled through interim solutions, such as temporary retention basins, the permanent solution for flood mitigation is a regional drainage plan for Western Kapolei.

# CHAPTER 3: DESCRIPTION OF THE EXISTING ENVIRONMENT, PROJECT IMPACTS & MITIGATION MEASURES

This chapter describes the surrounding environment in the vicinity of the project. The probable environmental impacts associated with the regional drainage system are discussed, and mitigative measures are identified, where necessary.

## 3.1 CLIMATE

The climate of the project site, warm and dry, is typical of the 'Ewa Plains. The prevailing winds throughout the year are northeasterly trade winds, with occasional southwesterly "Kona" winds. According to data collected by the National Oceanic and Atmospheric Administration (NOAA), average temperature ranges from 69 degrees Fahrenheit during the coolest month to 87 degrees Fahrenheit during the warmest month. Average annual rainfall is approximately 14 inches per year with most of the rainfall occurring during winter months (November to February).

**Project Impacts and Mitigation**

No impacts or mitigation anticipated.

## 3.2 FLORA AND FAUNA

This section describes the existing flora and fauna resources of the proposed drainage system in two sections, between the shoreline and Malakole Street and between Malakole Street and Farrington Highway.

### 3.2.1 Existing Conditions

**Shoreline to Malakole Street (lower reach)**

A survey of botanical resources within this section of the drainage channel was conducted in 1989 by Char & Associates for the Kapolei Business Industrial Park Supplemental EIS (Char, 1989). The objectives of this botanical survey were to inventory the terrestrial vascular flora, describe the vegetation along the drainage channel, and search for any threatened and endangered plants.

The survey found that vegetation in the general area of the drainage channel, makai of Malakole Street, was dominated by an open kiawe forest and tangled mats of pickleweed (*Batis maritima*). Pluchea shrubs, about three to six feet high were also common along the drainage channel. In some places, akulikuli (*Sesuvium portulacastrum*) and swollen finger grass (*Chloris*

*barbata*) were abundant. Other native species identified in this area included kipukai, ilima, and few shrubs of false sandlewood or naio. No endemic, threatened or endangered plants were found within the drainage channel; nor were there any plants candidate or proposed.
A reconnaissance level flora and fauna survey of this drainage channel section was conducted by Reginald David and Eric Guinther in September 2010. The purpose for this survey was to compare the 2010 findings with findings of the flora and fauna surveys conducted in 1989 to determine whether habitat and associated flora and fauna resources have changed.

From a botanical perspective, the area remains unchanged since 1989 with no valuable botanical resources present. No plant species currently listed, or proposed for listing under either federal or the state endangered species programs were observed during both 1989 and 2010 surveys. Comparisons of avian and mammalian surveys between 1989 and 2010 show that the habitat and species currently present on the site have also not changed significantly (David et al 2010).

**Malakole Street to OR&L to Farrington Highway (upper reach)**

A survey of Botanical, Avian and Mammalian Resources was prepared for the Kapolei Harborside Center EIS in 2006 by Rana Productions (David et. al., 2006). The Rana botanical survey included the regional drainage channel spanning from Malakole Street to the OR&L Railroad crossing. The survey documented the findings of botanical, avian and mammalian surveys that were conducted to determine the potential effects of Kapolei Harborside on biological resources on the site and within the surrounding vicinity.

The mammalian survey detected three (3) mammalian species while on site: domestic dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes aurpounctetus*), and cat (*Felis catus*). All three of these species are introduced species that are considered harmful to native avian species and Hawaiian ecosystems.

The avian survey identified 441 individual birds of 18 different species. Observations indicated that avian diversity was relatively low. Four (4) native species were recorded; Black-crowed Night-Heron (*Nycticorax nycticorax hoactli*), Pacific Golden-Plover (*Pluvialis fulva*), Black-necked Stilt (*Himantopus mexicanus knudseni*), and Ruddy Turnstone (*Arenaria interpres*). The remaining avian species detected are considered alien to the Hawaiian Islands.

The pedestrian botanical survey was conducted following a relatively wet period on O‘ahu when most of the plants encountered were growing well and flowering, making positive field identifications relatively easy. The surveyed area is characterized in three distinct vegetation areas, 1) quarry and dredged material tailings, (2) former agriculture lands now abandoned, and 3) kiawe (*Prosopis pallida*) and bufflegrass (*Cenchrus ciliaris*) lowland forest and savannah.

The flora of the survey area is overwhelmingly dominated by alien plant species and comprised of flowering plants. A total of 121 species of plants were identified, of which 73 species were identified in 2006 and the remaining 48 were previously recorded by other studies in the same location. Sixteen of the species recorded were known to occur in the islands before the arrival of James Cook in 1778, with four (4) being introduced by early Polynesian settlers. Twelve (12) plant species remain that are considered native to the Hawaiian Islands. Of the 12, only one is an endemic species, kupala (*Sicyos pachycarpus*) is a vine that is fairly common in leeward coastal areas. The remaining native species are indigenous and also common in leeward and coastal sites throughout the Pacific Islands. No ferns or fern allies were observed during the survey.

According to the United States Department of the Interior, Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office (FWS), the project site is potentially near areas documented as having endangered plant populations. Using data gathered from the Hawaiʻi Biodiversity and Mapping Program and the Hawaiʻi GAP Program, there are two (2) federally endangered plants, ʻEwa hinahina and ʻEwa plains akoko that are known to occur near the project location. The protection of these endangered plants is subject to Section 7 of the Endangered Species Act.

Through consultation with FWS, the project area is identified as having a large concentration of unique limestone anchaline pools. These pools are known to support two (2) species of anchaline pool shrimp, opae ʻula and *Metabetaeus lohena*, with the latter as a candidate species for listing under the Endangered Species Act (ESA). There are also restored pools near the project location that are recipient sites for translocation of the orange-black damselfly, also an endangered species candidate for listing under the ESA.

### 3.2.2 Project Impacts and Mitigation

The future construction of the project will require clearing of existing vegetation in preparation for drainage improvements. Significant excavation activities will occur primarily in the Drainage Outlet and Drainage Channel sections of the project.

In the areas between the shoreline and Malakole Street, a new concrete lined (in part) and unlined (in part) drainage channel, paved access roads, fencing, and pedestrian bridge will be constructed. These improvements will affect vegetation dominated by introduced species consisting mostly of kiawe and pickleweed. Soil salinity in this area is also very high. No officially listed threatened or endangered flora or fauna species is known to existing in this area, nor are there any plants that are candidate or proposed species on this site. The proposed Drainage Outlet should have no adverse impact on the total island populations of the species involved since the majority of species are introduced.

Mauka of Malakole Street to Farrington Highway, the proposed drainage channel is not anticipated to have an adverse impact on botanical, avian, or mammalian species. The results of the flora and fauna surveys indicate that there are no species listed as endangered, threatened, or that are currently proposed for listing under federal or State of Hawai‘i endangered species statues within the drainage project area. However, based on consultation with FWS, there is potential for threatened or endangered species to be located on the site or within the immediate vicinity of the project. If limestone anchialine pools are encountered, it is possible that shrimp species or the orange-black damselfly may be present.

Prior to construction, a knowledgeable botanist should survey the drainage corridor for federally listed plant species during the wettest portion of the year typically occurring November thru April. The presence of any anchialine pools must also be determined at this time. If it is determined that any future project may potentially affect federally endangered species, then consultation with FWS pursuant to Section 7 of the Endangered Species Act would be initiated.

## 3.3 MARINE ENVIRONMENT

This section describes the pre-existing and existing marine environment conditions fronting the proposed Drainage Outlet. Descriptions of the submerged shoreline environment are provided along with the results of previous quantitative biological studies.

### 3.3.1 Existing Conditions

On May 14, 1990 AECOS surveyed the marine biology in the coastal waters fronting the proposed drainage outlet. The area of study extended from the shoreline and intertidal area to offshore areas of approximate depths over 50 feet. A summary description of the marine reef environment from the 1990 survey is included below:

Shore and Intertidal Areas: The drainage outlet would enter the ocean through a cut in the limestone formation at the shoreline. In this area of the coastline, stretching from Kahe Point to Barbers Point Beach Park, erosion of the ancient emergent reef has created a limestone solution bench. This bench varies from place to place, but is generally a leveled surface of variable width positioned near mean sea level on which grows a diverse assemblage of marine algae.

Nearshore Subtidal Zone: Immediately offshore of the marine bench is the shoreline area that receives the full force of waves. The at-shore bottom is an irregular surface of projecting limestone pinnacles separated by grooves and holes. The bottom quickly drops to depths of 6 to 8 feet off the bench then gradually descends to depths of 9 to 10 feet.

Low Relief Limestone Bottom: The nearshore bottom adjacent to the drainage outlet is found between depths of 6 to 20 feet. Coral growth reaches approximately 20 percent of ground cover and species of sea urchin are abundant. A variety of macrothallic algae also is found here.

High Relief Limestone: The outer edge of the limestone reef formation off of Barbers Point has greater habitat complexity compared to the bottom inshore and offshore. This is due to the increased vertical relief caused by coral formations occurring in areas beyond 300 feet from shore and in waters over 15 feet and under 50 feet in depth. A separate survey conducted in 1985 by AECOS, reported a relatively high coral coverage of 34 percent coral at locations 1300 feet offshore from the drainage outlet.

Deep Offshore Sand and Rubble Bottom: The bottom seaward of approximately 40 to 50 foot in depth isobaths descends gradually and consists of a generally featureless sand and rubble bottom. With increasing depth, the bottom is covered with sand of greater thickness interrupted by few rubble patches and less common areas of large boulders, up to 6 feet in diameter. The overall substratum is 60 to 70 percent sand bottom with very low vertical relief.

As an update to the 1990 survey, on November 13, 2009 AECOS biologists conducted a reconnaissance biological survey of the shore and intertidal zone along a transect extending from the mouth of the existing drainage channel seaward into the ocean. The reconnaissance survey of the nearshore marine environment extended up to approximately 200 feet off the beach fronting channel. It was conducted using mask and snorkel. Identification of all species observed was conducted in the field and no specimens were collected. An examination of the current survey results with previous survey results conducted in the same area and reported in 1991; indicate that the composition and abundance of species located at the opening of the drainage outlet remain unchanged for nearly two decades. This survey is included in this document as Appendix C.

The AECOS surveys indicate that no federal or state listed threatened and endangered species were observed during the surveys. Species observed included algae, corals, fishes, and invertebrates. However, the green sea turtle (*Chelonia* mydas) and spinner dolphins (*Stenella* longirostris) are threatened and endangered species known to frequent the offshore waters of the project site. One species of coral observed during the survey, spreading rice coral (*Montipora patula*) is currently under status review by the federal government for listing as "endangered" or "threatened". Humpback whale *(Megaptera novaeangliae)*, another listed species are known to frequent waters well offshore of the project site during winter months. A list of all species observed during the November 13, 2009 survey can be found in the AECOS survey provided here as Appendix C of this environmental assessment.

Green Sea turtles (*Chelonia* mydas), also known as "honu" in Hawai'i are frequently seen in feeding on marine plants in shallow coastal waters. The population of honu throughout Hawai'i is starting to show some increases due to receiving protection in 1978 under the U.S. Endangered Species Act (UH Hilo, 1998). In other areas of the Pacific and worldwide, most green sea turtle populations continue to be threatened with extinction from excessive subsistence and commercial hunting.

### 3.3.2 Project Impacts and Mitigation

Impacts of the project on the marine environment encompass both short-term construction related and long-term effluent quality impacts. A discussion of the potential impacts and mitigations are discussed below.

Short-term impacts to the marine environment will be associated with the construction of the drainage outlet. These impacts would be limited to the marine bench and immediate subtidal area just seaward of the outlet. It is possible that turbidity generated during construction could temporarily influence a wider area of submerged reefs off the mouth of the outlet. However, there is substantial wave action in this area that would cause turbidity impacts to be largely aesthetic and is not likely to produce serious short-term or long-term consequences.

The bottom elevation (outlet invert) of the channel would be at approximately 5 feet below mean sea level where the marine bench in the nearshore subtidal zone sharply descends to 6 to 7 feet below mean sea level. Thus, removal of material would not need to extend beyond the edge of the outlet structure, effectively limiting the direct short-term impacts to the shoreline environment.

The drainage outlet would be approximately 100 feet wide at the shore, requiring the removal of the limestone outcrop and solution bench along that length to construct the sloped trapezoidal channel. This would likely result in some loss of habitat presently harboring a variety of seaweeds, none of which are listed endangered or threatened species. A marine bench habitat is the dominant shoreline type along this coast, extending for several miles north and at least one mile south (towards Barbers Point) from the outlet opening. The algal community in this area is of relatively high diversity and not unique within this habitat along the Barbers Point shoreline.

A narrow band of *Pterocladia* seaweeds present along the seaward edge of the marine bench could be lost due to the channel construction. The *Pterocladia* is a food source for sea turtles. The impact on turtles from the potential loss of this resource would be small relative to how much of the resource is available along this coastline. Although considered as an insignificant impact, the loss of this resource should be considered as contributory to a cumulative impact

on the marine bench habitat that has and continues to occur because of Kalaeloa Barbers Point Harbor and Ko Olina Lagoons. An algal monitoring program of the solution bench at Ko Olina has been underway since before construction of those lagoons. Post-construction monitoring has produced preliminary qualitative evidence to indicate that losses have been confined to areas of direct habitat removal, such as channel cuts through the bench, and no further. Thus, Pterocladia growth has recovered in suitable areas without effect from the bench cuts. No further mitigations are recommended.

Should the removal of the limestone bench require explosive blasting, specific precautions will need to be taken to protect marine life in the vicinity, with careful consideration given to green sea turtles and spinner dolphins.

Long-term impacts include those impacts anticipated to occur following the completion and use of the drainage outlet. Upon completion, the drainage channel will become an inlet of the sea with the outlet invert below sea level. This would create an intertidal bottom from the channel mouth where waves and tidal reaches would extend into the channel. It is anticipated that the channel will develop as an inlet with a sand or silty-sand bottom, similar to the conditions found at the existing drainage channel located between Campbell Industrial Park and Kalaeloa Airport (formerly known as the Barbers Point Naval Air Station). These conditions are expected to provide brackish water habitat for a number of potential reef fish inhabitants, such as tilapia (*Oreochromis mossambica*), aholehole (*Kuhlai sandvicensis*), mullet (*Mugil cephalus*), gobies (*Gobiidae*), and goatfishes (*Mullidae*). Also, this considered suitable habitat for a variety of juvenile fishes and non-demersal fishes commonly associated with harbors and similar inlets.

Storm water discharge is likely to incur long-term consequences if not mitigated properly through appropriate design of individual drainage systems associated with each new development. The focused discharge of runoff into nearshore waters will have an impact on marine resources at shore and off shore. The potential for pollutants from the watershed to be introduced into the marine environment is high. Potentially toxic substances are also likely.

The potential for depressed salinity associated with major flood events is of paramount consideration. This impact occurs within the lower portion of the channel and the effluent plume extending offshore during flooding events. As a result, salinity depression modeling is being conducted for the project design. Highly mobile organisms, such as fish, can avoid the effluent plume and are least impacted at these times. Attached organisms, such as corals, are at the highest risk. The potential for accumulation is not great and significant wave action at this area will help to relieve impacts from major storm events.

There is potential that urban pollutants could be carried to the ocean through storm water runoff. The Campbell Industrial Park area, as well as other areas within the watershed, is typified by infrequent rains. There are significant time periods for accumulation of contaminants on impermeable surfaces. Recognition that runoff from urban and industrial areas can produce significant loadings into the nation's aquatic environments; the U.S. Environmental Protection Agency has promulgated regulations governing storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Since this project will service an area defined as industrial, each facility that contributes to the drainage channel will be required to obtain permit approval under the NPDES program.

As the proposed project will require onshore and offshore dredging, the development and implementation of a Best Management Practices (BMP) plan is recommended to minimize impacts to water quality and marine resources. Further, based upon the continued presence of marine resources in the vicinity of the proposed project, it is anticipated that quantitative surveys of marine resources will likely be required for project permitting. The result of these additional surveys will then be used to assess potential impacts and identify potential mitigation measures.

## 3.4 GEOGRAPHY, TOPOGRAPHY AND SOILS

This section describes the existing topography and soils of the proposed drainage channel in two sections, between the shoreline and Malakole Street and between Malakole Street and Farrington Highway. Soil types are shown in Figure 6.

### 3.4.1 Existing Conditions

The 'Ewa plain is composed of an emergent ancient coral-algae calcareous material, which has been modified by a series of weathering factors to form a hard yet extremely permeable surface. The underlying structure of the landform is rock, generally classified as coral limestone or coral limestone breccias, interlayered by alluvium, consisting of muds and clays. Elevation of the proposed drainage channel ranges from sea level to about 100 feet above mean sea level. The topographic gradient of the drainage corridor is generally south, towards the ocean. The natural topography of the project site is relatively flat with mounds and depressions scattered throughout the area.

In 1990, a Geotechnical Engineering Investigation was prepared by Dames and Moore for the regional drainage system. The purpose of this study was to explore the subsurface and groundwater conditions at the project site and to provide pertinent design and construction recommendations for the regional drainage system.

**Shoreline to Malakole Street (lower reach)**

A natural drainage way already exists through this portion of the proposed drainage project. Two existing 36-inch pipe culverts cross Malakole Street with invert elevations of 1.5 feet above MSL on the makai end. According to the Soil Conservation Service's Soil Survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lāna'i, State of Hawai'i dated August 1972, soils within this area of the project are classified as Beaches (BS) and coral outcrop (CR). Beaches (BS) occur as sandy, gravelly, or cobbly areas on O'ahu that are washed and rewashed by ocean waves. Coral outcrop (CR) soils consist of 80% to 90% coral outcrop with the remaining 10% to 20% consisting of a thin layer of friable red soil material in cracks, crevices and depressions within the coral outcrop.

**Malakole Street to OR&L to Farrington Highway (upper reach)**

The majority of this portion of the project is situated soils classified as coral outcrop (CR) by the soil survey. Coral outcrop consists of coral or cemented calcareous sand and is found at elevations ranging from sea level to approximately 100 feet. The other soil types found in this area include the following:

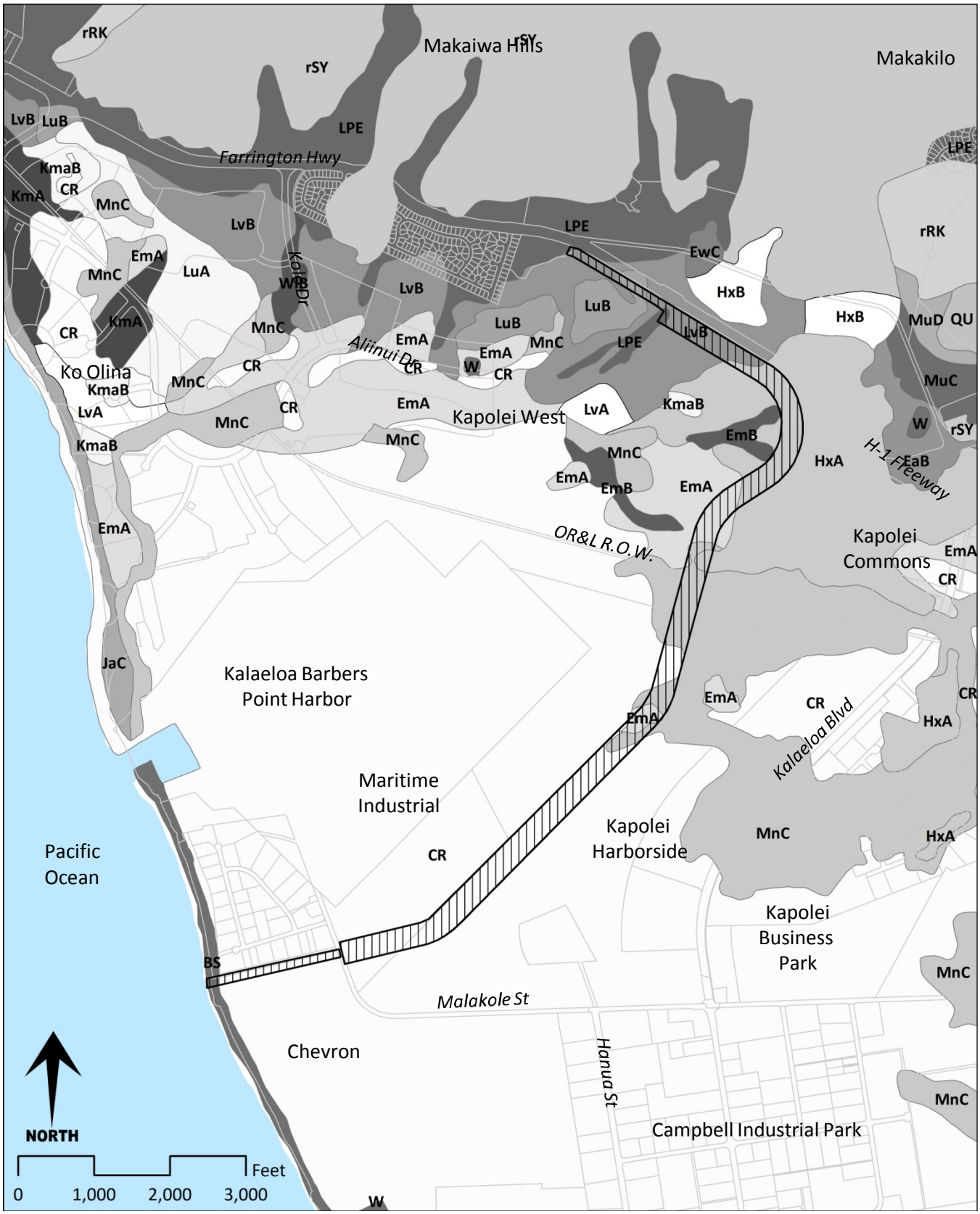
- 'Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes (EmA)
- 'Ewa silty clay loam, moderately shallow, 2 to 6 percent slopes (EmB)
- Mamala stony silty clay loam, 0 to 12 percent slopes (MnC)
- Honouliuli clay, 0 to 2 percent slopes (HxA)
- Lualualei stony clay, 0 to 2 percent slopes (LvB)

### 3.4.2 Project Impacts and Mitigation

Recommendations from the 1990 Dames and Moore geotechnical evaluation remain valid since there have been no changes in the soil conditions. That study recommends protection against erosion and minimization of channel wall instability. Soft soils encountered along the project would be removed and replaced with boulder fill or rip rap. If extensive areas of soft soils are encountered, then those areas would be treated on a case-by-case basis, as field conditions are confirmed.

The project site will be cleared of vegetation and debris prior to start of excavation or filling. Materials from clearing and grubbing operation will be properly disposed of off-site.

No significant impact to topographic landforms or soils is anticipated. Development of the proposed drainage improvements will require clearing of vegetation and grading, however all earthwork will comply with the City and County of Honolulu's grading regulations.




# SOIL SURVEY

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

## FIGURE 6

Data Sources:
SCS Soil Survey, Island of Oahu
Engineering Concepts Inc.
State GIS Database, O'ahu Tax Map Key Layer

## 3.5 AIR QUALITY

The State of Hawai'i, Department of Health, operates air monitoring stations throughout the state, including the West Beach station which is located within 2 miles north of the project. According to the State of Hawai'i Annual Summary 2008 Air Quality Data, measured levels of $PM_{10}$ (particulate matter that is 10 microns or less in diameter), $SO_2$ (sulfur dioxide), and $NO_2$ (nitrogen dioxide) were well within State and Federal ambient air quality standards.

### 3.5.1 Existing Conditions

In 2006, an Air Quality Study was prepared by B.D. Neal and Associates for the Kapolei Harborside EIS. The purpose of this study is to assess the existing air quality conditions and examine the potential short- and long-term air quality impacts that could occur as a result from construction and uses of Kapolei Harborside. Mitigation measures to reduce any potential air quality impacts were included if possible and appropriate.

Based on the 2006 B.D. Neal study, the present air quality of the project site is "reasonably good" based on nearby air quality monitoring station data. Air quality data indicate that all national air quality standards are currently being met, with occasional exceedances of carbon monoxide based on the more stringent State standards. These typically occur near the most congested roadway intersections.

The present air quality at the project site is primarily affected by air pollutants from motor vehicles, industrial sources, agricultural operations, and to a lesser extent natural resources. The H-1 Freeway passes nearby the north of the project and is an interstate roadway that carries moderate to heavy volumes of traffic during peak travel hours. Emissions from motor vehicles, primarily nitrogen oxides and carbon monoxide tend to be carried over the project site by prevailing winds. There are several sources of industrial air pollution located in Campbell Industrial Park that emit large amounts of sulfur dioxide, nitrogen oxides, particulate matter, carbon monoxide and other air pollutants. However, these emissions tend to be carried seaward by prevailing winds.

### 3.5.2 Project Impacts and Mitigation

Short-term impacts to air quality from fugitive dust may occur during construction activities for drainage improvements. These impacts could result from construction vehicle activities and fugitive dust from excavation and grading. There are two potential types of air pollution emissions associated with these construction activities. First, fugitive dust caused by vehicle movements and excavation/fill activities. Second, vehicles exhaust emissions from on-site construction equipment. Mitigation measures will be implemented to control dust during construction.

State of Hawai‘i Air Pollution Control regulations prohibit visible emissions of fugitive dust from construction activities at the property line. Thus, an effective dust control plan will be prepared for the project. Some potential dust control measures may include: establishment of a frequent watering program for bare soil surfaces during construction; limiting the area that can be disturbed at any given time; and applying chemical stabilizers, mulching or wind screens. Also, open-bodied trucks will be covered at all times if they are transporting materials that could be blown away. Measures to reduce the amount of dirt haul truck track onto roadways will be used, such as road cleaning and tire washing.

On-site mobile and stationary equipment emit air pollutants from engine exhausts. Diesel engines can produce relatively high levels of nitrogen oxides, however the standards for nitrogen dioxide for this type of equipment are set on annual basis and not likely to be violated by limited-term construction activities meaning no post-construction emissions. Carbon monoxide emissions from diesel engines are low and would be relatively insignificant compared to vehicle emissions on nearby roadways.

Long-term impacts-There are no significant long-term impacts to air quality expected to result from the regional drainage system.

## 3.6 STREAMS AND AQUATIC RESOURCES

### 3.6.1 Existing Conditions

According to the Aquifer Identification and Classification for O‘ahu (Mink, 1990), the subject property overlies the ‘Ewa aquifer system of the Pearl Harbor aquifer sector. Two aquifer types exist within this portion of the ‘Ewa aquifer system. The first contains groundwater that is basal and unconfined and found in sedimentary-type geology. Water from this aquifer is not used for drinking or ecological purposes, has a moderate salinity of 1,000 to 5,000 milligrams per liter (mg/l) of chloride, is replaceable, and has a high vulnerability to contamination. The second aquifer type contains groundwater that is basal and confined and found in flank-type geology. It is not used for drinking or ecological purposes, has a low salinity of 250 to 1,000 mg/l of chloride, is irreplaceable, and has a low vulnerability to contamination.

There are no streams in the vicinity of this project, but there is an existing drainage way that collects water from under Farrington Highway through the three (3) major gulches in this area. This drainage way then follows an unnamed natural drainage ditch under the OR&L railroad and then sheet flows overland into small ditches and depressions scattered throughout the future Kapolei Harborside property. Due to the moderate permeability of soils in this area and low average rainfall, most runoff from these areas are the result of major storm events.

**Storm Water Discharge "Plume" Analysis**

To determine the potential impacts to ocean water quality, storm water runoff from the proposed project was modeled and documented in a report by Edward K. Noda and Associates in May 1990. A "plume" (plume) analysis was conducted to evaluate the effects of siltation, turbidity, and decrease in salinity that is usually associated with storm water runoff into the ocean. The results determined that storm water runoff associated with the proposed project may impact ocean water quality.

By letter dated September 24, 2010 to Craig Arakaki of Engineering Concepts, Inc.; Edward K. Noda and Associates, now known as EKNA Services, Inc. reviewed their May 1990 report and determined that the results remain valid as there have been no changes to the parameters used for the plume modeling. A copy of this letter is provided in Appendix E of this Final EA.

In conducting the plume analysis, ocean receiving waters are separated into two physical regions; near-field and far-field. This assists to simplify the analysis of storm water discharge. Different modeling is used for each physical region. The Prych-Davis-Shiraz (PDS) Model was utilized for the near-field plume analysis. These results were then utilized in a Monte Carlo simulation for the far-field plume analysis.

The PDS Model (Model) analyzed the physical characteristics of the interaction of the storm water runoff and receiving ocean waters; also known as the "mixing plume". Model components included the characteristics of the ambient receiving waters and storm water runoff, as well as the configuration of the channel outlet. In addition, the Model evaluated the salinity concentrations in the discharge plume. For modeling purposes, the near-field region extends from the channel outlet out to 3200 feet from the shoreline.

To identify the "worst case" scenario for the near-field plume, four scenarios were analyzed for suspended sediment concentrations and salinity. They are:

Case 1: 100 year frequency, 24 hour rainfall duration
Case 2: 100 year frequency, one hour rainfall
Case 3: One year frequency, 24 hour rainfall duration
Case 4: One year frequency, one hour rainfall duration

Results for the near-field plume were then incorporated into the Monte Carlo simulation model for the far-field plume analysis. For modeling purposes, the far-field region extends beyond 3200 feet from the shoreline.

### 3.6.2 Wetlands

The Clean Water Act of 1972 (CWA) provides federal protection for the quality of the nation's waterways. Section 404 of the CWA requires approval prior to discharges of dredged or fill material into the "Waters of the U.S.," including wetlands and requires a Department of the Army Permit from the U.S. Army Corps of Engineers (USACE). The project will result in discharges regulated under Section 404; therefore a Department of the Army Permit will be pursued.

The Drainage Outlet section contains a jurisdictional wetland close to but down slope of Malakole Street. The limits of this wetland was originally delineated in January 1996 by Winona Char and redelineated in May 2008 by AECOS. In 2009, USACE reviewed and issued an approved Jurisdictional Determination (POH-2008-00307) for the 2008 delineation and this approval will remain valid for five years (expires May 8, 2014). The 2008 wetland delineation encompasses 1.39 acres within the Drainage Outlet section of this project which will involve work within navigable waters of the U.S. and the discharge of dredged and/or fill material into waters under the regulatory jurisdiction of USACE.

### 3.6.3 Project Impacts and Mitigation

In 1997, the Estate of James Campbell entered into an agreement with the U.S. Army Corps of Engineers, Honolulu and Ducks Unlimited, Inc., Western Regional Office in conjunction with Department of Army Permits for the construction of drainage improvements at Campbell Industrial Park. A Memorandum of Agreement (Agreement No. A01096200) was developed to establish compensatory mitigation for the loss of 1.7 acres of wetlands as delineated in 1996 by Char. As part of the agreement, the approved compensatory mitigation plan prepared by the Estate of James Campbell identified mitigation funding for the Pouhala Marsh restoration project which was intended to result in the creation of approximately 1.7 acres of wetland habitat. As stated in Stipulation No. 1, the USACE's acceptance of the in lieu fee payment by the Estate of James Campbell was deemed as adequate compensatory mitigation for the loss of jurisdictional wetlands associated with construction of the drainage improvements and no additional compensatory mitigation will be required further. A copy of the Memorandum of Agreement is included as Appendix D.

With the project, storm water runoff will be directed away from Kalaeloa Harbor and redirected into the regional drainage channel. This would result in positive long-term impacts upon the harbor. No long-term adverse impacts are anticipated to result from the development of a regional drainage channel.

There will be short term impacts to ocean water quality as a result of the proposed project. Long term impacts to ocean water quality are not anticipated. A number of additional permits

and additional environmental reviews will be required prior to project construction. Issuance and approval of these permits and review will require the implementation of best management practices to minimize impacts to the receiving water environment. In the long term, surrounding developments will be required to retain existing runoff onsite. Further, a National Pollutant Discharge Elimination System Permit (NPDES) will be required for the proposed project, as well as other developments that intend to connect to the regional drainage system.

The proposed channel will be constructed to meet state and city regulatory requirements to protect the environment from storm water runoff impacts. Design of the proposed project will comply with the State Water Quality Standards and Hawaiʻi Administrative Rules, Chapter 11-54. It is expected that water quality requirements would be the responsibility of the individual projects with the watershed rather than the responsibility of the regional drainage facility.

## 3.7 ARCHAEOLOGICAL, HISTORICAL AND CULTURAL RESOURCES

This section describes the existing archaeological resources within the project site in two sections, between the shoreline and Malakole Street and between Malakole Street and Farrington Highway. Historic properties near or in the project site are shown in Figure 7.

### 3.7.1 Existing Conditions

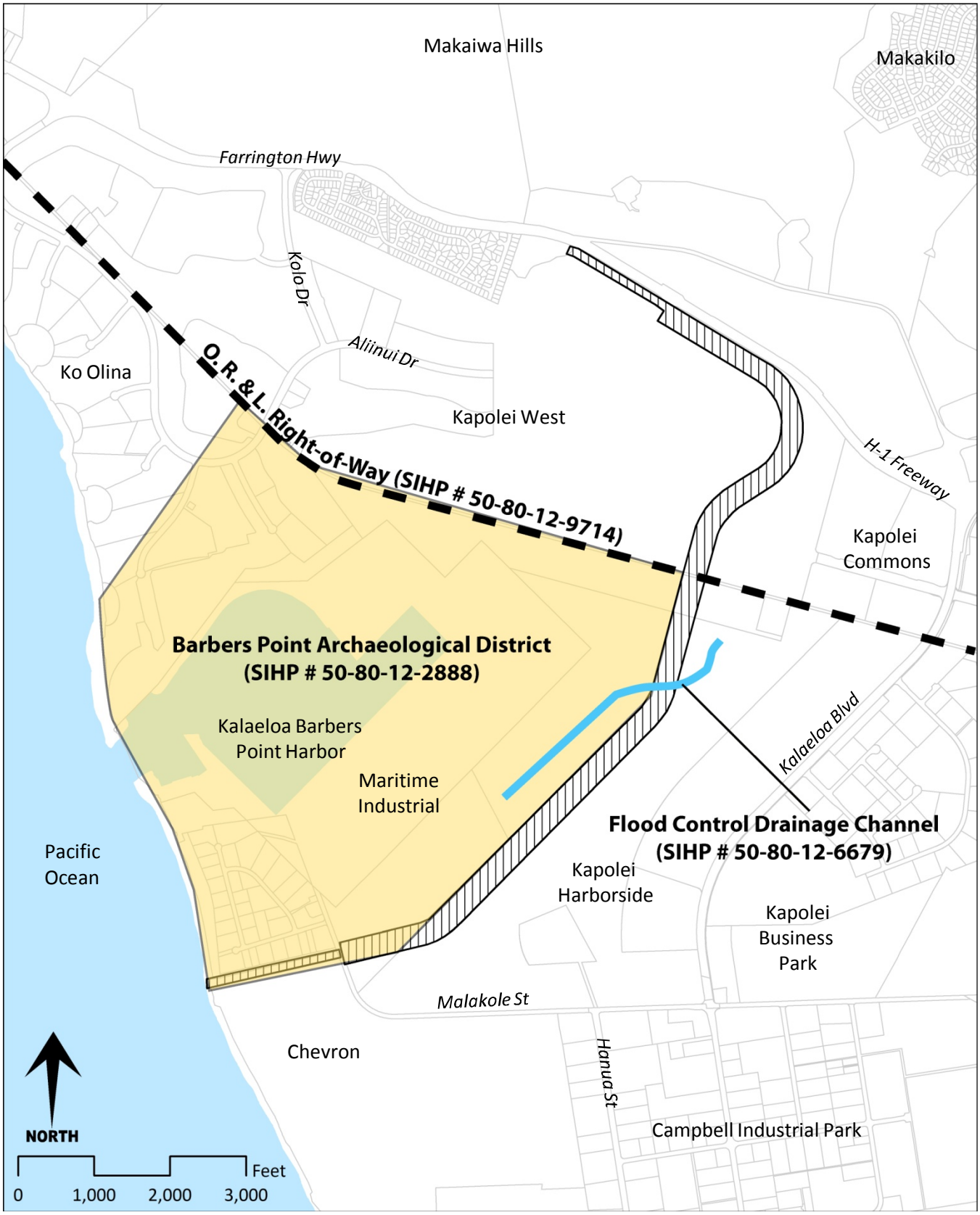
**Shoreline to Malakole Street (lower reach)**

An archaeological reconnaissance for this section of the proposed drainage channel was conducted in 1990 by Cultural Surveys Hawaiʻi as a supplement to a previous study. Based on the results of that reconnaissance, no archaeological remains were found with the limits of this section (CSH, 1990).

**Malakole Street to OR&L to Farrington Highway (upper reach)**

An archaeological inventory survey was prepared for the Kapolei Harborside Center in July 2006 by Cultural Surveys Hawaiʻi (CSH, 2006). This survey included the area for the proposed regional drainage channel spanning from Malakole Street to the OR&L Railroad crossing. The area of potential effect (APE) studied in this survey included the entire 345-acre Kapolei Harborside project site.

State of Hawaiʻi legislation and guidance for historic preservation and archaeological inventory surveys calls for identification, documentation, and recommendation of significance and mitigation for historic properties. The scope of work for this CSH survey included a full ground survey of the entire project area, subsurface testing, and research on historical and archeological studies previously conducted in the APE.




# HISTORIC PROPERTIES NEAR PROJECT

**FIGURE 7**

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Data Sources:
Engineering Concepts Inc.
State GIS Database, O'ahu Tax Map Key Layer
Cultural Surveys Hawai'i, 2006

The survey found that areas containing the proposed regional drainage channel have been drastically altered by historic and modern land use involving intensive sugar cane cultivation and large scale limestone quarry operations and stockpiling. Prior to the extensive historic and modern land alteration in this area, the Honouliuli ahupua'a would be expected to have remnants of traditional Hawaiian temporary habitations used during forays for marine resources and evidence of opportunistic seasonal agriculture. With the spread of 19$^{th}$ century ranching and intensive commercial agriculture, these resources have likely been destroyed or buried, including surface features and sinkholes.

Since the 1970's, land uses in this area predominantly involve limestone quarrying and stockpiling and these activities would have removed or covered over portions of the project site where Native Hawaiian archaeological remains and sinkholes were previously documented.

### 3.7.2 Historical Properties within the Drainage Channel Area

Based on the 2006 field work and research by CSH, a summary of the historical properties that have been previously documented and still remain is provided below. These features are currently listed or determined eligible for both federal and state historic registers. Figure 7 shows the locations of these historical properties.

- **Barbers Point Harbor Archaeological District (SIHP 50-80-12-2888)** – The Barbers Point Archaeological District became eligible for the National Register of Historical Places in 1977 and following boundary revision was again found eligible in 1979. The proposed drainage channel spanning from the ocean to the OR&L railroad is located entirely within this district, however this portion of the archaeological preserve appears to have been completely disturbed by historic and modern land uses. Any previously documented surface archaeological features are likely to be gone (CSH, 2006).

- **O.R. & L. Right-of-Way (SIHP 50-80-12-9714)** – The OR&L Right-of-Way in this area was included in the National Register of Historic Places in 1975. Any plans to cross or breach this rail line need to consult with the State Historic Preservation Division (SHPD), the State Department of Transportation (HDOT), and the Hawaiian Railway Society to determine the appropriate mitigation (CSH, 2006).

- **Flood Control Drainage Channel (SIHP 50-80-12-6679)** – In 2005, the Flood Control Drainage Channel was previously documented in detail with cross sectional drawings, photographs and descriptions. Per CSH, previous documentation is sufficient and appropriate documentation for this feature. It has no particular aesthetic merit or historical importance (CSH, 2006).

### 3.7.2 Project Impacts and Mitigation

There have been many efforts to document the rich historic properties of this area, but modern and historic land uses have greatly disturbed the majority of these areas. These uses have removed much of the extant archaeological and cultural properties that existed here once. The proposed drainage system is unlikely to have any adverse impacts on the Barbers Point Archaeological District because much of the historical features were removed by modern quarrying operations (CSH, 2006). The proposed drainage channel is unlikely to have adverse impacts on the Flood Control Drainage Channel, which has been documented for historical purposes, and will likely be removed as part of the Kapolei Harborside Center development.

The OR&L railroad right-of-way is a significant historic feature and any modifications to this site need to be consulted with the State Historic Preservation Division (SHPD), the State Department of Transportation (HDOT), and the Hawaiian Railway Society to determine the appropriate mitigation (CSH, 2006). In May 2009, Cultural Surveys Hawaiʻi completed the Preservation Plan for Seven Historic Properties Location in or Adjacent to the Kapolei West Project, Honolulu Ahupuaa, ʻEwa District, Oʻahu. This plan included proposed mitigation and protection measures for improvements related to the regional drainage system project to protect the historic OR&L railroad right-of-way. The State Historic Preservation Division (SHPD) reviewed and approved this plan by letter dated April 28, 2011 and is included in Appendix E of this Final EA.

The Hawaiian Railway Society was consulted during the development of this preservation plan and provided comments to the Department of Planning and Permitting on March 7, 2008 regarding the proposed OR&L railroad right-of-way crossings. The Hawaiian Railway Society recommended that all proposed crossings be accomplished by bridges or tunnels rather than at-grade which would reduce the amount of stops for the train and have minimal impacts on the character of the historic track. The response expressed additional concerns with Railroad Bridge 28A during major storm events because of the significant amount of stormwater the bridge crosses and requested the opportunity to review drawings of drainage and utility facilities when they are available. A copy of the OR&L related correspondence taken from the CSH preservation plan is also included in Appendix E of this document.

The preservation plan prepared by CSH in May 2009 recommended that a Memorandum of Agreement (MOA) be completed for the OR&L historical right-of-way between the State Historic Preservation Officer (SHPO), the State Department of Transportation (landowner of right-of-way) and the Hawaiian Railway Society. The MOA, as a preservation mitigation, will detail the type of crossing that will be made across the tracks and any reconstruction, if necessary. The MOA would stipulate the obligations and time frames for any work to be undertaken. The preservation plan also identified specific preservation measures to be

undertaken for the OR&L railroad right-of-way alignment. Measures included the use of adequate buffer zones, interim protective measures and long-term protective measures.

Although there have been extensive archaeological explorations conducted in this area, it is noted that there still exists the potential to uncover significant archaeological artifacts or human remains. There is potential for unrecorded subsurface deposits, with no surface indicators, to be present in the area's karstic limestone environment.

Based on the discussion above, no impacts to archaeological resources are anticipated. No impacts to cultural resources or practices are expected, as the site is not associated with ongoing cultural practices and does not possess any unique resources to support such activities.

## 3.8 FLOOD AND TSUNAMI HAZARD

### 3.8.1 Existing Conditions

According to the Flood Insurance Rate Map (FIRM), Map Number 15003C0305F (Revised September 30, 2004) prepared by the Federal Emergency Management Agency, the majority of the project is located in Zone "D", an area of undetermined flood hazard. The outlet of the proposed Drainage Outlet section is located Zone "AE" which is designated as an area inundated by the 100-year flood with a base flood elevation of eight feet above MSL. This area is also exposed to potential tsunami inundation extending from the shoreline up to Makakole Street. The Flood Insurance Rate Map designations are shown in Figure 8.

A Letter of Map Revision (LOMR) is process used by FEMA's for proposed modifications to an effective Flood Insurance Rate Map (FIRM), or Flood Boundary and Floodway Map (FBFM), or both. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). The LOMR officially revises the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM), and sometimes the Flood Insurance Study (FIS) report, and when appropriate, includes a description of the modifications. The above definitions and more detailed information on LOMR is available on FEMA's website (http://www.fema.gov).

### 3.8.2 Project Impacts and Mitigation

The proposed regional drainage system will improve drainage throughout the watershed and eliminate existing drainage problems in the flood-prone and low-lying areas near Malakole Street. It is not anticipated that a LOMR will be required for this project since no modifications to the applicable FIRM is being proposed as part of this action.

## 3.9 ROADWAYS

### 3.9.1 Existing Conditions

Vehicular access to the subject property and Kalaeloa Harbor is provided by Malakole Street. Malakole Street is a 2-lane improved roadway owned by the State of Hawai'i. The Hanua Street Access Road is an unpaved compacted road that originates on Malakole Street. Malakole Street is accessed via Kalaeloa Boulevard, a major thoroughfare that connects Campbell Industrial Park to the H-1 Freeway, Farrington Highway, and Kapolei Highway.

Public transit facilities on Oahu are operated by the City and County of Honolulu, Department of Transportation Services, Public Transit Division (DTS). DTS operates a rush-hour only bus route (No. 413) that travels through this area connecting to the Kapolei Transit Center. This route travels along Kalaeloa Boulevard and Malakole Street with a turnaround at Barbers Point Harbor.

### 3.9.2 Project Impacts and Mitigation

Construction activities may have a short-term impact on traffic in this area due to vehicles traveling to and from the project site. Design plans for the drainage improvements should include traffic control plans to mitigate potential adverse traffic impacts from the project. The Malakole Street Culvert will be constructed in place of existing culverts crossing Malakole Street. A Maintenance of Traffic Plan will be prepared during the detailed design phase of this culvert to assure minimal, if any, impacts to vehicle travelling along Malakole Street.

## 3.10 WATER SYSTEM

### 3.10.1 Existing Conditions

Potable water supply for this area is provided by the Honolulu Board of Water Supply (BWS) through a water main located in Malakole Street. The project will not generate any new demands for potable water.

### 3.10.2 Project Impacts and Mitigation

No impacts or mitigations anticipated.

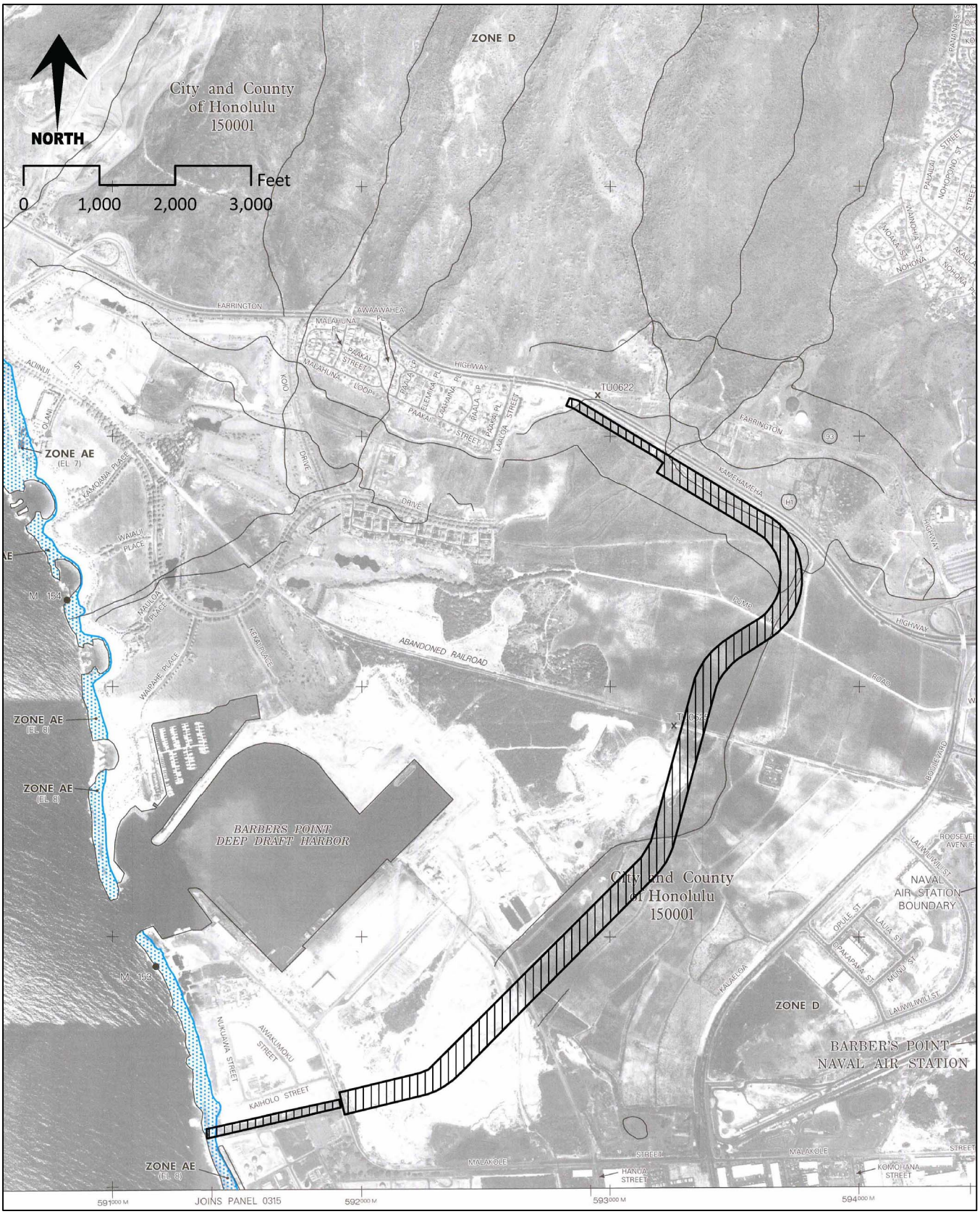
## 3.11 WASTEWATER DISPOSAL

### 3.11.1 Existing Conditions

There is no municipal sewer system that services this area. The project will not generate wastewater.

### 3.11.2 Project Impacts and Mitigation

No impacts or mitigation anticipated.




# FLOOD INSURANCE RATE MAP

## FIGURE 8

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Base Map Data Source:
FIRM Map Number 15003C0305F
(Revised September 30 ,2004)

# CHAPTER 4: CONFORMANCE WITH LAWS, PLANS AND POLICIES

This chapter describes the project's conformance with applicable plans and policies of Federal laws, the Hawai'i State Plan, State Land Use District regulations, and the regulations, policies, and goals set forth under the City and County of Honolulu General Plan, 'Ewa Development Plan and City Land Use Ordinance.

## 4.1 FEDERAL

### 4.1.1 Clean Water Act

The Water Pollution Control Act, more commonly referred to as the Clean Water Act of 1972 (CWA) provides federal protection for the quality of the nation's waterways. Federal protection of navigable and tidally-influenced waterways is also provided under Section 10 of the Rivers and Harbors Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972.

Section 404 of the CWA regulates discharge of dredge and fill material (as would be expected with bridge construction) into the "Waters of the United States," including wetlands, and requires a Department of the Army permit from the US Army Corps of Engineers. Section 401 of the Clean Water Act directs states to establish water quality certification (WQC) programs; in Hawai'i, the Section 401 WQC is administered by the Hawai'i Department of Health, Clean Water Branch (DOH-CWB). The project will result in discharges regulated under Section 404, so a Department of the Army Permit will be pursued under Section 404. Section 401 WQC will be required as well, and is initiated upon submission of a Section 404 application.

Section 402 of the CWA requires a National Pollutant Discharge Elimination System (NPDES) permit for discharges from construction activities that disturb one acre or more. The NPDES program within Hawai'i is administered by the DOH-CWB as well, as covered in HRS Chapter 342D and HAR Chapter 11-55.

### 4.1.2 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 USC 1451 et seq.) encourages coastal states to protect coastal resources consistent with the state's coastal zone management program. The objectives of the Coastal Zone Management (CZM) Program are to provide the public with recreational opportunities, protect historic resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards and manage development.

Within Hawai‘i, the CZM program was authorized by HRS Chapter 205A, and is administered by the Office of Planning within the State of Hawai‘i Department of Business, Economic Development, and Tourism (DBEDT). Actions anywhere within the State of Hawai‘i must comply with the CZM program.

A consistency determination is required for federal actions that would have reasonably foreseeable direct or indirect effects on any use of or resource in the coastal zone. FHWA has evaluated the Proposed Action and has determined that it is consistent to the maximum extent practicable with the State of Hawai’i CZM program. The consistency determination will be submitted to the DBEDT Office of Planning.

## 4.2 STATE OF HAWAI‘I

### 4.2.1 Hawai‘i Revised Statutes, Chapter 343

This environmental assessment has been prepared to ensure compliance with Chapter 343, Hawai‘i Revised Statutes (HRS). Chapter 343, HRS requires state and county governments to publicly disclose and consider public comments on the environmental, social, cultural and economic consequences of proposed projects.

### 4.2.2 Hawai‘i State Plan

The Hawai‘i State Plan, Chapter 226, Hawai‘i Revised Statutes, serves as a guide for the future long-range development of the State; identifies goals, objectives, policies and priorities for the State; provides a basis for determining priorities and allocating resources; improves coordination of federal, state and county activities; and establishes a system to integrate major state and county activities.

The proposed action’s consistency with relevant State goals, objectives, and policies is discussed below:

*§226-4 State goals.*

*(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.*

*(3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.*

Assessment: Planning a regional drainage system in accordance with long-range development plans is consistent the intent of the Hawai‘i State Plan, Chapter 226 of the Hawai‘i Revised

Statutes. The overall benefits of this project will serve an important role for western Kapolei which is in line with the State's goal of creating desirable physical environments. As new construction developments increase in this area, so will the need for an adequate regional drainage facility. Therefore, the project is consistent with the State's goal of creating desirable physical environments by establishing a regional drainage system where none exists today.

The project will contribute positively to enhancing the mental and physical well being of Hawai'i's people, mainly impacting the western Kapolei community. There is no current regional drainage system serving this area of Kapolei because planned developments have not yet been constructed. We acknowledge that these facilities must be designed with human compatibility and well-being in mind but also in accordance with City and County of Honolulu standards for both runoff and water quality. All desirable outcomes should be pursued to the extent that the system protects the environment, is cost efficient, and can be maintained. The proposed project is conceptual at this point and the applicant is following the necessary City review and approval steps throughout the design process.

The majority of the channel through the Kapolei Harborside development will remain unlined. The lined sections of the channel through Kapolei Harborside will be limited to those areas where soil erosion is expected due to higher velocities, such as downstream of bridge and culvert crossings and where energy dissipation is required. The section of the channel between Malakole Street and the ocean has been identified to be concrete-lined at the recommendation of the project soils engineer because of the expected tidal action within the channel. Alternatives to concrete-lining will be investigated during design of the channel when additional soils investigations are performed.

The project is consistent with the State goals stated above by providing a regional drainage system that will improve existing drainage and flood conditions in Western Kapolei. The drainage system will serve master-planned developments within the Western Kapolei watershed by channelizing and stormwater runoff into the ocean to prevent undesirable upland flooding and soil erosion.

*§266-11 Objectives and policies for the physical environment—land-based, shoreline, and marine resources.*

- *(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.*
- *(3) Take into account the physical attributes of areas when planning and designing activities and facilities.*
- *(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.*

*(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.*

*(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.*

*(8) Pursue compatible relationships among activities, facilities, and natural resources.*

Assessment: It is anticipated that sediment and pollutants from upstream developments will unavoidably find its way to the regional drainage channel. In accordance with the approved Regional Drainage Master Plan for Western Kapolei, water quality issues will be addressed within each development contributing to the regional drainage system. The Makaiwa Hills, Kapolei West and Kapolei Harborside developments each are required to prepared master drainage plans to address and treat the quality of collected runoff prior to discharge into the regional drainage system in accordance with the requirements of the Department of Planning and Permitting.

The regional drainage channel will be mostly unlined through the majority of the system beginning at the Malakole Street culvert and extending to Farrington Highway. The Drainage Channel section will be lined in coral which has many benefits over a concrete-lined channel. The coral lining would be beneficial to the environment by reducing the speed of flow of storm water runoff and allowing percolation of discharge prior to reaching the ocean. This approach reduces the levels of freshwater, sediments and other land-generated pollutants that will enter the ocean.

Individual phases within the larger land developments will be required to address the water quality impacts from their actions. It is within these phases, or in the case of the Kapolei Harborside development within each lot, that alternatives such as vegetated swales, bioretention systems, etc. would be encouraged and required, if necessary. Vegetated swales and bioretention systems could also be incorporated in the landscaping requirements for these developments thereby adding to the attractiveness of the developments, reducing some of the irrigation requirements, as well as reducing pollutants from being introduced into the roadway drainage systems and ocean.

Based on the assessment in this Final EA and the discussion above, development of the regional drainage system and its long-term use to support development in western Kapolei is not anticipated to have significant adverse effects on the natural environment when appropriate water quality mitigation measures are designed for individual land developments. Plans for the regional drainage facility have started and designers are considering the impact on natural resources and ocean water quality to ensure that its use is protecting the environment in accordance with Federal, State and Local laws governing water quality.

*§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources.*

*(1) Promote the preservation and restoration of significant natural and historic resources.*

*(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.*

Assessment: The project is not anticipated to have adverse impacts on the areas historical properties or resources as described in Chapter 3 of this document. Lateral beach access would not be blocked since the project includes construction of a pedestrian crossing at just mauka of the certified shoreline.

*§226-13 Objectives and policies for the physical environment--land, air, and water quality.*

*(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.*

*(2) Promote the proper management of Hawaii's land and water resources.*

*(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.*

*(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.*

Assessment: The project is consistent with the State goals stated above by providing a regional drainage system that will improve existing flood conditions in Western Kapolei, thereby reducing the treat to life and property from flooding hazards. Design of the drainage facility will be in compliance with all applicable state, federal, and local regulations relating to land, air and water resources.

*§226-14 Objective and policies for facility systems--in general.*

*(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*

Assessment: The project is consistent with capital improvement priorities stated in the City and County of Honolulu General Plan the ‘Ewa Development Plan.

### 4.2.3 State Land Use Law

The State of Hawaiʻi Land Use Law, Chapter 205, Hawaiʻi Revised Statutes, classifies all lands in the State into four land use districts: Urban, Rural, Agricultural, and Conservation. The subject project is primarily within the Urban District. A portion of the project is within the Agricultural district and Conservation District.

Assessment: Use of the project site for a regional drainage system would be consistent with both the Urban and Agricultural designations. Figure 9 shows the State Land Use District designations. Construction of the Drainage Outlet proposes dredging within the Conservation District to occur on about 0.6 acres of land makai of the certified shoreline.

This portion of the project is within the Resource Subzone. According to HAR Title 13, Chapter 2, the objective of this subzone is to develop, with proper management, areas to ensure sustained use of the natural resources in the area. The project use is permitted with a board permit under HAR Sections 13-5-24(a) and 13-5-22(b). The use is defined as a "public purpose use" which identifies "water system" and other uses that are undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the Conservation District.

### 4.2.4 State Water Code

The State Water Code (HRS Chapter 174C) established the Water Commission as responsible to regulate activities affecting stream channels, which are defined as any natural or artificial watercourse with a definite bed and banks, which periodically or continuously contains flowing water. A Stream Channel Alteration Permit (SCAP) is required (HAR Chapter 13-169) for any activity that would:

- Obstruct, diminish, destroy, modify, or relocate a stream channel
- Change the direction of flow of water in a stream channel
- Place material or structures in a stream channel, or
- Remove material or structures from a stream channel

Construction of drainage improvements will require a SCAP as a result of the project construction in the ocean outfall section.

## 4.3 CITY AND COUNTY OF HONOLULU

### 4.3.1 General Plan

The General Plan for the City and County of Honolulu is a comprehensive statement of objectives and policies which set forth the long-term aspiration of Oahu's residents and the actions to achieve them.

Development of the proposed regional drainage system is consistent with the following objectives and policies of the Honolulu General Plan:

*I. Population*

*Objective C – To establish a pattern of population distribution that will allow the people of O'ahu to live and work in harmony.*

*Policy 2 – Encourage development within the secondary urban center at Kapolei and the 'Ewa and Central O'ahu urban-fringe areas to relieve developmental pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.*

Assessment: Development of the regional drainage system is consistent with plans to develop the City's secondary urban center at Kapolei because it will serve the drainage needs of the future planned uses in Western Kapolei. This project is identified in the 'Ewa Development Plan.

*III. Natural Environment*

*Objective A - Protect and preserve the natural environment.*

*Policy 6 - Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.*

*Policy 8 - Protect plants, birds, and other animals that are unique to the State of Hawaii and the Island of Oahu.*

Assessment: The proposed project is not anticipated to have any impacts on any threatened or endangered species. Design of the drainage system will be in compliance with applicable state, federal, and local regulations relating to land, air and water resources.

*VII. Physical Development and Urban Design*

*Objective C – To develop a secondary urban center in 'Ewa with its nucleus in the Kapolei area.*

Assessment: Development of the regional drainage system is consistent with plans to develop the City's secondary urban center at Kapolei because it will serve the drainage needs of the future planned uses in Western Kapolei. This project is identified in the 'Ewa Development Plan.

*VIII. Public Safety*

*Objective B - To protect the people of Oahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.*

Assessment: The proposed project will significantly improve the current drainage conditions of west Kapolei that are frequently subject to flooding during heavy rain storms.

### 4.3.2 'Ewa Development Plan

The island of O'ahu is divided into eight Development/Sustainable Community Plan areas. Each plan implements the objectives and policies of the General Plan and serves as a guide for public policy, investment, and decision making within their respective region. The subject property is within the 'Ewa Development Plan (DP) area. The vision for ''Ewa is described in two horizons; the first establishes policies to shape the growth and development of the 'Ewa DP area to year 2030 the second horizon looks beyond 2030 towards "full" development of 'Ewa. Figure 10 shows the 'Ewa Development Plan Urban Land Use Map.

This section discusses the project's conformance with general policies and principles set forth by the 'Ewa Development Plan (1997). The 'Ewa Development Plan is being updated through the City's Plan Review Process and is expected to be completed in the near future. This section discusses conformity with proposed changes in Public Review Draft (2008) of the Updated 'Ewa Development Plan.

**Industrial Centers**

1. ***General Policies***
   - *Maintain industrial activity at Barbers Point Industrial Area, Kalaeloa, Honouliuli Industrial Area, Kahe Valley and permit industrial activity at other dispersed industrial areas as noted below.*

   ***Barbers Point Industrial Area/Kalaeloa***
   - *Maintain the Barbers Point Industrial Area as one of Oahu's and the State's most important industrial areas.*

Assessment: According to the 'Ewa Development Plan and proposed changes to the Plan, the Barbers Point Industrial Area, which includes Campbell Industrial Park, Kalaeloa Barber's Point Harbor, Kenai Industrial Park, and Kapolei Business Park, should continue to grow as one of Oahu's and the State's most important industrial areas. Development of the regional drainage system will enable its eventual full development to support industrial operations. Therefore, this drainage system is consistent with the general policies of industrial centers in the Development Plan by planning for the expansion industrial activities at Barbers Point Industrial Area.

***2. Planning Principles***

- *Appropriate Scale – The visibility of large building volumes and tall building or machinery elements from resort areas, residential areas, commercial and civic districts, and parks should be minimized through site planning and landscaping.*
- *Environmental Compatibility – Industries and utilities that discharge air or water pollutants, even when treated, should be located in areas where they would impose the least potential harm on the natural environment in case the treatment process fails to perform adequately.*

Assessment: This project is consistent with the planning principles of the Barber's Point Industrial Area as identified in the development plan.

**Drainage Systems**

***1. General Policies***

- *Design drainage systems to emphasize flood control and minimization of non-point source pollution and the retention and/or detention of storm water on-site and in appropriate open space and wetland areas.*
- *Use natural and man-made vegetated drainageways and retention basins as the preferred solution to drainage problems wherever they could promote water recharge, help control non-point source pollutants and provide passive recreation benefits. However, concrete-lined channels can be permitted, despite their potential adverse environmental impacts, if there is no other feasible alternative to meet specific design challenges.*

***2. Planning Principles***

- *Retention and Detention - Public and private agencies should employ methods of retaining or detaining storm water for gradual release as the preferred strategy for management of storm water. Where feasible, any open space, including parking lots, landscaped areas, mini and community parks, and public and private golf courses, should be used to detain or infiltrate storm water flows to reduce their volume and runoff rates and the amounts of sediments and pollutants transported.*

Assessment: The development plan identifies drainage improvements needed which includes a major new system to drain Makaiwa Hillls, Kapolei Business Park, and the industrial areas closest to the Kalaeloa Barbers Point Harbor. Portions of the drainage channel will be concrete-line where applicable. Design of the drainage facility will be in compliance with all applicable state, federal, and local regulations relating to land, air and water resources. Figure 10 shows the 'Ewa Development Plan Urban Land Use Map.

### 4.3.3 Land Use Ordinance

The City and County of Honolulu Land Use Ordinance regulates land use in a manner that will encourage orderly development in accordance with the General Plan and Development Plans. The subject project traverses the following zoning districts:

- Industrial Waterfront (I-3)
- Industrial Intensive (I-2)
- Preservation, General (P-2)
- Industrial-Commercial Mixed Use (IMX-1)
- Apartment Mixed Use, Medium-Density (AMX-2)
- Apartment, Low-Density (A-1)

Assessment: The proposed drainage channel is a public structure which is a permitted use in all zoning districts. Figure 12 shows the City's zoning designations.

## 4.4 SPECIAL MANAGEMENT AREA

The Hawai'i Coastal Zone Management (CZM) Program, Chapter 205A, Hawai'i Revised Statutes (HRS), outlines control, policies and guidelines for development within an area along the shoreline referred to as the Special Management Area (SMA). CZM policies are administered by each County. In the City and County of Honolulu, management of lands located within the SMA is regulated through Chapter 25, Special Management Area, Revised Ordinances of Honolulu (ROH).

The shoreline to Malakole Street portion (lower reach) of the drainage project is entirely within the City and County of Honolulu's SMA. The proposed project would require an SMA permit. Figure 11 shows the SMA boundary in relation to the proposed action.

### 4.4.1 Conformance with CZM Objectives and Policies

Section 25-3.1, ROH, states that the objectives and policies of this chapter shall be those contained in HRS Section 205A-2, Coastal zone management program; objectives and policies. Impacts of the project relative to applicable objectives and policies are provided in this section:

*(b) Objectives.*

*(1) Recreational resources;*

*(A) Provide coastal recreational opportunities accessible to the public.*

Comment: The Project is consistent with the recreational resource objective of the coastal zone management program. A new pedestrian bridge crossing is planned for the shoreline area to allow the public lateral beach access across the drainage outlet section.

*(2) Historic resources;*

*(A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*

Comment: The Project is consistent with the SMA objectives for historic resources protection. The environmental review process allows for open disclosure of project impacts on historic properties and potential mitigation measures, if necessary. There are no archaeological sites or deposits present within the Project SMA.

*(3) Scenic and open space resources;*

*(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.*

Comment: The Project is consistent with SMA objectives for scenic and open space resources. The Drainage Outlet is located between the existing Chevron Refinery and the Kenai Industrial Park. The drainage channel will be constructed below grade. Some structures, such as the maintenance roads, will be at grade, while the security fence and pedestrian bridge will be above grade. These structures are not out of character with the surrounding industrial development and will not adversely impact scenic views or open space.

*(4) Coastal ecosystems;*

*(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.*

Comment: The Project is consistent with SMA objectives for the protection of coastal ecosystems. In 1990, a marine survey was conducted at the Project site to document the marine life present near the Drainage Outlet. No threatened or endangered species were recorded, however a number of various algae, coral, sea urchins and fish were observed.

Construction of the 150-foot wide channel will require the removal of a portion of the limestone outcrop and the marine bench near the shoreline. As a result, some of the seaweed may be lost. Although no endangered species would be affected, algae are a common food source for the endangered sea turtle.

*(5) Economic uses;*

*(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.*

Comment: The Project is consistent with SMA objectives for economic uses. The Western Regional Drainage System is intended to support the development of planned projects in Western Kapolei. It will address current needs for drainage improvements in Western Kapolei. This facility is necessary for the City of Kapolei and island of O‘ahu because of the economic importance of the Campbell Industrial Park, Kalaeloa Harbor, and other industrial uses in Western Kapolei.

*(6) Coastal hazards;*

*(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.*

Comment: The Project is consistent with the SMA object to reduce hazards to life caused by flooding. One main objective of this Project is to mitigate existing flood hazards in the Western Kapolei area. This action is intended to protect life and property from flooding and is consistent with the development plan provision to mitigate flooding problems at intersections of Kalaeloa Boulevard, Malakole Street, and areas within the adjacent industrial park.

*(7) Managing development;*

*(A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

Comment: The planning and design of this Project is consistent with the managing development objective of the coastal zone management program. The State environmental review process will be followed which allows for full public disclosure of project impacts and incorporates public and agency input.

*(8) Public participation;*

*(A) Stimulate public awareness, education, and participation in coastal management.*

Comment: The Project is consistent with the SMA public participation objective. Public participation and agency input is a part of the State Chapter 343 environmental assessment process. Public hearing opportunities will be included as part of the entitlements approval process.

*(9) Beach protection;*

*(A) Protect beaches for public use and recreation.*

Comment: This Project is consistent with beach protection objectives. A pedestrian bridge

crossing will be constructed to allow for continued lateral beach. The O'ahu Coastal Zone Atlas indicates that shoreline waters in this area are used by body surfers and pole and line fishing. Due to the rocky nature and strong currents of the shoreline, coastal recreational opportunities in this vicinity are very limited.

*(10) Marine resources;*

*(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

Comment: This Project is consistent with marine resource protection objectives. The design of drainage systems are determined based on State and City drainage standards intended to protect the environment and ocean. This project is being designed according to standards and will required additional City approval before implementation.

*(c) Policies.*

*(1) Recreational resources;*

*(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*

*(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*

*(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*

*(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6;*

Comment: The Project provides adequate public access along the shoreline by including a pedestrian bridge crossing for lateral shoreline access over the new drainage channel. This would maintain access as it exists today. The project will be designed and constructed in accordance with State and City water quality standards. The shoreline areas and pedestrian crossing are to be included in lands proposed for dedication to the City upon completion.

*(2) Historic resources;*

*(A) Identify and analyze significant archaeological resources;*

*(B) Maximize information retention through preservation of remains and*

*artifacts or salvage operations; and*

*(C) Support state goals for protection, restoration, interpretation, and display of historic resources;*

Comment: The Project is consistent with SMA policies relating to the protection of historic resources. The environmental review process allows for open disclosure of project impacts on historic properties and potential mitigation measures, if necessary. There are no archaeological sites or deposits present within the Project SMA. Further discussion on impacts to historic resources are covered in Chapter 3 of this document.

*(3) Scenic and open space resources;*

*(A) Identify valued scenic resources in the coastal zone management area;*

*(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*

*(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*

*(D) Encourage those developments that are not coastal dependent to locate in inland areas;*

Comment: The Project is consistent with the SMA policies on scenic and open space resources. The 1987 Coastal View Study completed by the City and County of Honolulu identified Malakole Road as a roadway offering intermittent coastal views. The view from the Malakole Culvert crossing to the coast is limited by existing developments, including the Chevron USA Refinery and the Kenai Industrial Park. The concrete-lined portion of the drainage channel at the Drainage Outlet section will be constructed at and below grade so there would be minimal visual impacts, if any. Some structures, such as the maintenance roads, will be at grade, while the security fence and pedestrian bridge will be above grade. These structures are not out of character with the surrounding industrial development and will not adversely impact scenic views or open space.

*(4) Coastal ecosystems;*

*(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*

*(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*

*(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land*

*and water uses, recognizing competing water needs; and*

*(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures;*

Comment: This Project would result in minimal impacts to coastal waters and the marine environment. Construction impacts of the Drainage Outlet section will be reduced as much as possible and are expected to be minimal. Construction will be performed in "dry" conditions and only after the channel has been substantially constructed, will it be opened to the ocean. The most impact to these resources will result from stormwater a discharge which is considered a temporary change in water quality that occurs at the point where discharges mix with receiving waters.

*(5) Economic uses;*

*(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*

*(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*

*(viii) Use of presently designated locations is not feasible;*

*(ix) Adverse environmental effects are minimized; and*

*(x) The development is important to the State's economy;*

Comment: The project will facilitate the implementation of land use development patterns that have been sanctioned by the City through the adoption of the *'Ewa Development Plan* and proposed draft.

*(6) Coastal hazards;*

*(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*

*(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source*

*pollution hazards;*

*(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*

*(D) Prevent coastal flooding from inland projects;*

Comment: The Project is consistent with coastal hazards policies by increasing safety through significantly reducing potential flood hazards. The project will be designed and constructed in conformance with City drainage system standards and Federal Flood Insurance Program requirements.

*(7) Managing development;*

*(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*

*(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and*

*(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process;*

Comment: The Project is consistent with land use development plans in Western Kapolei. This environmental assessment and public involvement process will supplement applications for the SMA and SSV approvals.

*(8) Public participation;*

*(A) Promote public involvement in coastal zone management processes;*

Comment: The Project is consistent with the public participation policy. Environmental assessment process serves as a full disclosure document for public and agency input. Furthermore, public hearings will be a part of the entitlement approval processes.

*(9) Beach protection;*

*(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;*

Comment: This Project would result in minimal impacts to beaches. The project will be constructed during “dry” conditions to reduce impacts to the natural shoreline processes and

lateral access along the shoreline will not be impeded since a pedestrian crossing will be constructed for future public access.

*(10) Marine resources;*

*(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*

Comment: This Project would result in minimal impacts to coastal waters and the marine environment. Impacts are primarily due to stormwater discharges during major storm events. Specialists in the fields of ocean engineering, marine biology, and water quality have been consulted to identify existing conditions at the receiving water locations and recommend measure to mitigate potential adverse impacts the marine environment.

### 4.4.2 Conformance with SMA Guidelines

Section 205A-26, HRS, states the special management area guidelines the authority shall adopt for the review of developments proposed in the special management area. These guidelines are adopted in Section 25-3.2, ROH, and used as a guide to assess project impacts occurring with the SMA. Impacts of the project relative to these guidelines are provided in this section:

*(a) All development in the special management area shall be subject to reasonable terms and conditions set by the authority in order to ensure:*

*(1) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;*

Comment: Public parking and shoreline access is currently provided at the Kenai Industrial Park. This access is located approximately 230 feet north of the Drainage Outlet section. Kalaeloa Barbers Point Deep Draft Harbor is located approximately 0.5 miles north of this section. This facility is currently used by cargo vessels and recreational boaters. Barbers Point Beach Park is located about 1.5 miles south of the Project Site. The proposal will not impact access to these facilities.

While access exists, lateral shoreline access is difficult due to the rocky and uneven nature of the shoreline. Construction of the Drainage Outlet at the shoreline may impede lateral shoreline access. To mitigate this impact, the applicant has agreed to construct a pedestrian bridge near the shoreline as indicated earlier. However, details regarding the specific location, design features, and the dedication of the bridge still need to be coordinated with the relevant government agencies willing to accept dedication.

*(2) Adequate and properly located public recreation areas and wildlife preserves are reserved;*

Comment: The Proposed Project will not impact properly located public recreation areas and wildlife preserve areas.

*(3) Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources; and*

Comment: The Drainage Outlet will not involve solid or liquid waste disposition. During the construction phase, the excavated and dredge material will be disposed of by the contractor at an approved disposal site.

*(4) Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake.*

Comment: The drainage outlet will not alter any identifiable existing land forms. A botanical survey of the Project Site on land was conducted by Char and Associates in 1989. At that time, the site was described as a kiawe forest with pickle weed ground cover. Also present were a variety of shrubs, grasses and ground cover. A reconnaissance level flora and fauna survey of this drainage channel section was conducted by Reginald David and Eric Guinther in September 2010. The purpose for this survey was to compare the 2010 findings with findings of the flora and fauna surveys conducted in 1989 to determine whether habitat and associated flora and fauna resources have changed.

From a botanical perspective, the area remains unchanged since 1989 with no threatened or endangered botanical resources present. Comparisons of avian and mammalian surveys between 1989 and 2010 show that the habitat and species currently present on the site have also not changed (David et al 2010).

Off shore water quality is designated Class A by the State Department of Health. The objective of Class A designation is to protect these waters for recreation and aesthetic enjoyment. Impacts to coastal waters during construction of the Drainage Outlet are expected to be minimal. Construction will be performed in "dry" conditions. Only after the Proposed Project has been substantially constructed, will it be opened to the ocean. The most significant impact to coastal water quality will result from storm-water dischargers. A temporary change in water

quality will occur where the discharge mixes with the receiving water. Water quality impacts will occur due to changes in constituents such as suspended solids, dissolved substances, temperature and effluent volume.

The Drainage Outlet is located between the Chevron Refinery and the Kenai Industrial Park. Most of the project will be constructed below grade. Those structures that will be at or above grade include maintenance roads, security fencing and the pedestrian bridge. These structures are not out of character with the surrounding industrial development.

The 1987 Coastal View Study done by the City and County of Honolulu identified Malakole Road as a roadway offering intermittent coastal views. The view from the road way to the coast is limited due to the existing developments, including the Chevron USA Refinery and the Kenai Industrial Park. The concrete-lined portion of the channel, maintenance roads and fence will terminate approximately at the shoreline.

The proposed Project is intended to facilitate the implementation of the land use development patterns that have been sanctioned by the City through the adoption of the Development Plans. Rather than eliminate planning options, the project will increase safety and development potential for the area by eliminating potential flood hazards.

Public parking and shoreline access is currently provided at the Kenai Industrial Park. This access is located approximately 230 feet north of the site. Barbers Point Deep Draft Harbor is located approximately 0.5 miles north of the Drainage Outlet. This facility is currently used by cargo vessels and recreational boaters. Barbers Point Beach Park is located about 1.5 miles south of the Drainage Outlet. The proposed Project is not expected to impact access to these facilities.

Lateral shoreline access is difficult due to the rocky and uneven nature of the shoreline. Construction of the drainage channel at the shoreline may impede lateral shoreline access. To mitigate this impact the applicant has agreed to construct a pedestrian bridge near the shoreline. Accordingly, recreational amenities will not be adversely affected by the proposed Project.

The proposed Project is expected to reduce the potential impact related to flooding. It is not expected to have any impact related to wind damage, storm surge, landslides, erosion, siltation, or earthquakes.

*(b) No development shall be approved unless the authority has first found:*

*(1) That the development will not have any substantial adverse environmental or*

*ecological effect, except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Such adverse effects shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect, and the elimination of planning options;*

Comment: The proposed Project will provide an engineered route for storm water runoff to reach the ocean, eliminating flooding that currently occurs at low lying areas near the Kalaeloa Boulevard/Malakole Road intersection and on the northwest corner of the Chevron USA refinery, adjacent to Malakole Road. Accordingly, the overall regional drainage system is in the interest of public health and safety.

The Project is intended to facilitate the implementation of approved 'Ewa land use development patterns that have been sanctioned by the City through the adoption of Development Plan and subsequent zoning approvals. Rather than eliminating planning options, the Project increases planning options for the area by allowing planned development projects to be built.

*(2) That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature; and*

Comment: This environmental assessment describes how the proposal is consistent with the objectives, policies and SMA guidelines that have been adopted by the legislature.

*(3) That the development is consistent with the county general plan and zoning. Such a finding of consistency does not preclude concurrent processing where a general plan or zoning amendment may also be required.*

Comment: The Drainage Outlet will support the development of Kapolei Harborside, Makaiwa Hills and Kapolei West. All three projects received zoning approval from the Honolulu City Council in September 2008. The development will support the following Objectives and policies of the Oahu General Plan:

*Population:*

*Objective C: To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.*

*Policy 2: Encourage development within the secondary urban center at Kapolei and the Ewa and Central O'ahu urban-fringe areas to relieve developmental pressure in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.*

*Economic Activity:*

*Objective A: To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.*

*Policy 1: Encourage the growth and diversification of Oahu's economic base.*

*Objective G: To bring about orderly economic growth on Oahu.*

*Policy 3: Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on Oahu.*

The Project involves the construction of infrastructure that is a permissible use in any zoning district. Furthermore, it will enable the development of commercial and industrial areas and help ensure a favorable business climate on O'ahu.

*(c) The authority shall seek to minimize, where reasonable:*

*(1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;*

Comment: The applicant does not propose to dredge or fill any of the named water features. The applicant has conducted a botanical study of the drainage channel and delineated the location of the wetland.

*(2) Any development which would reduce the size of any beach or other area usable for public recreation;*

Comment: There is no sandy beach fronting the Drainage Outlet. The proposal will not reduce the area useable for public recreation.

*(3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach;*

Comment: Public parking and shoreline access is currently provided at the Kenai Industrial

Park located approximately 230 feet north of the Drainage Outlet site. Kalaeloa Barbers Point Deep Draft Harbor is located approximately 0.5 miles north and is currently used by cargo vessels and recreational boaters. Barbers Point Beach Park, is located about 1.5 south of the Project site. The Proposed Project is not expected to impact access to these facilities.

As previously indicated, lateral shoreline access is difficult due to the rocky and uneven nature of the shoreline. Construction of the Drainage Outlet at the shoreline may impede lateral shoreline access. To mitigate this impact the applicant has agreed to construct a pedestrian bridge near the shoreline with design details to be determined at a future date.

*(4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and*

Comment: The nearest state highway, the H-l Freeway, is located nearly 2 miles north of the portion of the Drainage Outlet. It is unlikely that any of the above ground structures, such as the proposed fences and pedestrian bridge, will be visible from that distance.

*(5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.*

Comment: Offshore water quality is designated Class A by the State of Hawaii Department of Health. The objective of this designation is to protect these waters for recreation and aesthetic enjoyment.

Impacts to coastal waters during construction of the Drainage Outlet are expected to be minimal. Construction will be performed in "dry" conditions. Only after the Proposed Project has been substantially constructed, will it be opened to the ocean.

The applicant does not propose to place visible structures in existing areas of open water. There are no wildlife habitats in the vicinity of the project site. Avifauna and Feral Mammal Surveys were conducted in 1989 and 2010. Still, no endemic land birds were recorded during the course of the 2010 field survey and it was determined by AECOS that the only likely endemic species that might occasionally forage the area would be the Hawaiian Owl and the Hawaiian Stilt.

The only feral mammals observed during the survey were cats and a mongoose. Both surveys indicated that it is likely that mammals such as rats, mice, cats and mongoose, frequent the Project site in numbers that are typical of what one would find elsewhere in similar habitat on

Oahu. The Project site is not currently used for agricultural purposes and is located in an area intended for industrial uses. Accordingly, there is no potential that agricultural uses will be developed within the Project site.

## 4.5 SHORELINE SETBACK AREA

Chapter 205A, HRS also establishes the shoreline setback area to further manage uses along the shoreline. The City and County of Honolulu is delegated authority to regulate uses located within the established Shoreline Setback Area (SSA) for the island of O‘ahu. A portion of the proposed drainage improvements is located within the SSA.

Management of lands in the SSA is regulated through Chapter 23, Shoreline Setbacks, ROH. The project is not a permitted use in the SSA and would require a Shoreline Setback Variance (SSV) for construction activities. An application for a SSV requires a Final EA/FONSI or an Environmental Impact Statement (EIS) with a letter of acceptance. An approved certified shoreline will be included in the SSV application submitted to the City and County of Honolulu.

### 4.5.1 Certified Shoreline and 40-foot Setback Line

A copy of the previously proposed Certified Shoreline Map and 40-foot setback line, surveyed in 2008, is provided in Appendix E. This Certified Shoreline Map was submitted to the State Land Surveyor for approval but an encroachment issue prevented the shoreline from being certified. The encroachment was caused by an existing underground gas line and gas valve box owned and maintained by The Gas Company.

Since 2009, Aina Nui Corporation has been in consultation with DLNR and The Gas Company to resolve encroachment and easement issues which resulted in the approach described below. Ultimately, an approved Certified Shoreline will be acquired before applications are submitted for discretionary land use approvals.

Aina Nui Corporation has acquired a determination of non-conformity for the gas line from DLNR’s Office of Coastal and Conservation Lands (OCCL). The non-conforming status of the gas line allows the line to be applicable for an easement, which in turn would allow the shoreline to be certified. The valve box was not applicable for non-conforming status so it will be removed at a time to be determined by the State Land Surveyor. Following the application for the gas line easement and approval from the Board of Land and Natural Resources, Aina Nui Corporation would then re-survey the shoreline and prepare a new Certified Shoreline Map. This new Certified Shoreline Map would be submitted to the State Land Surveyor for processing and approval.

### 4.5.2 Criteria for Granting a Variance

A shoreline setback variance may be granted if the proposed structure or activity meets one of the three standards defined in Chapter 23-1.8(b), ROH. They are identified as:

1) Shoreline-dependent Facility Standard
2) Public Interest Standard
3) Hardship Standard

### 4.5.3 Shoreline –dependent Facility Standard

The provisions of Chapter 23, ROH allow the approval of a shoreline setback variance if the action constitutes a shoreline-dependent facility such as drainage facilities and boating, maritime or ocean sports recreational facilities; provided that the proposal is the practicable alternative which best conforms to the purpose of the shoreline setback rules.

As indicated in this EA, the applicant is undertaking a number of mitigation measures that will minimize adverse environmental impacts making the project the most practicable alternative which best conforms to the purpose of the shoreline setback rules.

The regional drainage system will serve two main purposes: (1) The channel will relieve existing flooding conditions, and (2) will support future development as is planned within the "Second City" of Kapolei. Without adequate drainage facilities and infrastructure, the current flooding conditions which occur in existing low-lying industrial areas near the Kalaeloa Boulevard/Malakole Road intersection will continue and development within the 2,400 acre drainage basin cannot proceed.

### 4.5.4 Public Interest Standard

The proposed Project also qualifies for consideration under the second standard for granting a variance, the Public Interest Standard. The project purpose is to protect health, safety and property and thus qualifies for a shoreline setback variance under the provisions of ROH Section 23-1.8(b)(2) which provides: “A variance may be granted for a…private facility or improvement which is undertaken by a private entity and is clearly in the public interest; provided that the proposal is a practicable alternative which best conforms to the purpose of this chapter and shoreline setback rules.”

### 4.5.5 Flood Hazard Districts Compliance Certification

As required by the City’s Land Use Ordinance (LUO), Chapter 21, Section 9.10, the project will be in compliance with the Flood Hazard District rules and regulations since a portion of the Drainage Outlet is located within Zone AE. The base flood elevation within Zone AE is 8 feet. Zone AE is a flood-fringe district in the 100-year flood plain.

For the most part, the Proposed Project will be constructed below grade and will require applicable pre-construction no-rise certification and post-construction elevation certification to comply with Section 9.10 of the LUO.

### 4.5.6 Analysis of Public Impacts

Since the project is consistent with both the Shoreline-dependent Facility Standard and the Public Interest Standard, the proposed Project has been shown to be consistent with the criteria for granting a shoreline setback variance as provided in Chapter 23 ROH. The proposed Project is intended to protect health, safety and property. As such, the proposed channel is both in the public interest and its denial would result in continued flooding and hardship to the applicant and others who use and occupy the area.

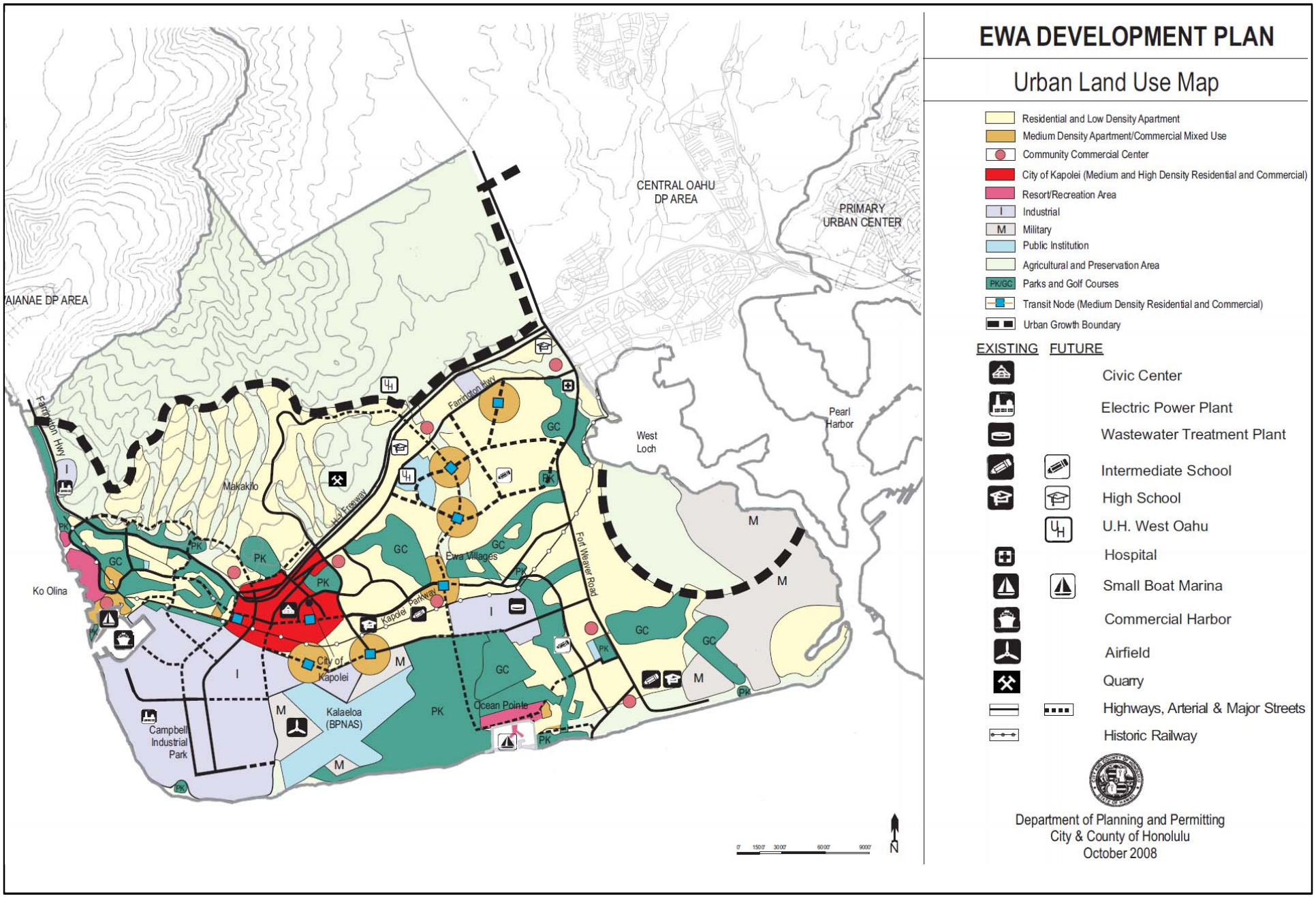
# STATE LAND USE DISTRICTS

**FIGURE 9**

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Data Sources:
Engineering Concepts Inc.
State GIS Database, SLUD Layer



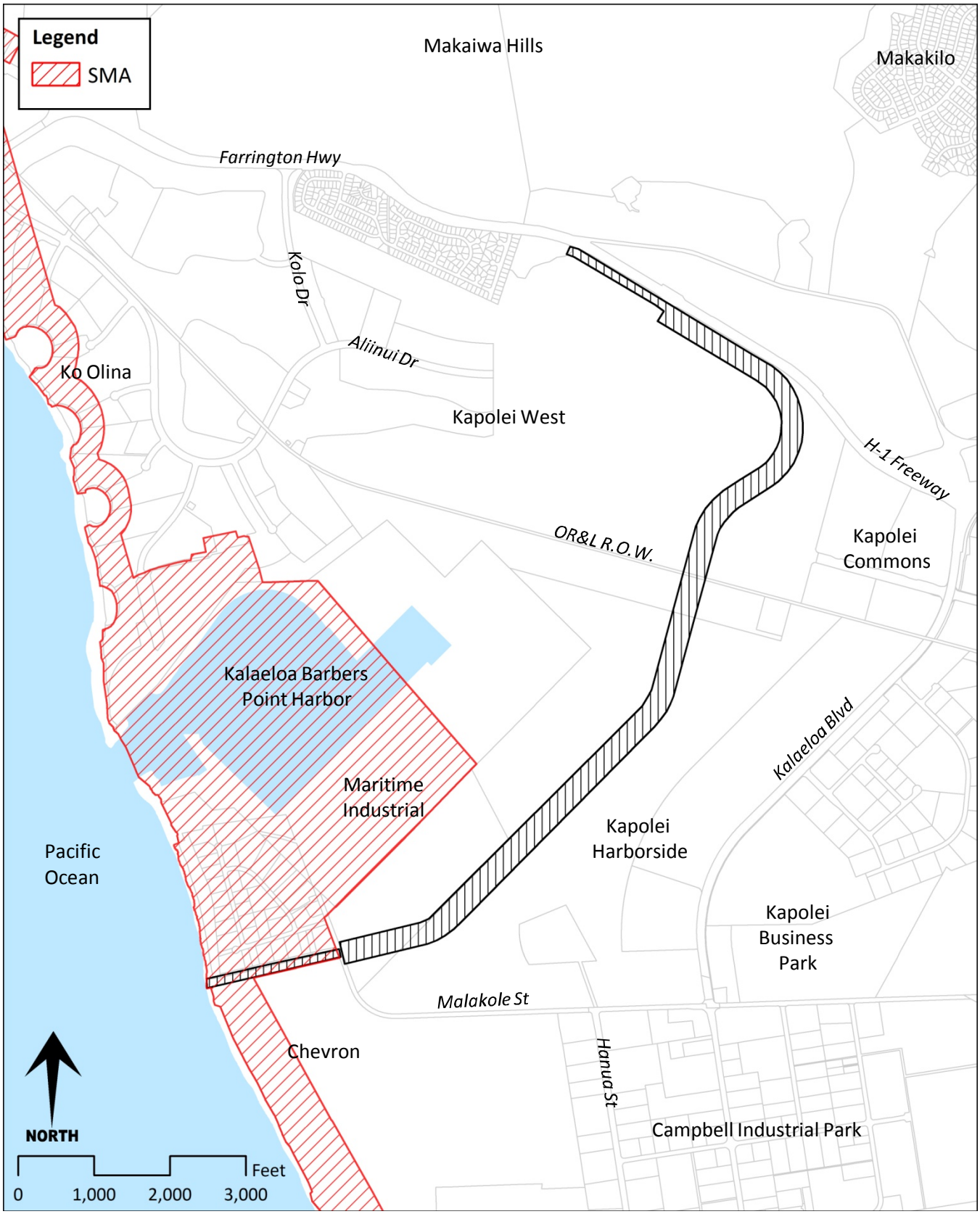

# EWA DEVELOPMENT PLAN LAND USE MAP

**FIGURE 10**

Source: City and County of Honolulu, 'Ewa Development Plan

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL



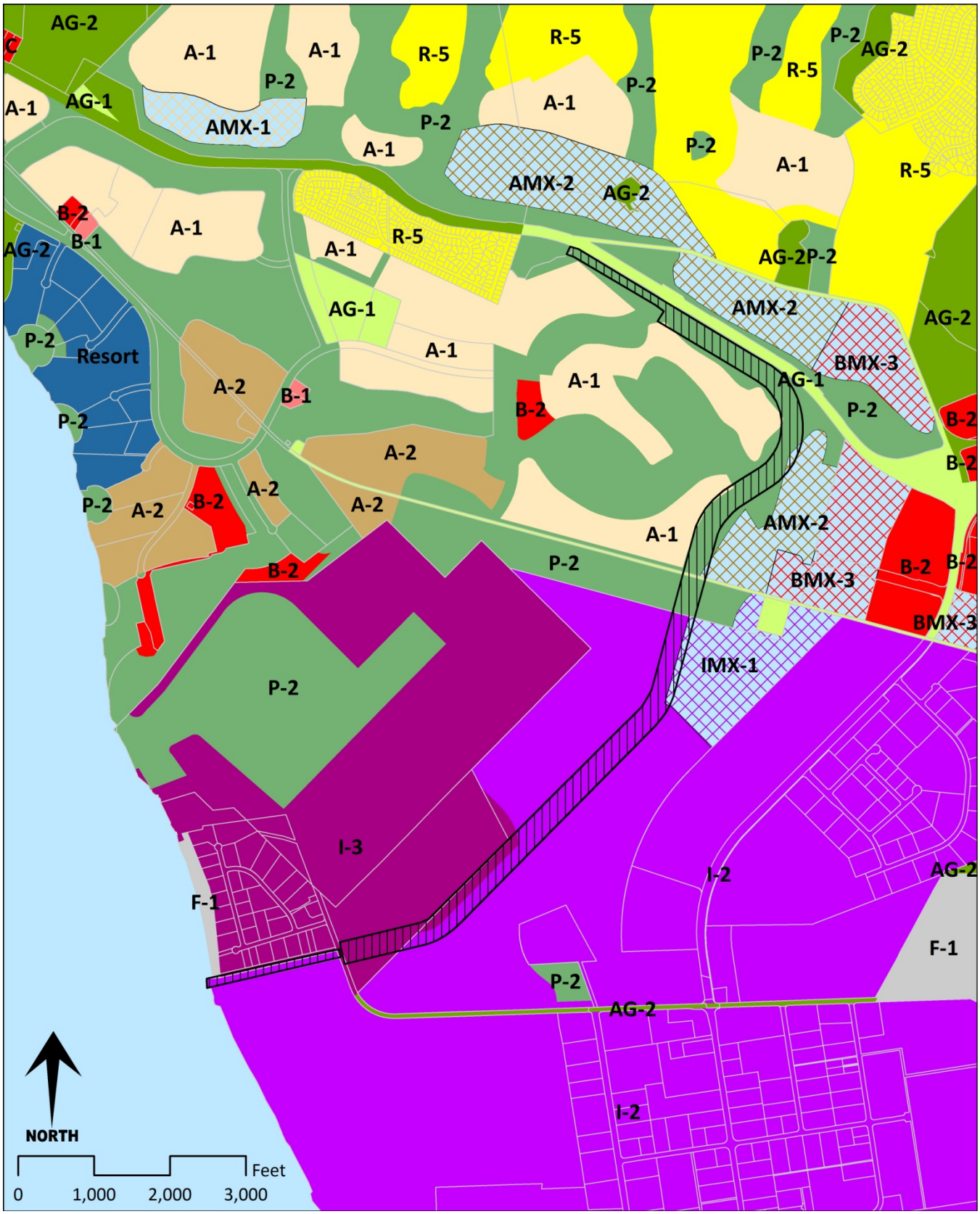

# SPECIAL MANAGEMENT AREA

**FIGURE 11**

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Data Sources:
Engineering Concepts Inc.
State GIS Database, O'ahu SMA Layer




# C&C OF HONOLULU ZONING

**FIGURE 12**

Western Kapolei Regional Drainage System
Aina Nui Corporation

SSFM INTERNATIONAL

Data Sources:
Engineering Concepts Inc.
State GIS Database, O'ahu Zoning Layer

# CHAPTER 5: ALTERNATIVES TO THE PROPOSED ACTION

This chapter presents alternatives actions that were considered but rejected from further consideration.

## 5.1 NO-ACTION ALTERNATIVE

In this alternative, no action would be taken and existing drainage patterns in the contributing drainage area would remain as is for the foreseeable future. Major flooding events would continue following heavy rainstorms. The problems caused by storm water runoff flows would be compounded due to continuing development of Western Kapolei lands. Negative impacts to Kalaeloa Barbers Point Harbor would continue and likely worsen.

This alternative is not acceptable because it will propagate current drainage problems in Western Kapolei and increase risks to public safety and infrastructure. While the No-Action alternative clearly would not fulfill the need for the project, it is always included for consideration as a baseline for other alternatives.

## 5.2 DIVERT RUNOFF INTO KALAELOA BARBER POINT HARBOR

In this alternative, the storm water runoff generated by the contributing drainage area could be diverted to discharge into the Kalaeloa Barbers Point Harbor. This would require the use of a box culvert system to accommodate the large volume of runoff during intense storm events. Such a system may be infeasible.

There is likely to be significant adverse impacts on the harbor environment and operations from this alternative. The harbor diversion alternative could create safety hazards and cause navigational difficulties for vessels in the harbor. The velocity of discharge would likely affect maneuvering of vessels and has the potential to dislodge ships from moorings. In consultation with Aina Nui Corporation, the State Department of Transportation, Harbors Division concurs with the dismissal of this alternative.

## 5.3 DIVERT RUNOFF INTO EXISTING EASTERN DRAINAGE CHANNEL

In this alternative, the storm water runoff generated by the contributing drainage area would be diverted to an existing drainage channel located east of the project site between Campbell Industrial Park and former Barbers Point Naval Air Station, now the Kalaeloa Development area under the jurisdiction of the State of Hawai‘i Community Development Authority (HCDA). Multiple pump stations would likely be required to convey runoff to the existing eastern channel.

While this alternative appears to have few environmental impacts, it is not feasible because the existing channel does not have the capacity to accommodate runoff generated by the additional drainage area. The channel in Kalaeloa Development area serves a separate drainage basin consisting of approximately 2500 acres. Increasing the capacity would likely involve increasing its width or depth to twice its present dimension. Increasing the channel width is not possible because due to development on both sides and increasing the depth is not hydraulically feasible. Therefore, this alternative has been eliminated from further consideration.

## 5.4 RETAIN RUNOFF IN RETENTION BASINS

In this alternative, permanent retention basins would be used to contain all storm water runoff from flowing overland and into the ocean. Some of the current runoff problems have been reduced through the use of small temporary retention basins. However these are just interim drainage solutions for limited areas of land.

While significant retention is already proposed to be included as part of new development drainage systems to address water quality and manage storm runoff flows, use of a permanent retention basin would require the design to accommodate runoff generated by a 100-year storm for a much larger area. In conjunction with the retention basins, a series of injection wells would be needed to allow percolation of collected runoff. While this alternative may have less impacts on marine waters and water quality, the significant land requirement for the adequate retention basins makes this alternative impractical.

## 5.5 OTHER ALTERNATIVES TO CONCRETE-LINED CHANNEL

In this alternative, the entire drainage channel would be natural versus concrete-lined. An alternative form of lining consisting of natural and permeable materials would be used such as landscaping or coral. This alternative may involve the use of vegetated swales and bioretention systems allowing for increased percolation and collection of sediments before reaching the ocean. It may seem that this alternative would have the least amount of impacts on the quality of water discharging into the ocean. This expectation is based on the drainageway allowing enough percolation of the water so that sediments and debris would settle before reaching the ocean. However, this may not be the case due to erosion caused by stormwater flowing at high velocities through unlined channels. As discussed in Chapter 2, while the majority of the drainage channel will be lined in coral, certain sections of the channel may require energy dissipaters, concrete or riprap lining, especially where high velocities or high erosion potential exists. Therefore, this alternative is dismissed from further consideration.

# CHAPTER 6: REQUIRED PERMITS AND APPROVALS

The following is a list of permits and approvals that are required for the project:

**Federal**

- Department of Army (DA) Permit under Section 10 of the Rivers and Harbors Act
- Department of Army (DA) Permit under Section 404 of the Clean Water Act

**State of Hawaii**

- Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM), Stream Channel Alteration Permit (SCAP)
- DLNR, Conservation District Use Permit
- DLNR, Land acquisition easement for portion of drainage canal built on state-owned lands makai (seaward) of the certified shoreline
- Department of Health (DOH), National Pollutant Discharge Elimination System (NPDES) Permits for construction activities and storm water discharge
- DOH, Water Quality Certification (WQC) under Section 401 of the Clean Water Act
- DOH, Antidegradation Analysis under Hawaiʻi Administrative Rules Chapter 11-5401.1

**City and County of Honolulu**

- Department of Planning and Permitting (DPP), Special Management Area (SMA) Permit
- DPP, Shoreline Setback Variance (SSV)
- DPP, Grading Permit

# CHAPTER 7: FINDINGS AND DETERMINATION

This chapter discusses the results of the environmental assessment conducted for the proposed regional drainage system project. The objective of this assessment is to identify and consider the "significance" of potential environmental effects which includes the sum of effects on the quality of the environment along with cumulative long-term effects.

As set forth in the State Department of Health Rules, Chapter 200, Title 11, a prescribed set of 13 Significance Criteria is used to determine the project's impact on the environment. The project's relationship to each criterion is discussed in this chapter and followed by the ensuing project determination.

## 7.1 FINDINGS

To determine whether a proposed action may have a significant effect on the environment under Hawai'i Administrative Rules Title 11, Chapter 200, the Approving Agency needs to consider every phase of the action, the expected primary and secondary consequences, cumulative effect, and the short- and long-term effects. The Approving Agency's review and evaluation of the proposed action's effect on the environment would result in a determination whether: 1) the action would have a significant effect on the environment, and an Environmental Impact Statement Preparation Notice should be issued, or 2) the action would not have a significant effect warranting a Finding of No Significant Impact (FONSI).

This section discusses the overall project relation to the 13 Significance Criteria and the resulting findings are included below for each criterion;

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;*

Archaeological surveys found that areas containing the proposed regional drainage channel have been drastically altered by historic and modern land use involving intensive sugar cane cultivation and large scale limestone quarry operations and stockpiling. Prior to the extensive historic and modern land alteration in this area, the Honouliuli ahupua'a would be expected to have remnants of traditional Hawaiian temporary habitations used during forays for marine resources and evidence of opportunistic seasonal agriculture. With the spread of 19$^{th}$ century ranching and intensive commercial agriculture, these resources have likely been destroyed or buried, including surface features and sinkholes.
As discussed in Section 3.7: Archaeological, Historical, and Cultural Resources, the proposed

drainage system is unlikely to have any adverse impacts on the Barbers Point Archaeological District because much of the historical features were removed by modern quarrying operations (CSH, 2006). The proposed drainage channel is also unlikely to have adverse impacts on the Flood Control Drainage Channel, which has been documented for historical purposes, and will likely be removed as part of the Kapolei Harborside Center development.

The OR&L railroad right-of-way is a significant historic feature and any modifications to this site need to be consulted with the State Historic Preservation Division (SHPD), the State Department of Transportation (HDOT), and the Hawaiian Railway Society to determine the appropriate mitigation (CSH, 2006). A Memorandum of Agreement (MOA) will be completed for the OR&L historical right-of-way between the State Historic Preservation Officer (SHPO), the State Department of Transportation (landowner of right-of-way) and the Hawaiian Railway Society. The MOA, as a preservation mitigation, will detail the type of crossing that will be made across the tracks and any reconstruction, if necessary. The MOA would stipulate the obligations and time frames for any work to be undertaken.

Development of the regional drainage will result in an irreversible commitment of currently undeveloped land and resources. However, based on the planning and discussion included in this EA, the project is not expected to have a significant impact on natural or cultural resources after mitigation.

*2. Curtails the range of beneficial use of the environment;*

The proposed action would not curtail the range of beneficial uses of the environment. Planning a regional drainage system in accordance with long-range development plans is consistent the intent of the Hawai‘i State Plan, Chapter 226 of the Hawai‘i Revised Statutes. The overall benefits of this project will serve an important role for western Kapolei which is in line with the State’s goal of creating desirable physical environments. As new construction developments increase in this area, so will the need for an adequate regional drainage facility. Therefore, the project is consistent with the State’s goal of creating desirable physical environments by establishing a regional drainage system where none exists today.

As discussed in Chapter 4, the development of the regional drainage channel is consistent with the state land use Urban and Agricultural state land use designations, underlying county zoning, General Plan and ‘Ewa Development Plan. *The Regional Drainage Plan for Western Kapolei* acknowledges differences in the planned development uses. This acknowledgement resulted in the recommendation that each of these unique areas require the regional drainage system to be designed to suit surrounding conditions by following existing drainage corridors and ensuring design of systems compatible with the surrounding environment.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The project is consistent with the guidelines of Chapter 344, HRS, the State Environmental Policy. Chapter 344 section 4(3)(A) seeks to protect endangered species, and indigenous plants and animals and to introduce new plants or animals only upon assurance of negligible ecological hazard. There are no endangered species that are anticipated to be impacted by this project. Chapter 344 section 4(2)(f) requires conducting an integrated system of state land use planning which coordinates the state and county general plans. This project is consistent with this guideline as the proposed use is consistent the State and County land use plans. Furthermore, none of the natural resources sought to be protected or preserved in Chapter 344, HRS, will be adversely affected by the proposed action.

4. *Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;*

The Project section referred to as the "Drainage Channel" is utilized for limestone quarry operations and industrial uses. In the long-term, the proposed action will have a beneficial economic impact by ensuring that sufficient drainage is available for Western Kapolei. The overall benefits of this project will serve an important role as new construction developments increase in this area, so will the need for an adequate regional drainage facility. No impact to cultural practices is anticipated as the subject property is not associated with ongoing cultural activities. Historic properties and archaeological sites are expected to be present on the property, but will not be adversely impacted by the project.

5. *Substantially affects public health;*

The proposed action is not anticipated to have any adverse environmental impacts that would affect public health. In fact, the drainage channel will provide an improved route for storm water runoff to reach the ocean, eliminating flooding that currently occurs at low lying areas and Kalaeloa Barbers Point Harbor. The design plan approach is described in the *Regional Drainage Plan for Western Kapolei* dated January 2012 and included as Appendix B of this Final EA. This plan has been reviewed and accepted by the City and County of Honolulu, Department of Planning and Permitting (DPP) as having addressed drainage-related issues for the development of the western Kapolei area as required by unilateral conditions for zoning. DPP has confirmed acceptance of this plan by letter dated February 22, 2012, also included in Appendix B.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities;*

The proposed action is not expected to induce secondary impacts such as population changes or to have a significant impact on public facilities. The proposed action is identified in the 'Ewa Development Plan as a needed project for the planned growth in West Kapolei.

The City Department of Parks and Recreation had commented on the Draft EA that the proposed project will not impact any program or facility of their department. The Honolulu Police Department (HPD) commented that this project may cause an increase in calls for police service because of the anticipated traffic congestion during the construction phase. However, HPD also commented that once the project is completed, it should have no significant impact on the facilities or services of their department. The Honolulu Fire Department commented that the project would have no significant impact to fire department services. The Honolulu Board of Water Supply (BWS) commented that construction drawings should be submitted for BWS review and the construction schedule should be coordinated to minimize impact to the water system. The City Department of Facility Maintenance and Department of Transportation Services both noted that they reviewed the Draft EA and do not have any comments at this time.

7. *Involves a substantial degradation of environmental quality;*

The proposed action is not expected to cause a substantial degradation of environmental quality. Short-term construction related impacts may occur during construction of improvements, however no significant long-term adverse impacts are anticipated with mitigation. As the proposed project will require onshore and offshore dredging, the development and implementation of a Best Management Practices (BMP) plan is recommended to minimize impacts to water quality and marine resources. Further, based upon the continued presence of marine resources in the vicinity of the proposed project, it is anticipated that quantitative surveys of marine resources will likely be required for project permitting. The result of these additional surveys will then be used to assess potential impacts and identify potential mitigation measures.

<u>Short-term impacts</u> to air quality from fugitive dust may occur during construction activities for drainage improvements. A dust control plan is recommended to identify mitigation measures will be implemented to control dust during construction.

*8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;*

The proposed regional drainage system is part of a commitment by the City to direct growth to the Secondary Urban Center of Kapolei. This action will be significant, but is necessary as described in the ‘Ewa Development Plan. This project does not require a commitment for larger actions as the drainage channel will be developed in concert with upcoming developments in Western Kapolei. The purposes of this project aim to improve drainage conditions in western Kapolei that are frequently subject to flooding during heavy rainstorms and to provide a regional drainage system in support of large planned developments, consisting of Makaiwa Hills, Kapolei West, and Kapolei Harborside. Planning a regional drainage system in accordance with long-range development plans is consistent the intent of the Hawai‘i State Plan, Chapter 226 of the Hawai‘i Revised Statutes.

*9. Substantially affects a rare, threatened, or endangered species, or its habitat;*

No rare, threatened, or endangered species inhabit the project site, nor does the site provide a unique or exceptional habitat for rare, threatened, or endangered species.

*10. Detrimentally affects air or water quality or ambient noise levels;*

No significant impact to air or water quality or ambient noise levels are anticipated to result from the proposed action. Short-term impacts may occur during construction; however, no significant long-term impacts are expected to result from the project. Any impacts to air or water quality or ambient noise levels and required mitigation will be addressed through the design. Design of the drainage system will be in compliance with all applicable state, federal, and local regulations relating to land, air and water resources.

*11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water.*

Design of the drainage system will be in compliance with all applicable state, federal, and local regulations relating to land, air and water resources. A portion of the drainage system will be located in the shoreline which is an environmentally sensitive area. The project will require both SMA and SSV approvals which would require implementation of specific design and environmental considerations. Overall the proposed system will improve drainage throughout the watershed and eliminate existing drainage problems in the flood-prone and low-lying areas.

*12. Substantially affects scenic vistas and view plans identified in county or state plans or studies.*

The proposed drainage project will not affect scenic vistas or view plains. The ‘Ewa Development Plan identifies panoramic views from the H-2 Freeway looking towards the ocean, including over the subject property. The channel section between the ocean and Malakole Street is unlikely to have adverse visual impacts on the surrounding industrial community because it would open coastal views from Malakole Street by removing unmaintained trees and vegetation within the channel. The action of removing overgrown brush is likely to contribute positively to the area. Therefore, no significant impact is anticipated.

*13. Requires substantial energy consumption.*

The proposed drainage channel will not require substantial energy consumption.

## 7.2 DETERMINATION

Based upon the information and results of the assessments conducted for the project site; a Finding of No Significant Impact (FONSI) determination is warranted for the Western Kapolei Regional Drainage System.

# CHAPTER 8: AGENCY AND PUBLIC CONSULTATION

Consultation with various Federal, State and County government agencies and nearby property owners was conducted to obtain their comments and concerns associated with the project as part of the Environmental Assessment process.

## 8.1 PRE-ASSESSMENT CONSULTATION

Pre-assessment consultation comments were solicited from the following government agencies and organizations. Comments letters received and responses are included in Appendix A of this Environmental Assessment. Consulted parties that have provided comments during the pre-assessment consultation are noted in **BOLD**.

**Federal Agencies**

**Department of the Army, Regulatory Branch (USACE)**
**Department of the Interior, U.S. Geological Survey (USGS)**
**Department of the Interior, Fish and Wildlife Service (FWS)**
**Department of the Interior, National Park Service (NPS)**
Department of Agriculture, National Resources Conservation Service (NRCS)
Department of Transportation, Federal Highways Administration (FHWA)
Environmental Protection Agency, Region 9 (EPA)

**State of Hawai‘i Agencies**

**Department of Accounting and General Services (DAGS)**
Department of Agriculture (DOA)
Department of Business, Economic Development, and Tourism (DBEDT)
DBEDT, Office of Planning (OP)
Department of Defense (DOD)
**Department of Education (DOE)**
Department of Hawaiian Home Lands (DHHL)
Department of Health (DOH)
DOH, Clean Water Branch (CWB)
**Department of Land and Natural Resources (DLNR)**
DLNR, State Historic Preservation Division (SHPD)
**Office of Hawaiian Affairs (OHA)**
University of Hawai‘i Environmental Center
Department of Transportation (HDOT)

**City & County of Honolulu Agencies**

**Board of Water Supply, Water Resources Program Administrator**
**Department of Community Services (DCS)**
**Department of Design and Construction (DDC)**
Department of Environmental Services (DES)
Department of Facility Maintenance (DFM)
Department of Planning & Permitting (DPP)
Department of Parks and Recreation (DPR)
**Department of Transportation Services (DTS)**
**Honolulu Fire Department (HFD)**
**Honolulu Police Department (HPD)**
Neighborhood Board No. 34, Makakilo/Kapolei/Honokai Hale

**Private**

Hawaiian Electric Company
**Hawaiian Telcom**
**The Gas Company, LLC**
**Oceanic Time Warner**

## 8.2 DRAFT ENVIRONMENTAL ASSESSMENT CONSULTATION

Notification on the availability of the Draft EA was provided on December 23, 2011 in the Office of Environmental Quality Control's (OEQC) *The Environmental Notice*. The Draft EA was sent to the list of Federal and State agencies below and also publicly available online through the OEQC's website.

Following the Draft EA's publication on December 23, 2011, a 30-day public review and comment period was opened to ensure that the public and agency stakeholders had adequate opportunity to review the Draft EA and provide comments that would be included as part of the official administrative record. No comments were received from members of the general public during the comment period. Consulted parties that have provided comments on the Draft EA are noted in **BOLD**.

**Federal Agencies**

Department of the Army, Regulatory Branch (USACE)
Department of the Interior, U.S. Geological Survey (USGS)
Department of the Interior, Fish and Wildlife Service (FWS)
Department of the Interior, National Park Service (NPS)
Department of Agriculture, National Resources Conservation Service (NRCS)

Department of Transportation, Federal Highways Administration (FHWA)
Environmental Protection Agency, Region 9 (EPA)

**State of Hawai'i Agencies**

Department of Accounting and General Services (DAGS)
Department of Agriculture (DOA)
Department of Business, Economic Development, and Tourism (DBEDT)
DBEDT, Office of Planning (OP)
Department of Defense (DOD)
Department of Education (DOE)
Department of Hawaiian Home Lands (DHHL)
Department of Health (DOH)
**DOH, Clean Water Branch (CWB)**
Department of Land and Natural Resources (DLNR)
DLNR, State Historic Preservation Division (SHPD)
Office of Hawaiian Affairs (OHA)
University of Hawai'i Environmental Center
Department of Transportation (HDOT)

**City & County of Honolulu Agencies**

**Board of Water Supply, Water Resources Program Administrator**
Department of Community Services (DCS)
**Department of Design and Construction (DDC)**
Department of Environmental Services (DES)
**Department of Facility Maintenance (DFM)**
**Department of Planning & Permitting (DPP)**
**Department of Parks and Recreation (DPR)**
**Department of Transportation Services (DTS)**
**Honolulu Fire Department (HFD)**
**Honolulu Police Department (HPD)**
Neighborhood Board No. 34, Makakilo/Kapolei/Honokai Hale

**Private**

Hawaiian Electric Company
Hawaiian Telcom
The Gas Company, LLC
Oceanic Time Warner

# CHAPTER 9: REFERENCES

AECOS, Inc. Wetland delineation for the north Campbell Drainage Channel, Campbell Industrial Park, O'ahu. August 27, 2008.

Char, Winona P. Campbell Drainage Canal, 'Ewa District, Island of O'ahu. Prepared for William E. Wanket, Inc. October 1989.

City and County of Honolulu, Department of Planning & Permitting. 'Ewa Development Plan. August 1997.

City and County of Honolulu, Department of Planning & Permitting. Draft 'Ewa Development Plan. August 2008.

City and County of Honolulu, Department of Planning and Permitting. Land Use Ordinance. April 2003.

Cultural Surveys Hawai'i, Inc. An Archaeological Inventory Survey for the Proposed 345-acre Kapolei Harborside Center, Honouliuli Ahupuaa, 'Ewa District, O'ahu Island TMK: (1) 9-1-14:027, 034,035, & 9-1-15:001. Prepared for Group 70 International, July 2006.

Cultural Surveys Hawai'i, Inc. Archaeological Reconnaissance of a Proposed Drainage Channel: Supplement to and Archaeological Assessment for the Proposed Kapolei Business/Industrial Park, Honouliuli, ''Ewa, O'ahu. 1990.

David, Reginald E and Eric Guinther. A Survey of Botanical, Avian, and Mammalian Resources, Kapolei Harborside Center, 'Ewa District, O'ahu, Hawai'i. October 2, 2006.

David, Reginald E and Eric Guinther. Update Biological Surveys Conducted for the Campbell Drainage Channel, Kapolei, O'ahu. September 1, 2010.

Department of Geography (UH Hilo). Atlas of Hawai'i. Third Edition. University of Hawai'i at Hilo. University of Hawai'i Press. Honolulu, Hawai'i. 1998.

Engineering Concepts, Inc. Final Environmental Impact Statement for the Campbell Drainage Channel Supplemental to Kapolei Business-Industrial park EIS, 'Ewa, O'ahu, Hawai'i. August 1991.

Federal Emergency Management Agency. Flood Insurance Rate Map, Map Number 15003C0305F. September 30, 2004.

Giambelluca, Thomas W, Michael A. Nullet, Thomas A. Schroeder. Rainfall Atlas of Hawai'i. Juen 1986.

Group 70 International. Kapolei Harborside Center Final Environmental Impact Statement. November, 2006.

Helber Hastert and Fee, Planners. Kapolei West Expansion Area Final Environmental Impact Statement. June 2005.

Mink, John F and Stephen Lau. Aquifer Identification and Classification of O‘ahu: Groundwater Protection Strategy for Hawai‘i. February 1990.

National Oceanic and Atmospheric Administration. Climatological Data, Hawai‘i and Pacific, Volume Number 99, ISSN 0095-4373. June 2003.

Tetra Tech EM Inc. Phase I Environmental Site Assessment, TMK: 91014026 (Plot2) Vacant Property (Kapolei Maritime Industrial Park) Malakole Street, James Campbell Industrial Park, O‘ahu, Hawai‘i. June 21, 2004.

Parsons Brinckerhoff Quade & Douglas, Inc. Final Supplemental Environmental Impact Statement, Basin Expansion and Tug Pier at Barbers Point Harbor, O‘ahu, Job H.C. 1823 and Future Pier and Storage Yard Improvements at Barbers Point Harbor. January 1995.

State of Hawai‘i, Department of Health. State of Hawai‘i Annual Summary 2008 Air Quality Data. August 2009.

# APPENDIX A-1: PRE-ASSESSMENT CONSULTATION LETTERS AND RESPONSES

**DEPARTMENT OF THE ARMY**
**U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT**
**FORT SHAFTER, HAWAII 96858-5440**

REPLY TO
ATTENTION OF:

June 9, 2011

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 13 2011
JKC
FILE

Regulatory Branch

File No. POH-2011-00142

SSFM International, Inc
Attn: Jared Chang
501 Summer Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

We have received your request for the Department of the Army to review and comment on the proposed Western Kapolei Regional Drainage Plan, in Kapolei. We have assigned the project the reference number POH-2011-00142. Please cite the reference number in any correspondence with us concerning this project. We have completed our review of the submitted document and have the following comments:

Section 10 of the Rivers and Harbors Act of 1899 (Section 10) requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging, and other activities occurring in, over, or under navigable waters of the U.S. Section 404 of the Clean Water Act of 1972 (Section 404) requires that a DA permit be obtained for the discharge (placement) of dredge and/or fill material into waters of the U.S., including wetlands.

Based on our review of the information provided, it appears that the makai end of the proposed project will affect navigable waters of the U.S. As such, authorization under Section 10 will be required for the proposed project. The Corps does not have sufficient information to determine if there are waters of the U.S. present mauka of the ocean or if such waters are proposed for impact, which may require authorization under Section 404 of the Clean Water Act.

When developing the Environmental Assessment, we recommend you include any information regarding any potential waterbodies, including wetlands, drainage ditches, gulches, stream, etc., on-site if they may be impacted by the proposed project. Only the Corps of Engineers has authority to determine if any of these features are or are not waters of the U.S. and, potentially subject to regulations under Section 404 of the Clean Water Act.

We recommend you conduct an aquatic resource inventory of the project site prior to designing any new facilities. The inventory should record any drainage features, streams, ditches, gulches, wetlands, etc., since these features may be jurisdictional waterbodies subject to Section 10 and/or Section 404 regulations. Wetland delineations must be conducted in accordance with the Corps of Engineers 1987 Wetland Delineation Manual and the Hawaii and Pacific Islands Supplement. Information regarding the physical, chemical, and biological characteristics of each aquatic resource should also be documented. Once an aquatic resource



inventory is conducted, we recommend you request an approved jurisdictional determination from our office.

Thank you for contacting us regarding this project and providing us with the opportunity to comment. Should you have any questions regarding our Regulatory Program or the permit application process, please contact Ms. Deserie Bala at (808) 438-9258 or via email at Deserie.M.Bala@usace.army.mil.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Department of the Army
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments for Draft Environmental Assessment
Kapolei, Oahu, Hawai`i
POH-2011-00142

Thank you for your letter dated June 9, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Branch when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

The Draft EA includes a discussion of the proposed project relative to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act of 1972. See Section 3.6 *Streams and Aquatic Resources*. We agree with your initial comments and recommendations to consider the impacts on existing aquatic resources prior to design of the system. We will continue to work with your Branch to secure an approved jurisdictional determination for the project at the appropriate time.

The potential mitigation for impacts to streams and aquatic resources are discussed in Section 3.6.3. The potential Federal, State, and County permits or approvals that may be required for the project are included in Chapter 6 of the Draft EA.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

---

United States Department of the Interior
U.S. GEOLOGICAL SURVEY
Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, Hawai'i 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

TAKE PRIDE IN AMERICA

SSFM INTERNATIONAL, INC
RECEIVED
JUN 0 8 2011
JKC
FILE

June 6, 2011

Mr. Jared K. Chang
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawai'i 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan, Environmental Assessment Pre-Assessment Consultation, Kapolei, Oahu, Hawai'i

Thank you for forwarding the subject Environmental Assessment Pre-Assessment Consultation for review and comment by the staff of the U.S. Geological Survey Pacific Islands Water Science Center. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document.

We appreciate the opportunity to participate in the review process.

Sincerely,

Stephen S. Anthony
Center Director

FILE COPY

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011 SSFM 2010_151.002

Mr. Stephen S. Anthony
United States Department of the Interior
U.S. Geological Survey
Pacific Islands Water Science Center
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawai'i 96813

Dear Mr. Anthony:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 6, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your letter is included in the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We understand that your department was unable to review the document due to prior commitments and lack of available staff.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

**From:** Jared Chang
**Sent:** Wednesday, June 15, 2011 8:38 AM
**To:** Pat Owan
**Subject:** FW: 2011-SL-0335 Western Kapolei Regional Drainage Plan development of DEA

Please log

---

**From:** Aaron_Nadig@fws.gov [mailto:Aaron_Nadig@fws.gov]
**Sent:** Wednesday, June 15, 2011 8:32 AM
**To:** Jared Chang
**Subject:** 2011-SL-0335 Western Kapolei Regional Drainage Plan development of DEA

Dear Mr. Chang:

Thank you for your letter received May 31, 2011, requesting environmental concerns related to the proposed project to develop an draft Environmental Assessment for western Kapolei Regional Drainage Plan on the island of Oahu.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program and the Hawaii GAP Program. The two federally endangered plants, Ewa hinahina (*Achyranthes splendens* var. *rotundata*) and Ewa plains akoko (*Chamaesyce skottsbergii* var. *kalaeloana*) are known to occur near the proposed project location. This area also has a high concentration of unique limestone anchaline pool communities. The anchaline pools support opae ula (*Halocaridina rubra*) at risk anchialine pool shrimp and *Metabetaeus lohena* an anchialine pool shrimp that is a candidate for listing under the Endangered Species Act (ESA). Additionally, there are restored pools near your location that have begun translocation of the orangeblack damselfly (*Megalagrion xanthomelas*), also a candidate species.

We offer the following recommendations to assist you with your environmental review. We recommend that a knowledgeable botanist survey for federally listed plant species during the wettest portion of the year (November- April) within your proposed project area. The project location should also be surveyed for presence anchaline pools and candidate species.

If it is determined that the proposed project may affect federally listed species we recommend you contact our office early in the planning process so that we may assist you with the ESA compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then the Federal agency should consult with us pursuant to section 7(a)(2) of the ESA.

If you have questions, please feel free to contact me.

Sincerely,

Aaron

~~~
~~~

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

Phone:(808) 792-9466
Fax:(808) 792-9581
~~~
~~~

# United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
300 Ala Moana Boulevard, Box 50165
Room 6-226
Honolulu, Hawaii 96850-0053

NATIONAL PARK SERVICE

INTERNATIONAL, INC.
RECEIVED
JUN 15 2011
jko
FILE

IN REPLY REFER TO:
L7619

June 13, 2011

SSFM International
501 Sumner Street
Suite 620
Honolulu, Hawaii 96817

Attention: Mr. Jared Chang, Project Planner

Re: Western Kapolei Regional Drainage Plan, EA Pre-Assessment Consultation, Kapolei, Oahu, Hawaii.

Dear Mr. Chang:

Thank you for the opportunity to provide comments on the above-referenced notice and information. The National Park Service has no input on this proposed project at this time but look forward to reviewing the Draft Environmental Assessment (DEA) at such time as it is completed.

If you need additional information, please do not hesitate to contact me at (808)541-2693 ext. 729 or by email at Melia_Lane-Kamahele@nps.gov

Sincerely,

M. Melia Lane-Kamahele
Acting Pacific Area Director

TAKE PRIDE IN AMERICA

FILE COPY

---

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Ms. M. Melia Lane-Kamahele
United States Department of the Interior
National Park Service, Pacific West Region
300 Ala Moana Boulevard, Room 6-226
Honolulu, Hawai'i 96850-0053

Dear Ms. Lane-Kamahele:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i
NPS: L7619

Thank you for your letter dated June 13, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that the National Park Service, Pacific West Region has no input on this proposed project at this time and look forward to reviewing the Draft EA when completed.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

NEIL ABERCROMBIE
GOVERNOR

BRUCE A. COPPA
COMPTROLLER

RYAN T. OKAHARA
DEPUTY COMPTROLLER

**STATE OF HAWAII**
**DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES**
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1116.1

JUN 15 2011

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 16 2011
JKC
FILE

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawaii

Thank you for the opportunity to provide comments for the subject project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Ms. Gayle Takasaki of the Public Works Division at 586-0502.

Sincerely,

BRUCE A. COPPA
State Comptroller

FILE COPY

---

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Bruce A. Coppa, Comptroller
State of Hawai'i
Department of Accounting and General Services
1151 Punchbowl Street
Honolulu, Hawai'i 96813

Dear Mr. Coppa:

Subject: Western Kapolei Regional Drainage System
Kapolei, Oahu, Hawai`i
Pre-Assessment Consultation for Draft Environmental Assessment

Thank you for your letter dated June 15, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that the project does not directly impact any of the General Services' projects or existing facilities.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 22 2011
JKC
FILE

June 20, 2011

SSFM International
501 Sumner Street Suite 620
Honolulu, Hawaii 96817

Attention: Mr. Jared Chang

Ladies and Gentlemen:

Subject: Pre-Assessment Consultation for Environmental Assessment for Western Kapolei Regional Drainage Plan

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Forestry & Wildlife, Land Division-Oahu District, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Russell Y. Tsuji
Administrator

FILE COPY

---

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

June 1, 2011

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Oahu District/Gavin Chun
x Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Western Kapolei Regional Drainage Plan
LOCATION: Island of Oahu
APPLICANT: SSFM International on behalf of Aina Nui Corporation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by June 15, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: _____
Date: June 2, 2011

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2011 JUN 20 P 3:52

DEPT. OF LAND
NATURAL RESOURCES
STATE OF HAWAII

June 1, 2011

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Oahu District/Gavin Chun
x Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Assessment Consultation for Western Kapolei Regional Drainage Plan
LOCATION: Island of Oahu
APPLICANT: SSFM International on behalf of Aina Nui Corporation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by June 15, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(x) We have no comments.
( ) Comments are attached.

Signed: Randy Kennedy PJZ
Date: 6-15-2011

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Russell Y. Tsuji, Administrator
State of Hawai'i
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

Dear Mr. Tsuji:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 20, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice.*

We note Department of Land and Natural Resources, Land Division-O'ahu District and Division of Forestry & Wildlife has no comments to offer on the proposed project.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

I:\2010\2010_151.002 KPD West Kapolei Reg Drainage - EA\H Reports\10 Pre-Assess Conslt\03 Response Ltrs\14 DLNR response.docx

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

**STATE OF HAWAI`I**
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 17 2011
JKC
FILE

June 16, 2011

Mr. Jared Chan, Project Planner
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chan:

SUBJECT: Western Kapolei Regional Drainage Plan Draft Environmental Assessment, Pre-Assessment Consultation, Kapolei, Oahu, Hawaii

The Department of Education (DOE) appreciates the opportunity to provide pre-consultation comments for the Draft Environmental Assessment (DEA) of the proposed Western Kapolei Regional Drainage Plan.

Based on the project information provided, the DOE has no comment to offer at this time. Should the project scope expand to include a larger geographic area, however, the DOE would appreciate ample notification with an opportunity to comment accordingly.

Should you have any questions, please do not hesitate to call Roy Ikeda of the Facilities Development Branch at 377-8301.

Sincerely yours,

Duane Y. Kashiwai
Public Works Administrator

DYK:jmb

c: Kathryn Matayoshi, Superintendent
Randolph Moore, Assistant Superintendent, OSFSS

FILE COPY

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Duane Y. Kashiwai
Public Works Administrator
State of Hawai'i
Department of Education
P.O. Box 2360
Honolulu, Hawai'i 96804

Dear Mr. Kashiwai:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 16, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We confirm that your department has no comment to offer at this time. Please note at this time that the geographic scope of the project has not expanded.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

**From:** Keola Lindsey [mailto:keolal@oha.org]
**Sent:** Tuesday, June 21, 2011 2:16 PM
**To:** Jared Chang
**Subject:** Western Kapolei Regional Drainage Plan pre-DEA

Aloha Jared Chang: The Office of Hawaiian Affairs (OHA) is in receipt of your May 27, 2011 letter seeking comments ahead of a draft environmental assessment (DEA) which will support the Western Kapolei Regional Drainage Plan proposed by the Aina Nui Corporation, an affiliate of the James Campbell Company, LLC.

OHA has no substantive comments at this time. We do look forward to the opportunity to review the DEA when it is available and provide comments at that time. Should you have any questions, please feel free to contact me.

Thank you, Keola Lindsey

*Keola Lindsey*
*Office of Hawaiian Affairs*
*Compliance Monitoring Program*
*711 Kapiolani Boulevard*
*Honolulu, Hawaii 96813*
*keolal@oha.org (email)*
*(808) 594-0244 (office)*



SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Keola Lindsey
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Lindsey:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your email received on June 21, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Office when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that your Office has no comments to offer at this time and will continue to be included in future consultations for this project.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

June 16, 2011

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 1 6 2011
jke
FILE

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
DENISE M. C. DE COSTA
ANTHONY R. GUERRERO, JR.
THERESIA C. McMURDO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Your Letter Dated May 27, 2011 Requesting Comments for the Environmental Assessment Pre-Assessment Consultation for the Western Kapolei Regional Drainage Plan

Thank you for the opportunity to comment on the proposed Western Kapolei Regional Drainage Plan Draft Environmental Assessment.

The impact of the planned drainage improvements on groundwater recharge rates and the existing potable and non-potable wells in this region should be addressed in the environmental assessment.

The construction drawings should be submitted for approval.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

*Water for Life . . . Ka Wai Ola*

FILE COPY

---

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Paul S. Kikuchi
Honolulu Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai'i 96843

Dear Mr. Kikuchi:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 16, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice.*

Section 3.6 *Streams and Aquatic Resources* of the Draft EA includes a description of the hydrologic resources within the project area. We will continue to work with you through design of the regional drainage system and submit construction drawings for approval at the appropriate time.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

DEPARTMENT OF COMMUNITY SERVICES

CITY AND COUNTY OF HONOLULU

715 SOUTH KING STREET, SUITE 311 ● HONOLULU, HAWAII 96813 ● AREA CODE 808 ● PHONE: 768-7762 ● FAX: 768-7792

PETER B. CARLISLE
MAYOR

SAMUEL E. H. MOKU
DIRECTOR

BRIDGET HOLTHUS
DEPUTY DIRECTOR

June 2, 2011

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 07 2011
JKC
FILE

Mr. Jared Chang
Project Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawaii

We have reviewed your letter dated May 27, 2011 and the attached information on the subject project. Thank you for providing us the opportunity to comment on this matter.

Our review of the information provided, indicates that the proposed Western Kapolei Regional Drainage Plan will have no adverse impacts on any Department of Community Services' activities or projects at this time.

Thank you again for providing this opportunity to comment on this matter.

Sincerely,

Samuel E. H. Moku
Director

SEHM:sk

FILE COPY

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Samuel Moku, Director
Department of Community Services
City and County of Honolulu
715 South King Street, Suite 311
Honolulu, Hawai'i 96813

Dear Moku:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 2, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that the proposed project will have no adverse impacts on your Department's activities or projects at this time.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

COLLINS D. LAM, P.E.
DIRECTOR

LORI M. K. KAHIKINA, P.E.
DEPUTY DIRECTOR

SSFM INTERNATIONAL, INC.
RECEIVED
JUL 08 2011
JKC

FILE

July 7, 2011

Mr. Jared Chang
Project Planner
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawai'i

Thank you for the opportunity to review and comment on this project. The Department of Design and Construction has the following comment to offer:

The City & County of Honolulu has a 33-inch gravity sewer parallel to the OR&L ROW.

Should there be any questions, please contact Jay Hamai at 768-8750.

Sincerely,

Collins D. Lam, P.E.
Director

CDL:pg(418769)

FILE COPY

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Collins Lam, P.E., Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Dear Mr. Lam:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated July 7, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We have noted that the City and County of Honolulu has a 33-inch gravity sewer parallel to the OR&L right-of-way. We will continue to coordinate with your Department as part of the environmental assessment process and through design and construction.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

DEPARTMENT OF PARKS & RECREATION

**CITY AND COUNTY OF HONOLULU**

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

RECEIVED
JUL 26 2011

FILE COPY

July 22, 2011

Mr. Jared Chang, Project Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawaii

Thank you for the opportunity to review and comment at the pre-consultation stage of the Environmental Assessment for the Western Kapolei Regional Drainage Plan.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

GARY B. CABATO
Director

GBC:jr
(418829)

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Gary B. Cabato, Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawai'i 96707

Dear Mr. Cabato:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated July 22, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA).

We note that your Department has no comment and does not anticipate the proposed project to impact any of your programs or facilities. At your request, we will remove your department from the balance of the environmental assessment consultation process

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

DEPARTMENT OF TRANSPORTATION SERVICES

**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

KENNETH TORU HAMAYASU, P.E.
DEPUTY DIRECTOR

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 28 2011
JKC
FILE

TP5/10-418750R

June 21, 2011

Mr. Jared Chang
Project Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan, Environmental Assessment, Pre-Assessment Consultation, Kapolei, Oahu, Hawaii

This responds to your letter of May 27, 2011, requesting our comments concerning this proposed project.

Our Traffic Engineering Division (TED) reserves their comments on the project pending the preparation of a traffic impact assessment as part of the Draft Environmental Assessment (DEA) submittal.

Our Public Transit Division (PTD) has the following comments:

- The DEA should include a description of Public Transit services and operations, the impact of your project on these operations during and after construction. Basic information is available on the websites: www.thebus.org and www.honolulu.gov/dts. For more detail, you may contact the PTD staff at 768-8370.



- Construction notes should include the following note concerning transit:

  "This project may affect bus routes, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 852-6016 and paratransit operations: 454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction."

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Wayne Yoshioka, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Yoshioka:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i
DTS: TP5/10-418750R

Thank you for your letter dated June 21, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

The Draft EA includes a discussion of the proposed project impacts on traffic and public transit services. See Section 3.9 *Roadways*. We will continue to work with your Department during the environmental assessment process and throughout design and construction.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

---

HONOLULU FIRE DEPARTMENT

**CITY AND COUNTY OF HONOLULU**

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

ROLLAND J. HARVEST
DEPUTY FIRE CHIEF

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 14 2011
Jkc
FILE

June 13, 2011

Mr. Jared Chang
Project Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Environmental Assessment Preassessment Consultation
Western Kapolei Regional Drainage Plan
Kapolei, Oahu, Hawaii

In response to your letter of May 27, 2011, regarding the above-mentioned subject, the Honolulu Fire Department reviewed the information provided and determined that there will be no significant impact to its services.

Should you have any questions, please call Acting Battalion Chief Gary Lum of our Fire Prevention Bureau at 723-7152.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/SY:bh

FILE COPY

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Kenneth G. Silva, Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, Hawai'i 96813

Dear Mr. Silva:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 13, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that the proposed project will not have significant impacts on any of your Department's services.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

---

POLICE DEPARTMENT
**CITY AND COUNTY OF HONOLULU**
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE BSW-LS

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 16 2011
JKC
FILE

June 13, 2011

Mr. Jared Chang, Project Planner
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

This is in response to your letter dated May 27, 2011, requesting comments on the Pre-Assessment Consultation, Environmental Assessment, for the Western Kapolei Regional Drainage Plan project.

This project may have a negative impact on calls for police service because of the anticipated traffic congestion during the construction phase.

If there are any questions, please call Major Raymond Ancheta of District 8 (Kapolei) at 723-8403.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
BRYAN S. WAUKE
Assistant Chief of Police
Support Services Bureau

*Serving and Protecting With Aloha*

FILE COPY

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Louis M. Kealoha, Chief
Honolulu Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawai'i 96813

Dear Mr. Kealoha:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 13, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to your Department when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We acknowledge that the proposed project may have impacts to your Department's services due to calls regarding traffic congestion during construction. A maintenance of traffic plan will be prepared for the project during design.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

---

Hawaiian Telcom

SFM INTERNATIONAL, INC.
RECEIVED
JUN 17 2011
JKC
FILE

June 15, 2011

SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817
Attention: Mr. Jared Chang, Project Planner

Dear Mr. Chang:

Subject: **Western Kapolei Regional Drainage Plan**
**Environmental Assessment Pre-Assessment Consultation**
**Kapolei, Oahu, Hawaii**

Thank you for the opportunity to review and comment in preparation of the Draft Environmental Assessment for the subject project.

Hawaiian Telcom does not have any comments to offer at this time.

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,

Les Loo
Network Engineer – Outside Plant Engineering
Network Engineering & Planning

cc: File [Barbers Point]

FILE COPY

PO Box 2200 • Honolulu • Hi 96841

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Les Loo
Hawaiian Telcom
P.O. Box 2200
Honolulu, Hawai'i 96841

Dear Mr. Loo:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 15, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that Hawaiian Telcom has no comments to offer at this time.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

---

THE GAS COMPANY

P.O. Box 3000
Honolulu, Hawaii 96802-3000
www.hawaiigas.com

SSFM INTERNATIONAL, INC.
RECEIVED
JUN 21 2011
JKC
FILE

June 16, 2011

Mr. Jared Chang
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawai'i

Per your letter on May 27, 2011, The Gas Company, LLC has no objections to the proposed Draft Environmental Assessment. Please be advised that The Gas Company, LLC maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call Chris Hall at 594-5553.

Sincerely,

The Gas Company, LLC

Charles E. Calvet, P.E.
Manager, Engineering

CEC:krs
11-163

FILE COPY

SSFM INTERNATIONAL

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Charles E. Calvet, P.E.
The Gas Company
P.O. Box 3000
Honolulu, Hawai'i 96802-3000

Dear Mr. Calvet:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 16, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We acknowledge that The Gas Company has no objection to the proposed project. We will continue to work with you during the environmental assessment process and through design and construction to identify any potential conflicts with your existing gas facilities in the project area.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

# Transmittal

OCEANIC TIME WARNER CABLE
200 Akamainui Street ◆ Mililani HI 96789
(808) 625 - 2100

Review & Comment

***Date:*** *June 15th, 2011*

***To:*** *SSFM International*
*501 Sumner Street, Ste 620*
*Honolulu, HI 96817*
*(808) 531-1308*

***Attention:*** *Jared Chang, Project Planner*

*Western Kapolei Regional Drainage Plan*
*Environmental Assessment Pre-Assessment Consultation*
*Kapolei, Oahu, HI*
*SSFM 2010.151.002*

**GENTLEMEN: We are sending you the following:**

- ☐ **Pole / Conduit Application**
- ☐ **Permit Applications**
- ☒ **Copy of Letter**
- ☐ **Preliminary / Final Drawings**
- ☐ **Return Prints**
- ☒ **Other Review/Comment**

| *Copies* | *Sht / Appl. #* | *Description* |
|---|---|---|
| 1 | 1 | Letter of Review/Comment |
| 1 | 1 | Copy Original Cover Letter |
| | | |
| | | |

***The Above is transmitted:***

- ☐ **For Your Approval**
- ☐ **For Review and Comment**
- ☒ **For Your Use / Records**
- ☒ **As Requested**
- ☐ **As Approved**
- ☐ **Other**

***Comments / Remarks:*** **As requested, OTWC comments regarding the Pre-Assessment Phase of the above project.**

**If you have any questions or concerns, please let me know:**
**kerick.fujimura@twcable.com or 625-9734 / 222-1019 Thank you.**

CC: **Lori Iha**

Signed: **Kerick Fujimura**
Title: **OSP Engineer**

200 Akamainui Street
Mililani, Hawaii 96789-3999
Tel 808-625-2100
Fax 808-625-5888

OCEANIC TIME WARNER CABLE

June 15th, 2011

SSFM International
501 Sumner Street, Suite 620
Honolulu, Hi 96817
(808) 531-1308

Attn: Jared Chang,
Project Planner

**Subject: Western Kapolei Regional Drainage Plan**
**Environmental Assessment Pre-Assessment Consultation**
**SSFM 2010.151.002**

Dear Mr. Chang,

Thank you for including Oceanic Time Warner Cable (OTWC) in this phase of the Draft Environmental Assessment.

OTWC facilities are attached to the joint-poles on the Mauka portions of Old Farrington Highway and Farrington Highway, and the Makai side of Malakole Street. These overhead lines are in close proximity to, or are crossed by the Project Limits shown in the attachments provided with the letter dated May 27, 2011. These locations provide services for residential, commercial, City & County, and State entities west of Kalaeloa Blvd. and act as the main connection to the Island of Kauai. It should be noted any relocation or upgrade to the joint-poles at these points will require additional planning to prevent any disruption in service.

OTWC is involved with several projects noted on the Pre-Assessment Consultation Project Summary. Please include any impact to the planning and construction of these projects.

Should you have any questions or concerns, please feel free to contact me at 625-9734 or 222-1019, or email me at kerick.fujimura@twcable.com.

Sincerely,

Kerick Fujimura
OSP Engineer



SSFM INTERNATIONAL

501 Sumner Street, Suite 620
Honolulu, Hawaii 96817
Phone:(808) 531-1308
Fax:(808) 521-7348
www.ssfm.com

May 27, 2011

SSFM 2010.151.002

Oceanic Time Warner
200 Akamainui Street
Mililani Town, HI 96889

Subject: Western Kapolei Regional Drainage Plan
Environmental Assessment Pre-Assessment Consultation
Kapolei, Oahu, Hawai`i

Aina Nui Corporation, an affiliate of the James Campbell Company, LLC, is proposing to implement regional drainage improvements to support long-term drainage needs from future developments in Western Kapolei. A project summary and location map is provided for your reference.

A Draft Environmental Assessment (Draft EA) is being prepared for this Project to comply with State environmental regulations under Hawai`i Revised Statutes (HRS) Chapter 343, and Hawai`i Administrative Rules (HAR) Title 11, Chapter 200, Department of Health, State of Hawai`i. This letter and attachments are being provided to solicit any comments, concerns, or regulatory requirements you may have in regards to this project so that it may be addressed in the Draft EA.

We would greatly appreciate your cooperation in providing us with any written comments stating your environmental concerns by Friday, June 17, 2011. Please send comments to:

SSFM International, Inc.
Attn: Jared Chang
501 Sumner Street, Suite 620
Honolulu, Hawai'i 96817

Thank you very much and if you have any questions on this matter, please contact me by email or phone at (808) 356-1242.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner
Email: jchang@ssfm.com

Enclosures: Project Summary and Location Map

501 Sumner Street
Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

November 21, 2011

SSFM 2010_151.002

Mr. Kerick Fujimura
Oceanic Time Warner Cable
200 Akamainui Street
Mililani Town, Hawai'i 96789

Dear Fujimura:

Subject: Western Kapolei Regional Drainage System
Pre-Assessment Comments, Draft Environmental Assessment
Kapolei, Oahu, Hawai`i

Thank you for your letter dated June 17, 2011 providing pre-assessment comments on the Western Kapolei Regional Drainage System project. Your comments have been incorporated into the project's Draft Environmental Assessment (Draft EA). A hardcopy will be provided to you when the Draft EA is published in the State Office of Environmental Quality Control's *Environmental Notice*.

We note that Oceanic Time Warner Cable facilities are in close proximity to or crossed by the proposed drainage project. We will continue to coordinate with you during the environmental assessment process and throughout design and construction to avoid any disruption of service to your customers.

Sincerely,

SSFM INTERNATIONAL, INC.

Jared Chang
Planner
Email: jchang@ssfm.com

# APPENDIX A-2: DRAFT EA CONSULTATION LETTERS AND RESPONSES

DEPARTMENT OF PARKS & RECREATION
CITY AND COUNTY OF HONOLULU
1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

SSFM INTERNATIONAL, INC.
RECEIVED
DEC 28 2011

PETER B. CARLISLE
MAYOR

GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

FILE

FILE COPY

December 27, 2011

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Draft Environmental Assessment
Western Kapolei Regional Drainage System
Kapolei, Hawaii
Tax Map Keys: 9-1-14: 2, 26 and 27; 9-1-15: 2, 4 and 20; 9-1-74: 36

Thank you for the opportunity to review and comment on Aina Nui Corporation's Draft Environmental Assessment for the proposed Western Kapolei Regional Drainage System.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

GARY B. CABATO
Director

GBC:jr
(445624)

cc: Blake La Benz, Department of Planning and Permitting

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Mr. Gary B. Cabato, Director
Department of Parks & Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

Dear Mr. Cabato:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawai'i
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated December 27, 2011 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

Per your department's request, we have removed your department as a consulted party for the balance of the EA process.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

POLICE DEPARTMENT

**CITY AND COUNTY OF HONOLULU**

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNATIONAL, INC.
RECEIVED
DEC 29 2011
JKC

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE JT-LS

FILE COPY

FILE

December 27, 2011

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

This is in response to a letter from the City Department of Planning and Permitting (dated December 12, 2011) regarding the Draft Environmental Assessment for the Western Kapolei Regional Drainage System project.

This project may cause an increase in calls for police service because of the anticipated traffic congestion during the construction phase. However, once the project is completed, it should have no significant impact on the facilities or services of the Honolulu Police Department.

If there are any questions, please call Major Raymond Ancheta of District 8 (Kapolei) at 723-8403.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
JOHN THOMPSON
Acting Assistant Chief of Police
Support Services Bureau

*Serving and Protecting With Aloha*

---

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Mr. Louis M. Kealoha
Honolulu Police Department
City and County of Honolulu
Chief of Police
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Kealoha:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated December 27, 2011 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

We acknowledge in the Final EA that the project may cause an increase in police calls during construction due to vehicles and work being conducted at the Malakole Street Culvert. A Maintenance of Traffic Plan will be prepared during design for the work occurring at Malakole Street to address roadway travel impacts. We concur that the project should have no significant impacts on your department's facilities or services once the project is completed.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

HONOLULU FIRE DEPARTMENT

**CITY AND COUNTY OF HONOLULU**

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

SSFM INTERNATIONAL, INC.
RECEIVED
JAN 09 2012
jke
FILE

January 5, 2012

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Draft Environmental Assessment
Western Kapolei Regional Drainage System
Kapolei-Ewa, Oahu, Hawaii
Tax Map Keys: 9-1-014: 002, 026, and 027; 9-1-015: 002, 004 and 020; and 9-1-074: 036

In response to a letter from Mr. David Tanoue of the City's Department of Planning and Permitting dated December 12, 2011, regarding the above-mentioned subject, the Honolulu Fire Department reviewed the material provided and determined that there will be no significant impact to fire department services.

Should you have any questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151 or sbratakos@honolulu.gov.

Sincerely,

for KENNETH G. SILVA
Fire Chief

KGS/KN:bh

**FILE COPY**

---

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012 SSFM 2012_151.002

Mr. Kenneth G. Silva
Honolulu Fire Department
City and County of Honolulu
Fire Chief
636 South Street
Honolulu, Hawaii 96813

Dear Mr. Silva:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 5, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

We acknowledge that your department has reviewed the Draft EA and determined that the proposed project would not have significant impacts on fire department services in the area.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

January 10, 2012

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
DENISE M. C. DE COSTA, Vice Chair
THERESIA C. McMURDO
DUANE R. MIYASHIRO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

DEAN A. NAKANO
Acting Manager

SSFM INTERNATIONAL, IN
RECEIVED
JAN 12 2012
jke
FILE

Mr. Jared Chang
SSFM International, Incorporated
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: The Letter Dated December 12, 2011 Requesting Comments on the Draft Environmental Assessment for the Western Kapolei Regional Drainage System, TMK: 9-1-14:2, 26 and 27; 9-1-15:2, 4, and 20; 9-1-74:36

Thank you for the opportunity to comment on the proposed project.

The construction drawings should be submitted for our review.

The construction schedule should be coordinated to minimize impact to the water system.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

Susan Uyesugi

SUSAN UYESUGI
Program Administrator
Customer Care Division

FILE COPY

*Water for Life . . . Ka Wai Ola*

---

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Ms. Susan Uyesugi
Board of Water Supply
City and County of Honolulu
Program Administrator, Customer Care Division
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Ms. Uyesugi:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 10, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

Plans for the proposed project will be coordinated with your department during the design phase anticipated to start in 2012. Construction drawings and schedules will be submitted to your department for review, as appropriate.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

DEPARTMENT OF FACILITY MAINTENANCE

**CITY AND COUNTY OF HONOLULU**

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

SSFM INTERNATIONAL INC.
RECEIVED
JAN 2 2 2012
JC

PETER B. CARLISLE
MAYOR

WESTLEY K.C. CHUN, Ph.D., P.E., BCEE
DIRECTOR & CHIEF ENGINEER

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 12-27

FILE

January 11, 2012

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Draft Environmental Assessment (DEA)
Western Kapolei Regional Drainage System

Thank you for the opportunity to review the subject DEA. We do not have any comments at this time.

Should you have any questions, please call Thomas Takeuchi of the Division of Road Maintenance, at 768-3608.

Sincerely,

Westley K.C. Chun, Ph.D., P.E., BCEE
Director & Chief Engineer

cc: Department of Planning and Permitting

---

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Wesley K.C. Chun, Ph.D., P.E., BCEE
Department of Facility Maintenance
City and County of Honolulu
Director and Chief Engineer
636 South Street
Honolulu, Hawaii 96813

Dear Dr. Chun:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 11, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

We note that your department does not have any comments at this time.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

Attn: Jared Chang

Re: D.E.A. Kapolei Drainage

From: Blake La Benz, D.P.P.
phone: 768-8016

This fax was received by GFI FaxMaker fax server. For more information, visit: http://www.gfi.com



**DEPARTMENT OF DESIGN AND CONSTRUCTION**
**CITY AND COUNTY OF HONOLULU**
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

LORI M.K. KAHIKINA, P.E.
ACTING DIRECTOR

CHRIS TAKASHIGE, P.E.
DEPUTY DIRECTOR

RECEIVED
'12 JAN 24 A8:32
DEPT OF PLANNING AND PERMITTING
CITY & COUNTY OF HONOLU

January 23, 2012

**MEMORANDUM**

TO: DAVID K. TANOUE, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: for LORI M.K. KAHIKINA P. E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: Chapter 343, Revised Statutes
Draft Environmental Assessment (EA)

Thank you for inviting us to review the above project. The Department of Design and Construction has the following comments.

In section 226-4 (2) of the Hawai'i State Plan is articulated the goal for: "*A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.*"

Notwithstanding that the Western Kapolei Regional Drainage Channel traverses industrial zoned land, the proposed plan seems to be in conflict with the State goal cited above because several sections of the structure, at least, will probably be considered unsightly and visually intrusive by most people, and the opposite of a "natural system." Although the Draft Environmental Assessment (DEA) provides little detail concerning the design of the project's waterways, there is little in the document to suggest that it will be designed with an eye to enhancing the beauty, cleanliness, and natural systems in the area. Presumably the section that traverses the future Kapolei West development and golf course will be attractively designed for human compatibility and well-being, but why should not the entire project from its start?

Unexamined in the DEA are various alternatives forms of a natural waterway not lined with concrete. There have been many innovative, greener, and sustainable engineering solutions developed elsewhere in this country that supersede the conventional, concrete lined channel solution. The DEA appears to recognize that - typical of such engineered structures - the proposed drainage plans will do little to mitigate the transport of large

This fax was received by GFI FaxMaker fax server. For more information, visit: http://www.gfi.com

amounts of upstream sediments and pollutants into near-shore ocean waters during major storm events.

A concrete channel conducts storm waters rapidly to the ocean without providing any opportunity for sediments or trash to settle out, or to quench thirsty vegetation in an otherwise semi-arid environment. Rather than being regarded as a liability, an appropriately designed and landscaped waterway could be looked upon as a potentially valuable public asset– a shady, attractive place where workers and patrons of businesses in the Kapolei Harborside development could recreate during lunch breaks and other off-hours. It is granted that alternative solutions have their own unique maintenance implications, but these alternatives deserve thorough investigation and consideration.

Chapter 5 concerning Alternatives to the Proposed Action should also explore the great variety of alternatives for improving percolation of storm water at areas subject to flooding, such as the Kalaeloa Boulevard/Malakole Road intersection. Although Alternative 5.4 in the DEA discusses retention of runoff in retention basins, it does not consider the many other engineering solutions that could be employed to mitigate flooding, such as vegetated swales, bioretention systems, water quality basins, and other methods to control and channel water for more constructive human purposes.

LMKK:pg(445558)

This fax was received by GFI FaxMaker fax server. For more information, visit: http://www.gfi.com

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012 SSFM 2012_151.002

Ms. Lori M.K. Kahikina, P.E.
Department of Design and Construction
City and County of Honolulu
Acting Director
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Ms. Kahikina:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your memorandum dated January 23, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project. In response to your comments, we offer the following:

The purposes of this project aim to improve drainage conditions in western Kapolei that are frequently subject to flooding during heavy rainstorms and to provide a regional drainage system in support of large planned developments, consisting of Makaiwa Hills, Kapolei West, and Kapolei Harborside. Planning a regional drainage system in accordance with long-range development plans is consistent the intent of the Hawai'i State Plan, Chapter 226 of the Hawai'i Revised Statutes. The overall benefits of this project will serve an important role for western Kapolei which is in line with the State's goal of creating desirable physical environments. As new construction developments increase in this area, so will the need for an adequate regional drainage facility. Therefore, the project is consistent with the State's goal of creating desirable physical environments by establishing a regional drainage system where none exists today.

The project will contribute positively to enhancing the mental and physical well being of Hawai'i's people, mainly impacting the western Kapolei community. There is no current regional drainage system serving this area of Kapolei because planned developments have not yet been constructed. We acknowledge that these facilities must be designed with human compatibility and well-being in mind but also in accordance with City and County of Honolulu standards for both runoff and water quality. All desirable outcomes should be pursued to the extent that the system protects the environment, is cost efficient, and can be maintained. The proposed project is conceptual at this point and the applicant is following the necessary City review and approval steps throughout the design process.

The design plan approach is described in the *Regional Drainage Plan for Western Kapolei* dated January 2012 and included as Appendix B of the Final EA. This plan has been reviewed and accepted by the City and County of Honolulu, Department of Planning and Permitting (DPP) as

having addressed drainage-related issues for the development of the western Kapolei area as required by unilateral conditions for zoning. DPP has confirmed acceptance of this plan by letter dated February 22, 2012, also included in Appendix B.

The *Regional Drainage Plan for Western Kapolei* acknowledges differences in the planned development uses between Makaiwa Hills, Kapolei West, and Kapolei Harborside. This acknowledgement resulted in the recommendation that each of these unique areas require the regional drainage system to be designed to suit surrounding conditions. This recommendation is consistent with the State's desire to create stable natural systems by following existing drainage corridors and ensuring design of systems compatible with the surrounding environment.

In the proposed project section between the shoreline and Malakole Street, a natural drainageway already exists that will eventually be concrete-lined. This is the only portion of the regional drainage system that will require concrete-lining throughout its length. Photos of this section are shown in Figure 5A of the Final EA. Since the channel reach below Malakole Street will be subject to tidal influence and consists of "soft soils," this section of the channel will require concrete lining based on preliminary geotechnical engineering investigations by Dames and Moore in 1990. There have been no changes in soil conditions since 1990, thus the Dames and Moore geotechnical evaluation recommendations remain valid for conceptual design purposes. Additional geotechnical investigations will be conducted for ensuing stages of the project design. The channel through this section is unlikely to be considered "visually obtrusive" to the surrounding industrial community because it would open coastal views from Malakole Street by removing unmaintained trees and vegetation within the channel. The action of removing overgrown brush is also likely to contribute positively to the "cleanliness" of the area.

The majority of the remaining channel through the Kapolei West and Kapolei Harborside developments will remain unlined. These unlined sections would be excavated in hard coral which has benefits over concrete-lined channels. The lined sections of the channel through Kapolei Harborside development will be limited to those areas where soil erosion is expected due to higher velocities, such as downstream of bridge/culvert crossings, and where energy dissipation is likely to be required. Alternatives to concrete lining will be investigated during the later design stages when additional soils investigations will be performed.

While sediment and pollutants from upstream developments will unavoidably find their way to the channel, Makaiwa Hills, Kapolei West, and Kapolei Harborside developments each have developed specific water quality plans to treat the quality of collected runoff prior to discharge into the regional drainage system. Furthermore, the regional drainage system will be largely unlined, allowing for percolation of collected runoff, especially through the Kapolei Harborside development where the channel bottom will likely be coral.

Individual phases within the larger planned developments will be required to address the water quality impacts from their actions. It is within these phases, or in the case of the Kapolei Harborside development within each lot, that alternatives such as vegetated swales and



bioretention systems would be encouraged. Vegetated swales and bioretention systems could potentially be incorporated in the landscaping requirements for these developments, adding to the attractiveness of each development, reducing some of the irrigation requirements, as well as reducing pollutants from being introduced into the roadway drainage systems and ultimately, the regional system.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

DEPARTMENT OF PLANNING AND PERMITTING
**CITY AND COUNTY OF HONOLULU**
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2011/ED-14 (BLB)

January 23, 2012

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Environmental Assessment No. 2011/ED-14
Chapter 343, Hawaii Revised Statutes (HRS)
Western Kapolei Regional Drainage System
Various - Kapolei
Tax Map Key 9-1-14: 2 and 26; 9-1-15: 2 and 4; and 9-1-74: 36

In accordance with the procedural provisions of Chapter 343, HRS, all comment letters received during the 30-day public comment period, which began with the initial publication of a notice of availability of the Draft Environmental Assessment (DEA) in The Environmental Notice on December 23, 2011, require a response addressed directly to the commenter. The Final EA must include all comment letters and responses to the letters, as well as appropriately revised text.

The following are the Department of Planning and Permitting comments on the DEA:

1. What is the discharge area for the Drainage Channel?

2. What is the discharge area for the Golf Course?

3. DEA Section 2.3.1(4), OR&L – Culvert: Clarify why the culvert design discharge states 3,700 cubic feet per second (cfs); but in narrative, the estimated 100-year peak flow is about 3,835 cfs.

4. DEA Section 2.3.2: Clarify whether or not the drainage outlet will be completed in 2012, prior to completion of other phases between the outlet and Farrington Highway. And, if in fact it is not to be, then provide a section in the Final EA on what the interim measures will be to allow prudent development of the area under this master plan.

5. DEA Section 3.6.1, Storm Water Discharge "Plume" Analysis: Case 3 and Case 4 are the same.

6. DEA Section 3.8 Flood and Tsunami Hazard: Will a LOMR be initiated to revise the FIRM map in this study area?



7. Clarify whether DEA Figure 8 is a floodway or a 100-year flood inundation area. Also, the information provided on this figure is not an official Flood Insurance Rate Map (FIRM). Provide accurate FIRM information and map number.

8. DEA Chapter 6 should include obtaining grading permits as part of the permitting process.

9. DEA Chapter 4, Conformance with Plans and Policies: We concur that the project is consistent with the General Plan and the Ewa Development Plan.

10. DEA Chapter 8, Agency and Public Consultation: Although the DEA states that the project will cross the OR&L right-of-way, and that appropriate mitigation measures need to be determined, there is no record that the Hawaiian Railway Society has been contacted and consulted. Such consultation should be done, given the Society's role in maintaining the tracks and operating a historic train ride on the OR&L right-of-way.

Please feel free to contact Blake La Benz of our staff at 768-8016 for any questions.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:nw

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Mr. David K. Tanoue
Department of Planning and Permitting
City and County of Honolulu
Director
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Tanoue:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 23, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project. We offer the following responses to your comments:

1. The discharge area for the Drainage Channel is undetermined. The term "discharge area" was inadvertently used in place of "drainage basin" in the section descriptions. A global correction was conducted in the Draft EA and is reflected in the Final EA. The drainage basin for the Drainage Channel section consists of about 2,565 acres at the ocean outlet. The area of the channel at the shoreline adds an additional discharge area of about 800 sq. ft. which is very small relative to the drainage basin.

2. The Golf Course drainage basin is 1,840 acres.

3. The culvert design is approximately 3,700 cubic feet per second (cfs) at the OR&L crossing. The 3,835 cfs reflects the discharge at the Kapolei West/Kapolei Harborside interface.

4. The drainage channel will not be completed in 2012, however, excavation of portions of the channel between Malakole Street and the OR&L have commenced, providing retention/detention volume to allow development of portions of the served properties. Design and excavation of the remaining portions of the channel above Malakole Street will continue through 2012.

5. The studies scenario for Case 4 was corrected to note a one year frequency and one hour rainfall duration.

6. A Letter of Map Revision (LOMR) is not being initiated since no modifications to the applicable Flood Insurance Rate Map (FIRM) are being proposed as part of this action.



7. Figure 8 in the Final EA was revised to show the official FIRM Map Number 15003C0305F (Revised September 30, 2004). This revision clarifies that the Drainage Outlet section is located in Zone "AE" which is a 100-year flood inundation area.

8. Grading Permits have been added to the list of required permits and approvals in Chapter 6 of the Final EA.

9. We acknowledge your concurrence that the project is consistent with the General Plan and 'Ewa Development Plan.

10. In May 2009, Cultural Surveys Hawai'i completed the *Preservation Plan for Seven Historic Properties Location in or Adjacent to the Kapolei West Project, Honolulu Ahupuaa, 'Ewa District, O'ahu*. This plan included proposed mitigation and protection measures for improvements related to the regional drainage system project to protect the historic OR&L railroad right-of-way. The State Historic Preservation Division (SHPD) reviewed and approved this plan by letter dated April 28, 2011 and both are included as Appendix E of the Final EA.

    The Hawaiian Railway Society was consulted during the development of this preservation plan and provided comments to the Department of Planning and Permitting on March 7, 2008 regarding the proposed OR&L railroad right-of-way crossings. The Hawaiian Railway Society recommended that all proposed crossings be accomplished by bridges or tunnels rather than at-grade which would reduce the amount of stops for the train and have minimal impacts on the character of the historic track. The response expressed additional concerns with Railroad Bridge 28A during major storm events because of the significant amount of stormwater the bridge crosses and requested the opportunity to review drawings of drainage and utility facilities when they are available. A copy of the OR&L related correspondence taken from the CSH preservation plan is also included in Appendix E.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

DEPARTMENT OF TRANSPORTATION SERVICES
**CITY AND COUNTY OF HONOLULU**
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

TP12/11-445621R

January 19, 2012

SSFM International, Inc
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Attention: Mr. Jared Chang

Dear Mr. Chang:

Subject: Special Management Area (SMA) Permit and Shoreline Setback Variance (SSV) to allow the construction of a regional drainage system in accordance with the Western Kapolei Regional Drainage Plan
Tax Map Keys: 9-1-14:2, 26 And 27; 9-1-15:2, 4 And 20; 9-1-74:36

This responds to your letter of December 12, 2011, for consultation and comments on a Draft Environmental Assessment (DEA) for the subject project. Based on our review, we have no comments to offer at this time.

Thank you for the opportunity to review this matter. Should you have any further questions on the matter, you may contact Virginia Bisho of my staff at 768-5461.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Mr. Wayne Y. Yoshioka, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

Dear Mr. Yoshioka:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 19, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

We acknowledge your determination that the proposed acquisition would not have significant impacts on the transit facilities in the area.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

**STATE OF HAWAII**
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

SSFM INTERNATIONAL, INC.
RECEIVED
FEB 07 2012
jka
FILE

February 1, 2012

12-093A CAB

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

SUBJECT: Western Kapolei Regional Drainage System, Draft Environmental Assessment

All projects should address potential dust, emissions, and odor nuisance concerns. Activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

We encourage the contractor to implement a dust control plan as stated in the assessment. A dust control plan, which does not require approval by the Department of Health, can assist in complying with the fugitive dust regulations. The plan may include measures identified in your report.

If you have any questions, please contact Mr. Barry Ching of the Clean Air Branch at 586-4200.

Sincerely,

NOLAN S. HIRAI
Acting Manager, Clean Air Branch

BC:mah

c: Blake La Benz, Department of Planning and Permitting,
City & County of Honolulu

FILE COPY

---

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012

SSFM 2012_151.002

Mr. Nolan S. Hirai, Acting Manager
Clean Air Branch
Department of Health
636 South Street
Honolulu, Hawaii 96813

Dear Mr. Hirai:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated February 1, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project.

We acknowledge your encouragement for the project to develop appropriate dust control plans as stated in the Draft EA. This language and recommendation remains in the Final EA.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

SSFM INTERNATIONAL, INC.
RECEIVED
JAN 26 2012
FILE

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

FILE COPY

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

01028PDCL.12

January 25, 2012

Mr. Jared Chang
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Mr. Chang:

**SUBJECT: Draft Environmental Assessment (EA) for the Western Kapolei Regional Drainage System Kapolei, Island of Oahu, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for an NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than



one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. This includes areas used for a construction base yard and the storage of any construction related equipment, material, and waste products. An NPDES permit is required before the start of the construction activities.

   b. Construction dewatering effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For other types of wastewater not listed in Item No. 2 above or wastewater discharging into Class 1 or Class AA waters, an NPDES individual permit will need to be obtained. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://hawaii.gov/health/environmental/water/cleanwater/forms/environmental/water/cleanwater/forms/indiv-index.html.

4. The DOH-CWB acknowledges that you will pursue a Department of the Army permit with the Army Corp of Engineers, Regulatory Branch.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

5. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at:

http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

DCL:ml

SSFM INTERNATIONAL

501 Sumner Street Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
www.ssfm.com

April 9, 2012 SSFM 2012_151.002

Mr. Alec Wong, P.E.
Department of Health
Clean Water Branch Chief
636 South Street
Honolulu, Hawaii 96813

Dear Mr. Wong:

Subject: Western Kapolei Regional Drainage System
Kapolei, Hawaii
Response to Comments on Draft Environmental Assessment

Thank you for your letter dated January 25, 2012 providing comments on the Draft Environmental Assessment (Draft EA) for the subject project. We have the following responses to your comments:

- We confirm that your review is based upon compliance with Chapters 11-54, State Water Quality Standards, Hawai‘i Administrative Rules (HAR) and Chapter 11-55, HAR: and that it is recommended that we also read the Clean Water Branch standard comments located at the Department of Health’s website.

- This further review will ensure that future development meets the following criteria set forth in Chapter 11-54, HAR:

  - Section 11-54-1.1, HAR: Antidegredation policy which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected;
  - Section 11-54-3, HAR: Designated uses as determined by the classification of the receiving State waters; and
  - Section 11-54-4 though 8: Water quality criteria.

- We note that future development will require that a National Pollutant Discharge Elimination System (NPDES) general permit be obtained. Further that multiple Notice of Intent (NOI) forms may be required; one NOI for each type of discharge.

- We also understand that wastewaters not listed in the NPDES general permit may require and NPDES individual permit.

- We agree that Department of Army permits shall be pursued with the Army Corps of Engineers, Regulatory Branch for this project.

Lastly, we also understand that all discharges related to future project construction must comply with the State's Water Quality Standards. That noncompliance is subject to penalties of $25,000 per day violation.

If you have any questions on this matter, please contact me at 356-1242. Thank you.

Sincerely,
SSFM INTERNATIONAL, INC.

Jared Chang
Project Planner

cc: Steve Kelly, Aina Nui Corporation
Blake La Benz, City Department of Planning and Permitting

# APPENDIX B-1: DPP Acceptance for Regional Drainage Plan dated February 22, 2012

DEPARTMENT OF PLANNING AND PERMITTING
**CITY AND COUNTY OF HONOLULU**
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

RECEIVED
FEB 24 2012
ENGINEERING CONCEPTS

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2012/ELOG-292 (lf)

February 22, 2012

Mr. Craig Arakaki, P. E.
Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Dear Mr. Arakaki:

Subject: Regional Drainage Plan for Western Kapolei
Tax Map Key: 9-1-015 and 9-2-003

The "Regional Drainage Plan for Western Kapolei", dated January 2012, is accepted as submitted.

The Regional Drainage Plan identifies both on-site and off-site conditions specifically for the Makaiwa Hills, Kapolei West, and Kapolei Harborside projects. Development of these projects is expected to begin in 2012 and continue through 2030.

A summary of the Regional Drainage Plan for Western Kapolei is provided below:

1. Makaiwa Hills is a planned hillside community consisting of single and multi-family homes, commercial uses, schools, and other public facilities. The drainage concept is to collect the off-site and any increase in surface runoff resulting from the proposed improvements so that flows passing through existing highway culverts will be at or below identified capacities. All drainage infrastructure for the planned development will be designed according to City and County of Honolulu standards for both runoff and water quality.

2. Kapolei West is a planned golf course community with multi-family residential, mixed-use commercial, public facilities, and associated transit-oriented development . The drainage concept is to collect and detain discharges within the limits of the golf course. On-site and off-site drainage discharges will also adhere to City standards for both runoff and water quality.

3. Kapolei Harborside is the light industrial component of the Western Kapolei regional drainage area. The drainage concept for this area is to collect and discharge the on-site and off-site runoff into a regional channel that by agreement will service Makaiwa Hills, Kapolei West, and Kapolei Harborside developments. Sometime in 2015, an existing channel, between Malakole Road and the ocean, will be improved to pass the regional design flows. In the interim, the proposed Harborside drainage channel will serve as a temporary retention basin for anticipated regional flows in addition to phased project-specific on-site retention basins.

4. All water quality designs will be based on the most current adopted City and County design standards.

The Regional Drainage Plan for Western Kapolei has addressed drainage-related issues for development of the western Kapolei area as required by the unilateral conditions for zoning. If you have any questions, please call Len Furukawa of our Site Development Division at 768-8105.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:ky
g:regionaldrainageplanforwesternkapolei2012

cc: Planning Division

# APPENDIX B-2: Final Regional Drainage Plan for Western Kapolei dated January 2012

# REGIONAL DRAINAGE PLAN

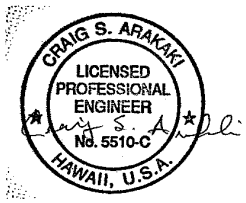
# FOR

# WESTERN KAPOLEI

**Prepared for:**
**KAPOLEI PROPERTY DEVELOPMENT LLC**
**HONOLULU, HAWAII**

**Prepared by:**
**ENGINEERING CONCEPTS, INC.**
**1150 SOUTH KING STREET, SUITE 700**
**HONOLULU, HAWAII 96814**

**January 2012**




## REGIONAL DRAINAGE PLAN
## FOR
## WESTERN KAPOLEI

### INTRODUCTION

The Estate of James Campbell LLC and affiliates - Makaiwa Hills LLC, Aina Nui Corporation, and Kapolei Property Development LLC are continuing the planning of development in the Kapolei area. The Western Kapolei development is comprised of three projects: Makaiwa Hills; Kapolei West; and Kapolei Harborside (Figure 1).

Makaiwa Hills is a planned hillside community on approximately 1,850 acres consisting of single and multi-family homes, commercial uses, and schools and other public facilities. Kapolei West (formerly Ko Olina Phase 2) is a planned golf course community with multi-family residential, mixed use commercial, public facilities and a proposed transit oriented development site on approximately 515 acres of former sugarcane land. Kapolei Harborside is the industrial component of the Western Kapolei development, with light industrial, maritime-related and industrial-mixed uses on about 351 acres.

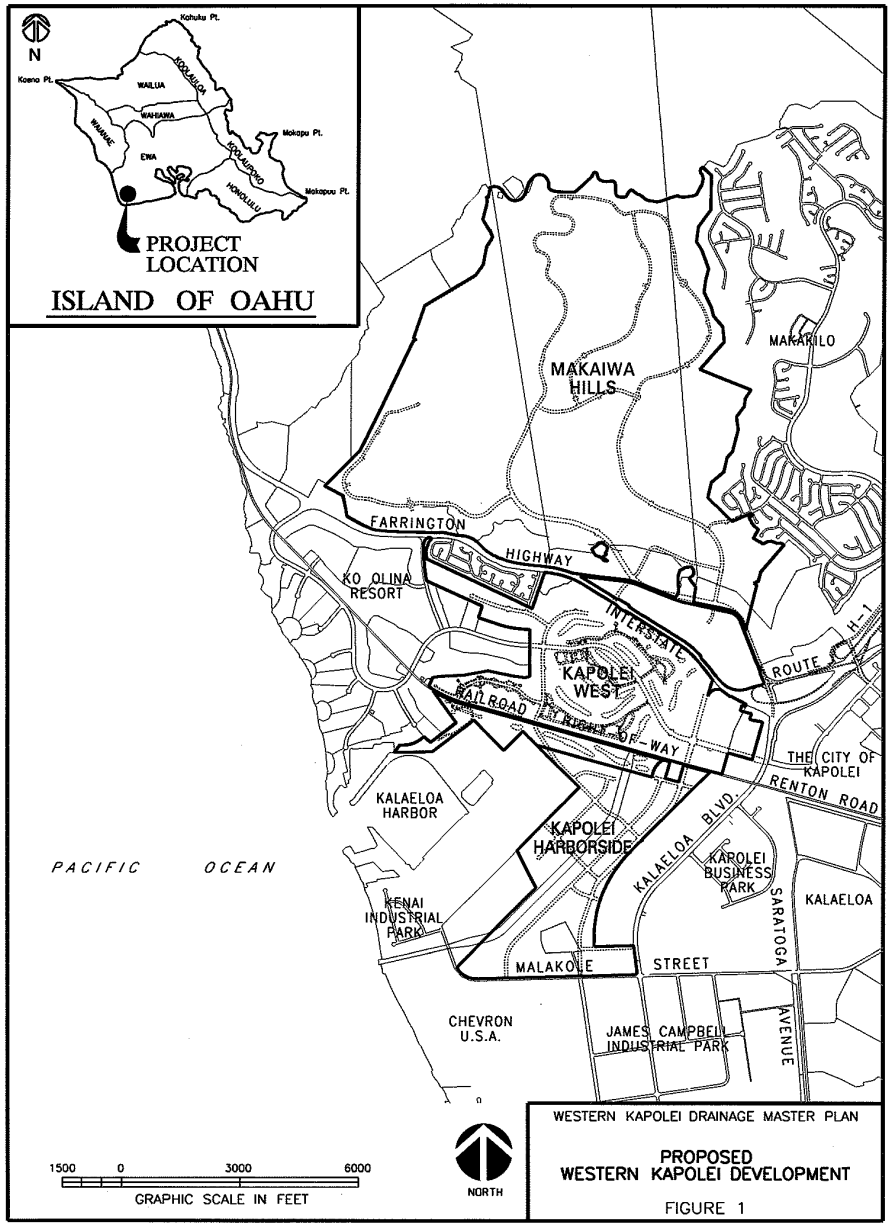
These three projects are essential components to the vision of Kapolei as Oahu's Second Urban Center (Figure 2). The diversity of housing and employment opportunities planned across these projects is critical to continuing the expansion of a successful urban center in Kapolei.

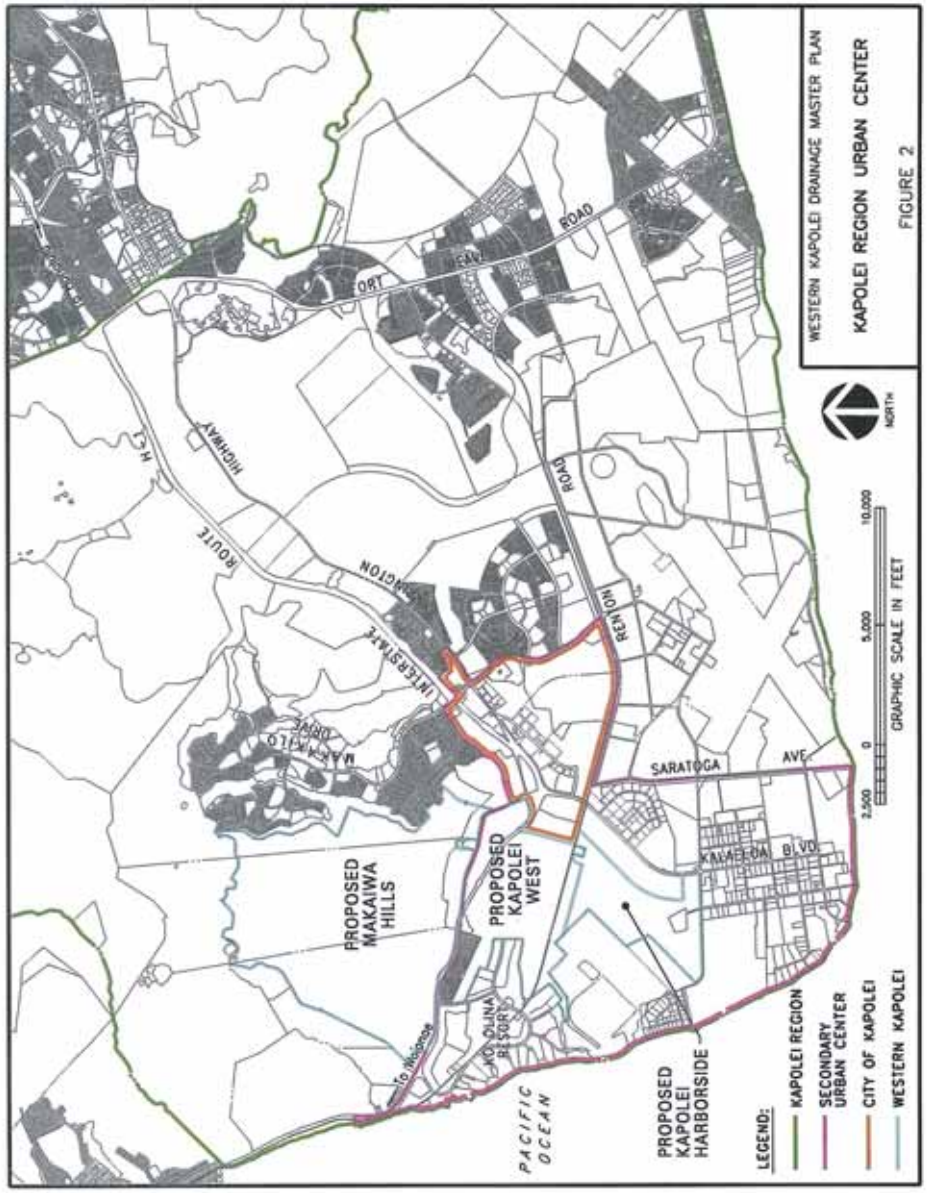
This report will discuss drainage related issues and identify the regional drainage plan for development of the Western Kapolei area as required by the unilateral conditions for zoning.

### CURRENT CONDITIONS

#### Land Uses

The three project sites are currently undeveloped. Former land uses include coral mining (Kapolei Harborside), sugarcane production (Kapolei West and Makaiwa Hills) and ranching (Makaiwa Hills).


N
Kahuku Pt.
Koeno Pt.
WAILUA
KOOLAULOA
WAHIAWA
WAIANAE
EWA
KOOLAUPOKO
HONOLULU
Makapu Pt.
Makapuu Pt.
PROJECT LOCATION
ISLAND OF OAHU
MAKAIWA HILLS
MAKAKILO
FARRINGTON
HIGHWAY
KO OLINA RESORT
INTERSTATE
ROUTE
H-1
KAPOLEI WEST
RAILROAD
RIGHT
OF-WAY
THE CITY OF KAPOLEI
RENTON ROAD
KALAELOA HARBOR
KAPOLEI HARBORSIDE
KALAELOA BLVD.
KAPOLEI BUSINESS PARK
KALAELOA
PACIFIC OCEAN
KENAI INDUSTRIAL PARK
MALAKOLE
STREET
SARATOGA
AVENUE
CHEVRON U.S.A.
JAMES CAMPBELL INDUSTRIAL PARK
1500 0 3000 6000
GRAPHIC SCALE IN FEET
NORTH
WESTERN KAPOLEI DRAINAGE MASTER PLAN
PROPOSED WESTERN KAPOLEI DEVELOPMENT
FIGURE 1


WESTERN KAPOLEI DRAINAGE MASTER PLAN
KAPOLEI REGION URBAN CENTER
FIGURE 2
NORTH
GRAPHIC SCALE IN FEET
0 2,500 5,000 10,000
FARRINGTON HIGHWAY
ROUTE H-1
INTERSTATE
MAKAKILO DRIVE
FORT WEAVER ROAD
RENTON ROAD
SARATOGA AVE.
KALAELOA BLVD.
PROPOSED MAKAIWA HILLS
PROPOSED KAPOLEI WEST
KO OLINA RESORT
To Waianae
PACIFIC OCEAN
PROPOSED KAPOLEI HARBORSIDE
LEGEND:
KAPOLEI REGION
SECONDARY URBAN CENTER
CITY OF KAPOLEI
WESTERN KAPOLEI

The Makaiwa Hills project site (Figure 3) is located on the southern slopes of the Waianae Range. Makakilo City, a residential community, is located to the east of the site, with Waimanalo Gulch Sanitary Landfill to the west. Honokai Hale and Nanakai Gardens, the proposed Kapolei West, and Ko Olina Resort border Makaiwa Hills to the south while Palehua Road and preservation zoned land form the mauka boundary. A portion of the project site is currently leased for ranching and nursery operations.

The Kapolei West project site (Figure 4) lies between the Makaiwa Hills to the north, Kapolei Harborside to the south, the City of Kapolei to the east, the Ko Olina Resort to the west, and the Honokai Hale and Nakakai Gardens communities to the northwest.

The Kapolei Harborside project site (Figure 5) is bounded by the proposed Kapolei West site on the north, Kapolei Business Park on the east, the Campbell Industrial Park on the south, and the Kalaeloa Harbor and undeveloped maritime industrial land on the west. A portion of the site along the makai boundary is currently used for the processing of green waste and a nursery. A coal conveyor system traverses the lower portion of the site transporting coal from Kalaeloa Harbor (former Barbers Point Harbor) to a generating station in Campbell Industrial Park.

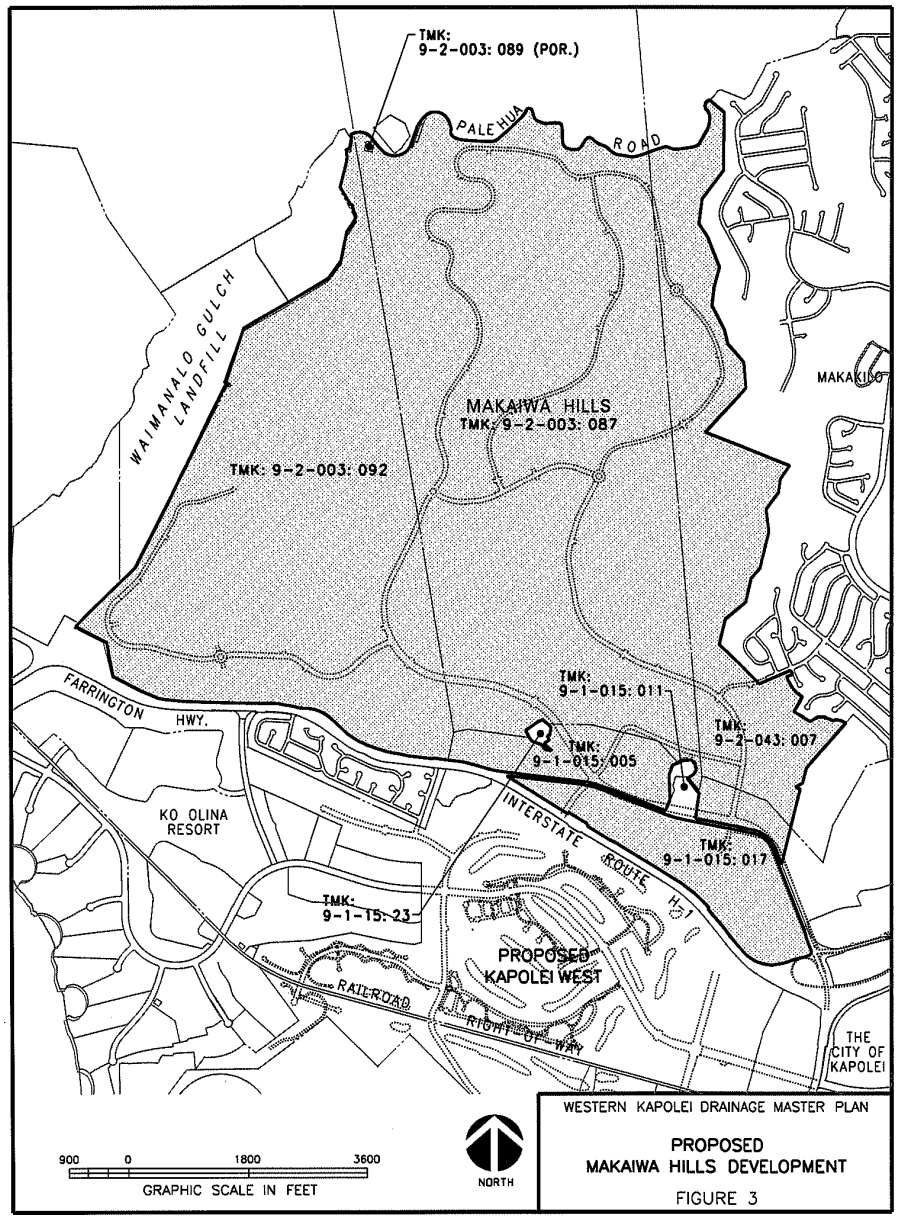
**Climate**

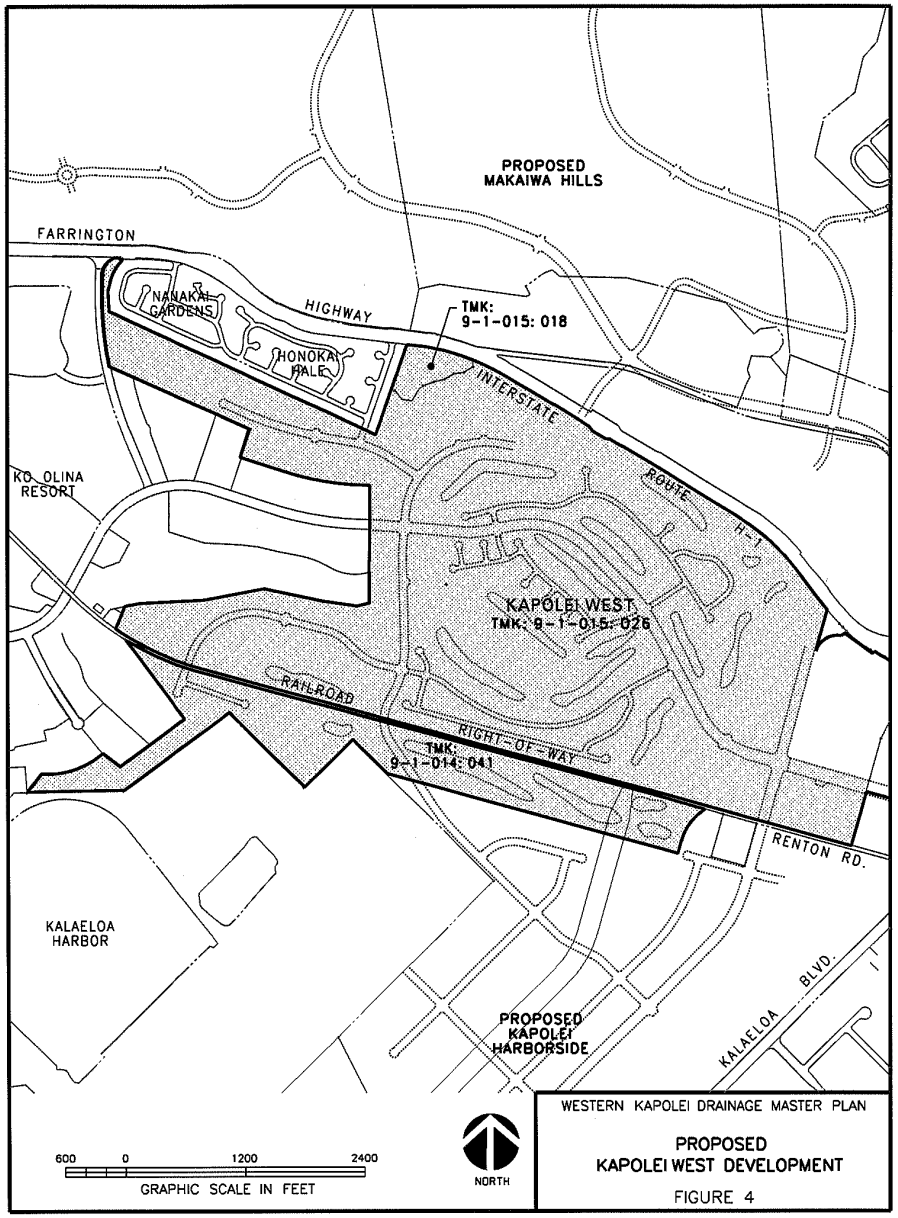
The climate of Western Kapolei area is relatively warm and dry. Tradewinds from the northeast occur much of the time, with occasional Kona winds. The normal temperatures range from the high 6o's to the low 90's (degrees Fahrenheit). Rainfall is light, with annual rainfall of about 30 inches at the northern boundary of Makaiwa Hills and about 20 inches for the lower coastal plains below Farrington Highway. The majority of rainfall occurs mainly between November and April.

**Topography Features**

Western Kapolei (Figure 6) extends from about 2 miles mauka of Farrington Highway to about 0.7 miles below the highway. Makaiwa Hills site exhibits local mountain range features, while Kapolei West and Kapolei Harborside show farm land characteristics.



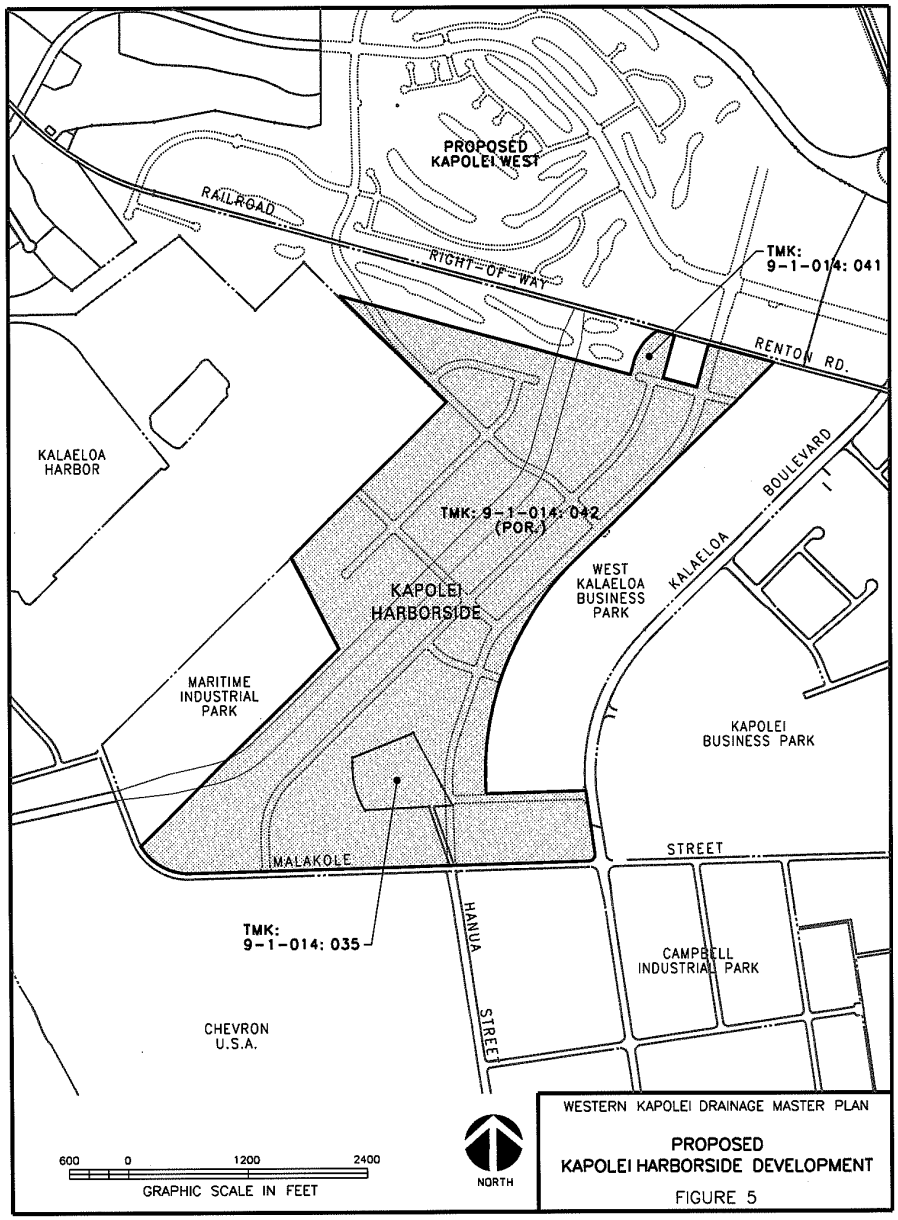





WESTERN KAPOLEI DRAINAGE MASTER PLAN

**PROPOSED KAPOLEI WEST DEVELOPMENT**

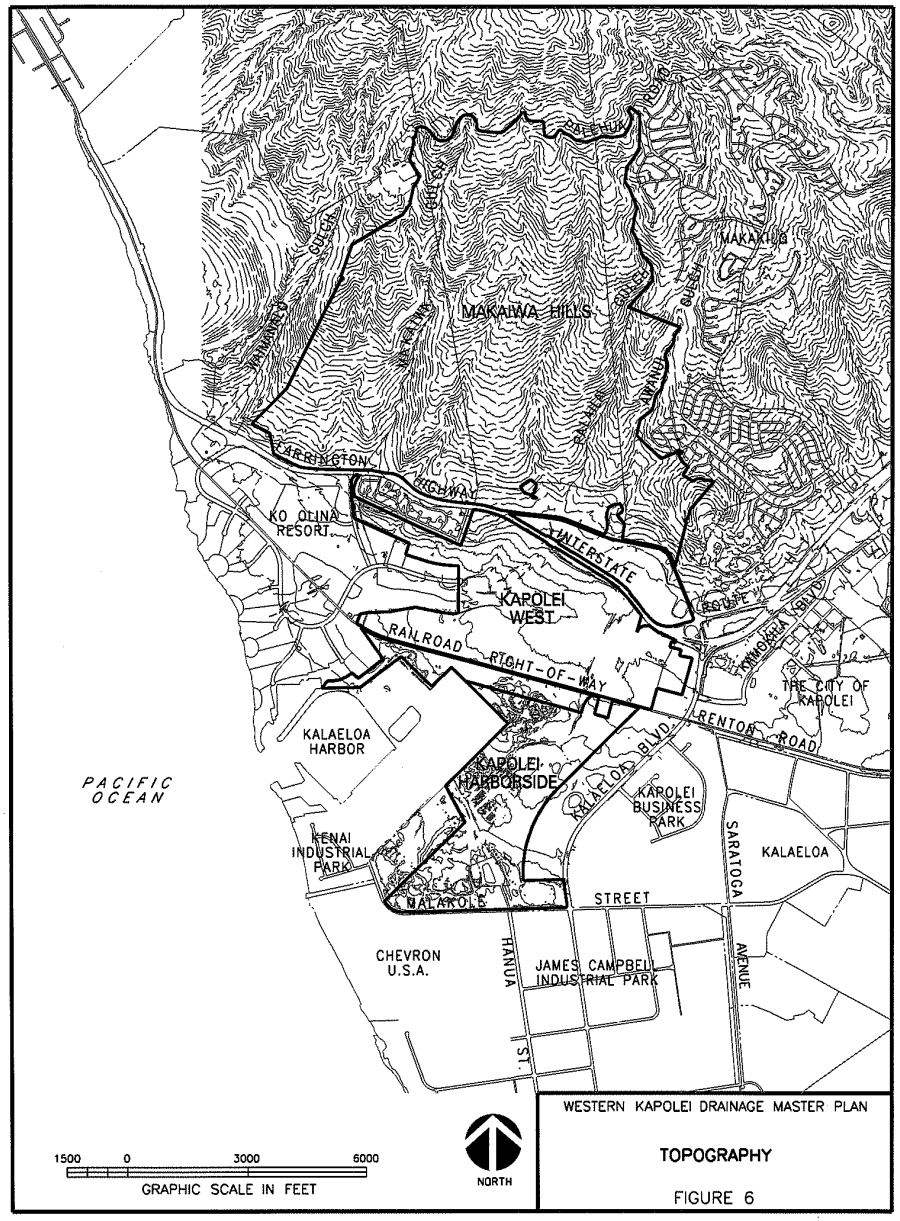
FIGURE 4




WESTERN KAPOLEI DRAINAGE MASTER PLAN

**PROPOSED KAPOLEI HARBORSIDE DEVELOPMENT**

FIGURE 5




WESTERN KAPOLEI DRAINAGE MASTER PLAN

**TOPOGRAPHY**

FIGURE 6

The Makaiwa Hills site ranges in elevation from about 150 feet mean sea level (MSL) at its southern boundary along Farrington Highway to about 1,300 feet MSL at its northern boundary of Palehua Road. Three major gulches and three minor unnamed gulches transect the site from north to south. The major gulches are Awanui Gulch, Palailai Gulch, and Makaiwa Gulch. The southeastern corner of the site is relatively flat with slopes as low as 2 percent. Across the plateaus and ridges, slopes of about 10 percent are common. Steeper slopes are found within the gulches, varying from 10 to 50 percent. Vegetation consists mainly of tall grasses with clumps of scattered brush or bushes. Kiawe and koa-haole shrubs are found in gulch areas.

On the Kapolei West site, elevation ranges from about 60 feet MSL at its southern boundary near the railroad right-of-way to about 155 MSL at Farrington Highway at its northern boundary. Slopes vary from about 0.5 percent in the southeastern corner of the site to about 5 percent in the northern portion of the site as approaching the highway/freeway. An existing drainage/irrigation ditch runs through the site from the highway/freeway to the railroad right-of-way. Mounds and depressions dot the site, a typical feature of former sugarcane lands. Generally, the sites slopes down from Farrington Highway and the OR&L right-of-way towards the center of the site and in an east to west direction toward the Ko Olina golf course.

The natural topography of Kapolei Harborside is generally flat, with mounds and depressions scattered over the site. A large depression, remnants of the Hawaiian Cement mining operations, is located in the northern portion of the site. Elevations range from approximately 5 feet mean sea level (MSL) near the intersection of Kalaeloa Boulevard and Malakole Road to approximately 75 feet MSL near the northwest corner of the petition area. Slopes of less than 0.5 percent to 5 percent are found on the site. In general, the petition area slopes from the railroad right-of-way to Malakole Road, with an average slope of approximately 1 percent.

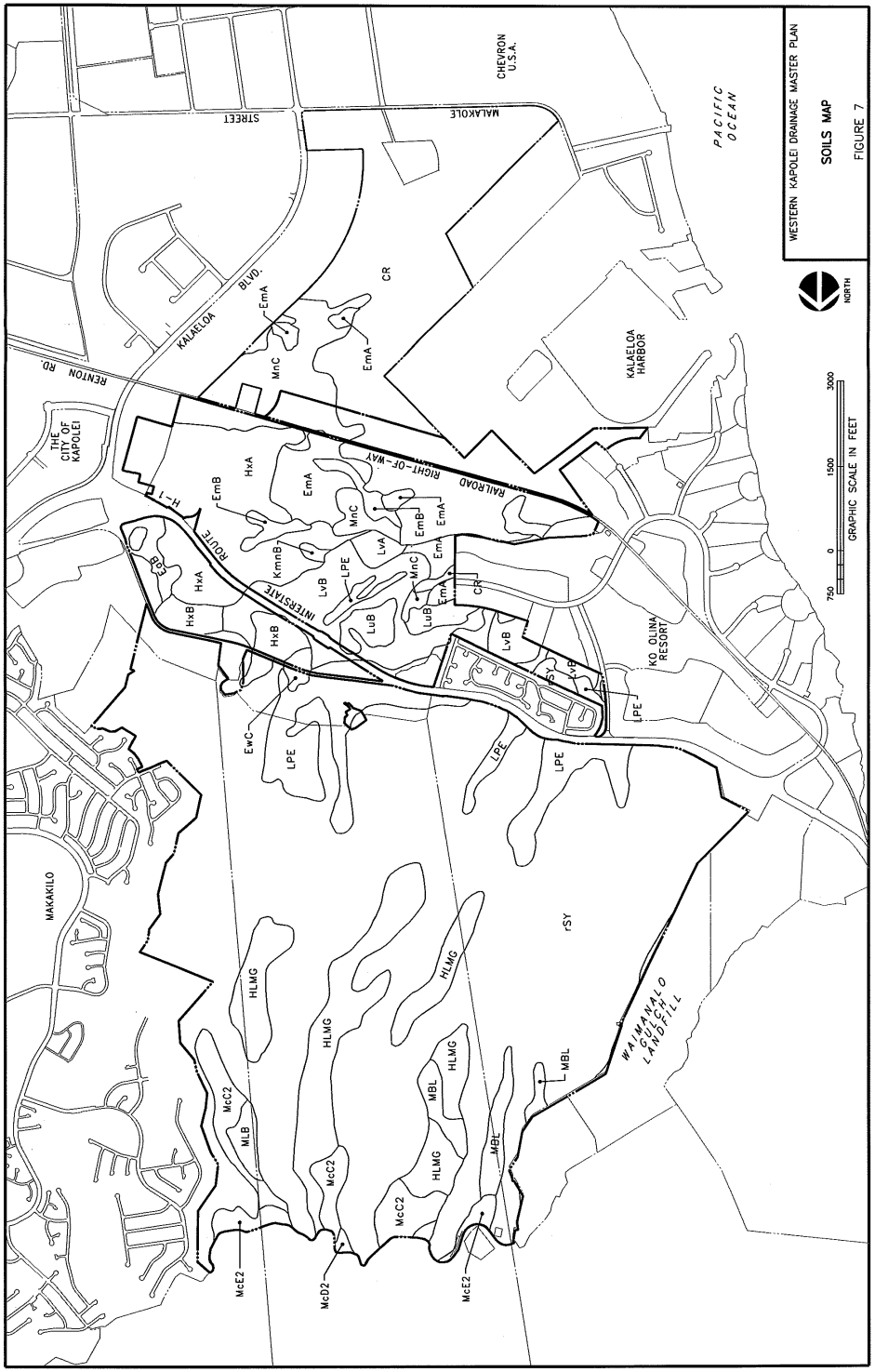
The offsite watershed above Makaiwa Hills exhibits varying terrain, extending from the Palehua Road to the crest of the Waianae Range at an elevation of approximately 2,400 feet MSL.

**Soil**

According to the Soil Survey by U.S. Department of Agriculture, Natural Resources Conservation Service (former Soil Conservation Service), various types of soils exist in the Western Kapolei area. The major soil types are listed below and depicted on Figure 7.

| Soil Type | Hydrologic Group |
|---|---|
| Makaiwa Hills: | |
| Ewa silty clay loam (EaB) | B |
| Ewa stony silty clay (EwC) | B |
| Helemano silty clay (HLMG) | C |
| Honouliuli clay (HxA, HxB) | D |
| Lualualei extremely stony clay (LPE) | D |
| Lualualei stony clay (LvB) | D |
| Mahana-badland comples (MBL) | B |
| Mahana silty loam (McC2, McD2, McE2) | B |
| Molokai silty clay loam (MuC) | B |
| Rock land (rRK) | |
| Stony steep land (rSY) | |
| Kapolei West: | |
| Coral Outcrop (CR) | |
| Ewa silty clay loam, moderate shallow (EmA, EmB) | B |
| Honouliuli clay (HxA) | D |
| Keaau stony clay (KmaB) | D |
| Lualualei clay (LuB) | D |
| Lualualei extremely stony clay (LPE) | D |





| | |
|---|---|
| Lualualei stony clay (LvA, LvB) | D |
| Mamala stony silty clay loam (MnC) | D |
| Stony steep land (rSY) | |

Kapolei Harborside:

| | |
|---|---|
| Coral Outcrop (CR) | |
| Ewa silty clay loam (EmA) | B |
| Mamala stony clay loam (MnC) | D |

**Drainage**

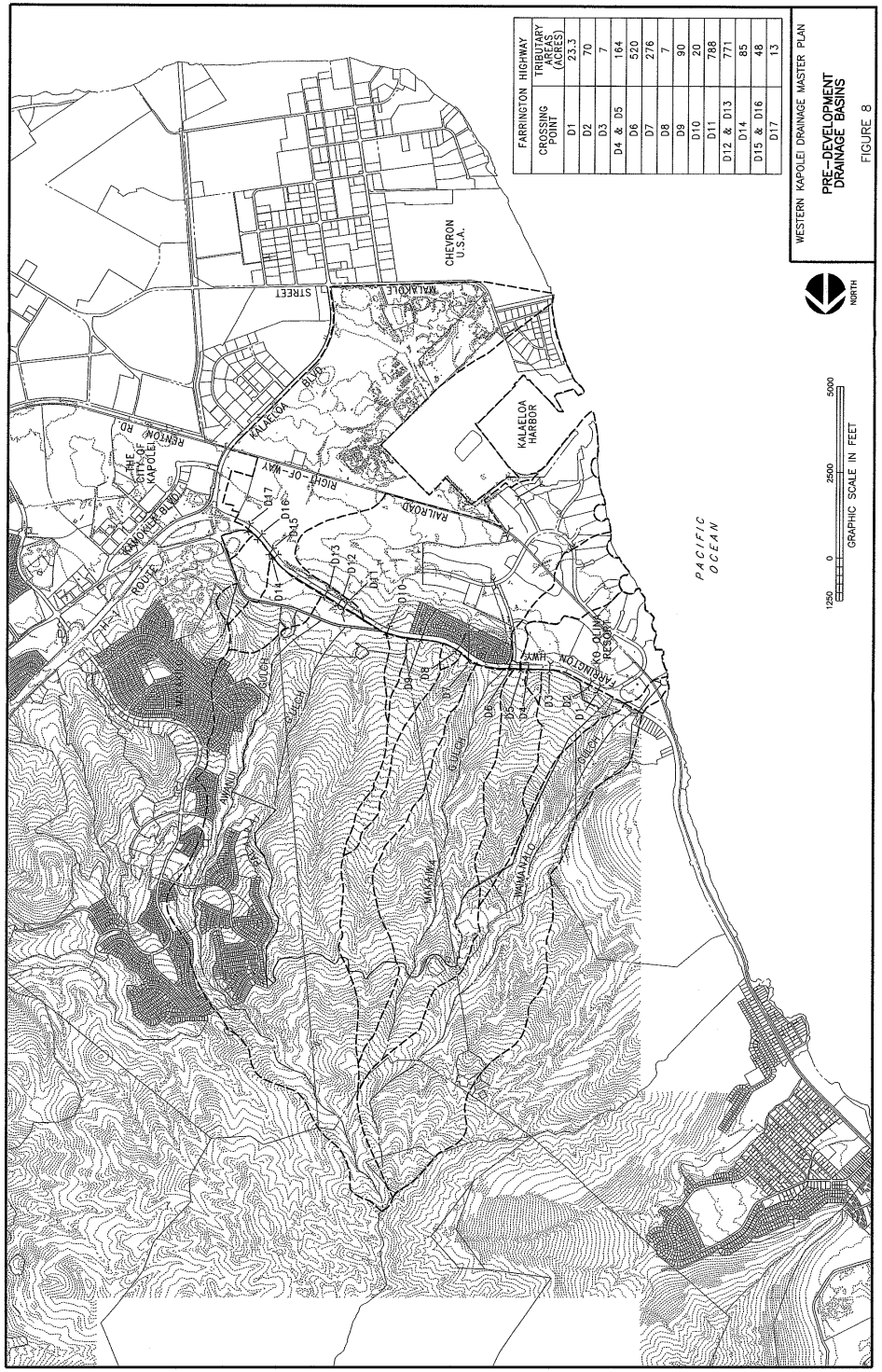
Western Kapolei falls within three large watersheds, the Awanui Gulch watershed, Palailai Gulch watershed, and Makaiwa Gulch watershed, and a few smaller unnamed drainage basins. The three larger watersheds extend from the coastline along the Ko Olina Resort, Kalaeloa Harbor and Campbell Industrial Park up into the Waianae Mountain range beyond the northern boundary of the Makaiwa Hills site (Figure 8).

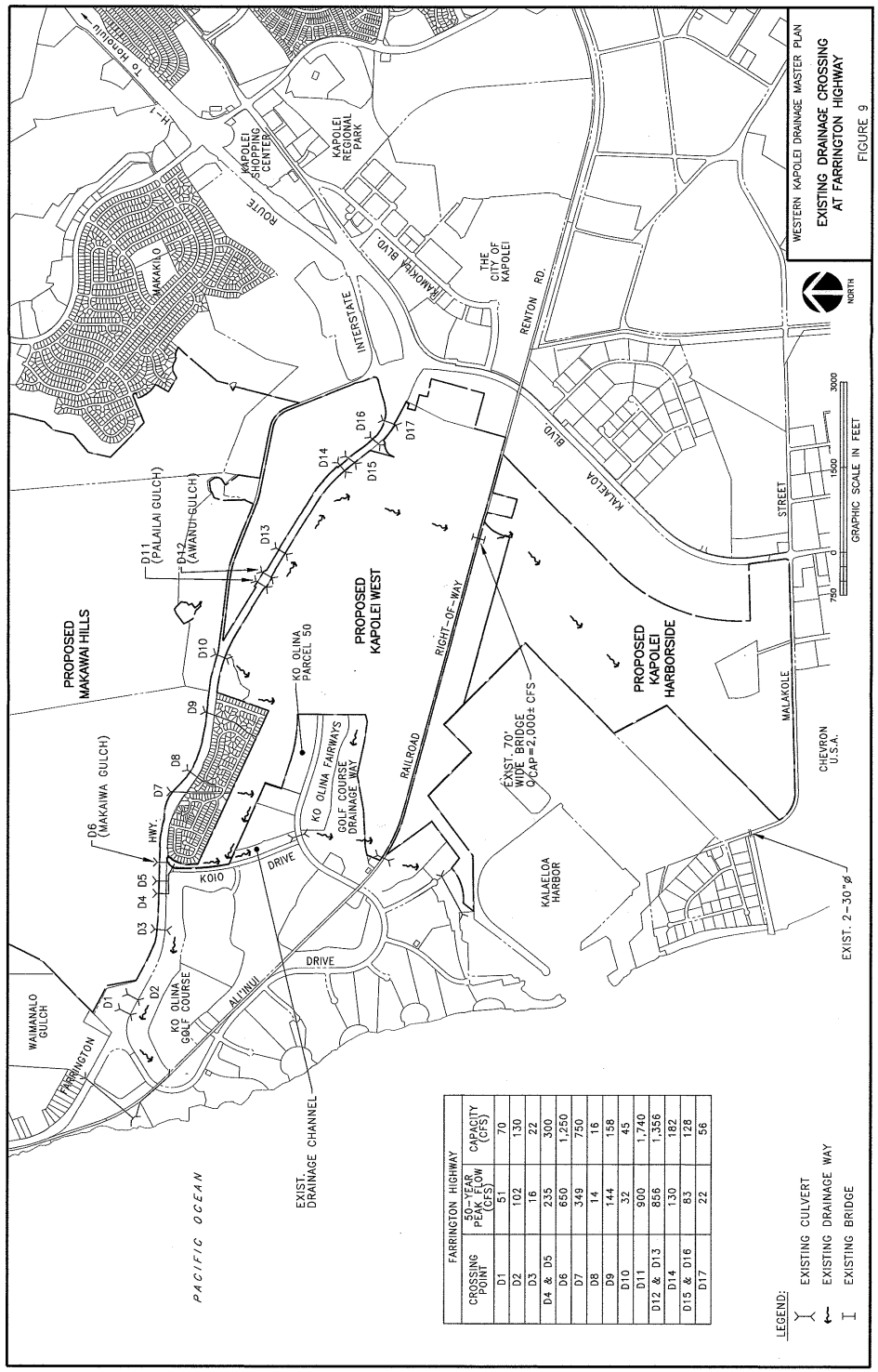
Makaiwa Hills

There are no existing drainage improvements in Makaiwa Hills. Runoff from Makaiwa Hills and the offsite watershed flows overland to Farrington Highway. Runoff is conveyed across Farrington Highway through seventeen existing culverts (D1 to D17) as shown in Figure 9. Fourteen of these culverts were constructed as drainage crossings while three culverts appeared to have been installed to accommodate the former plantation irrigation systems.

The runoff through culverts D1 to D3 discharges onto the Ko Olina golf course which parallels Farrington Highway. Runoff from culverts D1 to D3 are conveyed through the golf course, ultimately discharging to the ocean through an existing double cell box culvert in the vicinity of triple 96" drainpipes discharging runoff from Waimanalo Gulch. Waimanalo Gulch basin is located outside of the proposed development area, therefore, is not included in the discussion of this report.








| FARRINGTON HIGHWAY | | |
|---|---|---|
| CROSSING POINT | 50-YEAR PEAK FLOW (CFS) | CAPACITY (CFS) |
| D1 | 51 | 70 |
| D2 | 102 | 130 |
| D3 | 16 | 22 |
| D4 & D5 | 235 | 300 |
| D6 | 650 | 1,250 |
| D7 | 349 | 750 |
| D8 | 14 | 16 |
| D9 | 144 | 158 |
| D10 | 32 | 45 |
| D11 | 900 | 1,740 |
| D12 & D13 | 856 | 1,356 |
| D14 | 130 | 182 |
| D15 & D16 | 83 | 128 |
| D17 | 22 | 56 |

Runoff from culverts D4 and D5 are collected by a box culvert running parallel to the Farrington Highway diverted to an existing drainage channel along the east side of Koio Drive. This channel also carries runoff from culvert D6 (Makaiwa Gulch) across the Kapolei West site and at a lower elevation receives the runoff from crossing point D7. Runoff from culverts D7, D8 and D9 is conveyed through the Honokai Hale/Nanakai Gardens developments ultimately discharging to the Koio drainage channel. The Koio channel directs collected runoff to an existing drainage structure under Alii Nui Drive, discharging into a drainageway in the golf course.

Runoff from Makaiwa Hills collected at culverts D4 to D10 are routed through the Ko Olina development, converging at a five cell box culvert structure (5-8'x12') under the railroad at the southwest corner of the Kapolei West site. From there the runoff continues to a multi-pipe drainage structure (10-96") which discharges into the West Beach Marina. Currently, much of the railroad tracks are higher than the adjacent mauka areas creating a berming effect along its alignment. Consequently, much of the onsite runoff from the Kapolei West site is retained in the low lying areas forming large areas of ponding during major storms.

Makaiwa Hills runoff from culverts D11 (Palailai Gulch), D12 (Awanui Gulch) and D13 discharge to a former irrigation/drainage ditch running along the highway approximately 2,400 feet before veering makai, through the Kapolei West site. Joined by the runoff from crossing points D13 to D17 and the surface runoff from a small portion of the Kapolei West site, the runoff flows to a culvert crossing under the railroad at the southeast corner of the Kapolei West site and continue south through the Kapolei Harborside site. This drainageway ends at an existing service road approximately halfway between the railroad tracks and Malakole Street. Makai of the service road, runoff flows overland to Malakole Road. Existing culverts along Malakole Road discharging to a shallow drainageway between the Chevron, USA facility and Kenai Industrial Park aid in draining the area immediately mauka of Malakole Street.

Kapolei West

Runoff from the majority of the Kapolei West site currently flows overland in a westerly direction to the Ko Olina Golf Course. The portion of Kapolei West east of the existing irrigation/drainage ditch mentioned above flows to the ditch or the culvet crossing at the railroad right-of-way, discharging into the Kapolei Harborside site. Other than the existing irrigation/drainage ditch, there are no major drainage facilities in the Kapolei West site.

A portion of the recently developed Kapolei Commons shopping center is also within ithe Kapolei West watershed. The western half of the development currently falls within the Kapolei West watershed, along with a portion of Kapolei Parkway, West Phase 1. Runoff from Kapolei Commons and Kapolei Parkway currently drain to an existing retention/detention basin before overflowing into the existing drainage crossing of the railroad tracks. The eastern portion of Kapolei Commons drains to the City of Kapolei Drainage system.

Currently, much of the railroad tracks along the makai portion of Kapolei West is higher than the adjacent mauka areas creating a berming effect along its alignment. Also, because portions of the existing drainage ditch is built-up above ground, runoff cannot easily enter it. Consequently, much of the runoff from the project site and some of the mauka areas are retained in the low lying areas creating large areas of ponding.

Kapolei Harborside

There are no existing drainage improvements in the area other than the former irrigation ditch. Runoff generated on the site and from adjacent areas including the proposed West Kalaeloa Business Park and the Maritime Industrial Park drains overland via sheet flow and small ditches to the depressions on the site. With the exception of major storms, very little runoff is generated under existing conditions due to the former agricultural use, mining operations and infiltration characteristics of the soil. Runoff from major storms flows to the depression near the Kalaeloa Boulevard/Malakole Road intersection, flooding the low-lying area. Some runoff is directed by existing mounds and other obstructions to the Kalaeloa Harbor. Remaining runoff flows towards Malakole Road and the existing culverts along



Malakole Road. The existing culverts at Malakole Road aid to relieve the ponding of runoff within the Harborside Center site.

An existing drainageway runs below Malakole Road to the ocean, between the Chevron, USA property and the Kenai Industrial Park (Figure 9). This drainageway is designated as the corridor for the ultimate drainage channel serving the region. The drainageway is depressed between the Chevron and Kenai Industrial Park properties and acts as a partial retention basin due to the fact that the elevation at the shoreline is about a foot higher than immediately upstream of the shoreline. The drainageway lot is largely overgrown with scrub brush, weeds, and kiawe with an irregular cross-section. Runoff collects in the depression before overflowing to the ocean. Two 30-inch pipe culverts convey runoff from the mauka side of Malakole Road to this drainageway. Due to the irregular nature of the topography above the culverts and the existence of security berms, it is difficult to determine the area contributing runoff to the the culverts and the quantity of runoff collected.

Kalaeloa Boulevard, Malakole Road, and the roadways in the existing industrial park contain underground drainage systems that collect and convey runoff to drainage ditches and channels, ultimately discharging into the ocean.

**Existing Farrington Highway Culverts**

As mentioned above, there are seventeen existing drainage culevrts over a 3-mile section of the Farrington Highway through the Western Kapolei development. The characteristics of these culverts are summarized in Table-1 based on the as-built plans obtained from the Hawaii State Department of Transportation (State DOT).

**Existing Peak Runoff at Farrington Highway Crossing Points**

As described earlier, runoff from the area mauka of the highway flows overland to the culverts at the highway. The pre-development peak runoff at 14 drainage crossing points are shown on Figure 8. The estimated peak flows for the 50-year storm are listed here in Table-2.

The capacities of the existing culverts listed in Table 2 were estimated using inlet and outlet control nomographs with presumed headwater depths based on the As-Built information. For culverts with drop intakes or junction boxes the headwater depth set equal to the depth of structure, for deeper culverts the headwater levels with the pavement subgrade, and for shallow culverts the headwater set at the pipe soffit.

**Table-1**
**Characteristics of Existing Culverts**

| Crossing Point | Hwy Baseline Sta.+ | Structure Type | Length (ft) | Upstream Invert | Downstream Invert | Slope (%) |
|---|---|---|---|---|---|---|
| D1 | 81+26 | 36 CGMP | 108 | 37.50 | 34.74 | 2.55 |
| D2 | 84+00 | 2-42" CGMP | 112 | 38.00 | 37.56 | 0.39 |
| D3 | 98+35 | 36"x 22" CGM Pipe Arch | 99.6 | 75.50 | 75.20 | 0.30 |
| D4 | 104+57 | 2-58"x 36" CGM Pipe Arch | 104.7 | 87.00 | 86.51 | 0.47 |
| D5 | 106+77 | 2-58"x 36" CGM Pipe Arch | 100.6 | 92.50 | 91.00 | 1.49 |
| D6 (Makaiwa Gulch) | 110+43 | 16'-7"x 10'-1" Plate Pipe Arch | 114 | 98.34 | 97.20 | 1.00 |
| D7 | 121+70 | 2-84" CGMP | 140 | 141.00 | 128.95 | 8.61 |
| D8 | 125+20 | 24" CGMP | 137.4 | 143.50 | 135.20 | 6.04 |
| D9 | 136+34 | 60" CGMP | 91.5 | 139.50 | 133.65* | 6.43 |
| D10 | 146+85 | 36" CGMP | 102.8 | 141.7 | 137.02 | 4.55 |
| D11 (Palailai Gulch) | 161+28.61 | 2-120" Plate Pipe | 134<br>138 | 103.86<br>103.88 | 103.00<br>103.00 | 0.64 |
| D12 (Awanui Gulch) | 162+75 | 2-108" Plate Pipe | 130 | 104.30 | 103.00 | 1.00 |
| D13** | 167+38.85 | 24" RCP | 123.9 | 110.50 | 108.90 | 1.29 |
| D14 | 185+00 | 2-48" CGMP | 170 | 78.50 | 77.50 | 0.59 |
| D15** | 186+74 | 36" RCP | 172.5 | 81.40 | 80.90 | 0.29 |
| D16 | 192+50 | 3-50"x 31" CGM Pipe Arch | 111 | 77.50 | 77.00 | 0.45 |
| D17** | 198+20 | 2-30" RCP | 185.4 | 79.70 | 78.80 | 0.48 |

Notes: CGMP - Corrugated Metal Pipe; RCP – Reinforced Concrete Pipe.
+ Highway Baseline Station refers to SDOT defined Farrington Highway's baseline.
* Connected to an existing 6'(W) x 7'(H) concrete box culvert.
** Originally installed for irrigation purpose.



**Table-2**
**Estimated Existing 50-year Peak Runoff and Culvert Capacity**

| Crossing Point | Structure Type | Tributary Areas (acres) | 50-year Peak Flow (cfs) | Capacity (cfs) |
|---|---|---|---|---|
| D1 (B) | 36 CGMP | 23.3 | 51 | 70 |
| D2 (C) | 2-42" CGMP | 70 | 102 | 130 |
| D3 (D) | 36"x 22" CGM Pipe Arch | 7 | 16 | 22 |
| D4 & D5 (E & F) | 2-58"x 36" CGM Pipe Arch<br>2-58"x 36" CGM Pipe Arch | 164 | 235 | 300 |
| D6 (G Makaiwa Gulch) | 16'-7"x 10'-1" Plate Pipe Arch | 520 | 650 | 1250 |
| D7 (H) | 2-84" CGMP | 276 | 349 | 750 |
| D8 (I) | 24" CGMP | 7 | 14 | 16 |
| D9 (J) | 60" CGMP | 90 | 144 | 158 |
| D10 (K) | 36" CGMP | 20 | 32 | 45 |
| D11 (L Palailai Gulch) | 2-120" Plate Pipe | 788 | 900 | 1740 |
| D12 & D13 (L Awanui Gulch) | 2-108" Plate Pipe<br>24" RCP | 771 | 856 | 1356 |
| D14 (M) | 2-48" CGMP | 85 | 130 | 182 |
| D15 & D16 (N) | 36" RCP<br>3-50"x 31" CGM Pipe Arch | 48 | 83 | 128 |
| D17 (O) | 2-30" RCP | 13 | 22 | 56 |

( )-Drainage crossing designation used in SSFM's Makaiwa Hills report (October, 2007).

## DESIGN CRITERIA

For the proposed Western Kapolei developments, onsite drainage systems will be designed to meet the Honolulu City and County's current drainage standards (Standards) and drainage crossing structures under the highway will meet both the City's and the State Department of Transportation's (SDOT) requirements.

Design criteria for drainage systems:

Recurrent interval:

Tm = 10 year for onsite drainage area equal or less than 100 acres;

Tm = 50 year for onsite drainage area equal or less than 100 acres with sump conditions; and for highway/freeway drainage crossing structures;

Tm = 100 year for drainage areas greater than 100 acres.

Runoff Quantity Calculation Methods:

1) Rational Method: Q=CIA for area equal or less than 100 acres;
2) Use Plate 6 in the Standards for area larger than 100 acres.

Since the Western Kapolei development extends from the coastal area into the mountain range, the hourly rainfall intensity i used in the Rational Method increases as approaching higher elevations. Below is the hourly rainfall intensities of 10- and 50-year recurrence intervals established for each project site based on the rainfall frequency maps in the Standards (Plates 1 and 2):

| Project Site | Tm=10-year | Tm=50-year |
|---|---|---|
| Makaiwa Hills | 2.3 inch/hour | 2.8 inch/hour |
| Kapolei West | 2.3 inch/hour | 2.7 inch/hour |
| Kapolei Harborside | 2.2 inch/hour | 2.65 inch/hour |



## PROPOSED DRAINAGE IMPROVEMENTS

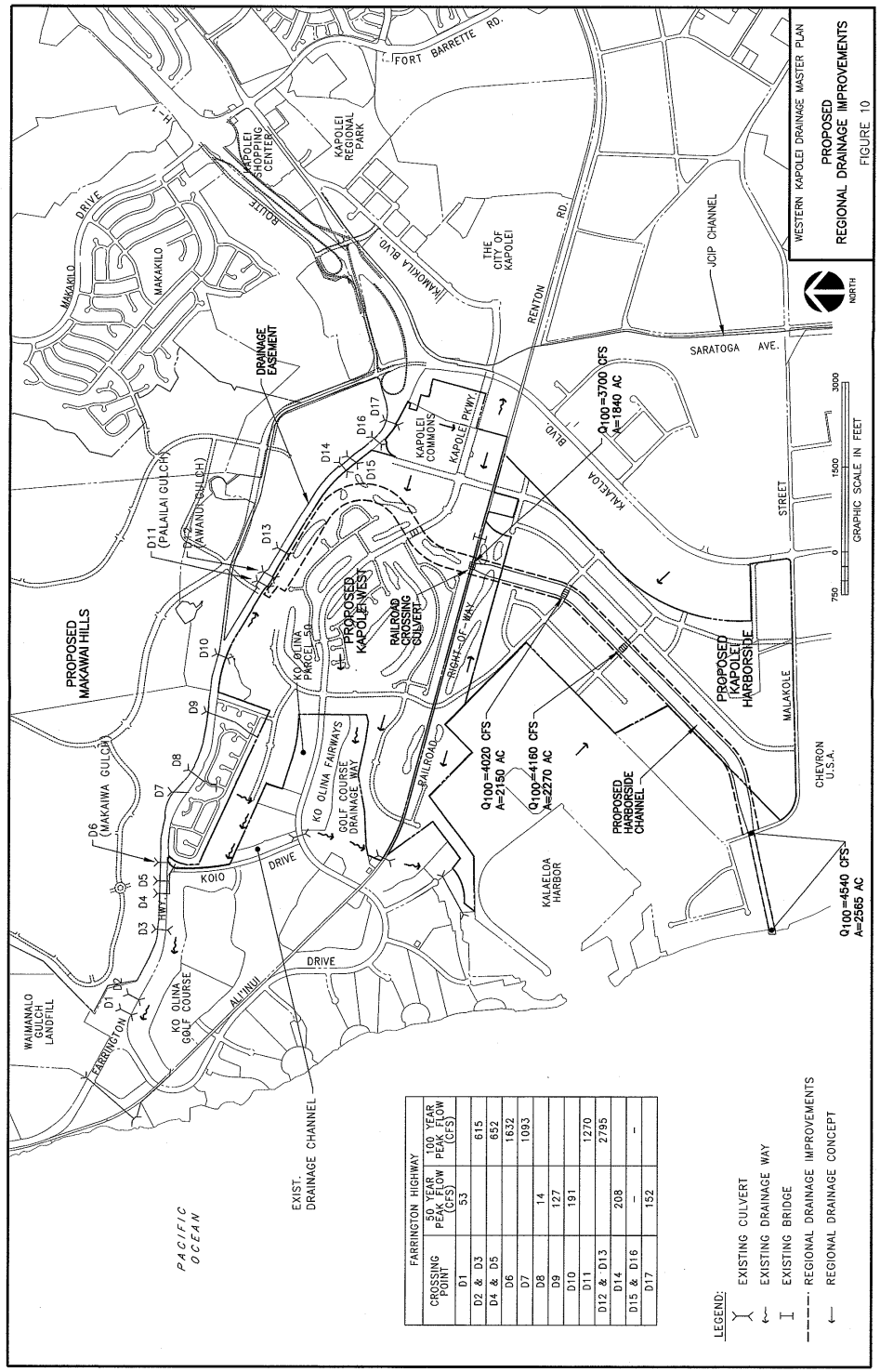
The proposed Western Kapolei developments will alter the hydrologic characteristics of the watersheds. The construction of new pavement and buildings will increase the imperviousness on the sites and reduce the time of concentration. These impacts will result in higher peak flows and runoff volumes. Therefore, it is necessary to establish new drainage systems and to improve the existing systems to accommodate the planned changes.

### Regional Systems

During the development of Ko Olina Resort area (formerly referred as West Beach Resort), Community Planning and Engineering, Inc. prepared a hydrologic study for all areas affected. The drainage systems of Ko Olina Resort were planned and designed to accommodate the expected increases in peak runoff from the western portion of the Makaiwa Hills development (see hydrologic maps in Appendix).

As mentioned previously, the proposed Kapolei West will be a golf course residential community. Similar to the Ko Olina golf course, this golf course is also planned to be used as a part of the regional drainage system conveying both onsite and offsite runoff from the east portion of the Makaiwa Hills development. Hydraulic analysis on the golf course drainageway should be performed when details of the golf course are developed. The drainageway will convey the collected runoff into a regional drainage channel to be constructed with the proposed Kapolei Harborside development (Figure 10).
A multi-cell culvert under the railroad will connect the golf course drainageway to the Kapolei Harborside Channel. The Harborside Channel will run from the railroad right-of-way to the ocean.

Based on the preliminary land use plan and intended drainage concepts, peak runoff at critical crossings along the channel were derived from Plate 6 of the City's Standards as shown on Figure 10.




A HEC-RAS analysis using these peak flows was performed for the preliminary design of the channel. The result indicates that, generally, a 2 (H) to 1 (V) side slope trapezoidal channel with a bottom width of approximately 150-feet and a depth of 15-feet would be sufficient. The actual channel configurations will be refined during design phase. It is anticipated that the Harborside Channel will be excavated in hard coral and will not require lining through its entire length. For certain sections of the channel, where excessive velocity or high erosion potential is expected, concrete or riprap lining will be used. If necessary, energy dissipaters will be installed. The HEC-RAS printout and the channel preliminary layout are included in the Appendix of this report.

At the rail road, the estimated 100-year peak flow is about 3,700 cfs. A fifty feet wide, multi-cell drainage structure is proposed for this crossing. Details of the structure will be determined in design phase. At Malakole Street, the 100-year peak flow is approximately 4,540 cfs. A multi-cell drainage structure is also being proposed at Malakole Street.

Since the channel reach below Malakole Street, is within the Special Management Area and will breach the shoreline. Additional permits, including the Army Corps of Engineers permit and a Conservation District Use permit will be required prior to construction of this portion of the channel. Permit applications are currently being prepared.

**Drainage Crossing at Farrington Highway**

The development of the Makaiwa Hills site, generally, will result in an increase to the peak runoff at the crossing points along the highway. The preliminary engineering report for Makaiwa Hills subdivided the drainage areas according to a preliminary site development plan and estimated the peak flows for the developed condition. Table-3 in this report summaries the developed peak flows at the highway/freeway culverts. The tributary areas and the 50-year flows in the table are based on the engineering report, however, the 100-year peaks presented here were derived using the City's Plate 6.

Per the SDOT's criteria, the capacities of culverts under the highway are only required to handle the 50-year storm since none of the drainage courses involved are covered under the National Flood Insurance Program. However, the City's Standards requires drainage areas larger than 100 acres be designed in accordance with Plate 6 of the City's Storm Drainage Standards. Since the City's requirement is more stringent, this report provides the peak flows from Plate 6 where applicable. Comparing the capacities of the existing culverts and the estimated peak runoff under developed condition in Table-3, some of the existing drainage structures may need to be upgraded if the Plate 6 flows were to govern. Alternatively, discharges from the Makaiwa Development could be controlled or detained as part of the project drainage improvements.

**Table-3**
**Peak Runoff under Developed Condition**

| Crossing Point | Tributary Areas (acres) | 50-year Peak Flow (cfs) | 100-year Peak Flow (cfs) | Exist. Culvert Capacity (cfs) |
|---|---|---|---|---|
| D1 | 23.3 | 53 | | 70 |
| D2 & D3 | 117 | 176 | | 152 |
| D4 & D5 | 129 | 208 | 652 | 300 |
| D6 (Makaiwa Gulch) | 534 | 741 | 1632 | 1250 |
| D7 | 287 | 435 | 1093 | 750 |
| D8 | 7 | 14 | | 16 |
| D9 | 25 | 127 | | 158 |
| D10 | 28 | 191 | | 45 |
| D11 (Palailai Gulch) | 361 | 508 | 1270 | 1740 |
| D12 & D13 (Awanui Gulch) | 1226 | 1419 | 2795 | 1356 |
| D14 | 91 | 208 | | 182 |
| D15 & D16 | | | | |
| D17 | 55 | 152 | | 56 |



**Onsite Systems**

Because of the different aspects of the three proposed projects (Makaiwa Hill is mostly residential; Kapolei West is a golf course residential community; and Kapolei Harborside is industrial) the proposed drainage improvements will vary some to suit the developed conditions. But in general, it is anticipated that onsite drainage systems consist of catch basins/inlets, manholes, and drain pipes or swales/channels. Local systems will carry/divert the onsite runoff into regional drainageways and channels that will convey runoff ultimately to the ocean. Detailed drainage analyses of the onsite drainage system will be performed for the individual projects. Drainage systems within roadways will be designed in accordance with City standards for dedication. Swales and channels will also be designed according to City standards for runoff quantities. Dedication of the swales/channels will need approval of the pertinent City agencies. Identification of public/private systems will be discussed during the design of these facilities.

Since the development schedule of the three proposed projects will vary, some upstream development may occur prior to implementation major downstream drainage components. This situation would require interim onsite detention upstream to limit discharge not exceeding the existing conditions makai of the proposed development. Drainage studies will be provided at the time of design to address interim detention requirements.

**Sequence of the Proposed Drainage Improvements**

Western Kapolei developments have completed rezoning of Makaiwa Hills, Kapolei West, and Kapolei Harborside.

The proposed schedule of the Harborside Channel is listed below:

1. Malakole Road to OR&L (upper reach): 2010 – 2016
2. Shoreline to Malakole Road (lower reach): 2013 – 2014
3. OR&L Crossing (culvert under railroad): 2016

Note that the above construction schedule is preliminary and will be updated as plans for the development progresses. Detailed drainage study shall be conducted for each individual project and submitted to the government agencies for approval to ensure compliance with all requirements. Specific construction schedule for the construction of the Harborside Channel will be address in the individual drainage reports for the projects.

**Stormwater Quality Requirements**

All developments within the Western Kapolei area will be required to address stormwater quality. Site specific water quality issues will be addressed with respect to current City and County Standards. The developments may use detention, flow-through or structural methods to meet the requirements. A separate water quality study will be performed for each individual projects.

Water quality standards are currently being updated and water quality reports may need to address low-impact development criteria and/or requirements. Coordination with the City's Department of Planning and Permitting will be required to address these requirements.

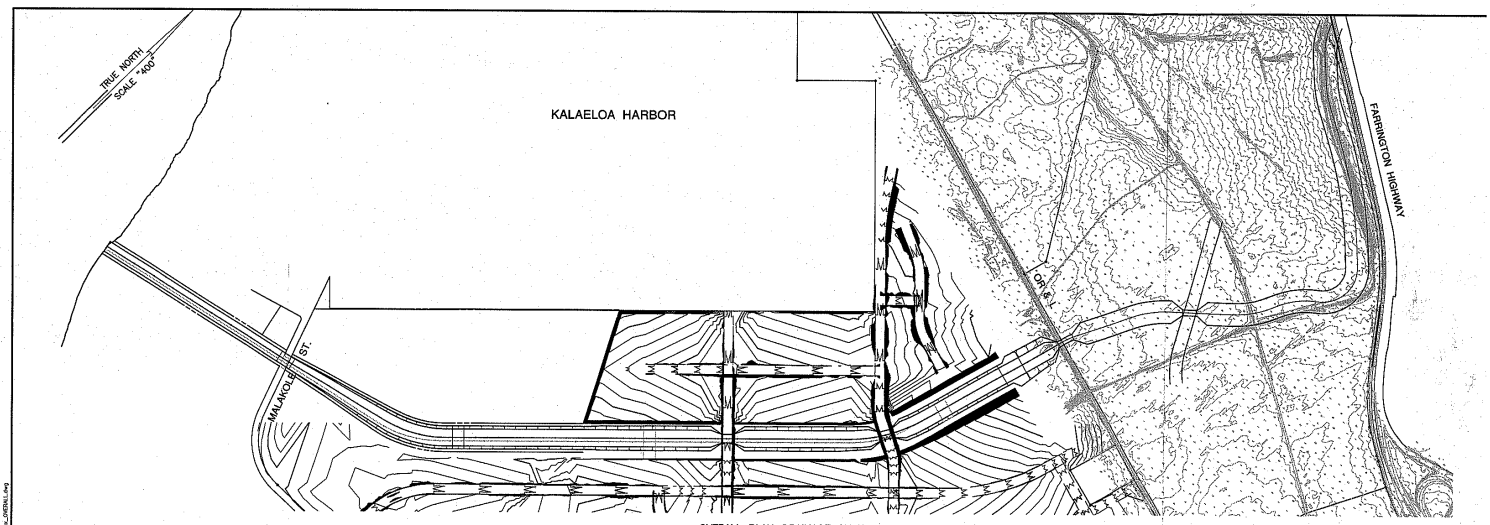


**References**

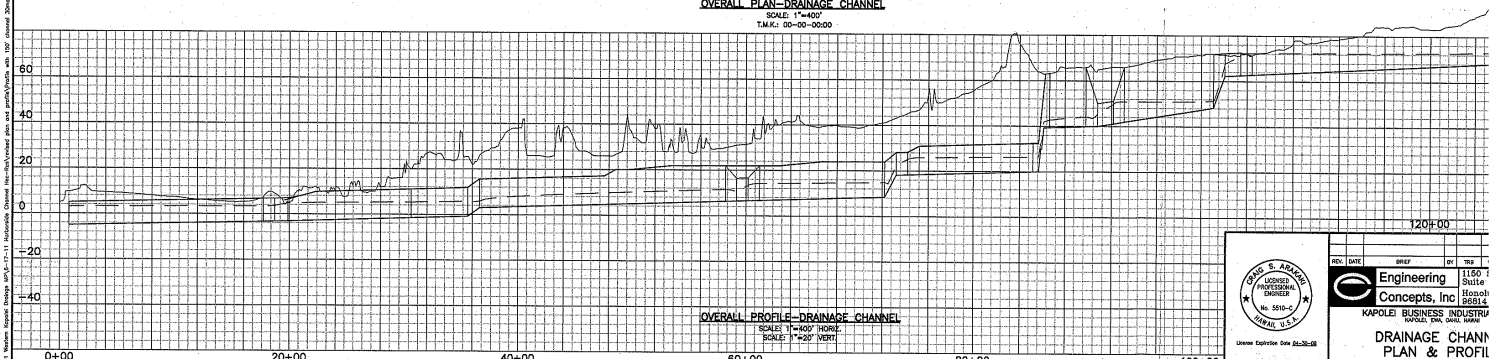

1. Preliminary Engineering Report for Makaiwa Hills, Prepared by SSFM International, Inc., October 2007.
2. Preliminary Engineering Report for the Proposed Kapolei West Development, Kapolei, Oahu, Hawaii, Prepared by Engineering Concepts, Inc., November 2007.
3. Preliminary Engineering Report for Kapolei Harborside Center, Kapolei, Oahu, Hawaii, Prepared by Engineering Concepts, Inc., June 2006.
4. Drainage Report for the Kapolei Harborside Center Drainage Channel, Prepared by Engineering Concepts, Inc., April 2008.
5. State of Hawaii Department of Transportation highways Division As-Built Plans for Farrington Highway Barber Point to Piliokoe Gulch, Federal Aid Secondary Project No. S-0900 (3).
6. Construction Plans of West Beach Resort Phase I, Honolulu, Ewa, Oahu, Hawaii.
7. West Beach Resort Hydrologic Map, Prepared by Community Planning and Engineering.
8. Ko Olina Resort Phase II, Storm Drainage System Plan, Prepared by Community Planning and Engineering.
9. Construction Plans of West Beach Resort Phase IIA, Honolulu, Ewa, Oahu, Hawaii.
10. Construction Plans of West Beach Resort Phase IIB, Honolulu, Ewa, Oahu, Hawaii.
11. Construction Plans of Nanakai Subdivision (Honokai Hale), Honolulu, Ewa, Oahu, Hawaii, Prepared by Chung Dho Ahn & Associates.
12. Construction Plans of Nanakai Gardens, Honolulu, Ewa, Oahu, Hawaii, Prepared by Park Engineering, Inc.
13. Hydrologic Map for Ko Olina Fairways, Honolulu, Ewa, Oahu, Hawaii, Prepared by Community Planning and Engineering.
14. Runoff Maps for Ko Olina Parcel 50, Honolulu, Ewa, Oahu, Hawaii, Prepared by Hida, Okamoto & Associates, Inc.

# APPENDIX

# HEC-RAS ANALYSIS




OVERALL PLAN–DRAINAGE CHANNEL
SCALE: 1"=400'
T.M.K.: 00-00-00:00




OVERALL PROFILE–DRAINAGE CHANNEL
SCALE: 1"=400' HORIZ.
SCALE: 1"=20' VERT.

GRAPHIC SCALES
SCALE: 1"=400' 400' 0 400' 800'
SCALE: 1"=20' 20' 0 20' 40'

GRAND S. ABAGON
LICENSED PROFESSIONAL ENGINEER
No. 5510-C
HAWAII, U.S.A.
License Expiration Date 04-30-06
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HRS TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.
Signature

| REV. | DATE | BRIEF | BY | TR |
|---|---|---|---|---|

Engineering Concepts, Inc
1150 S
Suite
Honolu
96814

KAPOLEI BUSINESS INDUSTRIA
KAPOLEI, EWA, OAHU, HAWAI

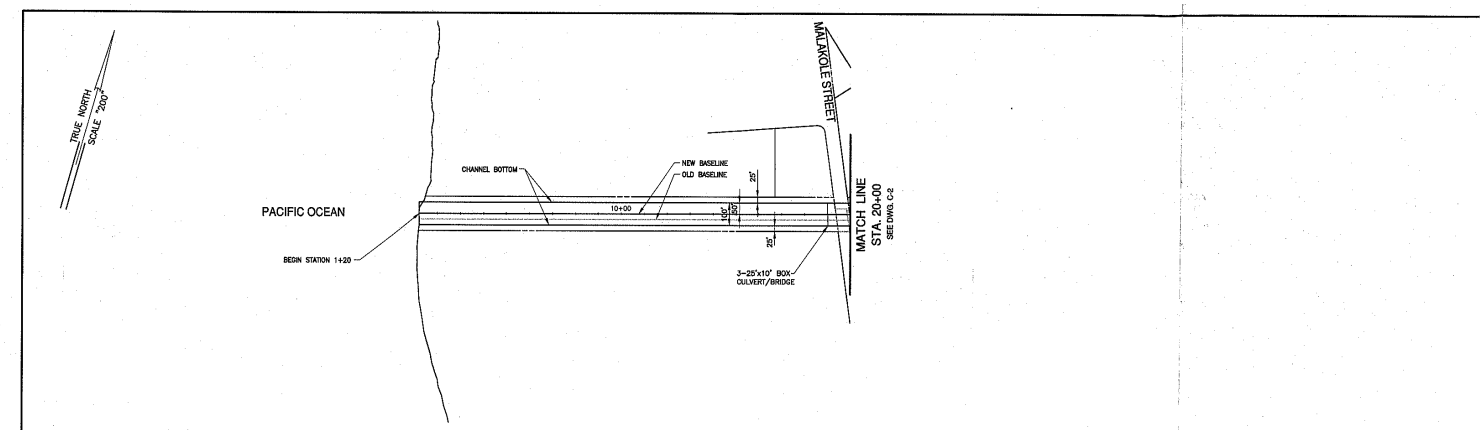
DRAINAGE CHANN
PLAN & PROFIL
(STA. 1+20 TO STA. 141+

DRAWN BY: DT ENGINEER:
APPROVED BY:

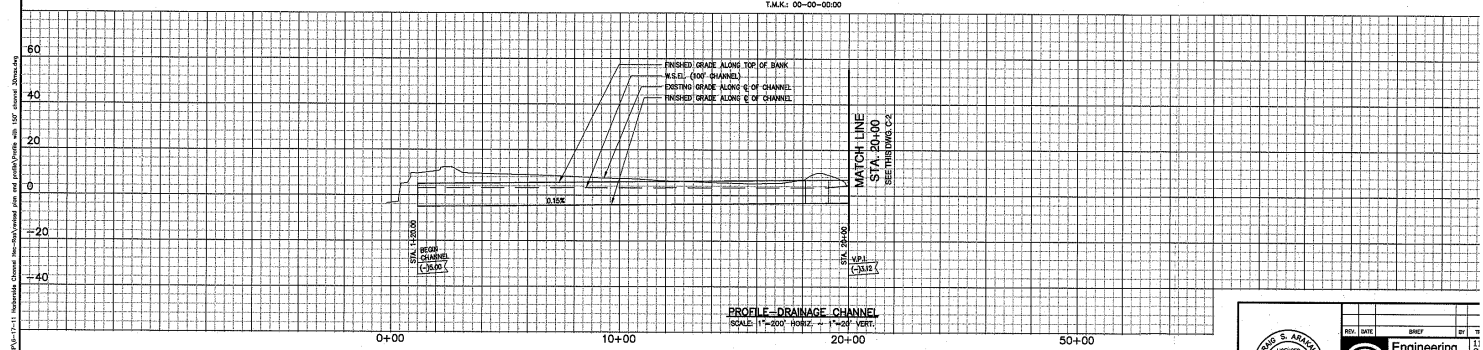
SHEET OF SHEETS

| FILE | POCKET | FOLDER |
|---|---|---|

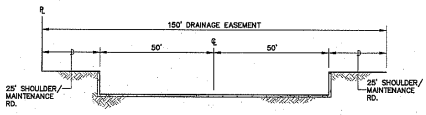
Jan 19, 2012-2:20pm
O:\Temp Jobs\Temp\C\2010 Hesham Kapolei Drainage MP\6-17-11 Hoakaleka Channel Rec-Rep\revised plan and profile\Profile with 150' channel 30mins_OVERALL.dwg




PLAN–DRAINAGE CHANNEL
SCALE: 1"=200'
T.M.K.: 00-00-00:00




PROFILE–DRAINAGE CHANNEL
SCALE: 1"=200' HORIZ. – 1"=20' VERT.




(STA. 1+20 TO 20+00)
TYPICAL DRAINAGE CHANNEL SECTION
SCALE: 1"=20'

GRAPHIC SCALES
SCALE: 1"=200' 200' 0 200' 400'
SCALE: 1"=20' 20' 0 20' 40'

GRAND S. ABAGON
LICENSED PROFESSIONAL ENGINEER
No. 5510-C
HAWAII, U.S.A.
License Expiration Date 04-30-06
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HRS TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.
Signature

| REV. | DATE | BRIEF | BY | T |
|---|---|---|---|---|

Engineering Concepts, Inc
1150 S
Suite
Honolu
96814

KAPOLEI BUSINESS INDU
KAPOLEI, EWA, OAHU, H

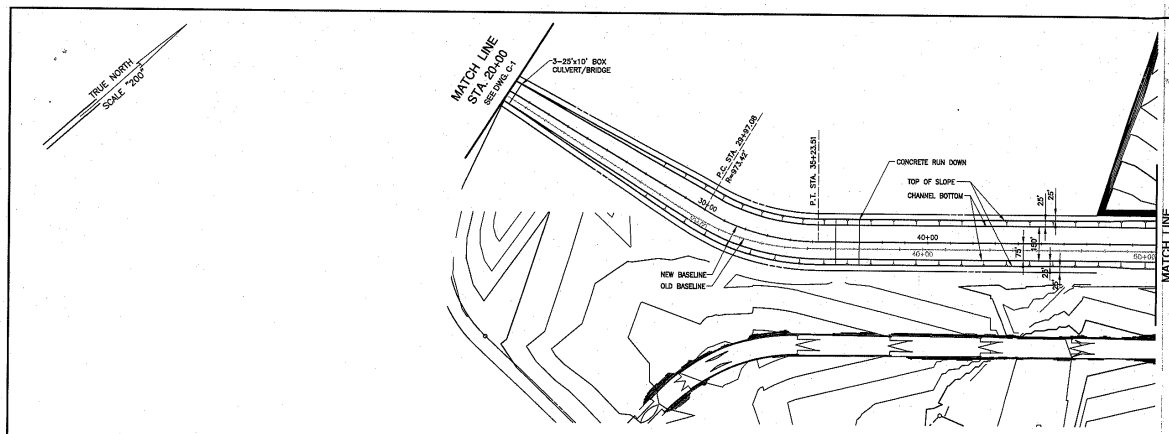
DRAINAGE CHA
PLAN & PRO
(STA. 1+20 TO STA.

DRAWN BY: DT ENGINE
APPROVED BY:

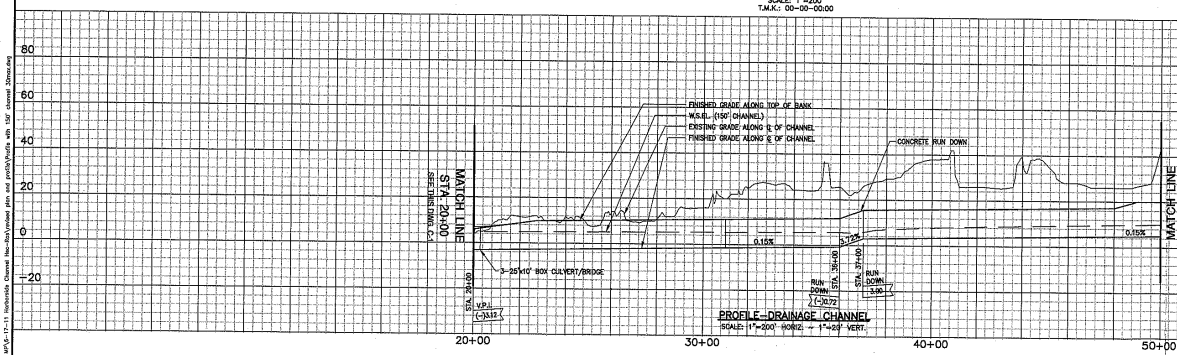
C-1 SHEET 1 OF 4 SHEETS

| FILE | POCKET | FOLD |
|---|---|---|

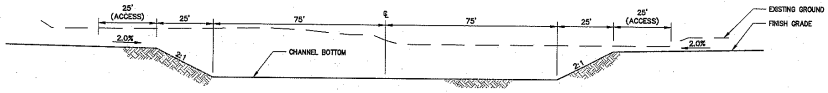
Jan 19, 2012-2:19pm
O:\Temp Jobs\Temp\C\2010 Hesham Kapolei Drainage MP\6-17-11 Hoakaleka Channel Rec-Rep\revised plan and profile\Profile with 150' channel 30mins.dwg




PLAN–DRAINAGE CHANNEL
SCALE: 1"=200'
T.M.K.: 00-00-00:00




PROFILE–DRAINAGE CHANNEL
SCALE: 1"=200' HORIZ. ~ 1"=20' VERT.




TYPICAL DRAINAGE CHANNEL SECTION
SCALE: 1"=20'

GRAPHIC SCALES
SCALE: 1"=200' 200' 0 200' 400'
SCALE: 1"=20' 20' 0 20' 40'

CRAIG S. ARAKAKI
LICENSED PROFESSIONAL ENGINEER
No. 5510-C
HAWAII, U.S.A.
License Expiration Date 04-30-08

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.

Signature

| REV. | DATE | BRIEF | BY | TRG |
|---|---|---|---|---|

Engineering Concepts, Inc
1150 Suite
Hono 96814

KAPOLEI BUSINESS INDUSTRI
KAPOLEI, EWA, OAHU, HAWAI

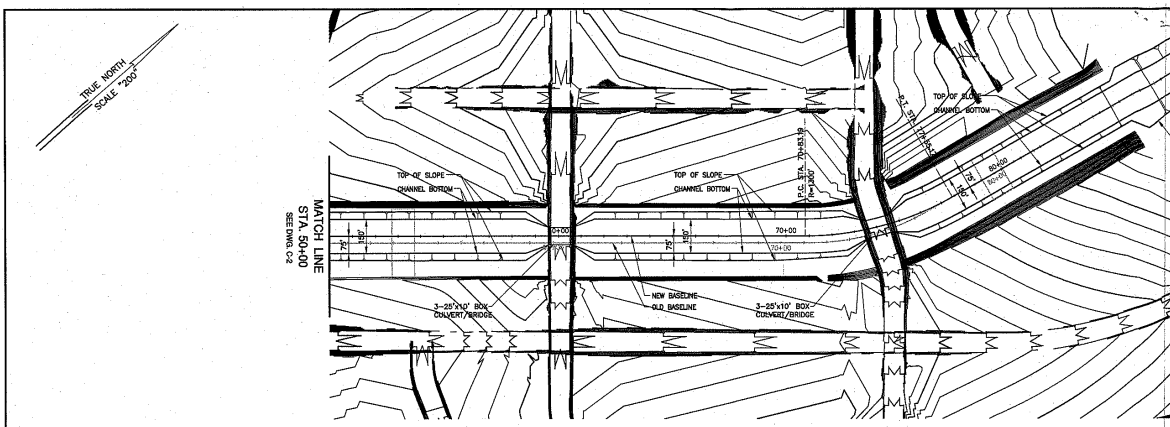
DRAINAGE CHAN
PLAN & PROFI
(STA. 20+00 TO STA. 50

DRAWN BY: DT ENGINEER:
APPROVED BY:

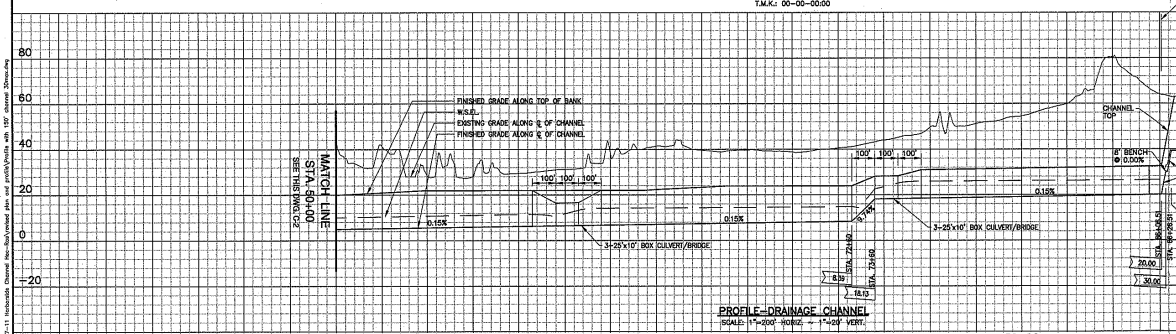
Jan 16, 2013-2:21pm
O:\Temp Area\Tmrdwg\01\01 Western Kapolei Drainage MP\6-17-11 Hachiroda Channel Rec-Sta\revised plan and profile\Profile with 150' channel 20mm.dwg

C-2 SHEET 2 OF 4 SHEETS

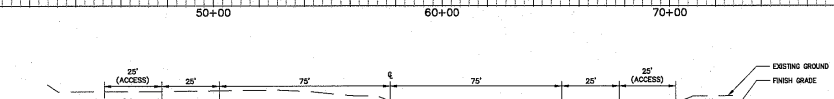
| FILE | POCKET | FOLDER |
|---|---|---|




PLAN–DRAINAGE CHANNEL
SCALE: 1"=200'
T.M.K.: 00-00-00:00




PROFILE–DRAINAGE CHANNEL
SCALE: 1"=200' HORIZ. ~ 1"=20' VERT.




TYPICAL DRAINAGE CHANNEL SECTION
SCALE: 1"=20'

GRAPHIC SCALES
SCALE: 1"=200' 200' 0 200' 400'
SCALE: 1"=20' 20' 0 20' 40'

CRAIG S. ARAKAKI
LICENSED PROFESSIONAL ENGINEER
No. 5510-C
HAWAII, U.S.A.
License Expiration Date 04-30-08

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.

Signature

| REV. | DATE | BRIEF | BY | TRG |
|---|---|---|---|---|

Engineering Concepts, Inc
1150 Suite
Hono 96814

KAPOLEI BUSINESS INDUSTRI
KAPOLEI, EWA, OAHU, HAWAI

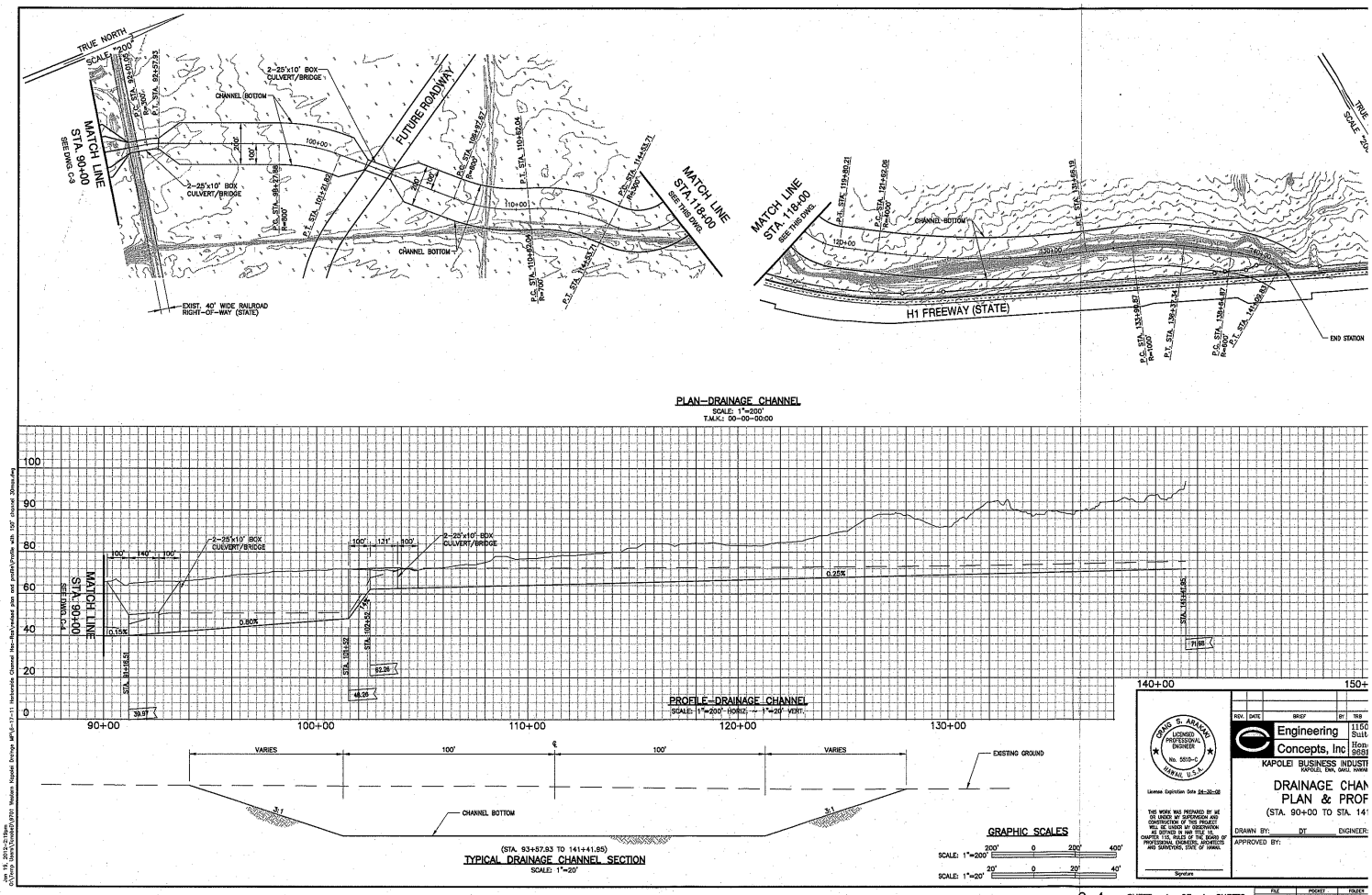
DRAINAGE CHAN
PLAN & PROFI
(STA. 50+00 TO STA. 90

DRAWN BY: DT ENGINEER:
APPROVED BY:

Jan 16, 2013-2:18pm
O:\Temp Area\Tmrdwg\01\01 Western Kapolei Drainage MP\6-17-11 Hachiroda Channel Rec-Sta\revised plan and profile\Profile with 150' channel 20mm.dwg

C-3 SHEET 3 OF 4 SHEETS

| FILE | POCKET | FOLDER |
|---|---|---|




HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 14141.95 | 3700.00 | 71.98 | 75.67 | | 76.02 | 0.002370 | 4.76 | 776.68 | 220.40 | 0.45 |
| Reach-1 | 14066.03 | 3700.00 | 71.79 | 75.49 | | 75.84 | 0.002356 | 4.75 | 778.82 | 221.21 | 0.45 |
| Reach-1 | 14016.03 | 3700.00 | 71.67 | 75.37 | | 75.72 | 0.002364 | 4.77 | 776.05 | 219.69 | 0.45 |
| Reach-1 | 13866.03 | 3700.00 | 71.29 | 75.02 | | 75.37 | 0.002300 | 4.74 | 781.13 | 218.65 | 0.44 |
| Reach-1 | 13666.03 | 3700.00 | 70.79 | 74.58 | | 74.92 | 0.002179 | 4.66 | 794.34 | 218.96 | 0.43 |
| Reach-1 | 13466.03 | 3700.00 | 70.29 | 74.18 | | 74.50 | 0.002008 | 4.54 | 814.84 | 219.42 | 0.42 |
| Reach-1 | 13266.03 | 3700.00 | 69.79 | 73.81 | | 74.11 | 0.001787 | 4.38 | 844.99 | 220.11 | 0.39 |
| Reach-1 | 13066.03 | 3700.00 | 69.29 | 73.50 | | 73.77 | 0.001531 | 4.17 | 886.65 | 221.06 | 0.37 |
| Reach-1 | 12866.03 | 3700.00 | 68.79 | 73.24 | | 73.48 | 0.001268 | 3.93 | 940.50 | 222.28 | 0.34 |
| Reach-1 | 12666.03 | 3700.00 | 68.29 | 73.04 | | 73.25 | 0.001022 | 3.68 | 1006.10 | 223.75 | 0.31 |
| Reach-1 | 12466.03 | 3700.00 | 67.79 | 72.88 | | 73.06 | 0.000798 | 3.38 | 1096.13 | 230.55 | 0.27 |
| Reach-1 | 12266.03 | 3700.00 | 67.29 | 72.76 | | 72.91 | 0.000627 | 3.13 | 1183.42 | 232.82 | 0.24 |
| Reach-1 | 12066.03 | 3700.00 | 66.79 | 72.66 | | 72.79 | 0.000492 | 2.90 | 1278.03 | 235.24 | 0.22 |
| Reach-1 | 11866.03 | 3700.00 | 66.29 | 72.59 | | 72.70 | 0.000388 | 2.68 | 1378.78 | 237.81 | 0.20 |
| Reach-1 | 11666.03 | 3700.00 | 65.79 | 72.53 | | 72.63 | 0.000308 | 2.49 | 1484.40 | 240.45 | 0.18 |
| Reach-1 | 11466.03 | 3700.00 | 65.29 | 72.48 | | 72.57 | 0.000247 | 2.32 | 1594.20 | 243.18 | 0.16 |
| Reach-1 | 11266.03 | 3700.00 | 64.79 | 72.45 | | 72.52 | 0.000199 | 2.17 | 1707.53 | 245.96 | 0.14 |
| Reach-1 | 10966.03 | 3700.00 | 64.29 | 72.40 | | 72.46 | 0.000164 | 2.03 | 1819.26 | 248.66 | 0.13 |
| Reach-1 | 10866.03 | 3700.00 | 63.79 | 72.39 | | 72.45 | 0.000134 | 1.91 | 1941.98 | 251.60 | 0.12 |
| Reach-1 | 10666.03 | 3700.00 | 63.29 | 72.37 | | 72.42 | 0.000111 | 1.79 | 2063.54 | 254.50 | 0.11 |
| Reach-1 | 10483 | 3700.00 | 62.83 | 72.36 | | 72.41 | 0.000048 | 1.70 | 2178.81 | 257.19 | 0.10 |
| Reach-1 | 10473.* | 3700.00 | 62.81 | 72.35 | | 72.40 | 0.000056 | 1.84 | 2012.14 | 236.63 | 0.11 |
| Reach-1 | 10463.* | 3700.00 | 62.78 | 72.34 | | 72.40 | 0.000067 | 2.00 | 1846.52 | 216.06 | 0.12 |
| Reach-1 | 10453.* | 3700.00 | 62.76 | 72.33 | | 72.40 | 0.000081 | 2.21 | 1677.67 | 195.47 | 0.13 |
| Reach-1 | 10443.* | 3700.00 | 62.73 | 72.31 | | 72.40 | 0.000100 | 2.45 | 1509.24 | 174.84 | 0.15 |
| Reach-1 | 10433.* | 3700.00 | 62.71 | 72.28 | | 72.39 | 0.000128 | 2.77 | 1337.82 | 154.18 | 0.17 |
| Reach-1 | 10423.* | 3700.00 | 62.68 | 72.23 | | 72.39 | 0.000169 | 3.17 | 1166.18 | 133.52 | 0.19 |
| Reach-1 | 10413.* | 3700.00 | 62.66 | 72.17 | | 72.38 | 0.000240 | 3.73 | 991.07 | 112.81 | 0.22 |
| Reach-1 | 10403.* | 3700.00 | 62.63 | 72.05 | | 72.37 | 0.000370 | 4.54 | 814.29 | 92.11 | 0.27 |
| Reach-1 | 10393.* | 3700.00 | 62.61 | 71.81 | | 72.34 | 0.000670 | 5.86 | 631.86 | 71.44 | 0.35 |
| Reach-1 | 10383 | 3700.00 | 62.58 | 71.17 | 68.05 | 72.27 | 0.001690 | 8.44 | 438.17 | 51.03 | 0.51 |
| Reach-1 | 10252.01 | Culvert | | | | | | | | | |
| Reach-1 | 10252 | 3700.00 | 62.26 | 67.72 | 67.72 | 70.46 | 0.006715 | 13.28 | 278.70 | 51.01 | 1.00 |
| Reach-1 | 10242.* | 3700.00 | 60.86 | 65.42 | 65.42 | 67.68 | 0.006328 | 12.05 | 307.03 | 68.73 | 1.00 |
| Reach-1 | 10232.* | 3700.00 | 59.46 | 63.43 | 63.43 | 65.38 | 0.006254 | 11.18 | 330.84 | 85.71 | 1.00 |
| Reach-1 | 10222.* | 3700.00 | 58.06 | 61.60 | 61.60 | 63.33 | 0.006343 | 10.55 | 350.63 | 102.24 | 1.00 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 10212.* | 3700.00 | 56.66 | 59.87 | 59.87 | 61.44 | 0.006469 | 10.05 | 368.14 | 118.48 | 1.00 |
| Reach-1 | 10202.* | 3700.00 | 55.26 | 58.21 | 58.21 | 59.66 | 0.006606 | 9.64 | 383.95 | 134.51 | 1.01 |
| Reach-1 | 10192.* | 3700.00 | 53.86 | 56.60 | 56.60 | 57.94 | 0.006737 | 9.28 | 398.52 | 150.40 | 1.01 |
| Reach-1 | 10182.* | 3700.00 | 52.46 | 55.02 | 55.02 | 56.28 | 0.006866 | 8.98 | 412.00 | 166.17 | 1.01 |
| Reach-1 | 10172.* | 3700.00 | 51.06 | 53.47 | 53.47 | 54.65 | 0.006996 | 8.72 | 424.46 | 181.85 | 1.01 |
| Reach-1 | 10162.* | 3700.00 | 49.66 | 51.94 | 51.94 | 53.06 | 0.007109 | 8.48 | 436.37 | 197.46 | 1.01 |
| Reach-1 | 10152 | 3700.00 | 48.26 | 51.23 | | 51.78 | 0.002513 | 5.97 | 620.07 | 217.81 | 0.62 |
| Reach-1 | 10141.01 | 3700.00 | 48.17 | 51.21 | | 51.74 | 0.004541 | 5.82 | 635.91 | 218.25 | 0.60 |
| Reach-1 | 9944.89* | 3700.00 | 46.60 | 50.96 | | 51.21 | 0.001344 | 3.98 | 930.02 | 226.18 | 0.35 |
| Reach-1 | 9748.77* | 3700.00 | 45.03 | 50.89 | | 51.03 | 0.000495 | 2.90 | 1276.04 | 235.18 | 0.22 |
| Reach-1 | 9552.65* | 3700.00 | 43.46 | 50.87 | | 50.95 | 0.000223 | 2.25 | 1646.23 | 244.43 | 0.15 |
| Reach-1 | 9356.53 | 3700.00 | 41.89 | 50.87 | | 50.92 | 0.000059 | 1.82 | 2037.08 | 253.84 | 0.11 |
| Reach-1 | 9346.53* | 3700.00 | 41.81 | 50.86 | | 50.92 | 0.000068 | 1.96 | 1884.57 | 231.52 | 0.12 |
| Reach-1 | 9336.53* | 3700.00 | 41.73 | 50.84 | | 50.91 | 0.000079 | 2.14 | 1731.88 | 209.85 | 0.13 |
| Reach-1 | 9326.53* | 3700.00 | 41.65 | 50.83 | | 50.91 | 0.000095 | 2.34 | 1578.36 | 188.67 | 0.14 |
| Reach-1 | 9316.53* | 3700.00 | 41.57 | 50.80 | | 50.91 | 0.000116 | 2.60 | 1423.82 | 167.96 | 0.16 |
| Reach-1 | 9306.53* | 3700.00 | 41.49 | 50.77 | | 50.91 | 0.000146 | 2.92 | 1267.82 | 147.64 | 0.18 |
| Reach-1 | 9296.53* | 3700.00 | 41.41 | 50.73 | | 50.90 | 0.000191 | 3.33 | 1110.06 | 127.68 | 0.20 |
| Reach-1 | 9286.53* | 3700.00 | 41.33 | 50.66 | | 50.89 | 0.000266 | 3.89 | 949.96 | 108.04 | 0.23 |
| Reach-1 | 9276.53* | 3700.00 | 41.25 | 50.53 | | 50.88 | 0.000405 | 4.70 | 786.75 | 88.69 | 0.28 |
| Reach-1 | 9266.53* | 3700.00 | 41.17 | 50.29 | | 50.85 | 0.000714 | 5.98 | 618.40 | 69.65 | 0.35 |
| Reach-1 | 9256.63 | 3700.00 | 41.09 | 49.68 | 46.54 | 50.78 | 0.001692 | 8.45 | 437.90 | 51.01 | 0.51 |
| Reach-1 | 9116.61 | Culvert | | | | | | | | | |
| Reach-1 | 9116.51 | 3700.00 | 39.97 | 45.42 | 45.42 | 48.17 | 0.006767 | 13.31 | 278.00 | 51.00 | 1.00 |
| Reach-1 | 9106.51* | 3700.00 | 39.96 | 44.78 | 44.78 | 47.17 | 0.006405 | 12.41 | 298.14 | 62.93 | 1.00 |
| Reach-1 | 9096.51* | 3700.00 | 39.94 | 44.28 | 44.28 | 46.42 | 0.006276 | 11.73 | 315.42 | 74.44 | 1.00 |
| Reach-1 | 9086.51* | 3700.00 | 39.92 | 43.90 | 43.90 | 45.84 | 0.006212 | 11.16 | 331.45 | 85.68 | 1.00 |
| Reach-1 | 9076.51* | 3700.00 | 39.91 | 43.58 | 43.58 | 45.38 | 0.006311 | 10.75 | 344.12 | 96.68 | 1.00 |
| Reach-1 | 9066.51* | 3700.00 | 39.90 | 43.43 | 43.32 | 45.00 | 0.005802 | 10.08 | 367.24 | 107.75 | 0.96 |
| Reach-1 | 9056.51* | 3700.00 | 39.88 | 43.72 | | 44.81 | 0.003571 | 8.36 | 442.58 | 119.83 | 0.77 |
| Reach-1 | 9046.51* | 3700.00 | 39.87 | 43.87 | | 44.70 | 0.002623 | 7.35 | 503.44 | 131.67 | 0.66 |
| Reach-1 | 9036.51* | 3700.00 | 39.85 | 43.96 | | 44.63 | 0.002026 | 6.58 | 562.35 | 143.49 | 0.59 |
| Reach-1 | 9026.51* | 3700.00 | 39.83 | 44.02 | | 44.58 | 0.001627 | 5.97 | 619.37 | 155.27 | 0.53 |
| Reach-1 | 9016.51 | 3700.00 | 39.82 | 44.07 | | 44.54 | 0.001353 | 5.49 | 673.42 | 166.99 | 0.48 |
| Reach-1 | 9000 | 3700.00 | 39.79 | 44.04 | | 44.51 | 0.002656 | 5.50 | 673.03 | 166.98 | 0.48 |
| Reach-1 | 8950 | 3700.00 | 39.72 | 43.88 | | 44.37 | 0.002856 | 5.62 | 657.92 | 166.62 | 0.50 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 8900 | 3700.00 | 39.64 | 43.70 | | 44.22 | 0.003080 | 5.76 | 642.54 | 166.25 | 0.52 |
| Reach-1 | 8850 | 3700.00 | 39.57 | 43.50 | | 44.05 | 0.003440 | 5.96 | 620.71 | 165.73 | 0.54 |
| Reach-1 | 8800 | 3700.00 | 39.49 | 43.27 | | 43.87 | 0.003943 | 6.22 | 594.83 | 165.10 | 0.58 |
| Reach-1 | 8750.05 | 3700.00 | 39.42 | 42.94 | | 43.64 | 0.004989 | 6.69 | 552.74 | 164.08 | 0.64 |
| Reach-1 | 8703 | 3700.00 | 39.34 | 42.65 | | 43.44 | 0.003120 | 7.13 | 518.84 | 163.25 | 0.70 |
| Reach-1 | 8700.05 | 3700.00 | 39.34 | 42.64 | | 43.43 | 0.003174 | 7.17 | 516.09 | 163.18 | 0.71 |
| Reach-1 | 8653.05 | 3700.00 | 39.27 | 41.89 | 41.89 | 43.17 | 0.006821 | 9.09 | 407.23 | 160.49 | 1.01 |
| Reach-1 | 8634.51 | 3700.00 | 30.00 | 33.03 | 32.62 | 33.98 | 0.004224 | 7.83 | 472.29 | 162.11 | 0.81 |
| Reach-1 | 8626.51 | 3700.00 | 30.00 | 32.62 | 32.62 | 33.90 | 0.006826 | 9.09 | 407.15 | 160.49 | 1.01 |
| Reach-1 | 8606.34 | 3700.00 | 20.00 | 26.43 | | 26.62 | 0.000335 | 3.54 | 1046.47 | 175.70 | 0.26 |
| Reach-1 | 8556.67 | 3700.00 | 19.93 | 26.41 | | 26.60 | 0.000326 | 3.50 | 1056.32 | 175.93 | 0.25 |
| Reach-1 | 8506.83 | 3700.00 | 19.85 | 26.39 | | 26.58 | 0.000618 | 3.47 | 1067.04 | 176.17 | 0.25 |
| Reach-1 | 8457.00* | 3700.00 | 19.78 | 26.36 | | 26.55 | 0.000605 | 3.44 | 1074.31 | 176.34 | 0.25 |
| Reach-1 | 8407.17* | 3700.00 | 19.70 | 26.34 | | 26.52 | 0.000589 | 3.41 | 1083.57 | 176.55 | 0.24 |
| Reach-1 | 8357.33 | 3700.00 | 19.63 | 26.31 | | 26.49 | 0.000577 | 3.39 | 1091.11 | 176.72 | 0.24 |
| Reach-1 | 8307.50* | 3700.00 | 19.55 | 26.28 | | 26.46 | 0.000561 | 3.36 | 1100.62 | 176.93 | 0.24 |
| Reach-1 | 8257.67* | 3700.00 | 19.48 | 26.26 | | 26.43 | 0.000549 | 3.34 | 1108.42 | 177.11 | 0.24 |
| Reach-1 | 8207.83 | 3700.00 | 19.40 | 26.23 | | 26.40 | 0.000534 | 3.31 | 1118.19 | 177.33 | 0.23 |
| Reach-1 | 8158.00* | 3700.00 | 19.33 | 26.21 | | 26.38 | 0.000522 | 3.29 | 1126.24 | 177.51 | 0.23 |
| Reach-1 | 8108.16 | 3700.00 | 19.25 | 26.18 | | 26.35 | 0.000508 | 3.26 | 1136.26 | 177.74 | 0.23 |
| Reach-1 | 8058.33* | 3700.00 | 19.18 | 26.16 | | 26.32 | 0.000497 | 3.23 | 1144.55 | 177.92 | 0.22 |
| Reach-1 | 8008.50 | 3700.00 | 19.10 | 26.14 | | 26.30 | 0.000483 | 3.20 | 1154.81 | 178.15 | 0.22 |
| Reach-1 | 8000.07 | 3700.00 | 19.09 | 26.13 | | 26.29 | 0.000482 | 3.20 | 1155.88 | 178.18 | 0.22 |
| Reach-1 | 7958.66 | 3700.00 | 19.03 | 26.12 | | 26.27 | 0.000472 | 3.18 | 1163.31 | 178.34 | 0.22 |
| Reach-1 | 7908.83* | 3700.00 | 18.95 | 26.09 | | 26.25 | 0.000459 | 3.15 | 1173.80 | 178.58 | 0.22 |
| Reach-1 | 7858.99 | 3700.00 | 18.88 | 26.07 | | 26.23 | 0.000449 | 3.13 | 1182.55 | 178.77 | 0.21 |
| Reach-1 | 7809.16* | 3700.00 | 18.80 | 26.05 | | 26.20 | 0.000436 | 3.10 | 1193.26 | 179.01 | 0.21 |
| Reach-1 | 7759.33* | 3700.00 | 18.73 | 26.03 | | 26.18 | 0.000426 | 3.08 | 1202.23 | 179.21 | 0.21 |
| Reach-1 | 7709.49 | 3700.00 | 18.65 | 26.01 | | 26.16 | 0.000414 | 3.05 | 1213.15 | 179.46 | 0.21 |
| Reach-1 | 7659.66* | 3700.00 | 18.58 | 26.00 | | 26.14 | 0.000405 | 3.03 | 1222.33 | 179.66 | 0.20 |
| Reach-1 | 7609.83* | 3700.00 | 18.50 | 25.98 | | 26.12 | 0.000393 | 3.00 | 1233.46 | 179.91 | 0.20 |
| Reach-1 | 7560 | 3700.00 | 18.43 | 25.97 | | 26.10 | 0.000195 | 2.97 | 1243.95 | 180.14 | 0.20 |
| Reach-1 | 7550.* | 3700.00 | 18.42 | 25.95 | | 26.10 | 0.000219 | 3.15 | 1175.89 | 169.79 | 0.21 |
| Reach-1 | 7540.* | 3700.00 | 18.40 | 25.92 | | 26.10 | 0.000246 | 3.34 | 1109.13 | 159.47 | 0.22 |
| Reach-1 | 7530.* | 3700.00 | 18.39 | 25.89 | | 26.09 | 0.000280 | 3.56 | 1040.10 | 149.11 | 0.24 |
| Reach-1 | 7520.* | 3700.00 | 18.37 | 25.86 | | 26.08 | 0.000322 | 3.81 | 972.12 | 138.78 | 0.25 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 7510.* | 3700.00 | 18.35 | 25.82 | | 26.08 | 0.000375 | 4.10 | 903.32 | 128.43 | 0.27 |
| Reach-1 | 7500.* | 3700.00 | 18.34 | 25.76 | | 26.07 | 0.000447 | 4.45 | 832.38 | 118.09 | 0.30 |
| Reach-1 | 7490.* | 3700.00 | 18.33 | 25.69 | | 26.06 | 0.000546 | 4.87 | 760.53 | 107.75 | 0.32 |
| Reach-1 | 7480.* | 3700.00 | 18.31 | 25.60 | | 26.04 | 0.000685 | 5.37 | 688.66 | 97.44 | 0.36 |
| Reach-1 | 7470.* | 3700.00 | 18.30 | 25.46 | | 26.02 | 0.000901 | 6.03 | 613.94 | 87.18 | 0.40 |
| Reach-1 | 7460.1 | 4020.00 | 18.28 | 25.05 | 22.66 | 25.98 | 0.001628 | 7.71 | 521.66 | 77.01 | 0.52 |
| Reach-1 | 7360.1 | Culvert | | | | | | | | | |
| Reach-1 | 7360 | 4020.00 | 18.13 | 22.51 | 22.51 | 24.72 | 0.006501 | 11.93 | 336.90 | 77.01 | 1.01 |
| Reach-1 | 7350.* | 4020.00 | 17.16 | 21.26 | 21.26 | 23.31 | 0.006357 | 11.49 | 350.01 | 86.38 | 1.01 |
| Reach-1 | 7340.* | 4020.00 | 16.18 | 20.05 | 20.05 | 21.97 | 0.006312 | 11.11 | 361.76 | 95.39 | 1.01 |
| Reach-1 | 7330.* | 4020.00 | 15.21 | 18.88 | 18.88 | 20.69 | 0.006320 | 10.79 | 372.50 | 104.15 | 1.01 |
| Reach-1 | 7320.* | 4020.00 | 14.23 | 17.72 | 17.72 | 19.44 | 0.006356 | 10.51 | 382.41 | 112.68 | 1.01 |
| Reach-1 | 7310.* | 4020.00 | 13.26 | 16.60 | 16.60 | 18.24 | 0.006407 | 10.26 | 391.65 | 121.05 | 1.01 |
| Reach-1 | 7300.* | 4020.00 | 12.29 | 15.49 | 15.49 | 17.06 | 0.006464 | 10.04 | 400.32 | 129.27 | 1.01 |
| Reach-1 | 7290.* | 4020.00 | 11.31 | 14.39 | 14.39 | 15.89 | 0.006526 | 9.84 | 408.50 | 137.36 | 1.01 |
| Reach-1 | 7280.* | 4020.00 | 10.34 | 14.70 | | 15.35 | 0.001812 | 6.46 | 622.15 | 150.02 | 0.56 |
| Reach-1 | 7270.* | 4020.00 | 9.36 | 14.90 | | 15.25 | 0.000726 | 4.75 | 846.62 | 163.10 | 0.37 |
| Reach-1 | 7260 | 4020.00 | 8.39 | 14.98 | | 15.20 | 0.000363 | 3.74 | 1076.22 | 176.38 | 0.27 |
| Reach-1 | 7250 | 4020.00 | 8.37 | 14.98 | | 15.20 | 0.000705 | 3.73 | 1078.93 | 176.43 | 0.27 |
| Reach-1 | 7200 | 4020.00 | 8.30 | 14.95 | | 15.16 | 0.000692 | 3.70 | 1085.47 | 176.59 | 0.26 |
| Reach-1 | 7150 | 4020.00 | 8.22 | 14.92 | | 15.13 | 0.000675 | 3.67 | 1093.97 | 176.78 | 0.26 |
| Reach-1 | 7100 | 4020.00 | 8.15 | 14.88 | | 15.09 | 0.000662 | 3.65 | 1100.79 | 176.94 | 0.26 |
| Reach-1 | 7050 | 4020.00 | 8.07 | 14.85 | | 15.06 | 0.000646 | 3.62 | 1109.57 | 177.14 | 0.26 |
| Reach-1 | 7000 | 4020.00 | 8.00 | 14.82 | | 15.02 | 0.000633 | 3.60 | 1116.64 | 177.30 | 0.25 |
| Reach-1 | 6950 | 4020.00 | 7.92 | 14.79 | | 14.99 | 0.000618 | 3.57 | 1125.65 | 177.50 | 0.25 |
| Reach-1 | 6900 | 4020.00 | 7.84 | 14.77 | | 14.96 | 0.000602 | 3.54 | 1134.80 | 177.69 | 0.25 |
| Reach-1 | 6850 | 4020.00 | 7.77 | 14.74 | | 14.93 | 0.000590 | 3.52 | 1142.32 | 177.88 | 0.24 |
| Reach-1 | 6800 | 4020.00 | 7.69 | 14.71 | | 14.90 | 0.000575 | 3.49 | 1151.72 | 178.08 | 0.24 |
| Reach-1 | 6750 | 4020.00 | 7.62 | 14.68 | | 14.87 | 0.000563 | 3.47 | 1159.49 | 178.26 | 0.24 |
| Reach-1 | 6700 | 4020.00 | 7.54 | 14.66 | | 14.84 | 0.000549 | 3.44 | 1169.15 | 178.47 | 0.24 |
| Reach-1 | 6650 | 4020.00 | 7.47 | 14.63 | | 14.81 | 0.000537 | 3.41 | 1177.16 | 178.66 | 0.23 |
| Reach-1 | 6600 | 4020.00 | 7.39 | 14.61 | | 14.79 | 0.000523 | 3.39 | 1187.09 | 178.88 | 0.23 |
| Reach-1 | 6550 | 4020.00 | 7.32 | 14.58 | | 14.76 | 0.000512 | 3.36 | 1195.31 | 179.07 | 0.23 |
| Reach-1 | 6500 | 4020.00 | 7.24 | 14.56 | | 14.73 | 0.000499 | 3.33 | 1205.49 | 179.30 | 0.23 |
| Reach-1 | 6450 | 4020.00 | 7.16 | 14.54 | | 14.71 | 0.000486 | 3.31 | 1215.75 | 179.52 | 0.22 |
| Reach-1 | 6400 | 4020.00 | 7.09 | 14.52 | | 14.68 | 0.000475 | 3.28 | 1224.35 | 179.72 | 0.22 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 6350 | 4020.00 | 7.01 | 14.50 | | 14.66 | 0.000463 | 3.26 | 1234.82 | 179.94 | 0.22 |
| Reach-1 | 6300 | 4020.00 | 6.94 | 14.47 | | 14.64 | 0.000453 | 3.23 | 1243.65 | 180.15 | 0.22 |
| Reach-1 | 6250 | 4020.00 | 6.86 | 14.45 | | 14.61 | 0.000441 | 3.20 | 1254.34 | 180.37 | 0.21 |
| Reach-1 | 6200 | 4020.00 | 6.79 | 14.43 | | 14.59 | 0.000431 | 3.18 | 1263.36 | 180.58 | 0.21 |
| Reach-1 | 6160 | 4020.00 | 6.72 | 14.42 | | 14.58 | 0.000214 | 3.16 | 1274.15 | 180.80 | 0.21 |
| Reach-1 | 6150.* | 4020.00 | 6.70 | 14.40 | | 14.57 | 0.000239 | 3.34 | 1204.71 | 170.27 | 0.22 |
| Reach-1 | 6140.* | 4020.00 | 6.69 | 14.37 | | 14.57 | 0.000271 | 3.55 | 1133.10 | 159.73 | 0.23 |
| Reach-1 | 6130.* | 4020.00 | 6.67 | 14.34 | | 14.56 | 0.000309 | 3.78 | 1062.51 | 149.20 | 0.25 |
| Reach-1 | 6120.* | 4020.00 | 6.66 | 14.30 | | 14.56 | 0.000358 | 4.06 | 989.81 | 138.67 | 0.27 |
| Reach-1 | 6110.* | 4020.00 | 6.64 | 14.25 | | 14.55 | 0.000420 | 4.38 | 917.71 | 128.15 | 0.29 |
| Reach-1 | 6100.* | 4020.00 | 6.63 | 14.19 | | 14.54 | 0.000504 | 4.77 | 843.39 | 117.63 | 0.31 |
| Reach-1 | 6090.* | 4020.00 | 6.62 | 14.10 | | 14.53 | 0.000621 | 5.23 | 767.99 | 107.13 | 0.34 |
| Reach-1 | 6080.* | 4020.00 | 6.60 | 13.99 | | 14.51 | 0.000789 | 5.81 | 692.29 | 96.67 | 0.38 |
| Reach-1 | 6070.* | 4020.00 | 6.59 | 13.82 | | 14.49 | 0.001057 | 6.56 | 613.24 | 86.27 | 0.43 |
| Reach-1 | 6060 | 4160.00 | 6.57 | 13.46 | 11.09 | 14.44 | 0.001700 | 7.94 | 523.79 | 76.01 | 0.53 |
| Reach-1 | 5960.1 | Culvert | | | | | | | | | |
| Reach-1 | 5960 | 4160.00 | 6.42 | 10.94 | 10.94 | 13.22 | 0.006473 | 12.12 | 343.18 | 76.01 | 1.01 |
| Reach-1 | 5950.* | 4160.00 | 6.41 | 10.64 | 10.64 | 12.76 | 0.006330 | 11.67 | 356.61 | 85.12 | 1.00 |
| Reach-1 | 5940.* | 4160.00 | 6.39 | 10.92 | | 12.45 | 0.004147 | 9.92 | 419.45 | 94.45 | 0.83 |
| Reach-1 | 5930.* | 4160.00 | 6.38 | 11.14 | | 12.30 | 0.002941 | 8.65 | 480.80 | 103.95 | 0.71 |
| Reach-1 | 5920.* | 4160.00 | 6.36 | 11.28 | | 12.20 | 0.002236 | 7.72 | 538.60 | 113.51 | 0.62 |
| Reach-1 | 5910.* | 4160.00 | 6.35 | 11.37 | | 12.13 | 0.001795 | 7.02 | 592.44 | 123.09 | 0.56 |
| Reach-1 | 5900.* | 4160.00 | 6.33 | 11.44 | | 12.08 | 0.001472 | 6.43 | 646.47 | 132.71 | 0.51 |
| Reach-1 | 5890.* | 4160.00 | 6.32 | 11.49 | | 12.04 | 0.001244 | 5.96 | 698.08 | 142.31 | 0.47 |
| Reach-1 | 5880.* | 4160.00 | 6.30 | 11.53 | | 12.01 | 0.001060 | 5.54 | 750.85 | 151.95 | 0.44 |
| Reach-1 | 5870.* | 4160.00 | 6.28 | 11.56 | | 11.98 | 0.000915 | 5.18 | 803.44 | 161.61 | 0.41 |
| Reach-1 | 5860 | 4160.00 | 6.27 | 11.59 | | 11.96 | 0.000804 | 4.87 | 854.08 | 171.26 | 0.38 |
| Reach-1 | 5850 | 4160.00 | 6.26 | 11.58 | | 11.94 | 0.001577 | 4.87 | 853.82 | 171.27 | 0.38 |
| Reach-1 | 5800 | 4160.00 | 6.18 | 11.50 | | 11.86 | 0.001576 | 4.87 | 854.00 | 171.27 | 0.38 |
| Reach-1 | 5750 | 4160.00 | 6.10 | 11.42 | | 11.79 | 0.001574 | 4.87 | 854.20 | 171.27 | 0.38 |
| Reach-1 | 5700 | 4160.00 | 6.03 | 11.34 | | 11.71 | 0.001585 | 4.88 | 852.41 | 171.23 | 0.39 |
| Reach-1 | 5650 | 4160.00 | 5.95 | 11.26 | | 11.63 | 0.001584 | 4.88 | 852.55 | 171.23 | 0.39 |
| Reach-1 | 5600 | 4160.00 | 5.88 | 11.18 | | 11.55 | 0.001595 | 4.89 | 850.66 | 171.19 | 0.39 |
| Reach-1 | 5550 | 4160.00 | 5.80 | 11.10 | | 11.47 | 0.001595 | 4.89 | 850.68 | 171.19 | 0.39 |
| Reach-1 | 5500 | 4160.00 | 5.73 | 11.02 | | 11.39 | 0.001607 | 4.90 | 848.70 | 171.15 | 0.39 |
| Reach-1 | 5450 | 4160.00 | 5.65 | 10.93 | | 11.31 | 0.001608 | 4.90 | 848.56 | 171.14 | 0.39 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

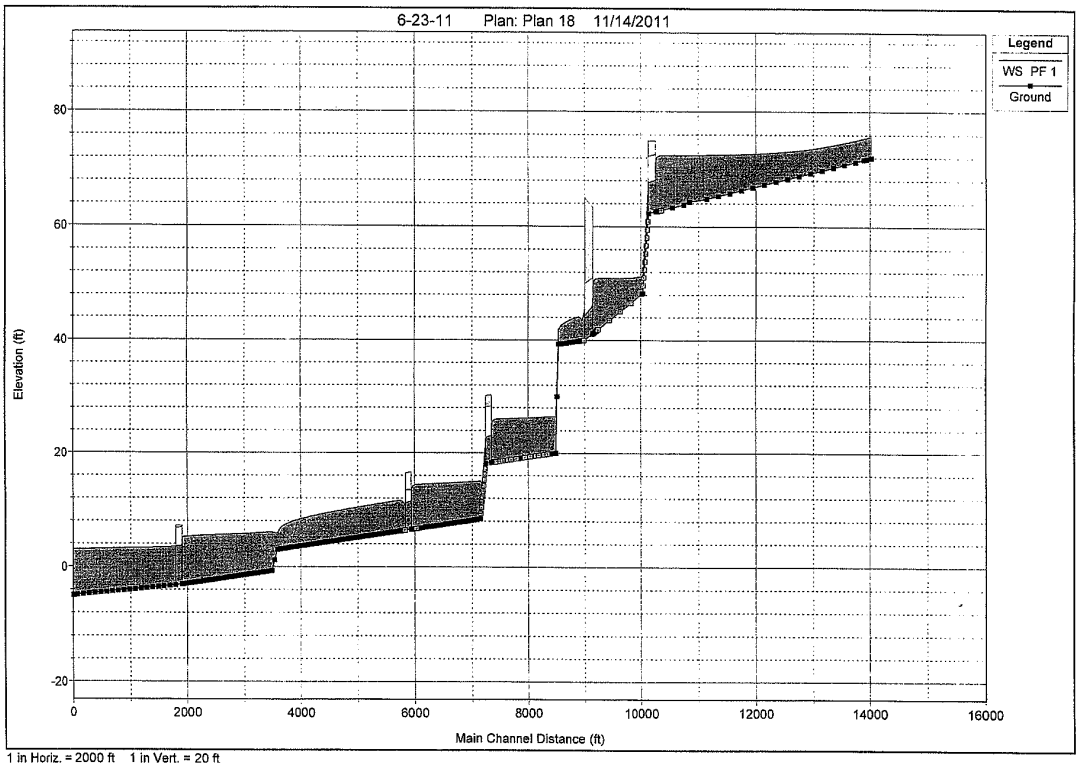
| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 5428 | 4190.00 | 5.61 | 10.89 | | 11.27 | 0.001633 | 4.94 | 848.25 | 171.12 | 0.39 |
| Reach-1 | 5400 | 4190.00 | 5.57 | 10.85 | | 11.23 | 0.001640 | 4.95 | 847.11 | 171.10 | 0.39 |
| Reach-1 | 5350 | 4190.00 | 5.50 | 10.76 | | 11.14 | 0.001655 | 4.96 | 844.64 | 171.05 | 0.39 |
| Reach-1 | 5300 | 4190.00 | 5.42 | 10.68 | | 11.06 | 0.001659 | 4.96 | 844.04 | 171.03 | 0.39 |
| Reach-1 | 5250 | 4190.00 | 5.35 | 10.59 | | 10.98 | 0.001676 | 4.98 | 841.36 | 170.98 | 0.40 |
| Reach-1 | 5200 | 4190.00 | 5.27 | 10.51 | | 10.89 | 0.001681 | 4.98 | 840.52 | 170.95 | 0.40 |
| Reach-1 | 5150 | 4190.00 | 5.20 | 10.42 | | 10.81 | 0.001700 | 5.00 | 837.61 | 170.89 | 0.40 |
| Reach-1 | 5100 | 4190.00 | 5.12 | 10.33 | | 10.72 | 0.001706 | 5.01 | 836.55 | 170.86 | 0.40 |
| Reach-1 | 5050 | 4190.00 | 5.04 | 10.25 | | 10.64 | 0.001714 | 5.02 | 835.43 | 170.83 | 0.40 |
| Reach-1 | 5000 | 4190.00 | 4.97 | 10.16 | | 10.55 | 0.001735 | 5.04 | 832.14 | 170.76 | 0.40 |
| Reach-1 | 4950 | 4190.00 | 4.89 | 10.07 | | 10.47 | 0.001745 | 5.04 | 830.68 | 170.72 | 0.40 |
| Reach-1 | 4900 | 4190.00 | 4.82 | 9.98 | | 10.38 | 0.001769 | 5.07 | 827.08 | 170.64 | 0.41 |
| Reach-1 | 4850 | 4190.00 | 4.74 | 9.89 | | 10.29 | 0.001781 | 5.08 | 825.26 | 170.59 | 0.41 |
| Reach-1 | 4800 | 4190.00 | 4.67 | 9.79 | | 10.20 | 0.001809 | 5.10 | 821.23 | 170.50 | 0.41 |
| Reach-1 | 4750 | 4190.00 | 4.59 | 9.70 | | 10.11 | 0.001825 | 5.12 | 818.99 | 170.45 | 0.41 |
| Reach-1 | 4700 | 4190.00 | 4.51 | 9.61 | | 10.02 | 0.001842 | 5.13 | 816.56 | 170.38 | 0.41 |
| Reach-1 | 4650 | 4190.00 | 4.44 | 9.51 | | 9.92 | 0.001876 | 5.16 | 811.89 | 170.28 | 0.42 |
| Reach-1 | 4600 | 4190.00 | 4.36 | 9.41 | | 9.83 | 0.001898 | 5.18 | 808.89 | 170.21 | 0.42 |
| Reach-1 | 4550 | 4190.00 | 4.29 | 9.31 | | 9.73 | 0.001938 | 5.21 | 803.59 | 170.09 | 0.42 |
| Reach-1 | 4500 | 4190.00 | 4.21 | 9.21 | | 9.64 | 0.001967 | 5.24 | 799.89 | 169.99 | 0.43 |
| Reach-1 | 4450 | 4190.00 | 4.14 | 9.10 | | 9.54 | 0.002015 | 5.28 | 793.78 | 169.86 | 0.43 |
| Reach-1 | 4400 | 4190.00 | 4.06 | 9.00 | | 9.43 | 0.002052 | 5.31 | 789.24 | 169.74 | 0.43 |
| Reach-1 | 4350 | 4190.00 | 3.98 | 8.89 | | 9.33 | 0.002093 | 5.34 | 784.26 | 169.62 | 0.44 |
| Reach-1 | 4300 | 4190.00 | 3.91 | 8.77 | | 9.22 | 0.002159 | 5.39 | 776.67 | 169.45 | 0.44 |
| Reach-1 | 4250 | 4190.00 | 3.83 | 8.66 | | 9.12 | 0.002215 | 5.44 | 770.44 | 169.30 | 0.45 |
| Reach-1 | 4200 | 4190.00 | 3.76 | 8.53 | | 9.00 | 0.002300 | 5.50 | 761.37 | 169.09 | 0.46 |
| Reach-1 | 4150 | 4190.00 | 3.68 | 8.41 | | 8.89 | 0.002378 | 5.56 | 753.43 | 168.90 | 0.46 |
| Reach-1 | 4100 | 4190.00 | 3.61 | 8.27 | | 8.76 | 0.002493 | 5.64 | 742.30 | 168.64 | 0.47 |
| Reach-1 | 4050 | 4190.00 | 3.53 | 8.13 | | 8.64 | 0.002607 | 5.72 | 731.93 | 168.39 | 0.48 |
| Reach-1 | 4000 | 4190.00 | 3.45 | 7.98 | | 8.50 | 0.002747 | 5.82 | 720.00 | 168.10 | 0.50 |
| Reach-1 | 3950 | 4190.00 | 3.38 | 7.81 | | 8.36 | 0.002959 | 5.96 | 703.44 | 167.71 | 0.51 |
| Reach-1 | 3900 | 4190.00 | 3.30 | 7.62 | | 8.20 | 0.003204 | 6.11 | 686.07 | 167.29 | 0.53 |
| Reach-1 | 3850 | 4190.00 | 3.23 | 7.41 | | 8.03 | 0.003592 | 6.33 | 661.93 | 166.73 | 0.56 |
| Reach-1 | 3800 | 4190.00 | 3.15 | 7.15 | | 7.84 | 0.004148 | 6.62 | 632.79 | 166.02 | 0.60 |
| Reach-1 | 3750 | 4190.00 | 3.08 | 6.79 | 5.93 | 7.59 | 0.005366 | 7.18 | 583.90 | 164.84 | 0.67 |
| Reach-1 | 3700 | 4190.00 | 3.00 | 5.85 | 5.85 | 7.23 | 0.006648 | 9.45 | 443.29 | 161.39 | 1.01 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

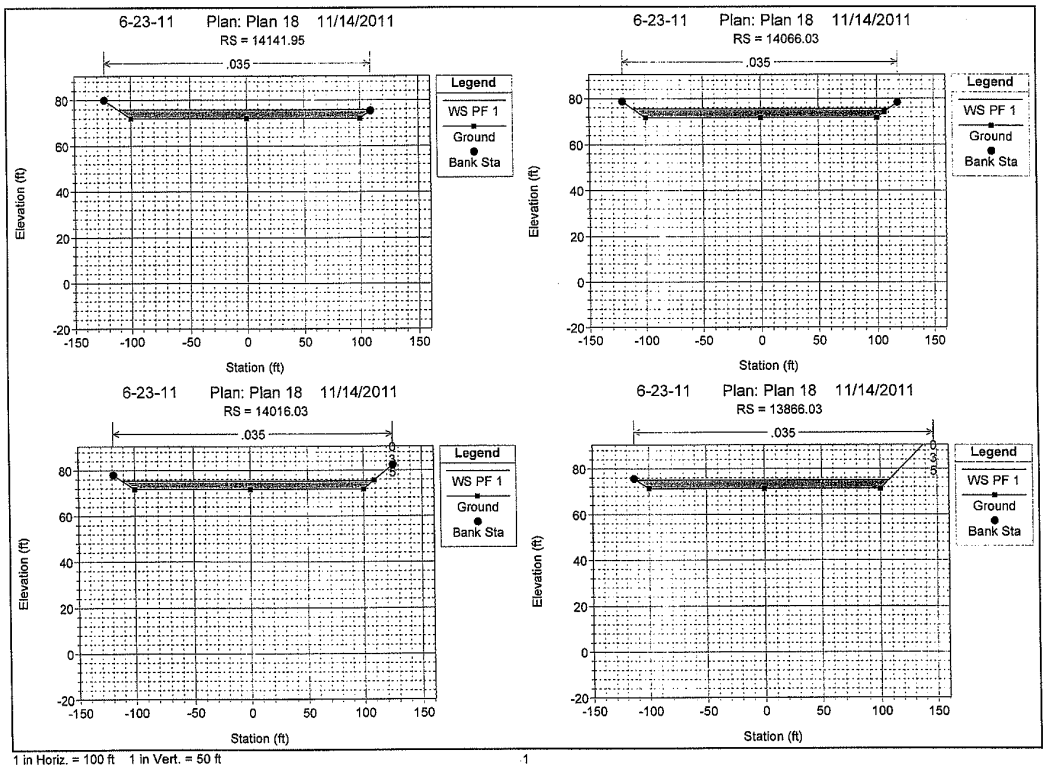
| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 3650 | 4190.00 | 1.14 | 5.88 | | 6.35 | 0.001203 | 5.55 | 755.35 | 168.94 | 0.46 |
| Reach-1 | 3600 | 4190.00 | -0.72 | 6.02 | | 6.25 | 0.000365 | 3.80 | 1102.48 | 176.97 | 0.27 |
| Reach-1 | 3550 | 4190.00 | -0.80 | 6.00 | | 6.22 | 0.000695 | 3.77 | 1112.79 | 177.20 | 0.26 |
| Reach-1 | 3500 | 4190.00 | -0.87 | 5.97 | | 6.19 | 0.000683 | 3.74 | 1119.44 | 177.36 | 0.26 |
| Reach-1 | 3450 | 4190.00 | -0.94 | 5.94 | | 6.15 | 0.000670 | 3.72 | 1126.22 | 177.52 | 0.26 |
| Reach-1 | 3400 | 4190.00 | -1.02 | 5.91 | | 6.12 | 0.000654 | 3.69 | 1134.93 | 177.71 | 0.26 |
| Reach-1 | 3350 | 4190.00 | -1.10 | 5.88 | | 6.08 | 0.000638 | 3.66 | 1143.77 | 177.89 | 0.25 |
| Reach-1 | 3300 | 4190.00 | -1.17 | 5.85 | | 6.05 | 0.000626 | 3.64 | 1150.99 | 178.07 | 0.25 |
| Reach-1 | 3250 | 4190.00 | -1.25 | 5.82 | | 6.02 | 0.000611 | 3.61 | 1160.08 | 178.26 | 0.25 |
| Reach-1 | 3200 | 4190.00 | -1.32 | 5.79 | | 5.99 | 0.000599 | 3.59 | 1167.58 | 178.45 | 0.25 |
| Reach-1 | 3150 | 4190.00 | -1.40 | 5.76 | | 5.96 | 0.000584 | 3.56 | 1176.90 | 178.64 | 0.24 |
| Reach-1 | 3100 | 4190.00 | -1.47 | 5.74 | | 5.93 | 0.000572 | 3.54 | 1184.60 | 178.82 | 0.24 |
| Reach-1 | 3050 | 4190.00 | -1.55 | 5.72 | | 5.91 | 0.000283 | 3.50 | 1195.88 | 179.07 | 0.24 |
| Reach-1 | 3000 | 4190.00 | -1.62 | 5.71 | | 5.89 | 0.000277 | 3.48 | 1203.22 | 178.69 | 0.24 |
| Reach-1 | 2950 | 4190.00 | -1.69 | 5.69 | | 5.88 | 0.000279 | 3.51 | 1194.39 | 176.01 | 0.24 |
| Reach-1 | 2900 | 4190.00 | -1.77 | 5.67 | | 5.87 | 0.000282 | 3.55 | 1181.22 | 172.29 | 0.24 |
| Reach-1 | 2850 | 4190.00 | -1.85 | 5.65 | | 5.85 | 0.000285 | 3.59 | 1167.30 | 168.51 | 0.24 |
| Reach-1 | 2800 | 4190.00 | -1.92 | 5.63 | | 5.84 | 0.000290 | 3.64 | 1151.13 | 164.67 | 0.24 |
| Reach-1 | 2750 | 4190.00 | -2.00 | 5.61 | | 5.82 | 0.000295 | 3.69 | 1136.21 | 160.85 | 0.24 |
| Reach-1 | 2700 | 4190.00 | -2.07 | 5.59 | | 5.81 | 0.000301 | 3.74 | 1119.02 | 156.97 | 0.25 |
| Reach-1 | 2650 | 4190.00 | -2.14 | 5.56 | | 5.79 | 0.000309 | 3.81 | 1101.17 | 153.05 | 0.25 |
| Reach-1 | 2600 | 4190.00 | -2.22 | 5.54 | | 5.77 | 0.000315 | 3.86 | 1084.54 | 149.16 | 0.25 |
| Reach-1 | 2550 | 4190.00 | -2.30 | 5.52 | | 5.76 | 0.000322 | 3.93 | 1067.20 | 145.23 | 0.26 |
| Reach-1 | 2500 | 4190.00 | -2.37 | 5.49 | | 5.74 | 0.000332 | 4.00 | 1047.85 | 141.26 | 0.26 |
| Reach-1 | 2450 | 4190.00 | -2.44 | 5.46 | | 5.72 | 0.000343 | 4.08 | 1027.80 | 137.26 | 0.26 |
| Reach-1 | 2400 | 4190.00 | -2.52 | 5.43 | | 5.70 | 0.000354 | 4.15 | 1008.81 | 133.27 | 0.27 |
| Reach-1 | 2350 | 4190.00 | -2.60 | 5.41 | | 5.68 | 0.000366 | 4.24 | 989.19 | 129.26 | 0.27 |
| Reach-1 | 2300 | 4190.00 | -2.67 | 5.37 | | 5.66 | 0.000381 | 4.33 | 967.42 | 125.20 | 0.27 |
| Reach-1 | 2250 | 4190.00 | -2.74 | 5.34 | | 5.64 | 0.000399 | 4.43 | 945.23 | 121.13 | 0.28 |
| Reach-1 | 2200 | 4190.00 | -2.82 | 5.30 | | 5.62 | 0.000414 | 4.52 | 926.48 | 117.63 | 0.28 |
| Reach-1 | 2150 | 4190.00 | -2.89 | 5.26 | | 5.60 | 0.000436 | 4.64 | 903.80 | 113.68 | 0.29 |
| Reach-1 | 2100 | 4190.00 | -2.97 | 5.22 | | 5.57 | 0.000460 | 4.76 | 880.96 | 109.58 | 0.30 |
| Reach-1 | 2050 | 4190.00 | -3.05 | 5.18 | | 5.55 | 0.000490 | 4.89 | 856.69 | 105.25 | 0.30 |
| Reach-1 | 2029.02 | 4540.00 | -3.07 | 5.04 | 0.92 | 5.53 | 0.000664 | 5.59 | 811.55 | 100.16 | 0.35 |
| Reach-1 | 1912 | Culvert | | | | | | | | | |
| Reach-1 | 1911.99 | 4540.00 | -3.21 | 3.54 | | 4.25 | 0.001183 | 6.72 | 675.91 | 100.13 | 0.46 |

HEC-RAS Plan: Plan 18 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Reach-1 | 1812 | 4540.00 | -3.31 | 3.42 | | 4.13 | 0.001196 | 6.74 | 673.68 | 100.14 | 0.46 |
| Reach-1 | 1800.00 | 4540.00 | -3.32 | 3.41 | | 4.12 | 0.000430 | 6.74 | 673.87 | 100.14 | 0.46 |
| Reach-1 | 1700.00 | 4540.00 | -3.42 | 3.38 | | 4.07 | 0.000417 | 6.67 | 680.62 | 100.14 | 0.45 |
| Reach-1 | 1600.00 | 4540.00 | -3.52 | 3.35 | | 4.03 | 0.000404 | 6.60 | 687.49 | 100.15 | 0.44 |
| Reach-1 | 1500.00 | 4540.00 | -3.62 | 3.32 | | 3.98 | 0.000391 | 6.54 | 694.47 | 100.15 | 0.44 |
| Reach-1 | 1400.00 | 4540.00 | -3.72 | 3.29 | | 3.94 | 0.000378 | 6.47 | 701.57 | 100.15 | 0.43 |
| Reach-1 | 1300.00 | 4540.00 | -3.82 | 3.26 | | 3.90 | 0.000366 | 6.41 | 708.77 | 100.15 | 0.42 |
| Reach-1 | 1200.00 | 4540.00 | -3.92 | 3.24 | | 3.86 | 0.000355 | 6.34 | 716.07 | 100.15 | 0.42 |
| Reach-1 | 1100.00 | 4540.00 | -4.02 | 3.21 | | 3.82 | 0.000343 | 6.28 | 723.48 | 100.15 | 0.41 |
| Reach-1 | 1000.00 | 4540.00 | -4.12 | 3.18 | | 3.78 | 0.000332 | 6.21 | 730.98 | 100.15 | 0.41 |
| Reach-1 | 900.00 | 4540.00 | -4.22 | 3.16 | | 3.75 | 0.000322 | 6.15 | 738.58 | 100.15 | 0.40 |
| Reach-1 | 800.00 | 4540.00 | -4.32 | 3.14 | | 3.71 | 0.000311 | 6.08 | 746.26 | 100.15 | 0.39 |
| Reach-1 | 700.00 | 4540.00 | -4.42 | 3.11 | | 3.68 | 0.000301 | 6.02 | 754.03 | 100.15 | 0.39 |
| Reach-1 | 600.00 | 4540.00 | -4.52 | 3.09 | | 3.64 | 0.000292 | 5.96 | 761.88 | 100.15 | 0.38 |
| Reach-1 | 500.00 | 4540.00 | -4.62 | 3.07 | | 3.61 | 0.000282 | 5.90 | 769.81 | 100.15 | 0.37 |
| Reach-1 | 400.00 | 4540.00 | -4.72 | 3.05 | | 3.58 | 0.000273 | 5.84 | 777.82 | 100.15 | 0.37 |
| Reach-1 | 300.00 | 4540.00 | -4.82 | 3.03 | | 3.55 | 0.000264 | 5.78 | 785.90 | 100.15 | 0.36 |
| Reach-1 | 200.00 | 4540.00 | -4.92 | 3.01 | | 3.52 | 0.000256 | 5.72 | 794.05 | 100.15 | 0.36 |
| Reach-1 | 150.00 | 4540.00 | -4.97 | 3.01 | | 3.51 | 0.000252 | 5.69 | 798.14 | 100.15 | 0.36 |
| Reach-1 | 120.00 | 4540.00 | -5.00 | 3.00 | -1.01 | 3.50 | 0.000249 | 5.67 | 800.61 | 100.15 | 0.35 |

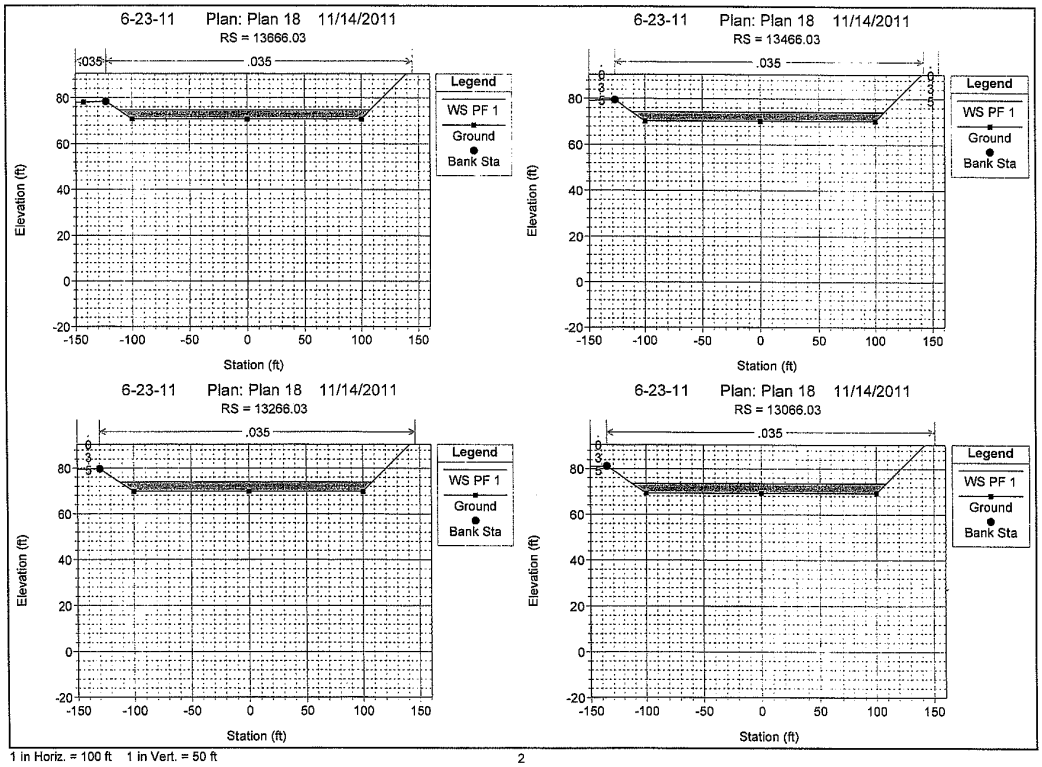



1 in Horiz. = 2000 ft 1 in Vert. = 20 ft



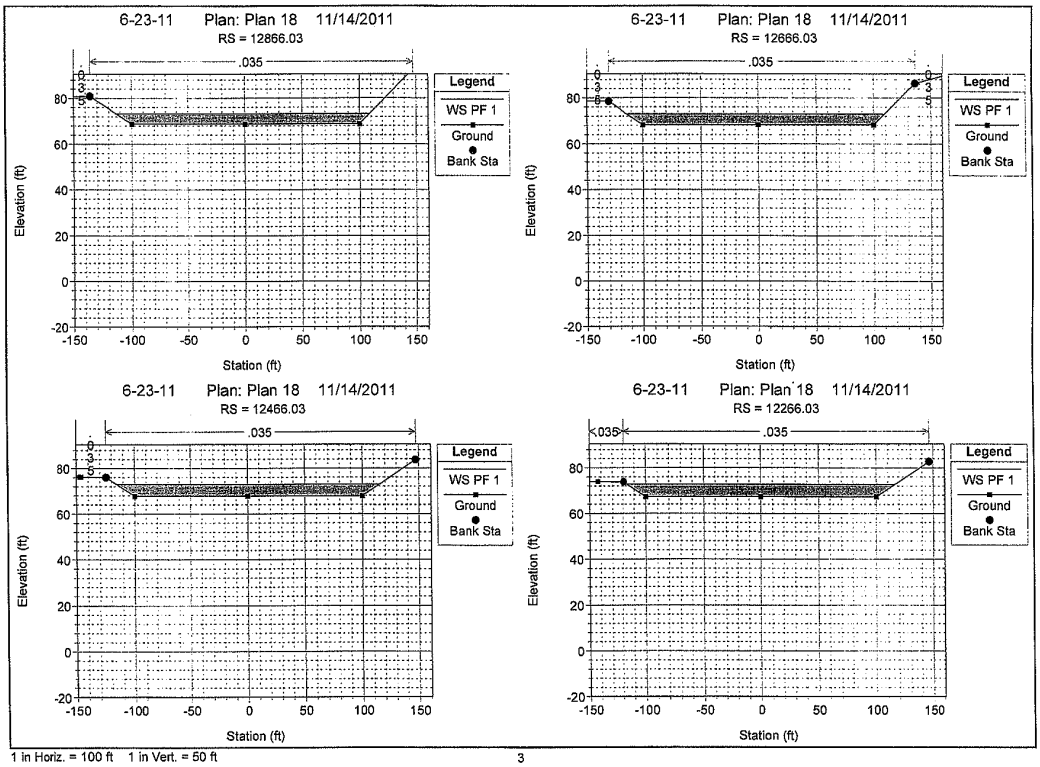

1 in Horiz. = 100 ft 1 in Vert. = 50 ft

1



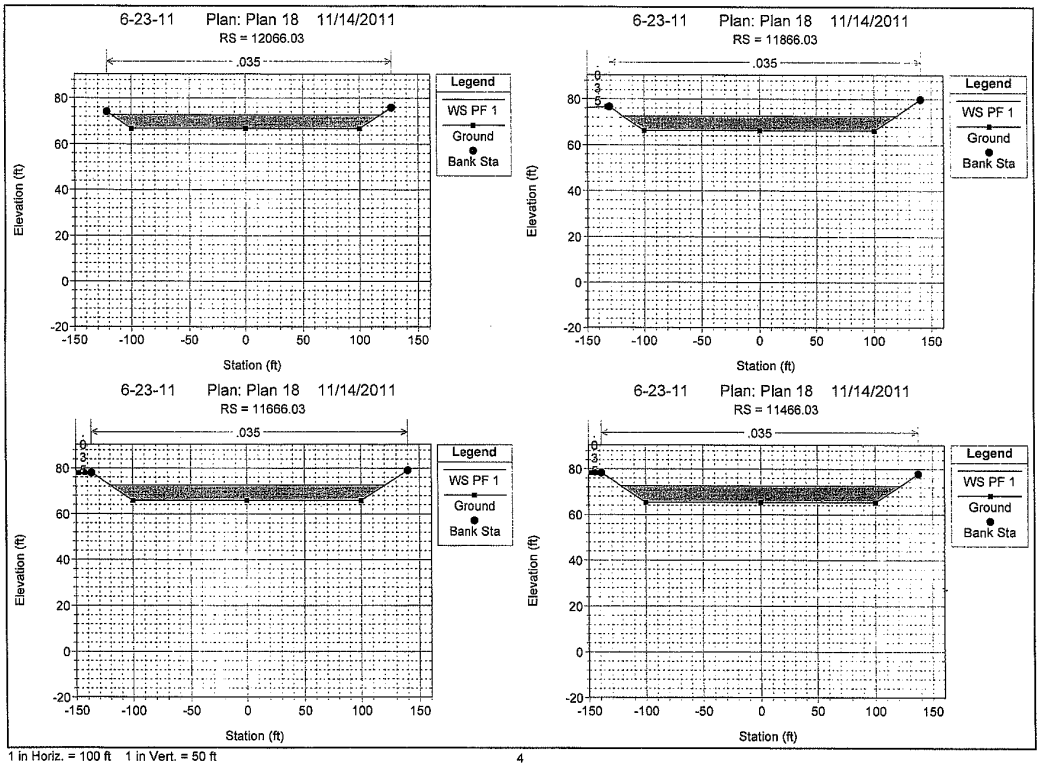

1 in Horiz. = 100 ft 1 in Vert. = 50 ft

2

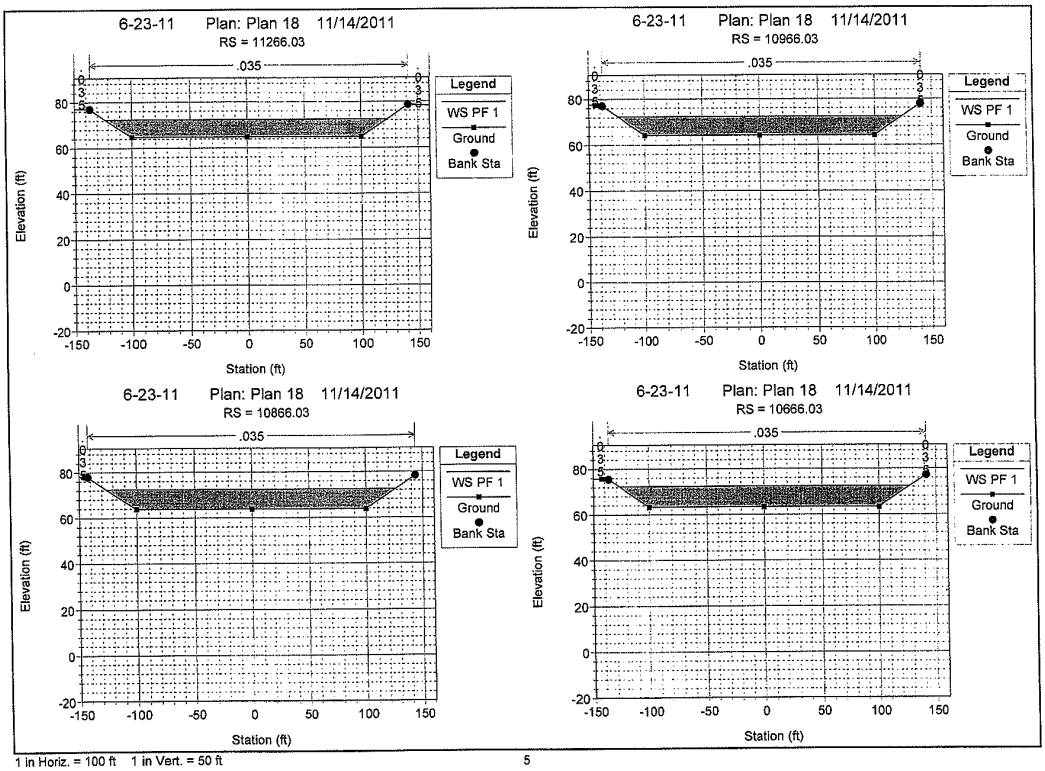



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



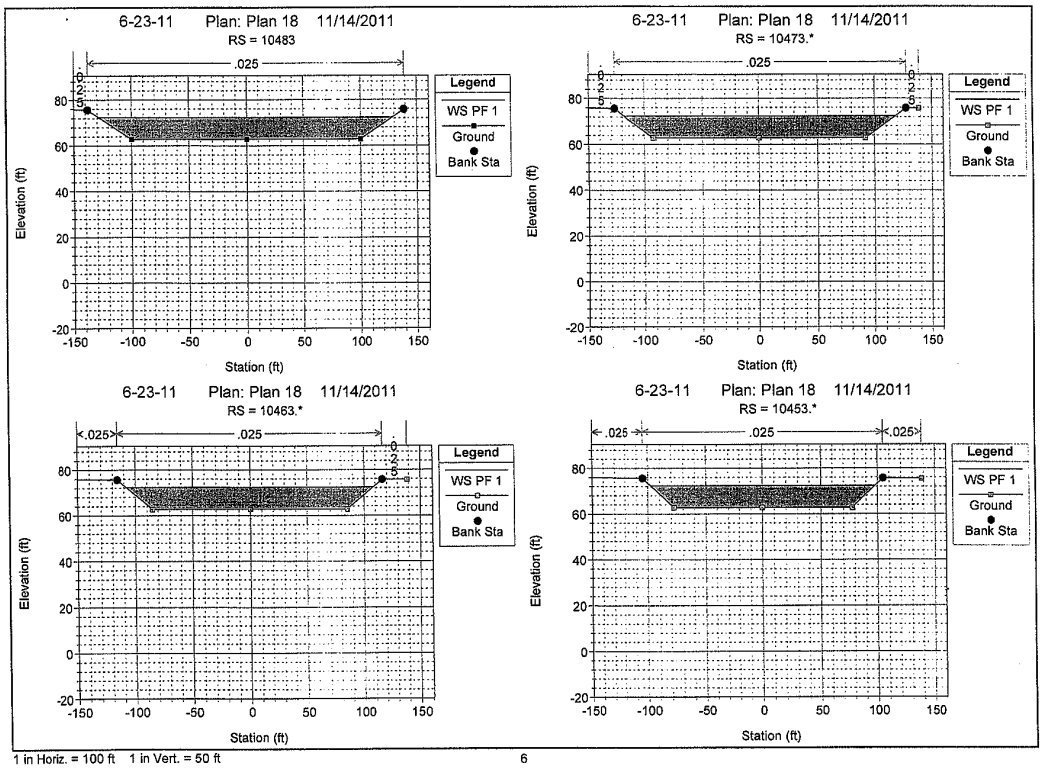



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



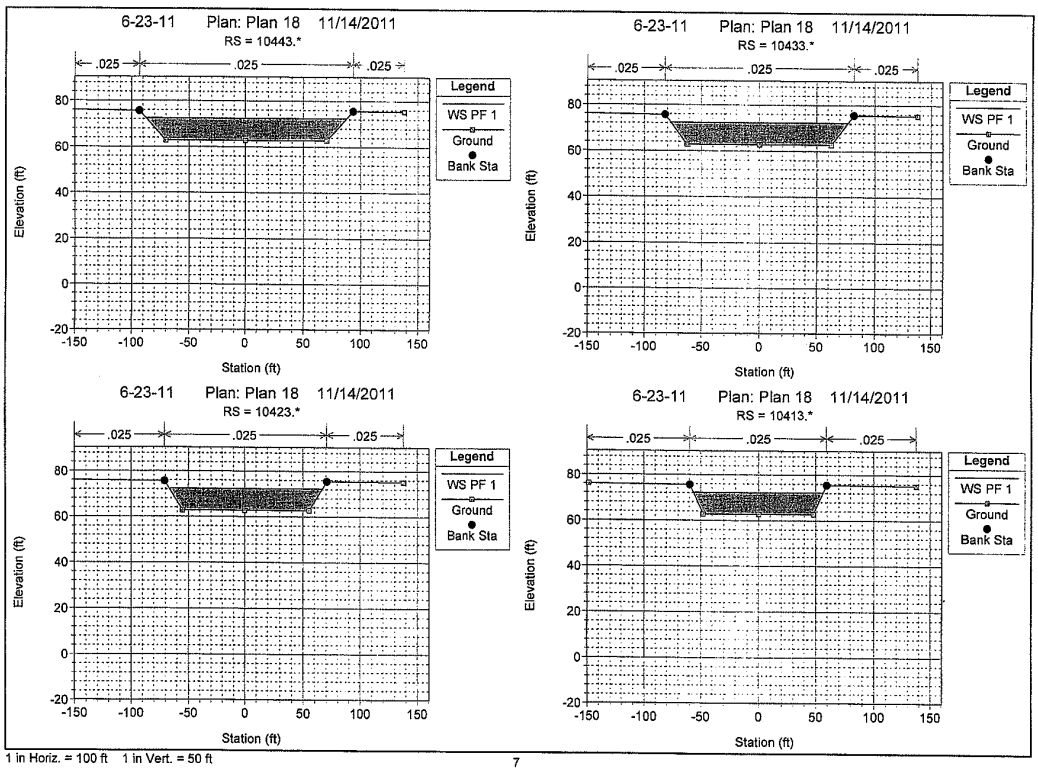

1 in Horiz. = 100 ft 1 in Vert. = 50 ft

5



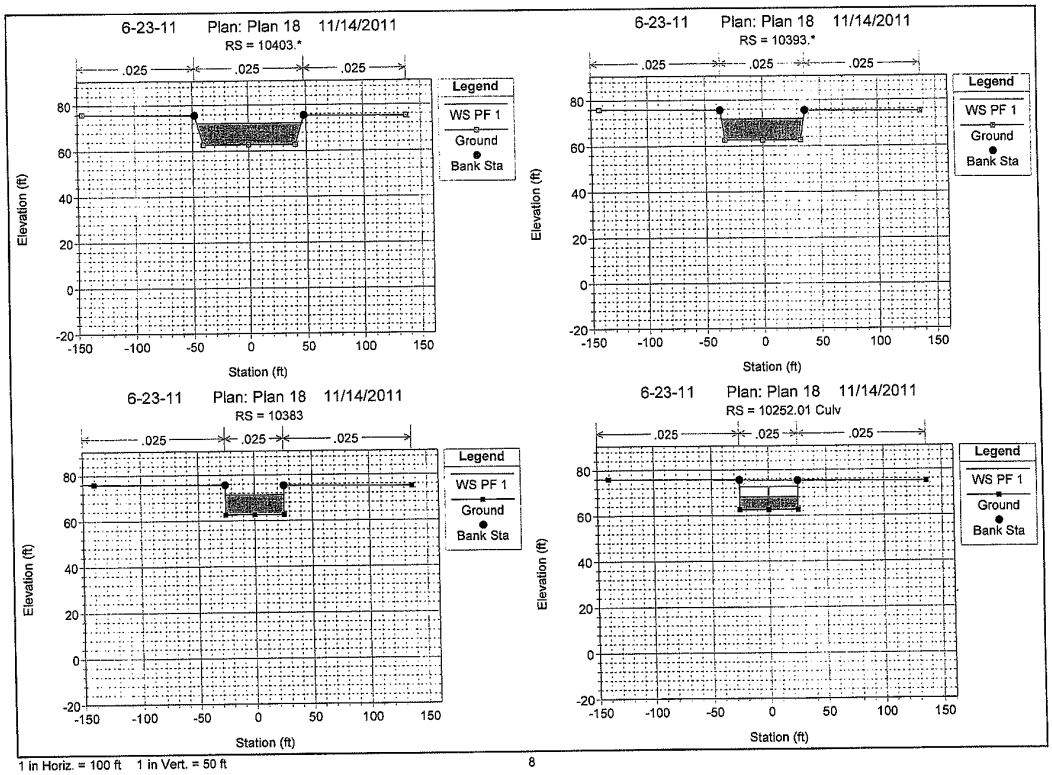

1 in Horiz. = 100 ft 1 in Vert. = 50 ft

6

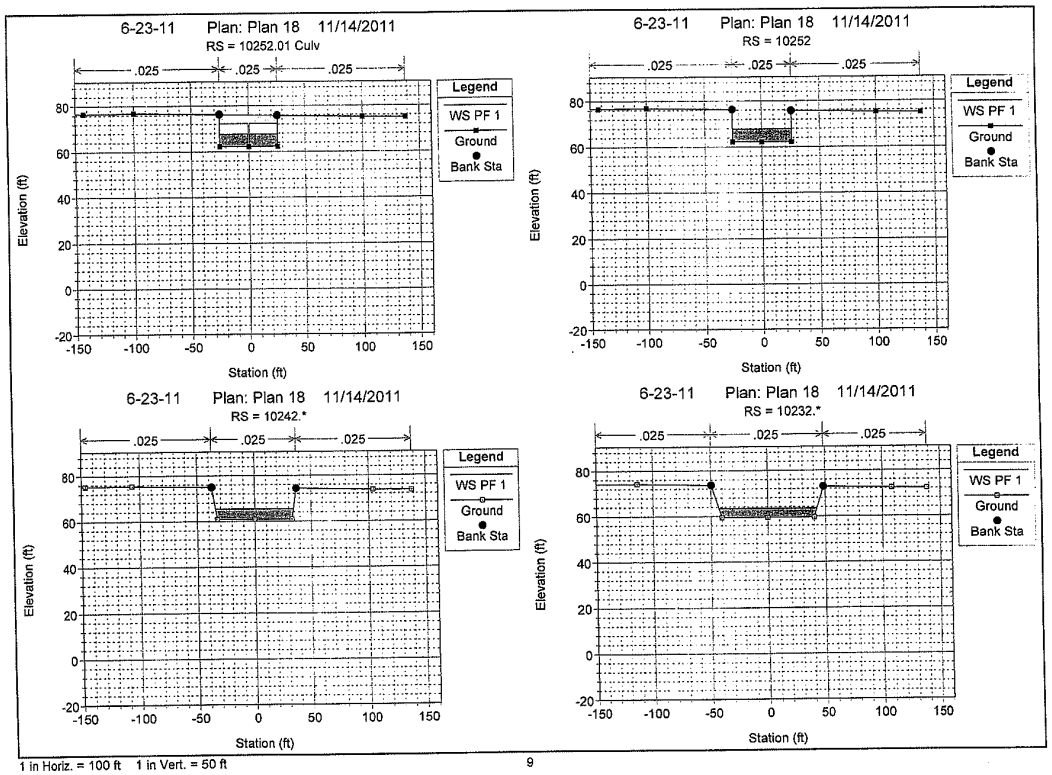



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



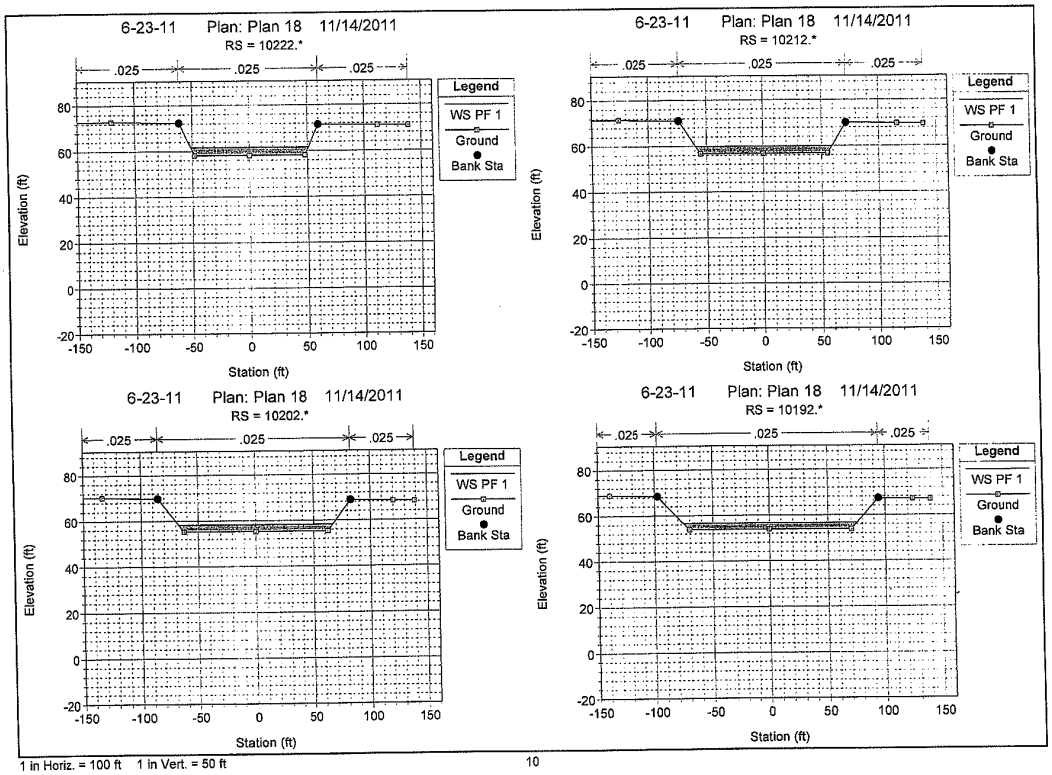



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

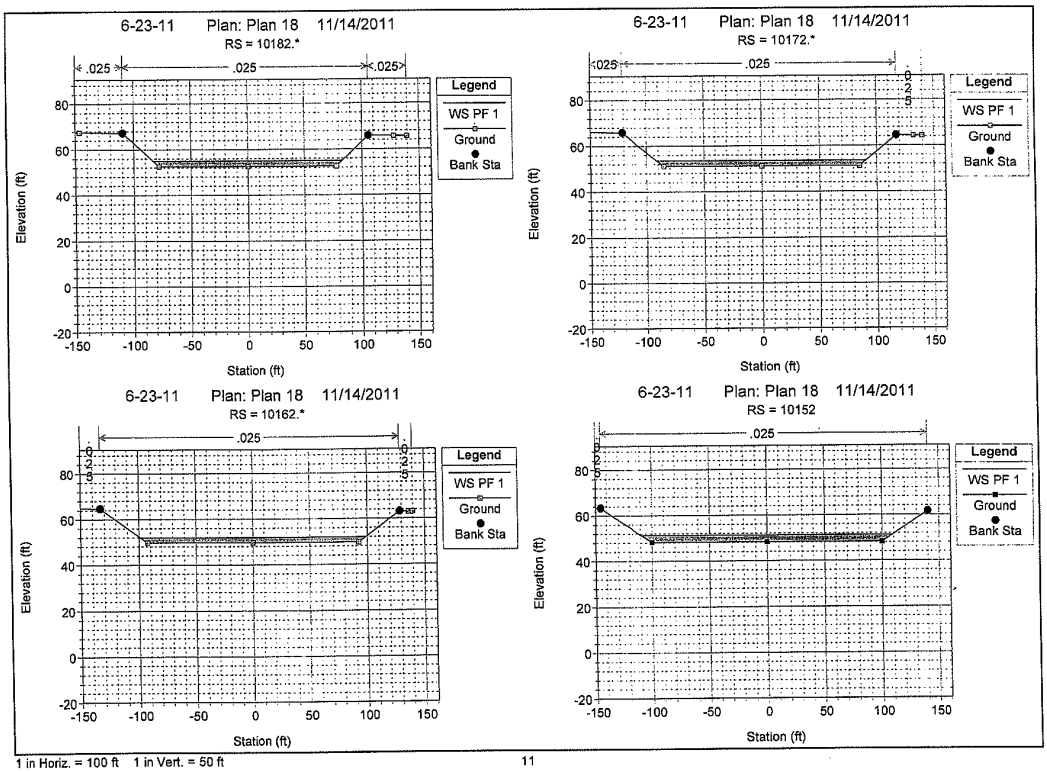



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



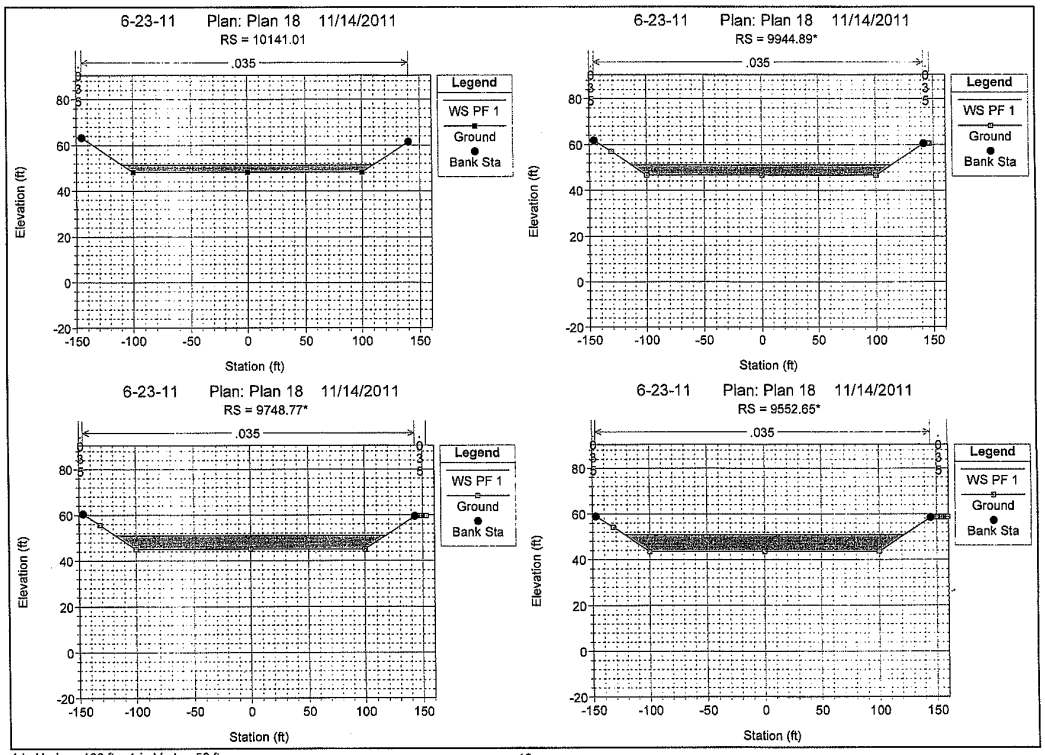



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

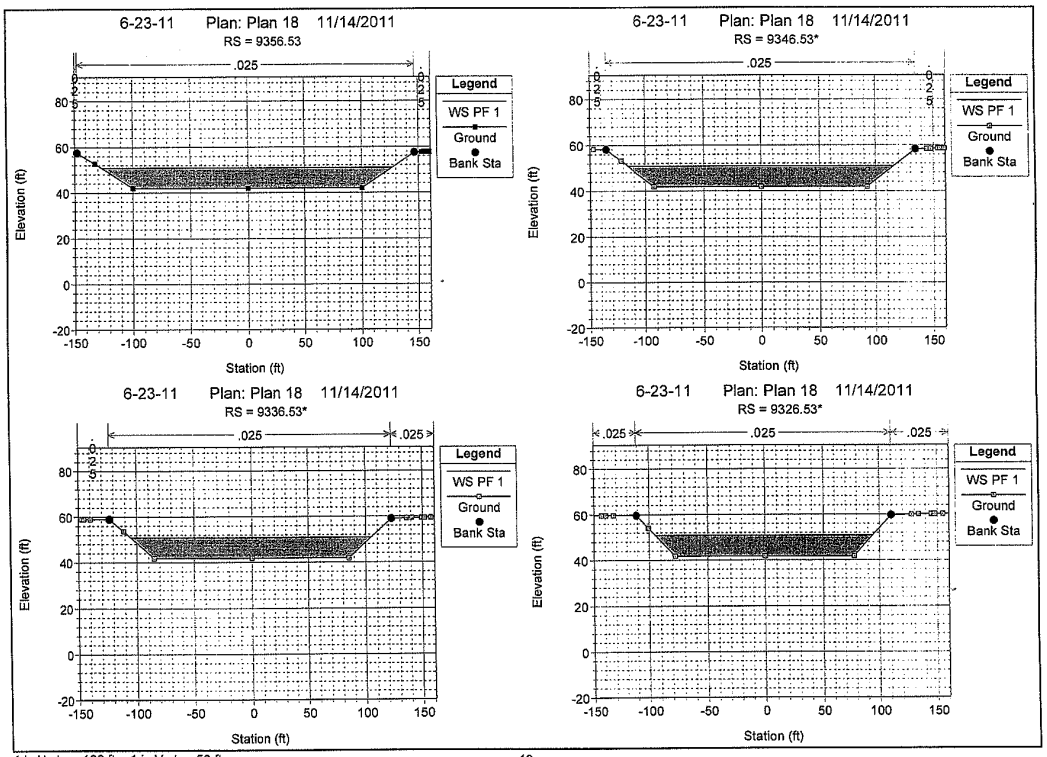



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



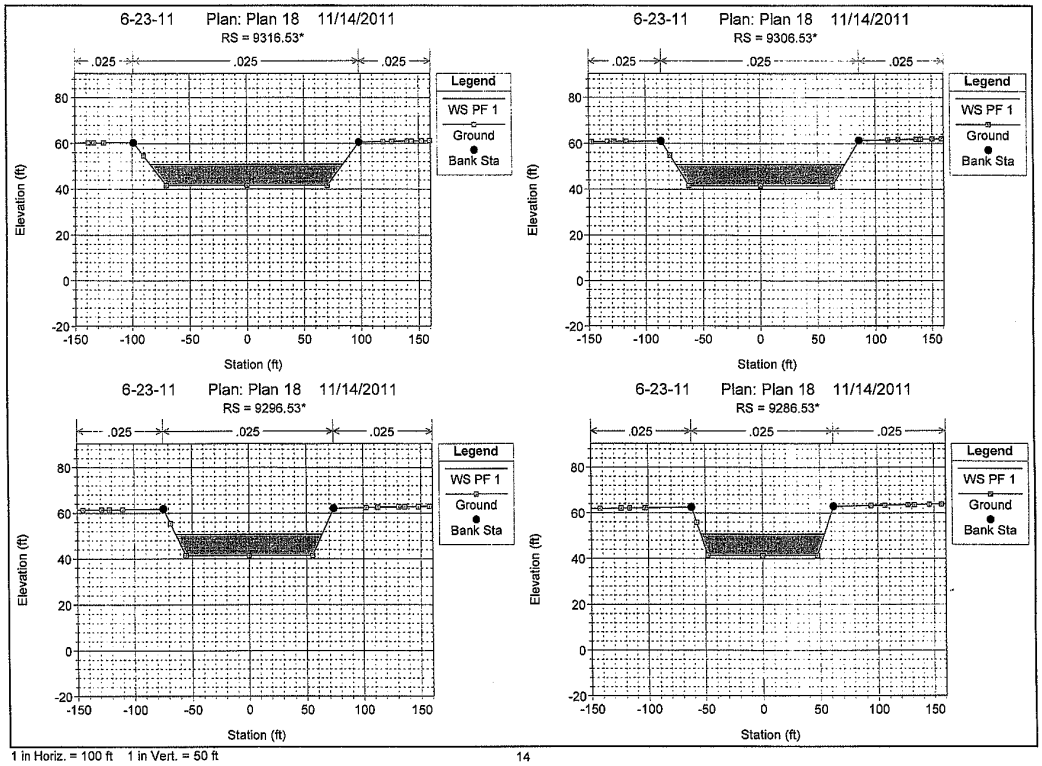



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

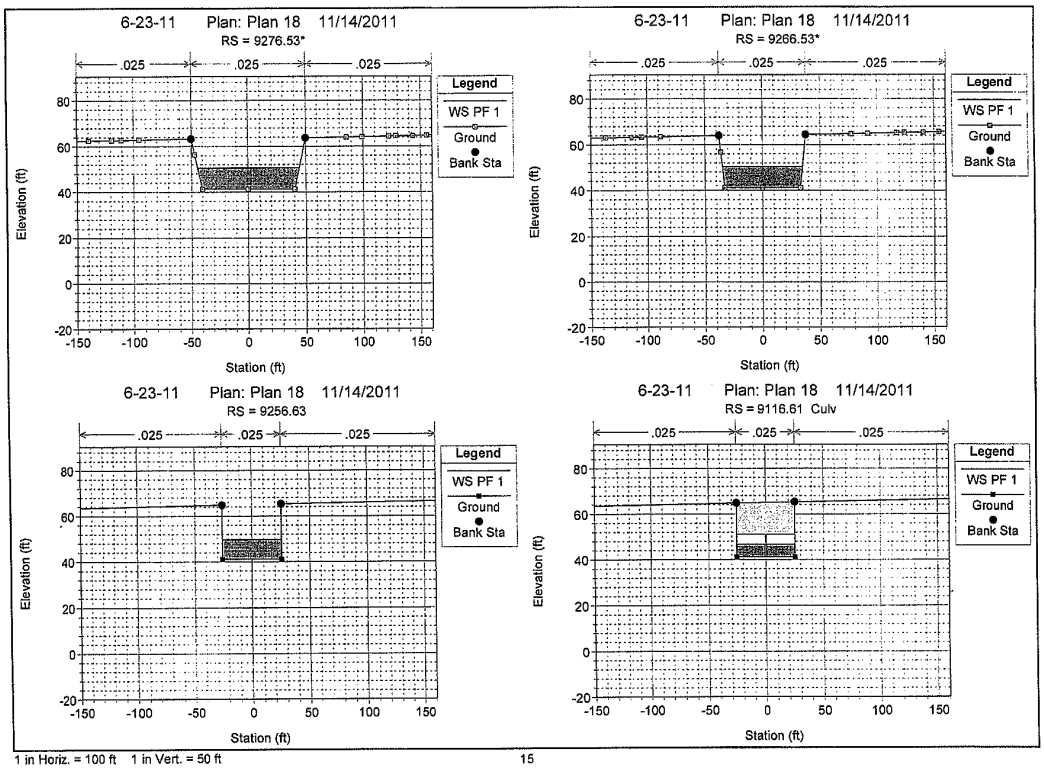



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



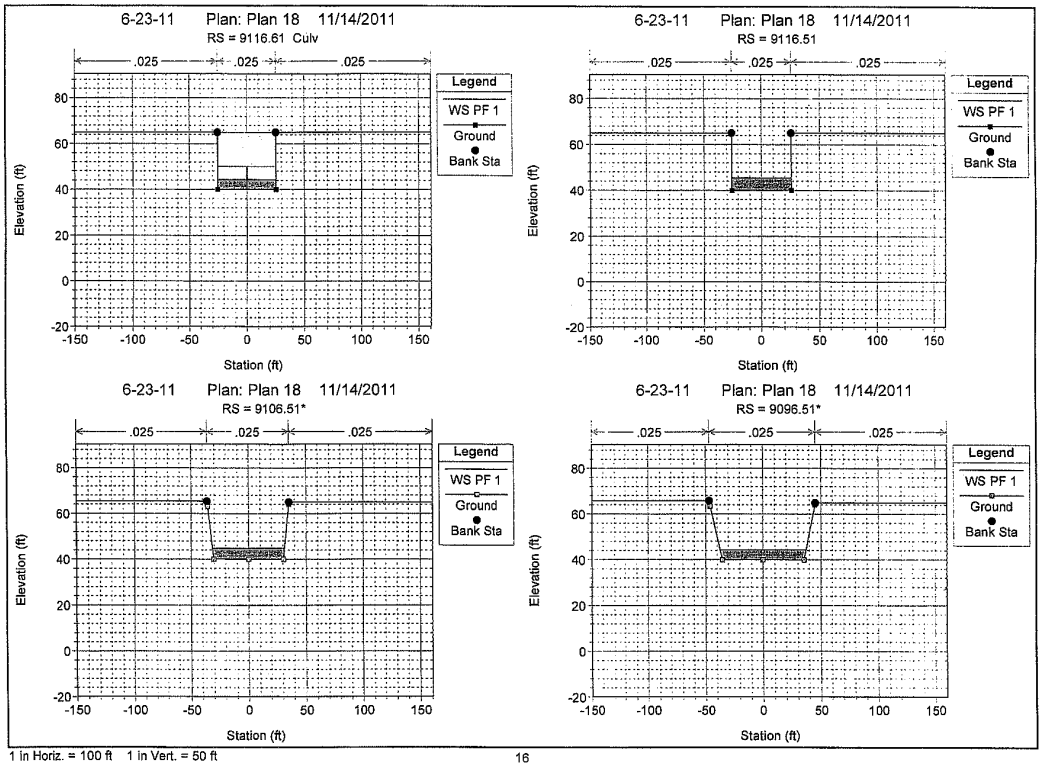



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

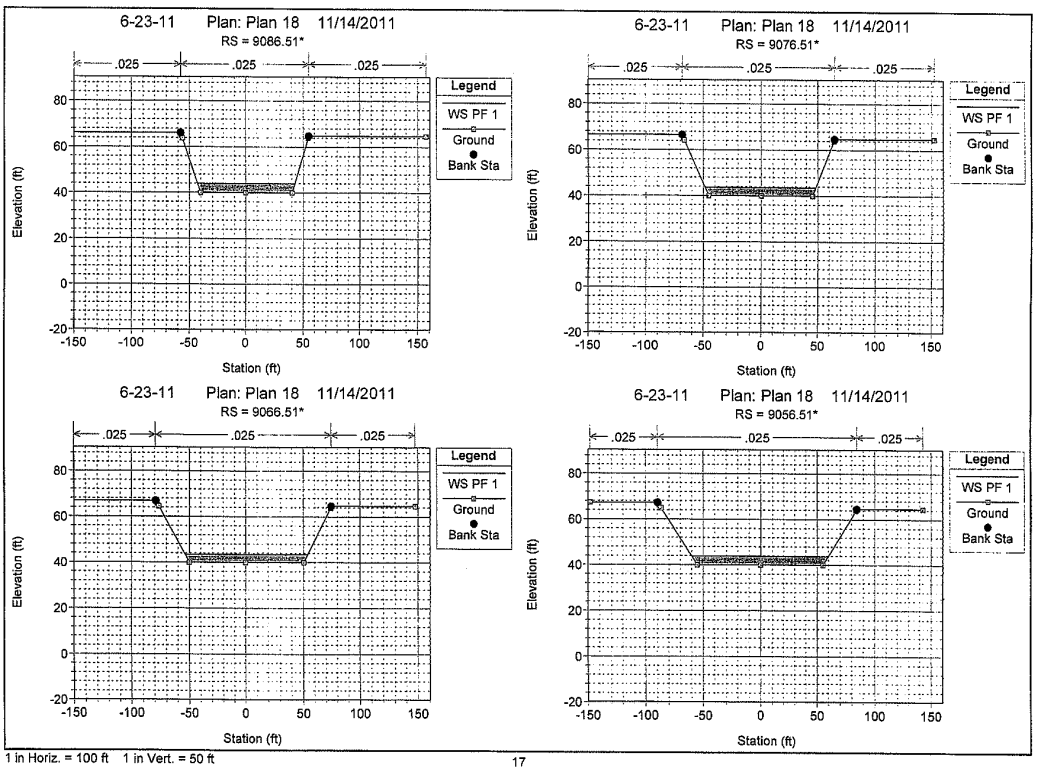



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



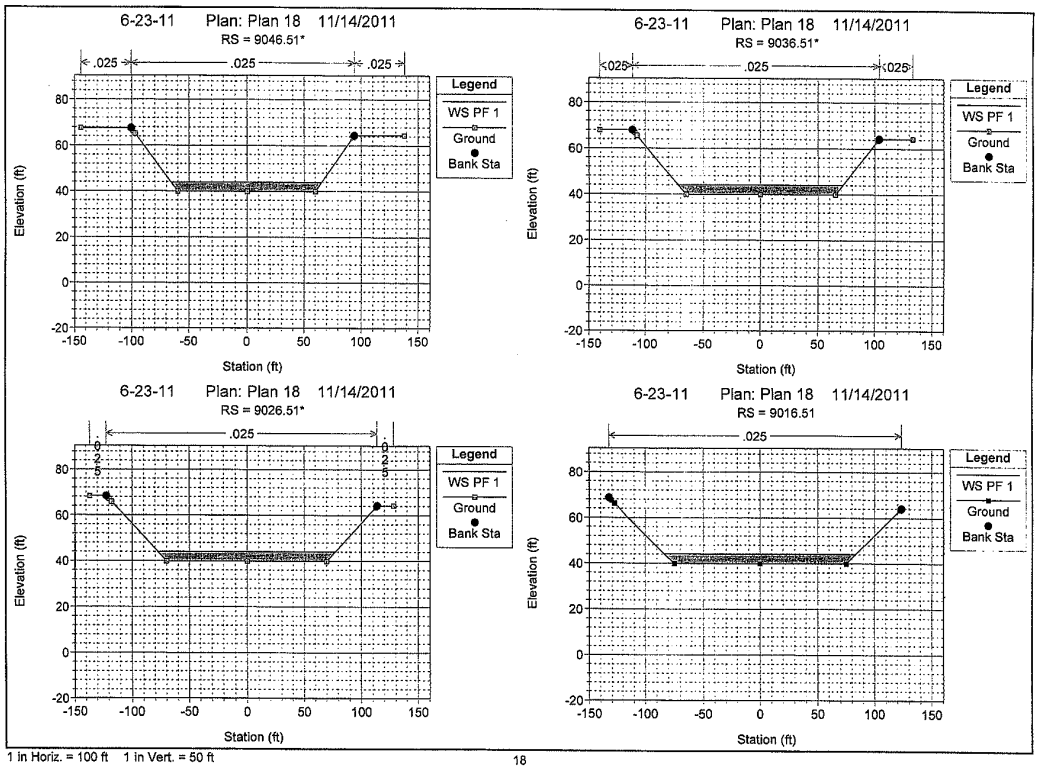



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

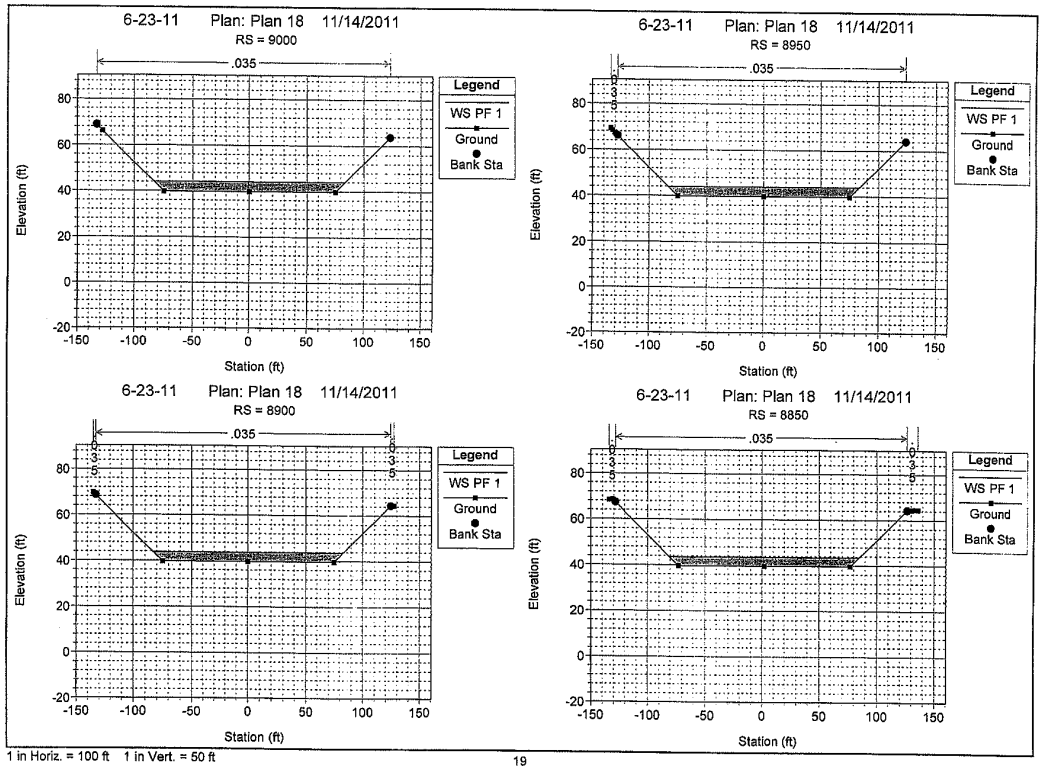



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



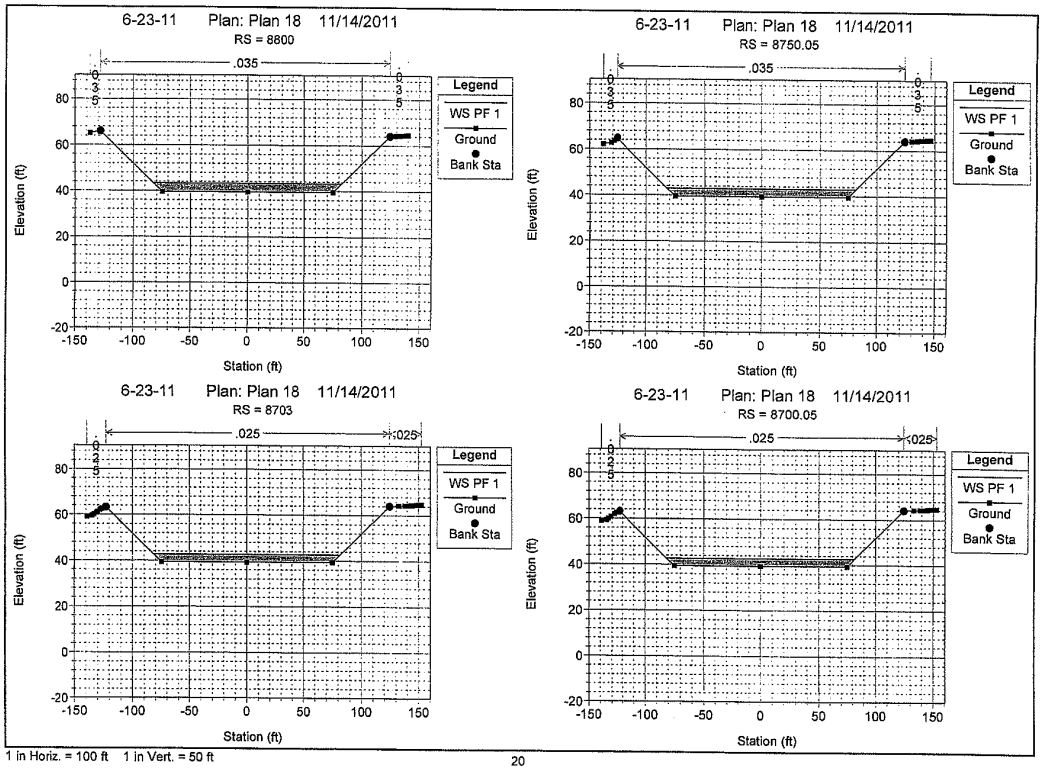



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

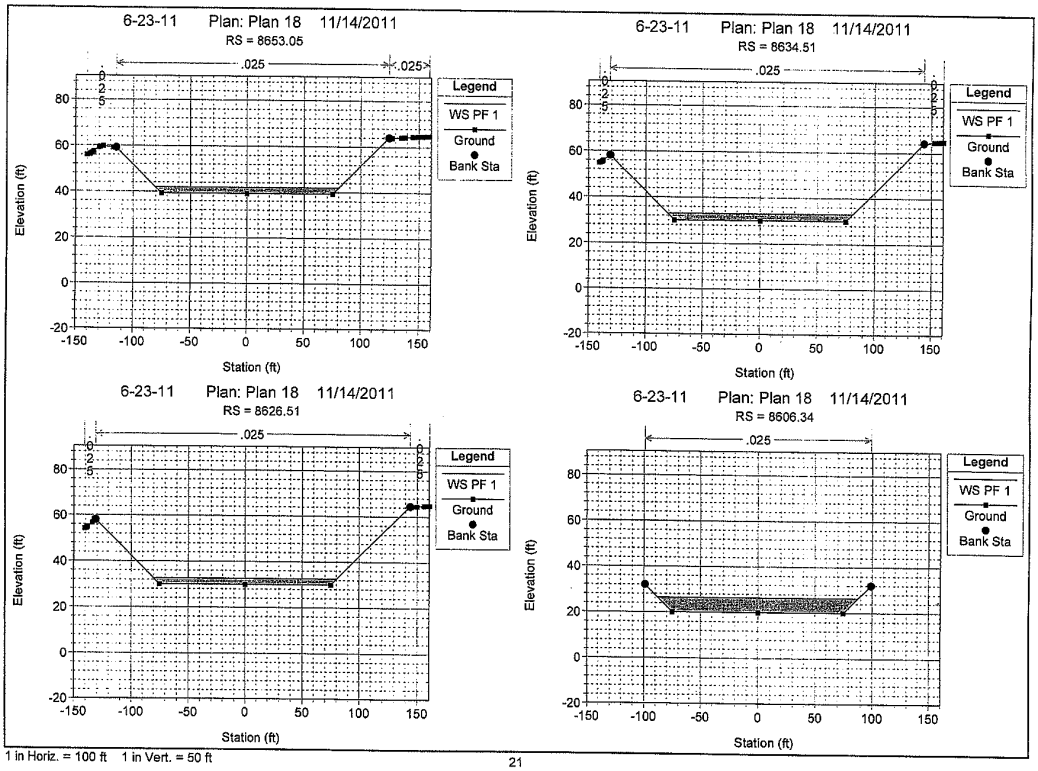



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



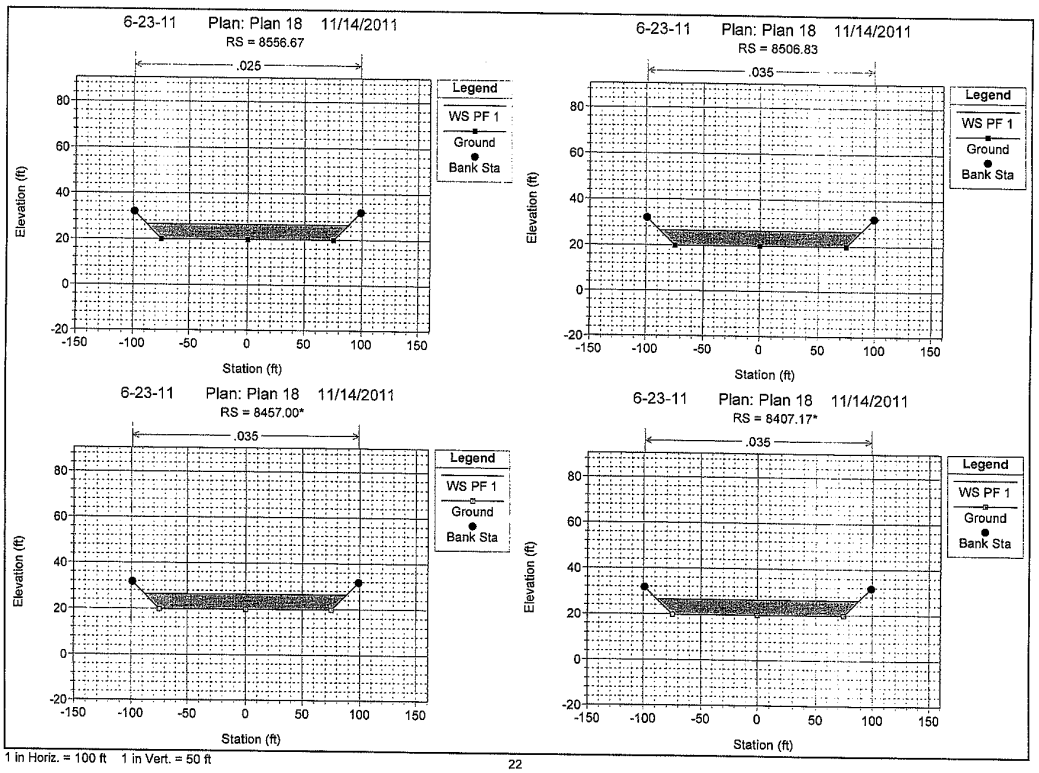



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

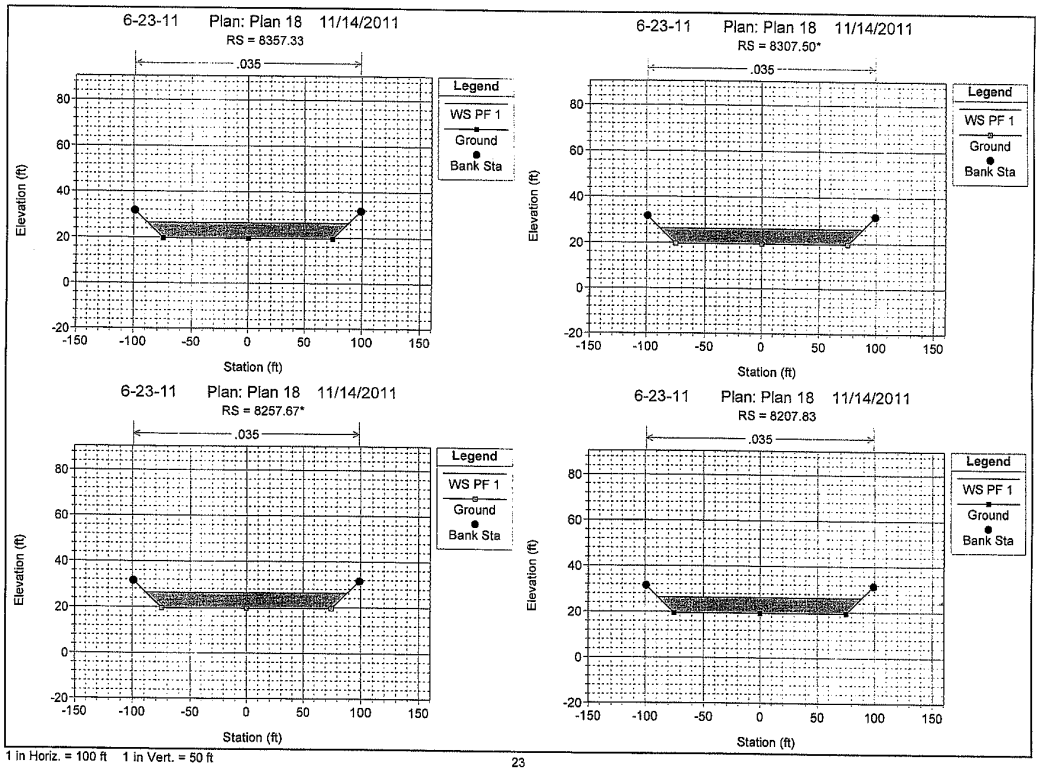



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

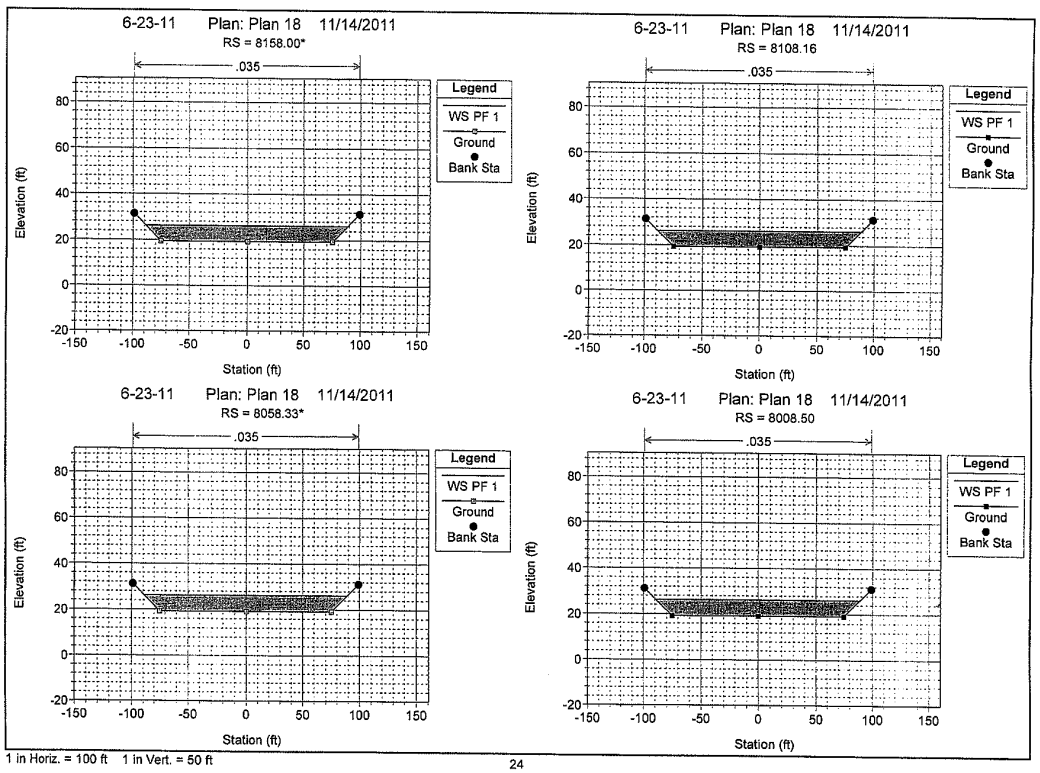


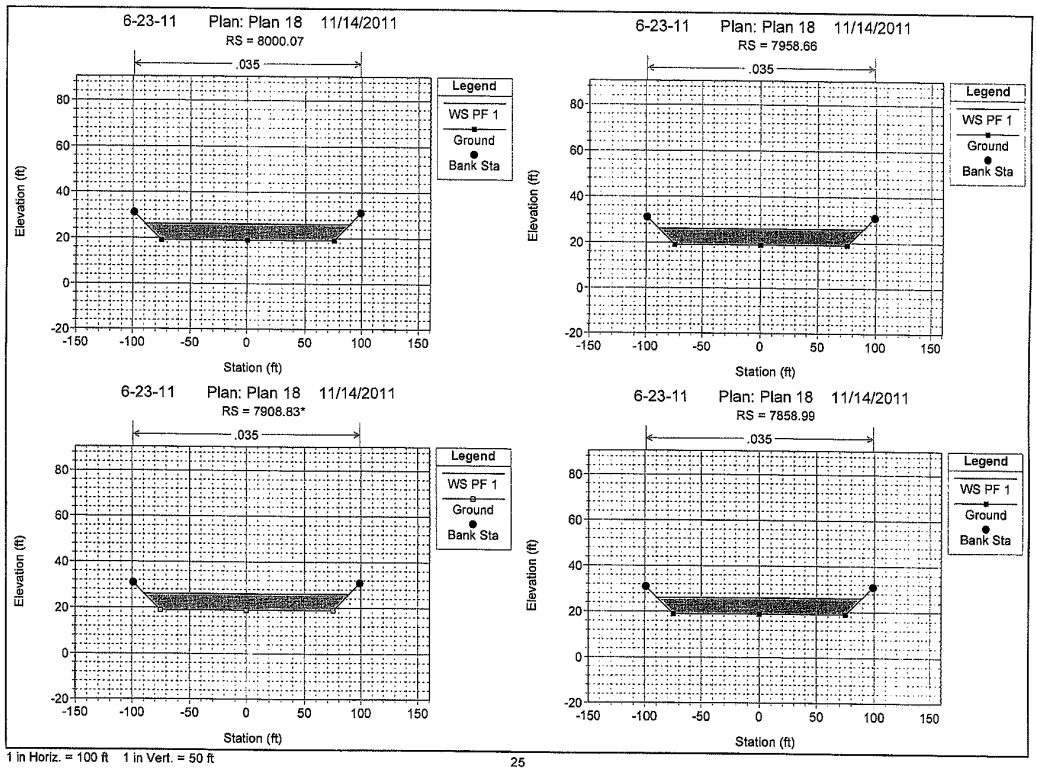



1 in Horiz. = 100 ft 1 in Vert. = 50 ft


6-23-11 Plan: Plan 18 11/14/2011
RS = 8357.33
6-23-11 Plan: Plan 18 11/14/2011
RS = 8307.50*
6-23-11 Plan: Plan 18 11/14/2011
RS = 8257.67*
6-23-11 Plan: Plan 18 11/14/2011
RS = 8207.83
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

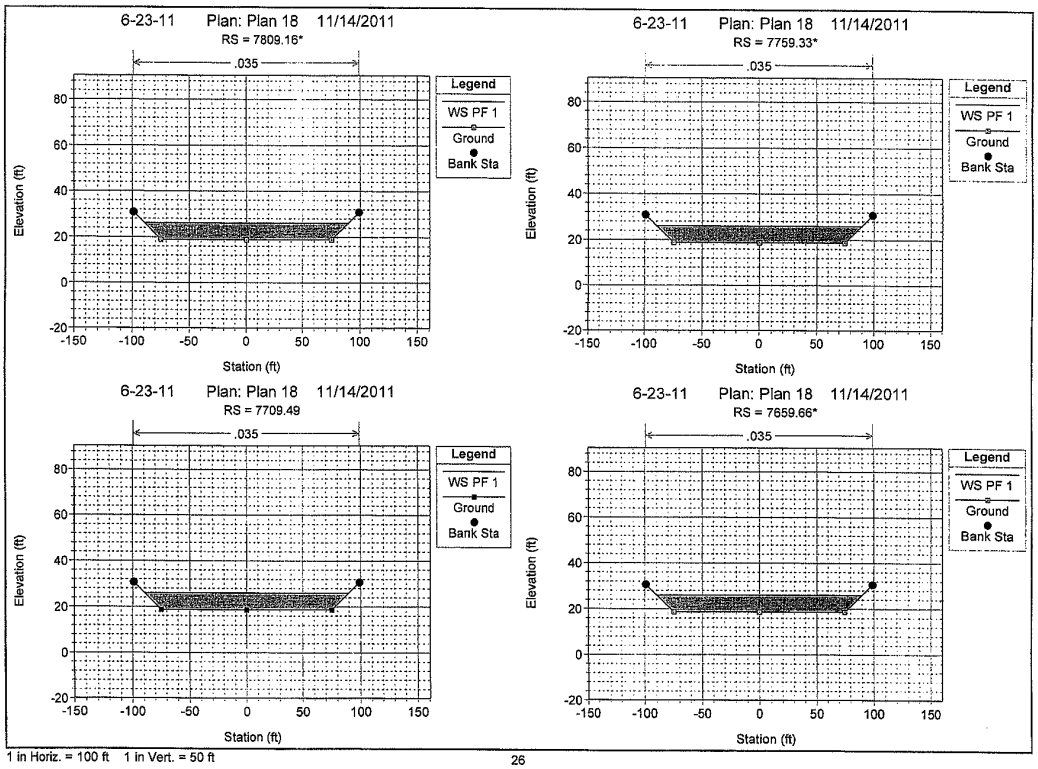



6-23-11 Plan: Plan 18 11/14/2011
RS = 8158.00*
6-23-11 Plan: Plan 18 11/14/2011
RS = 8108.16
6-23-11 Plan: Plan 18 11/14/2011
RS = 8058.33*
6-23-11 Plan: Plan 18 11/14/2011
RS = 8008.50
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

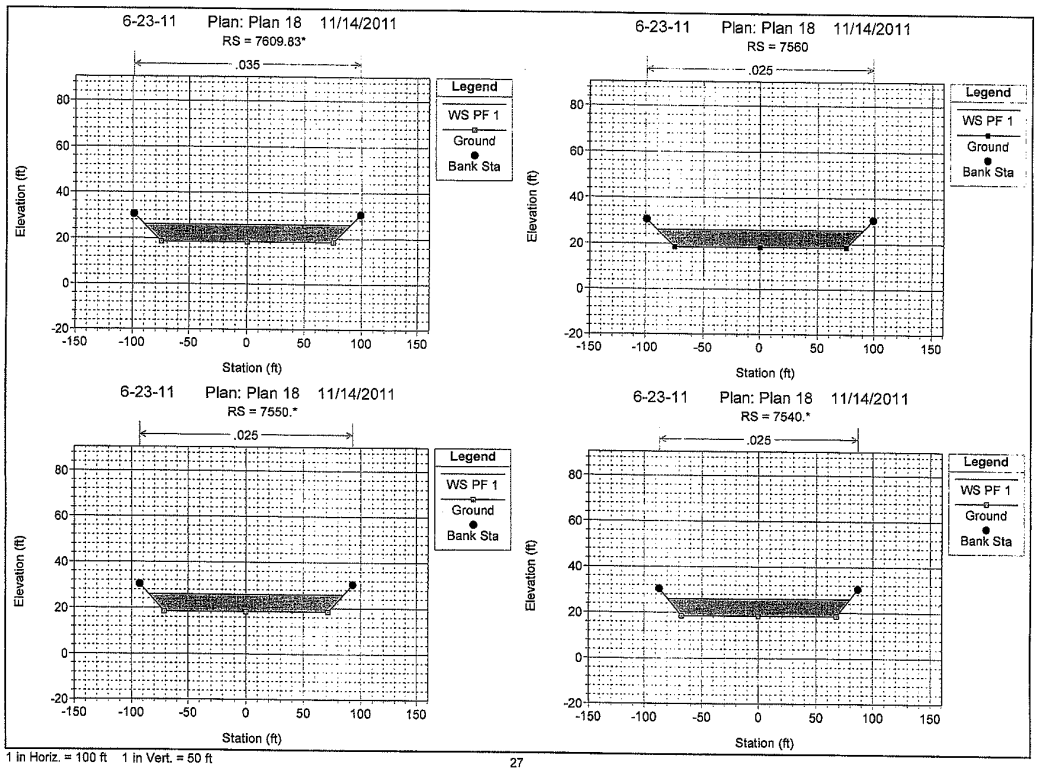



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



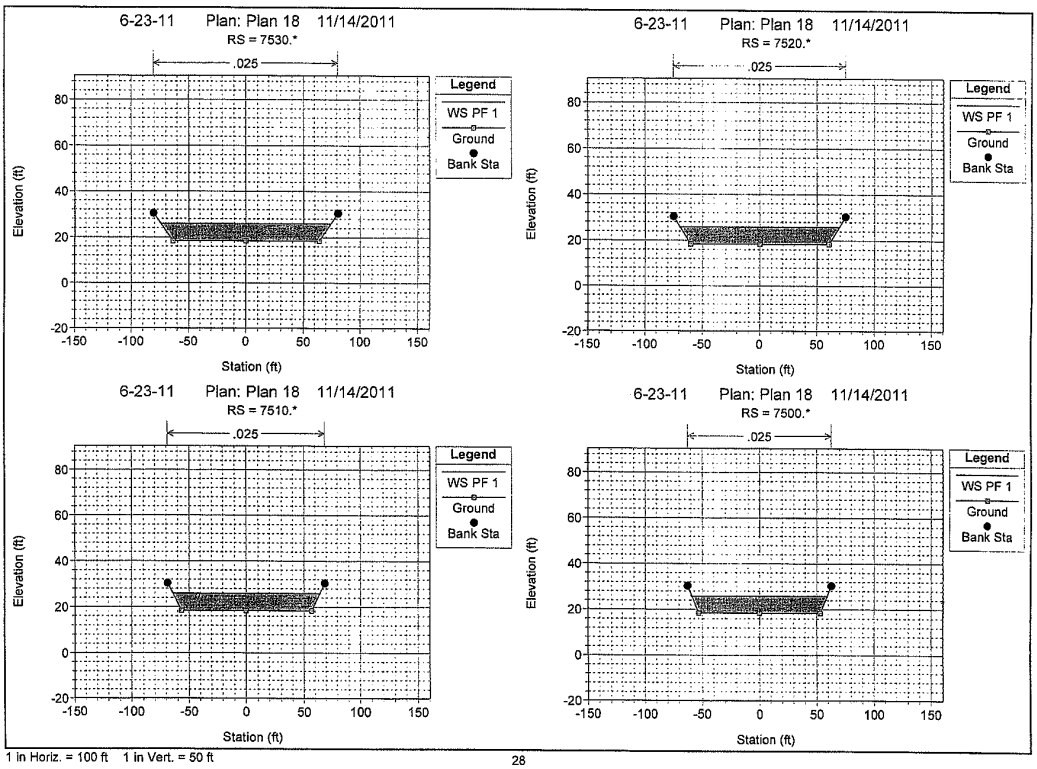



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

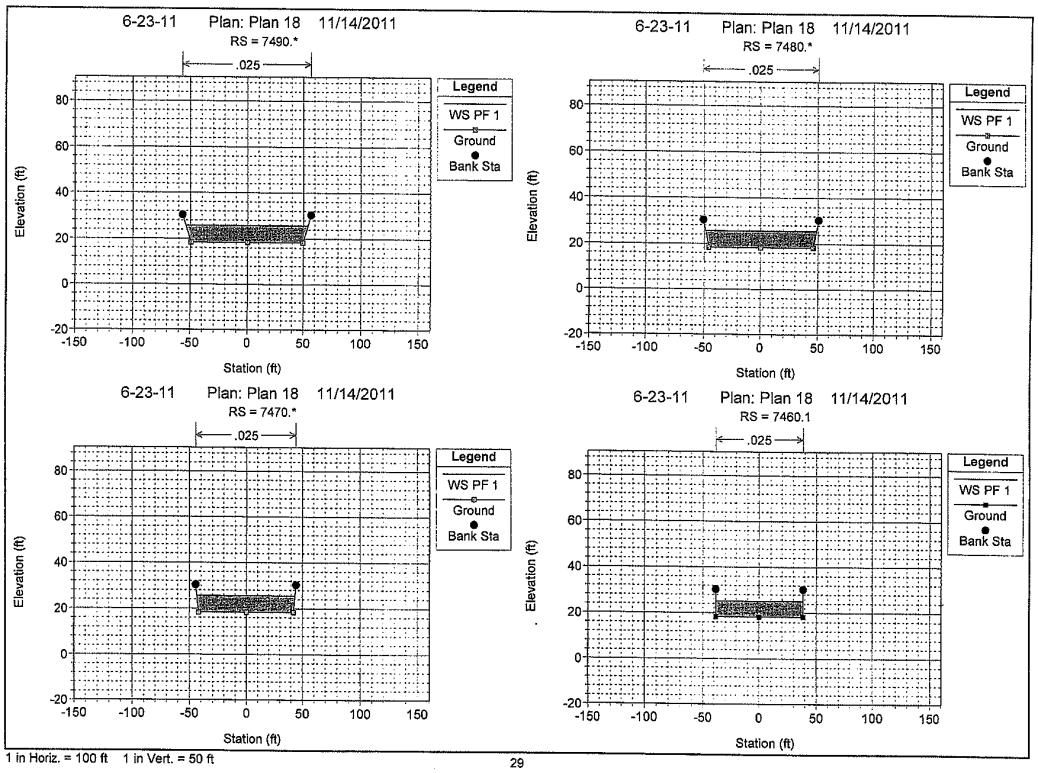



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

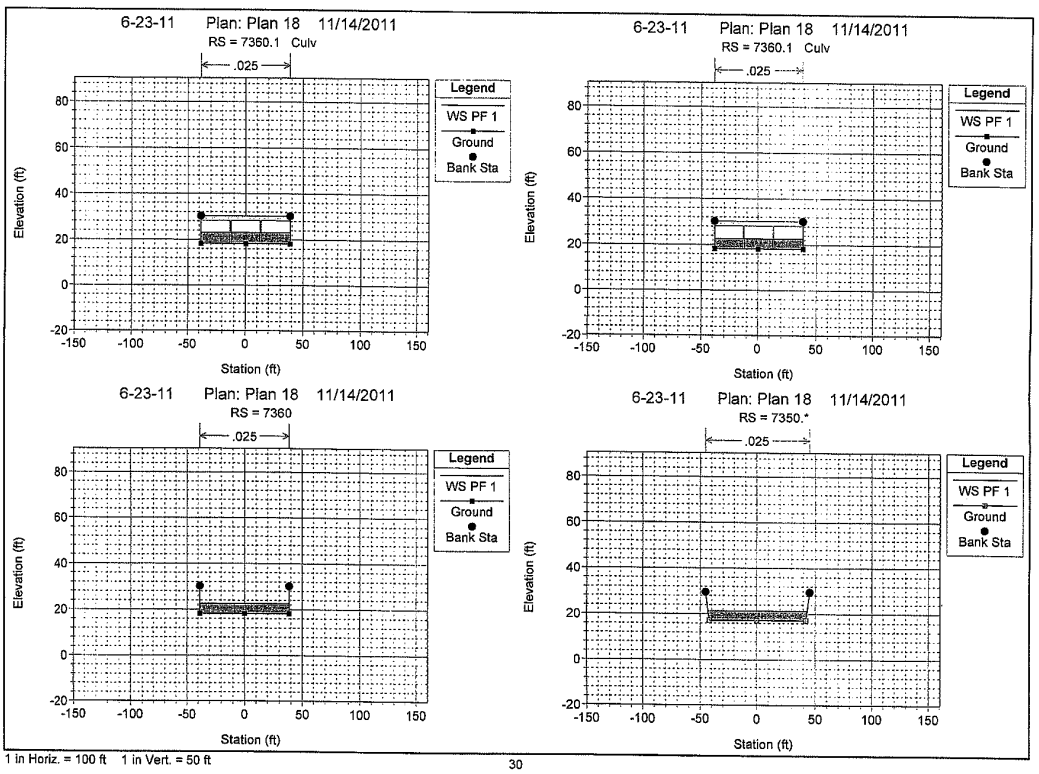


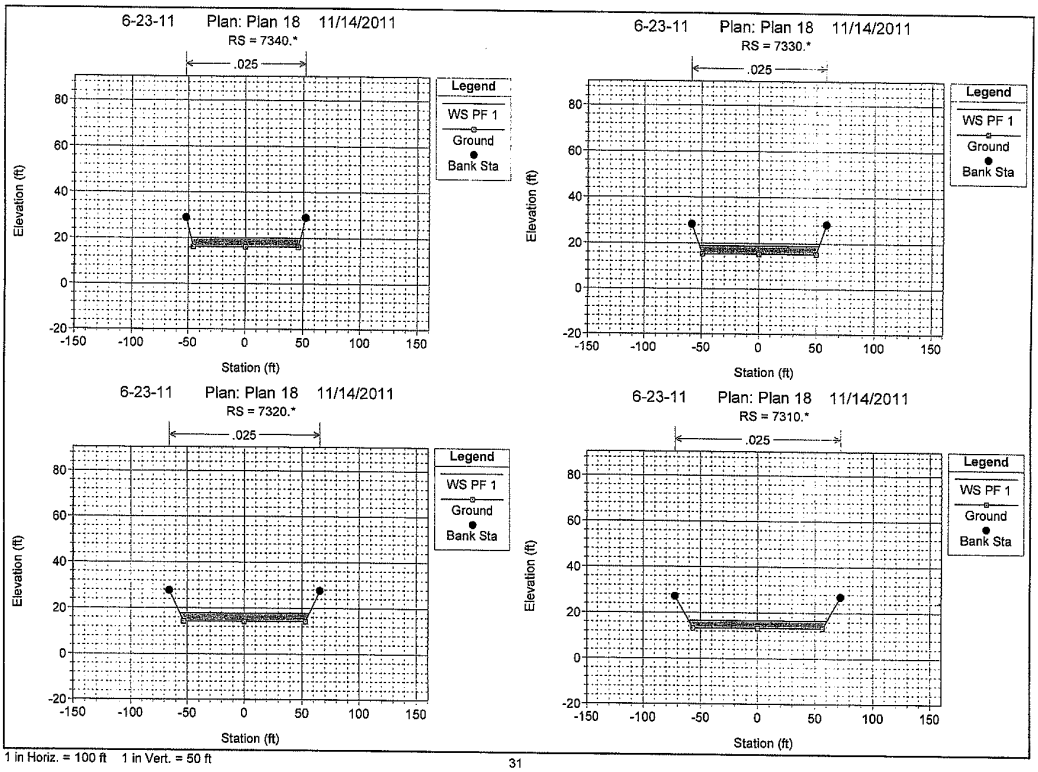



1 in Horiz. = 100 ft 1 in Vert. = 50 ft


6-23-11 Plan: Plan 18 11/14/2011
RS = 7490.*
6-23-11 Plan: Plan 18 11/14/2011
RS = 7480.*
6-23-11 Plan: Plan 18 11/14/2011
RS = 7470.*
6-23-11 Plan: Plan 18 11/14/2011
RS = 7460.1
.025
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

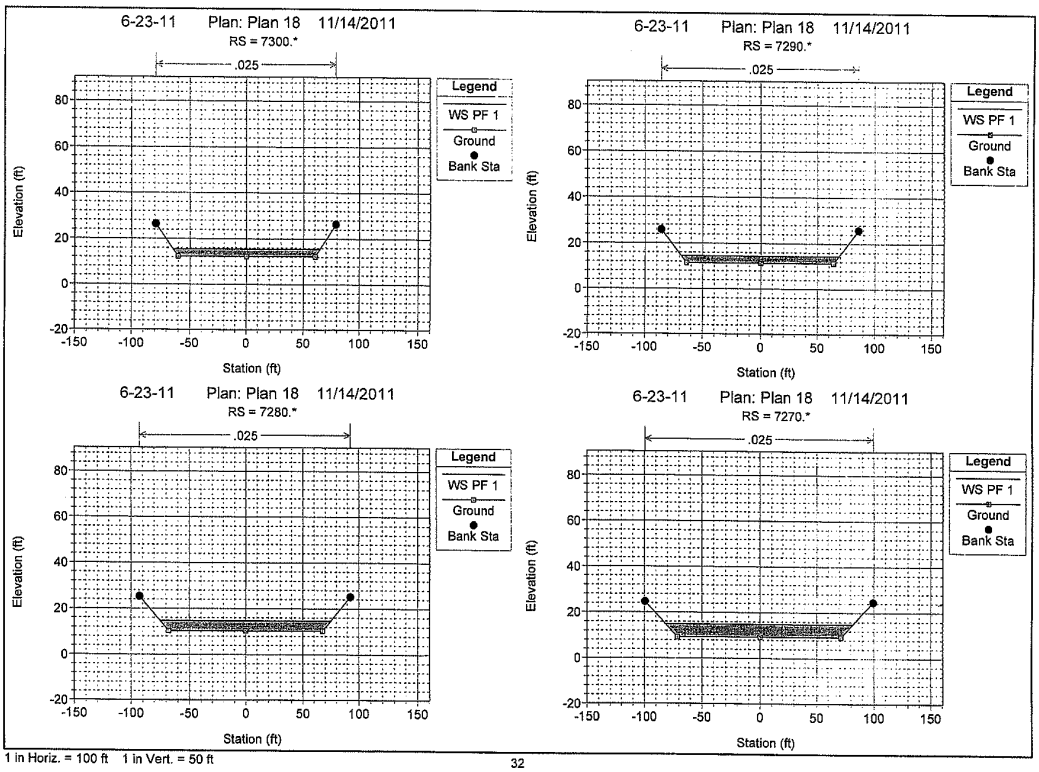



6-23-11 Plan: Plan 18 11/14/2011
RS = 7360.1 Culv
6-23-11 Plan: Plan 18 11/14/2011
RS = 7360.1 Culv
6-23-11 Plan: Plan 18 11/14/2011
RS = 7360
6-23-11 Plan: Plan 18 11/14/2011
RS = 7350.*
.025
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

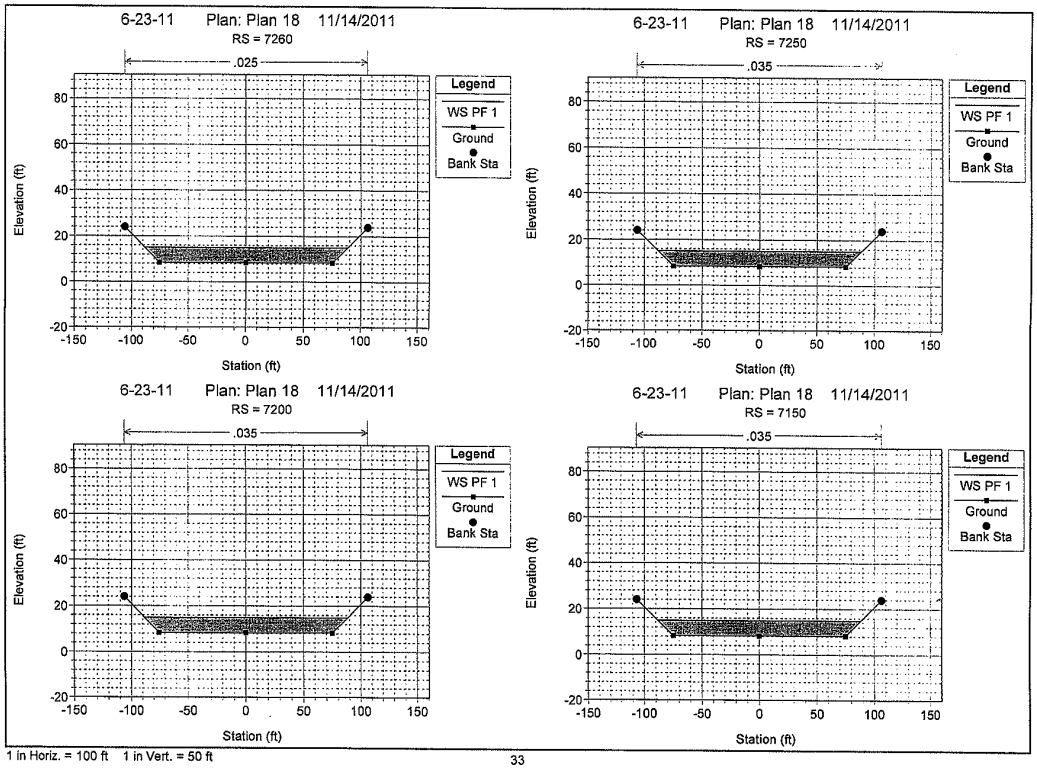



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



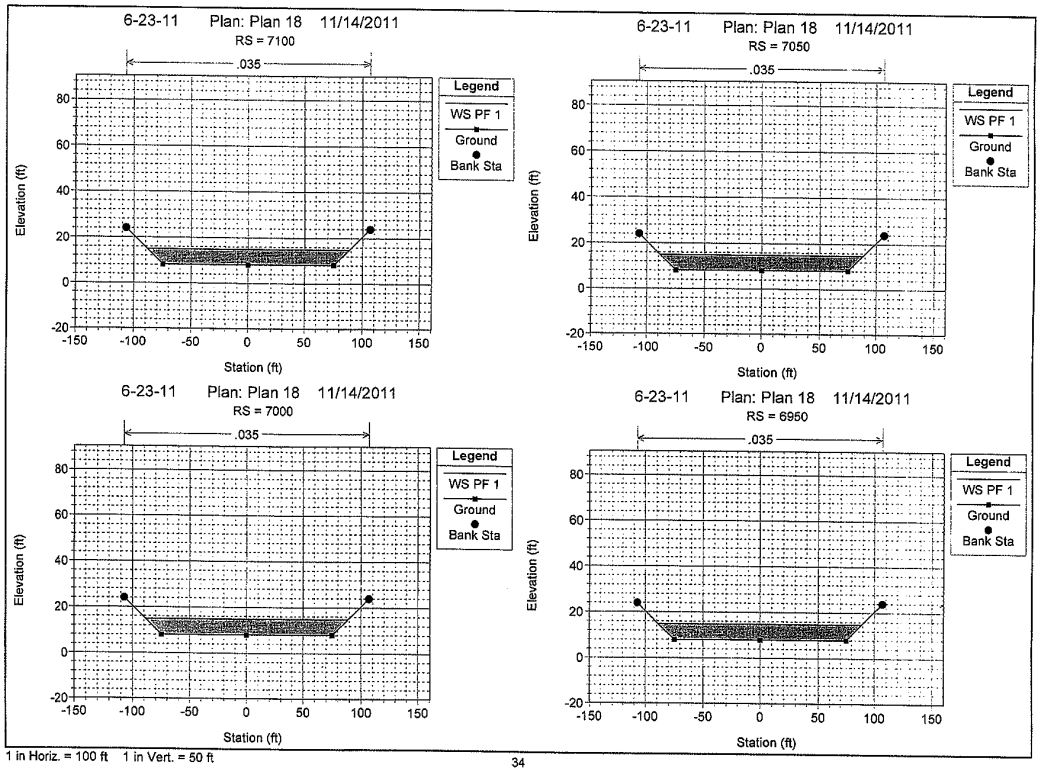



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

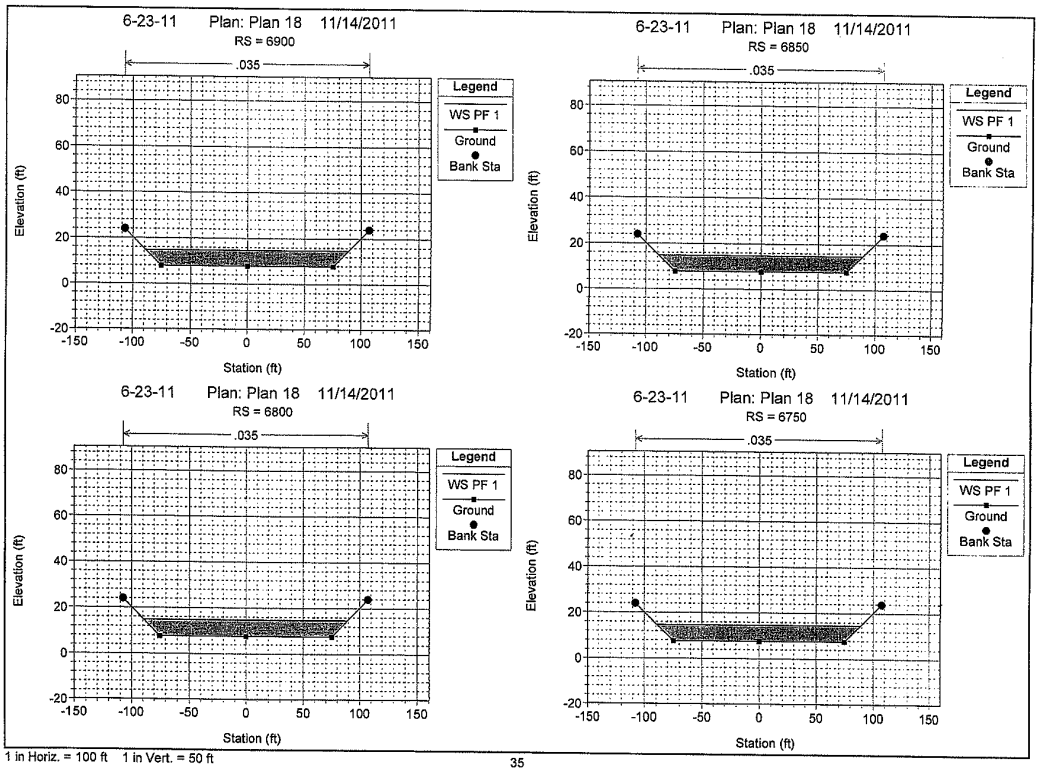



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



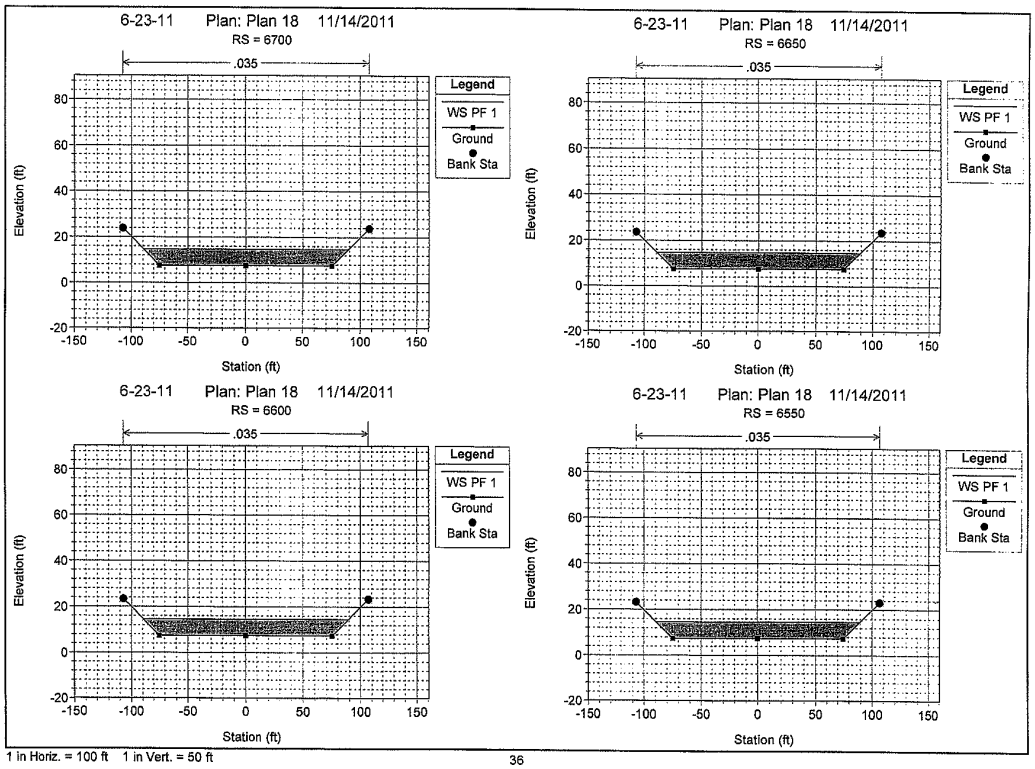



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

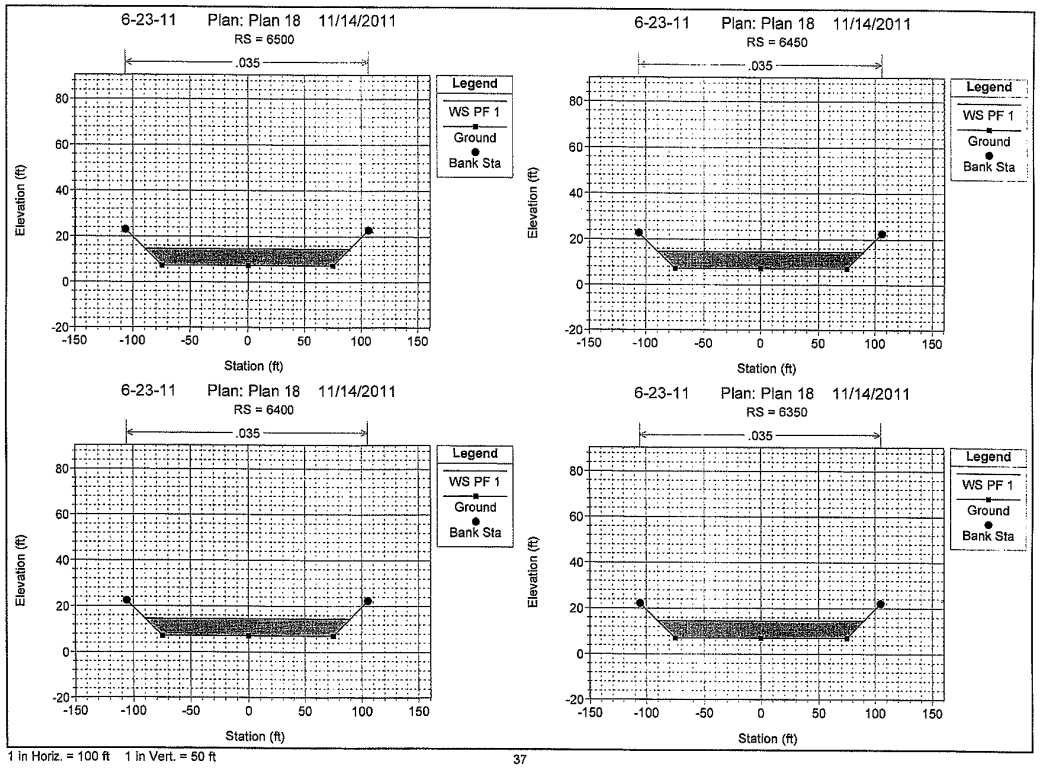



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



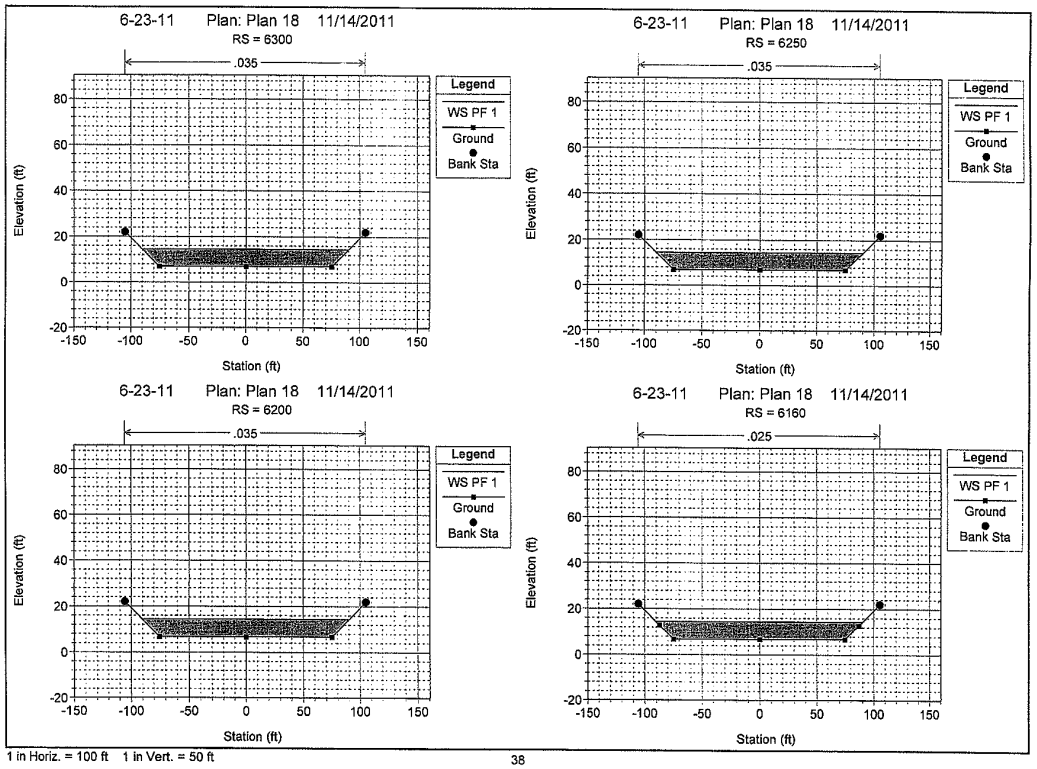



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

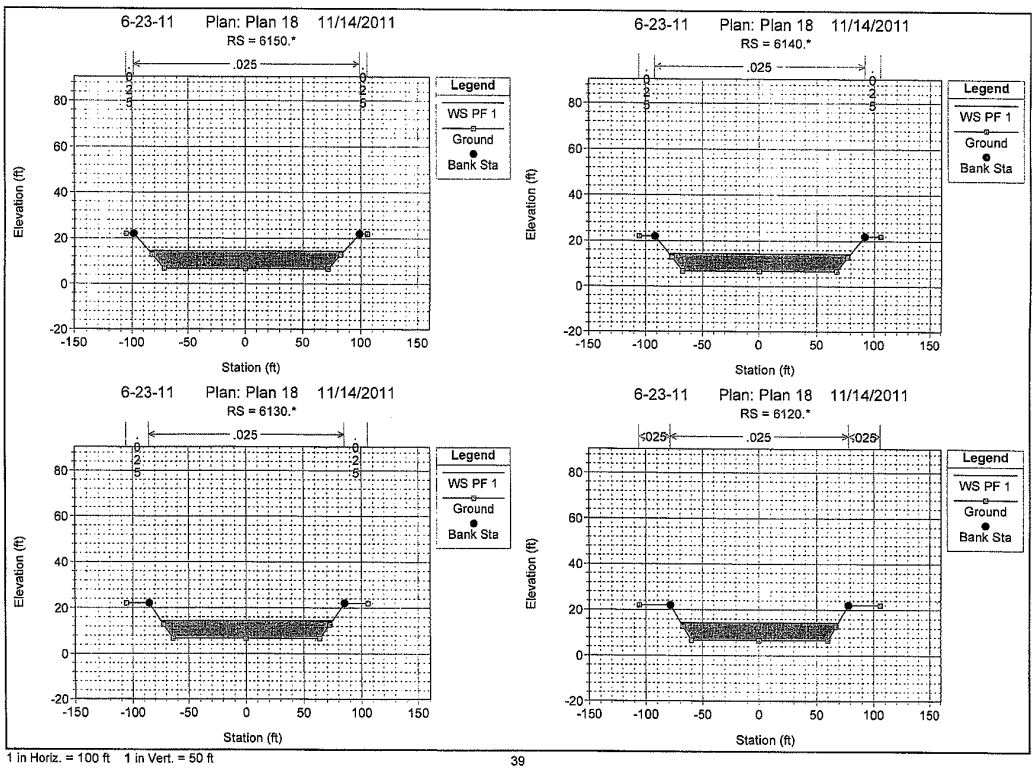



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



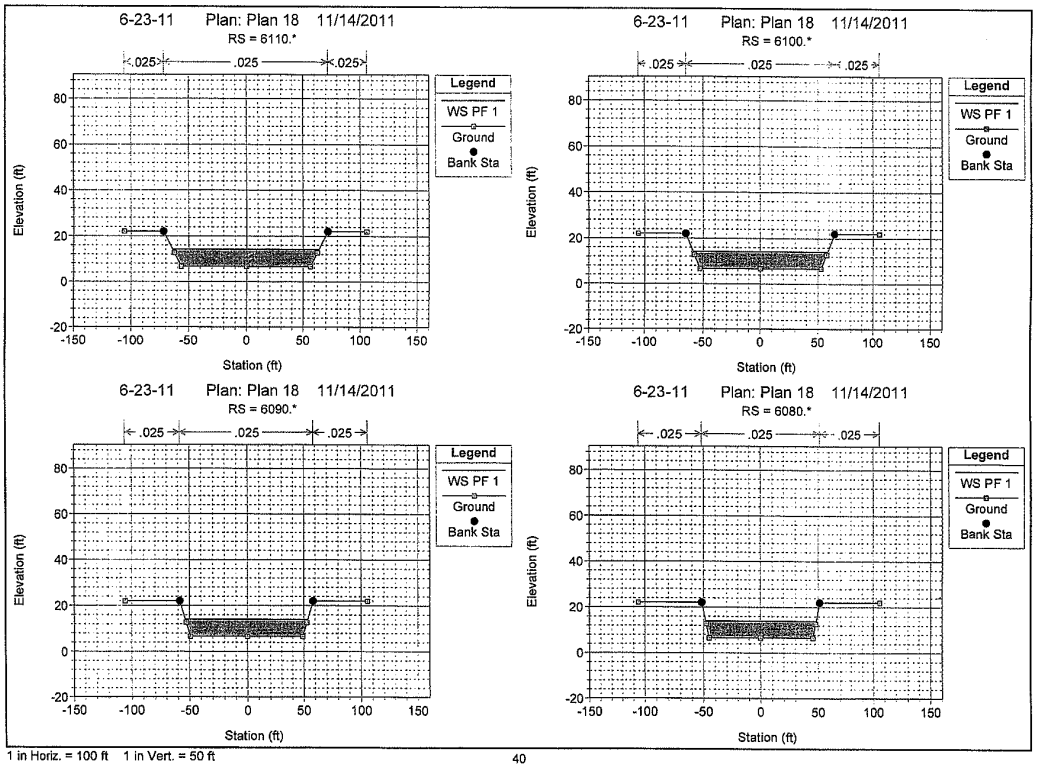



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

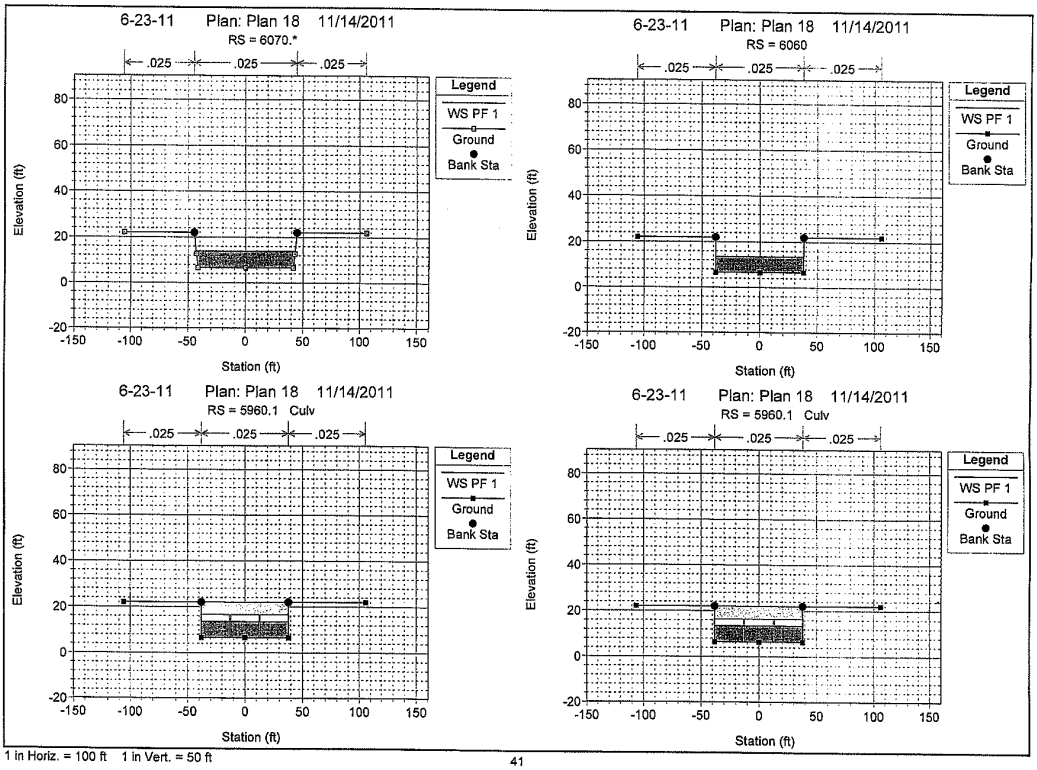



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



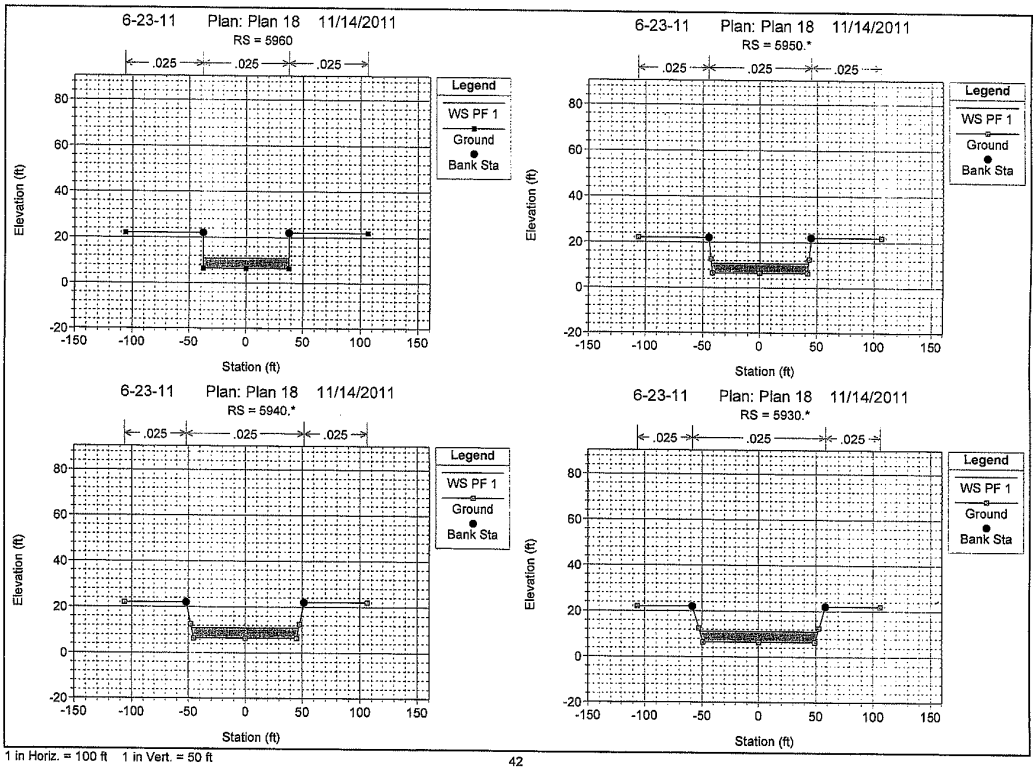



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

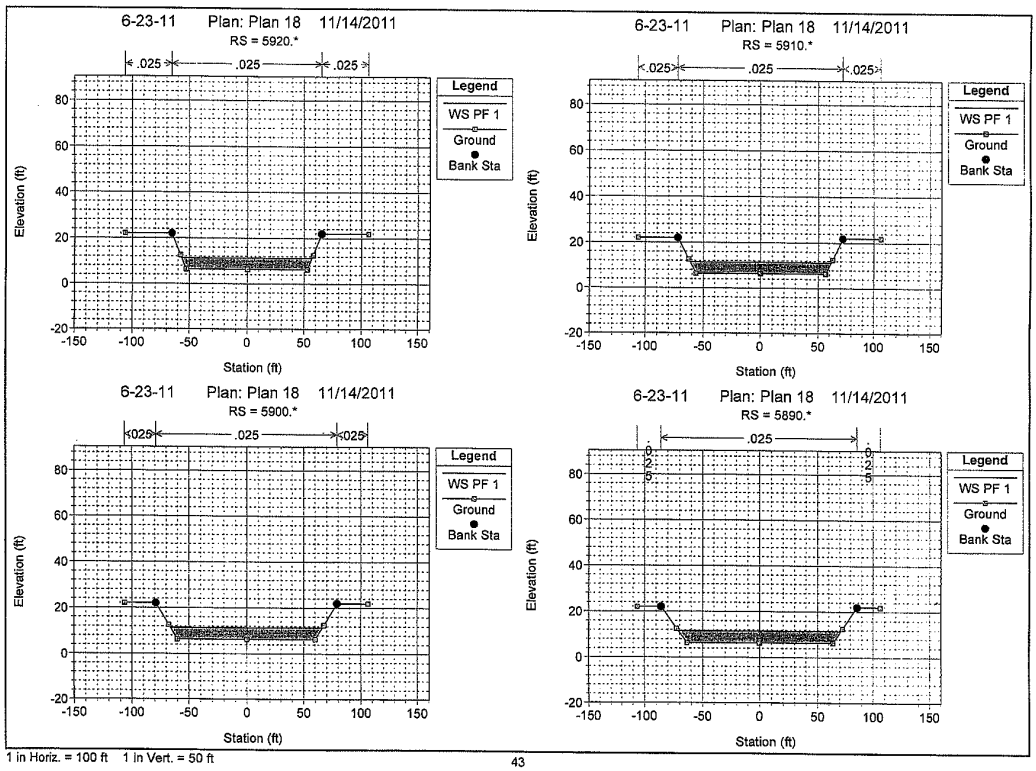



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



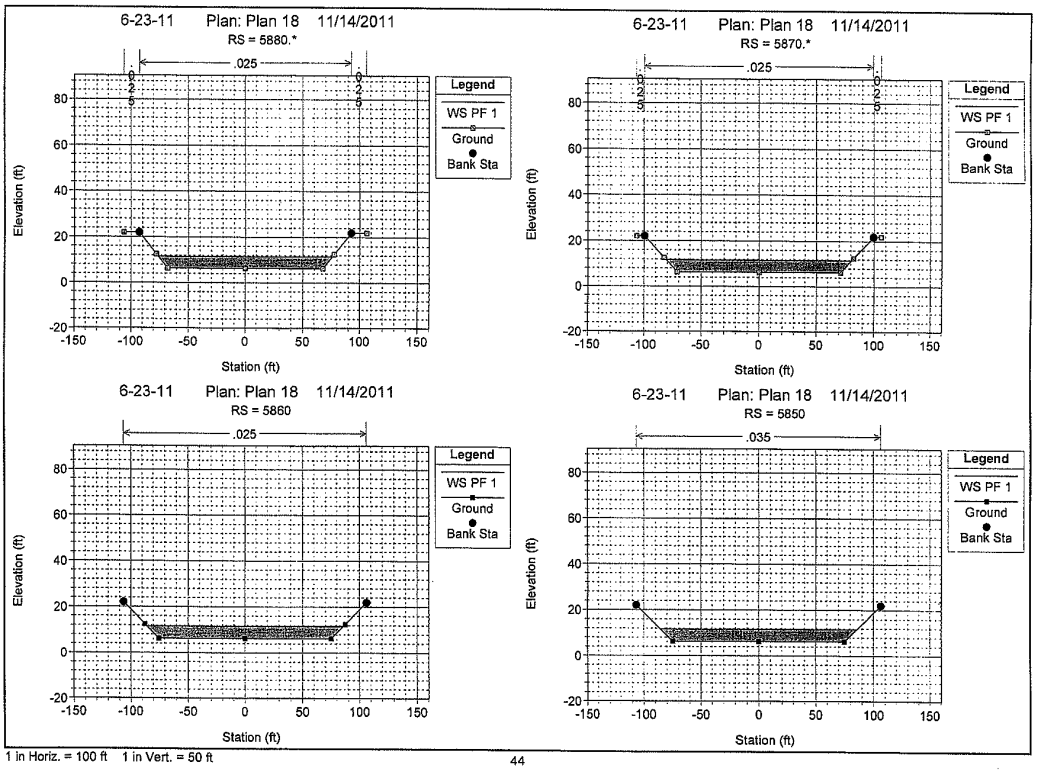



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

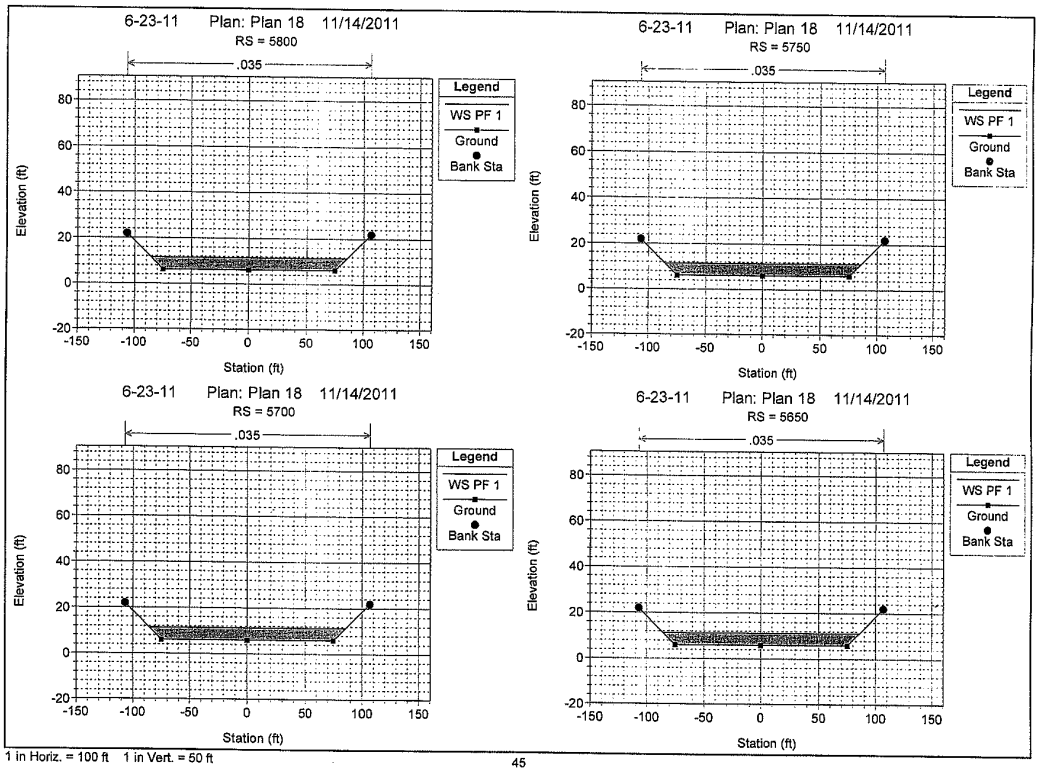



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



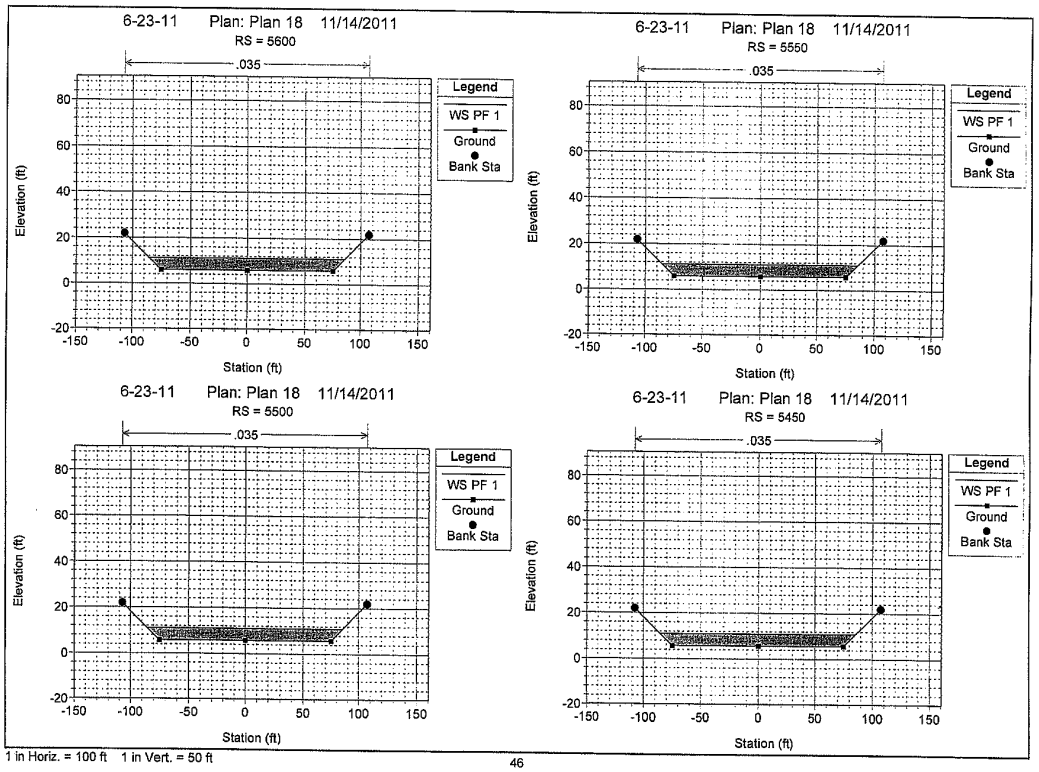



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

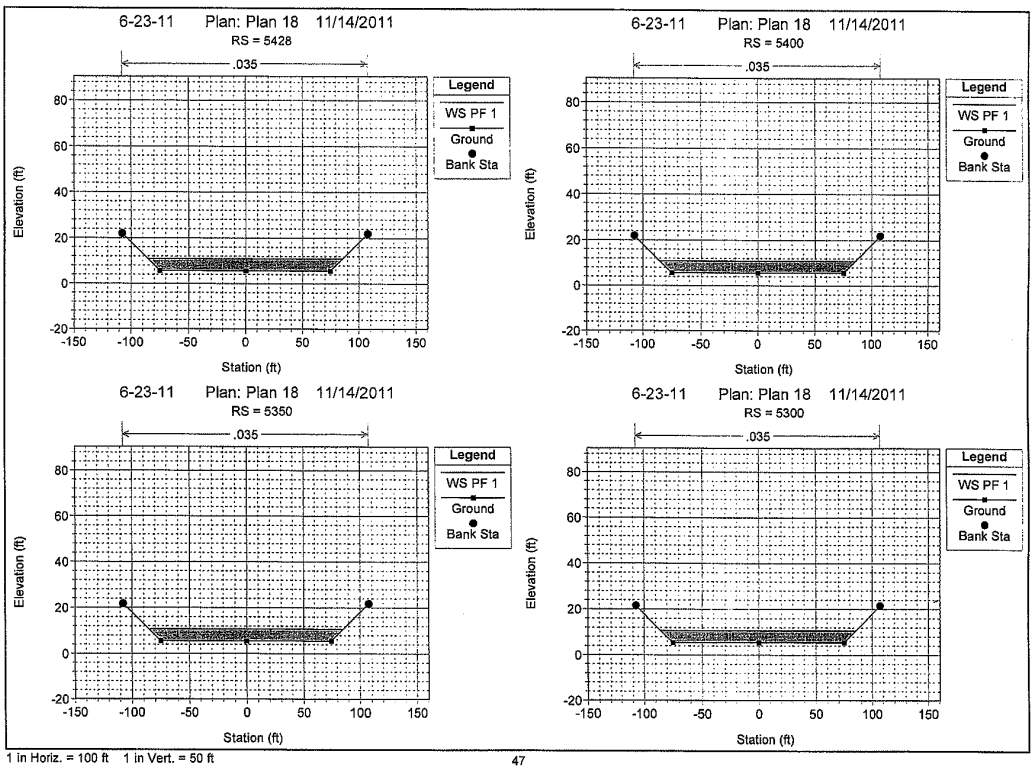



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

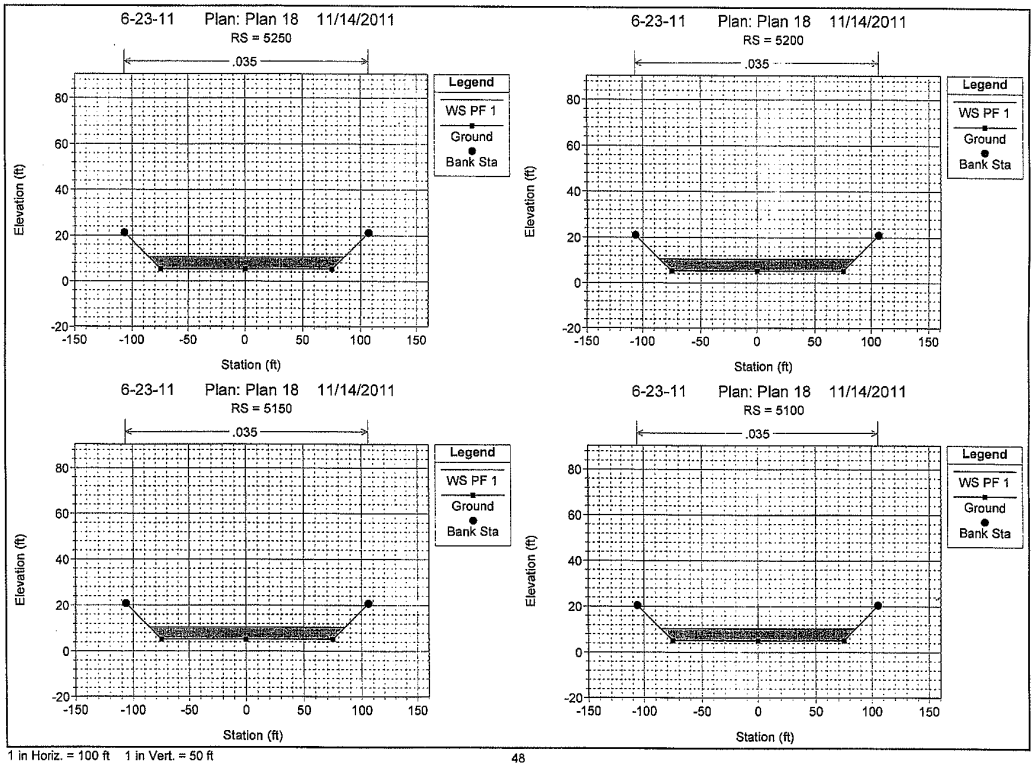


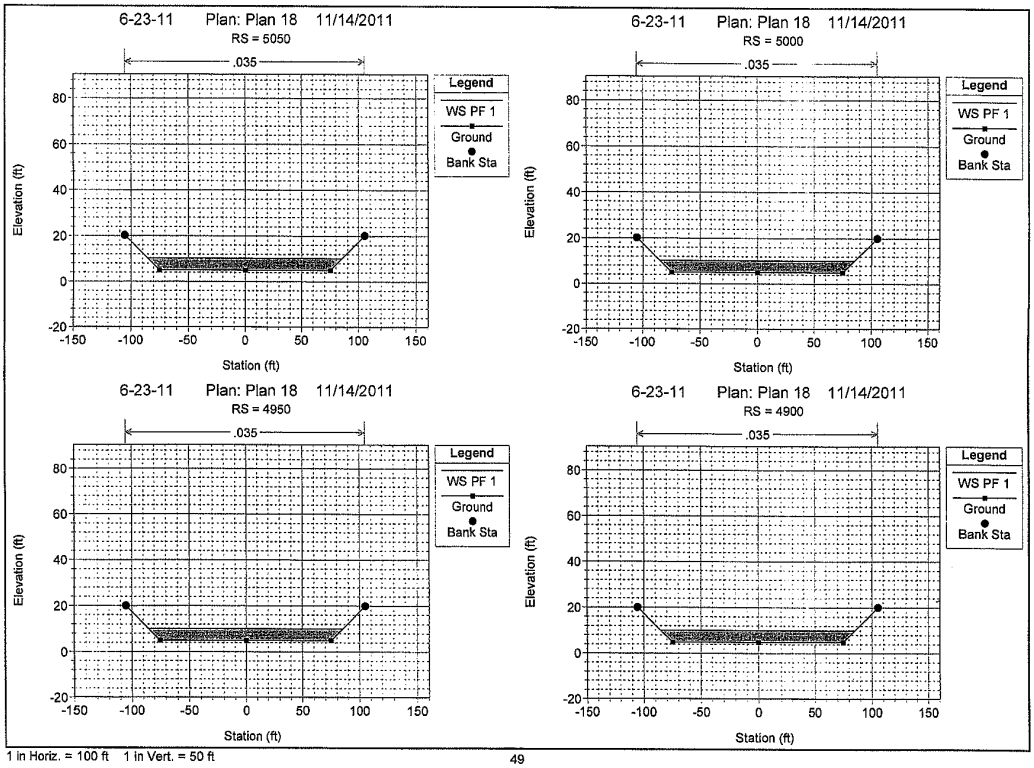



1 in Horiz. = 100 ft 1 in Vert. = 50 ft


6-23-11 Plan: Plan 18 11/14/2011
RS = 5428
6-23-11 Plan: Plan 18 11/14/2011
RS = 5400
6-23-11 Plan: Plan 18 11/14/2011
RS = 5350
6-23-11 Plan: Plan 18 11/14/2011
RS = 5300
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

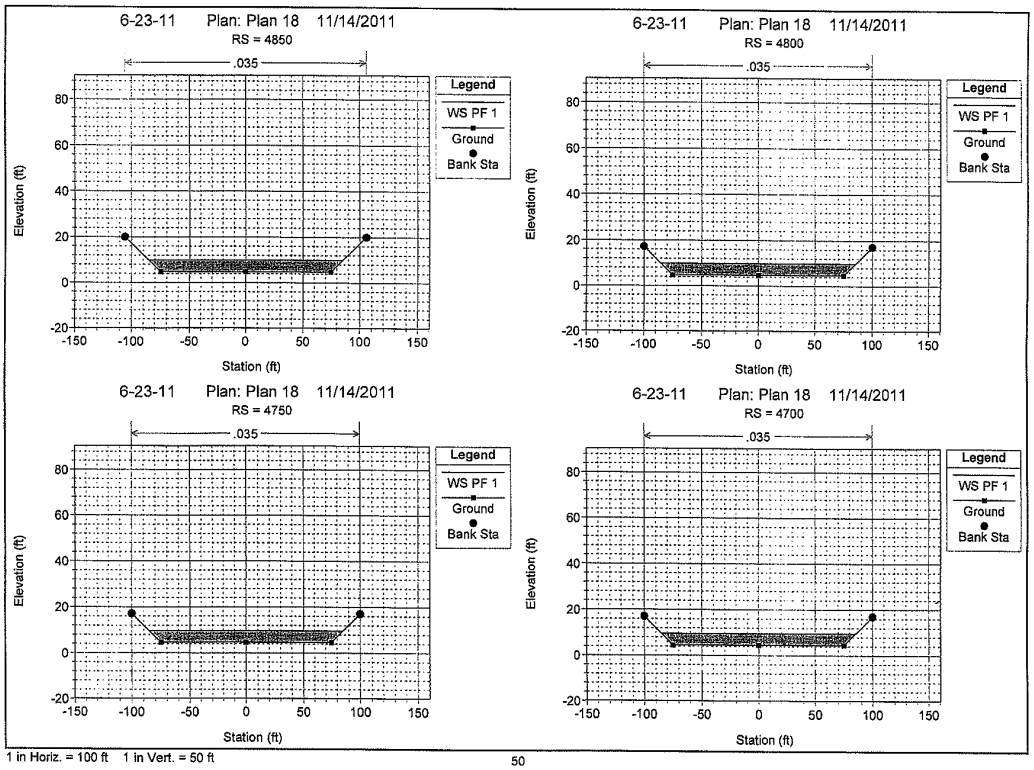



6-23-11 Plan: Plan 18 11/14/2011
RS = 5250
6-23-11 Plan: Plan 18 11/14/2011
RS = 5200
6-23-11 Plan: Plan 18 11/14/2011
RS = 5150
6-23-11 Plan: Plan 18 11/14/2011
RS = 5100
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

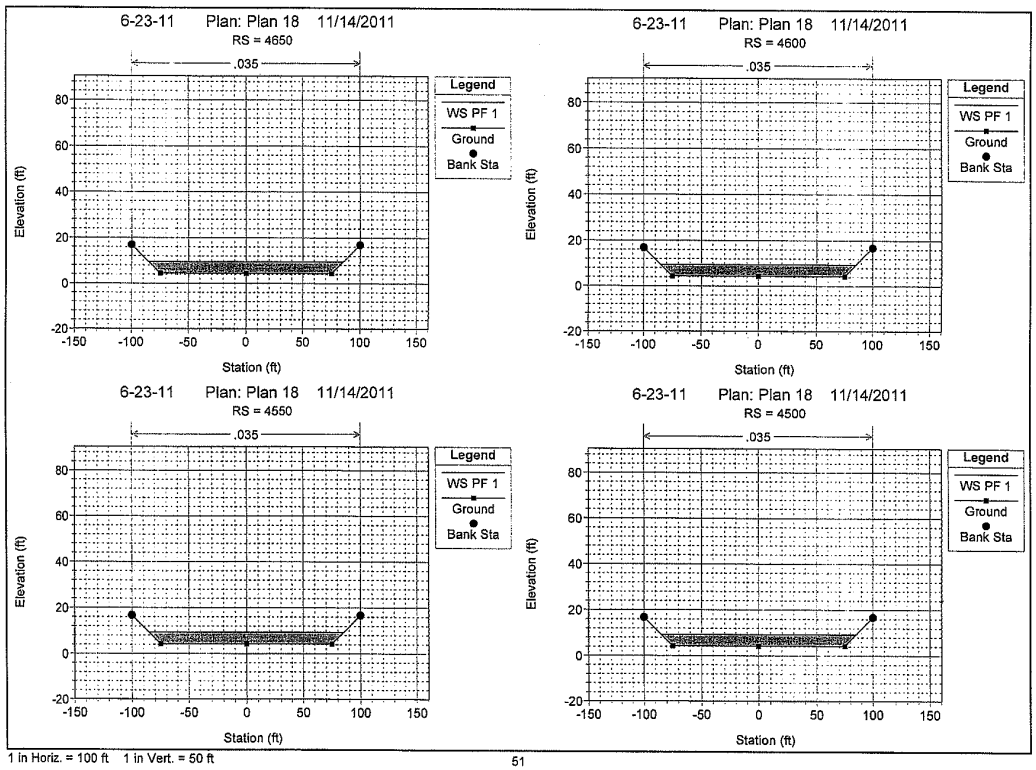



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



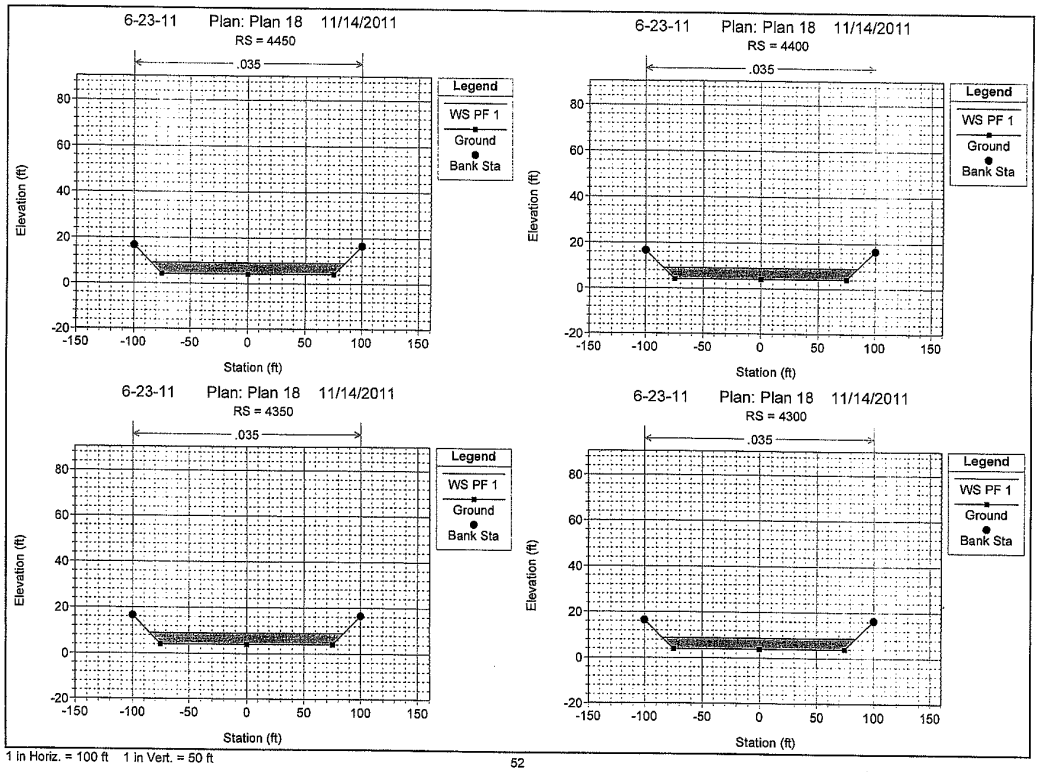



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

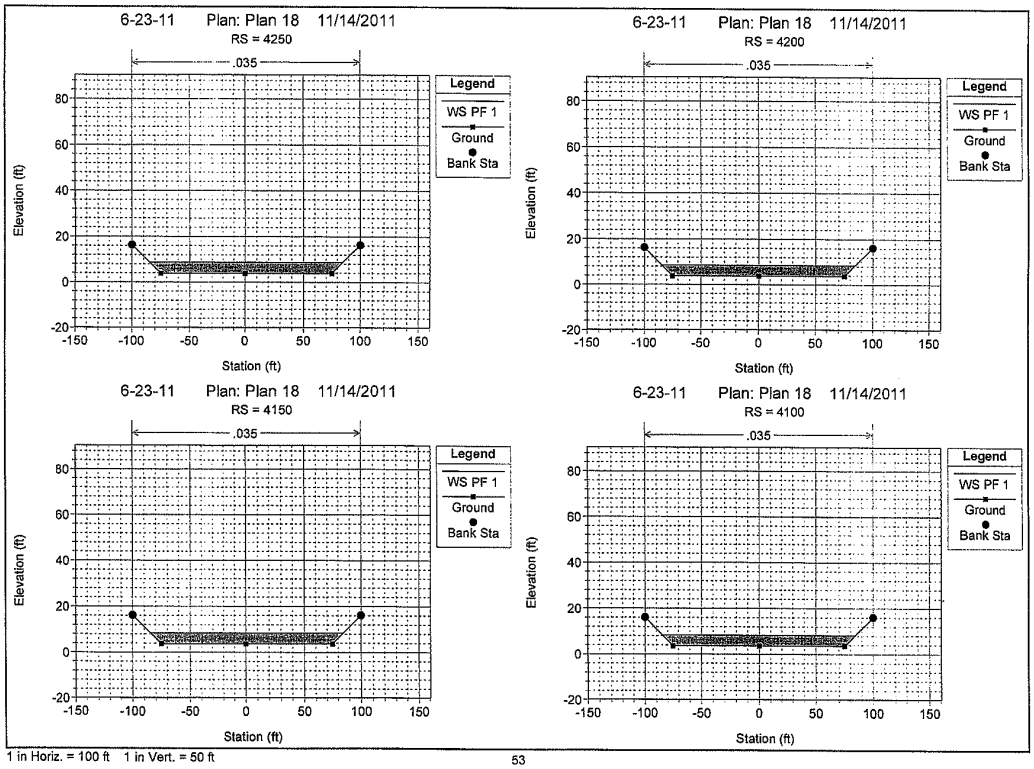



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

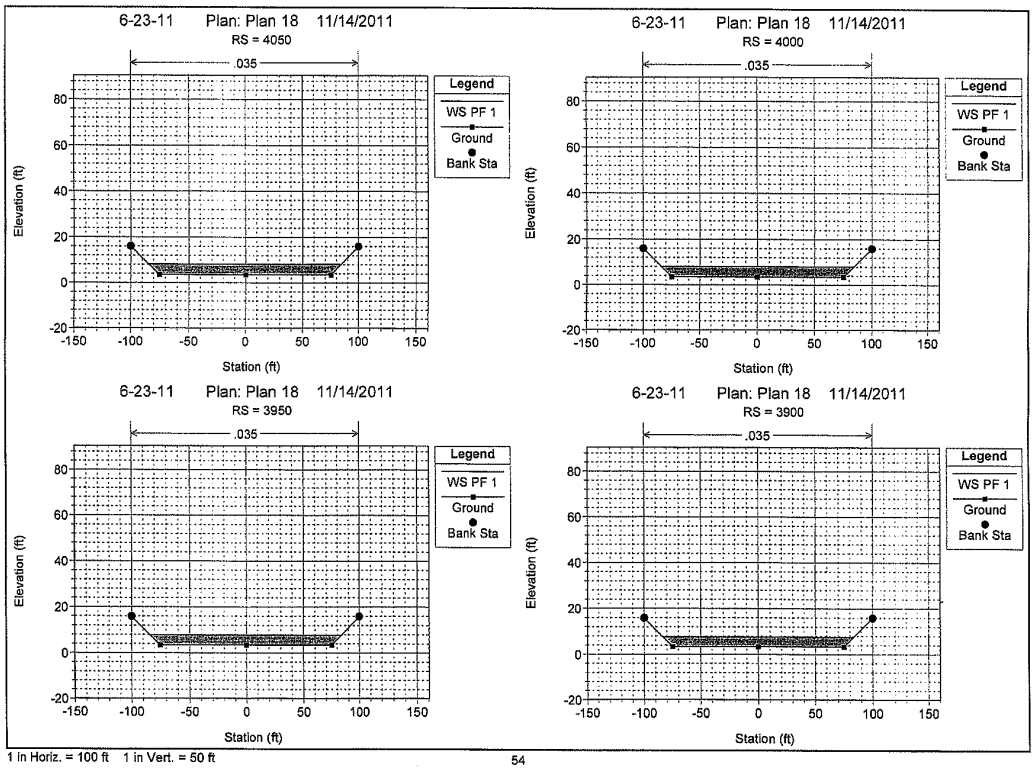


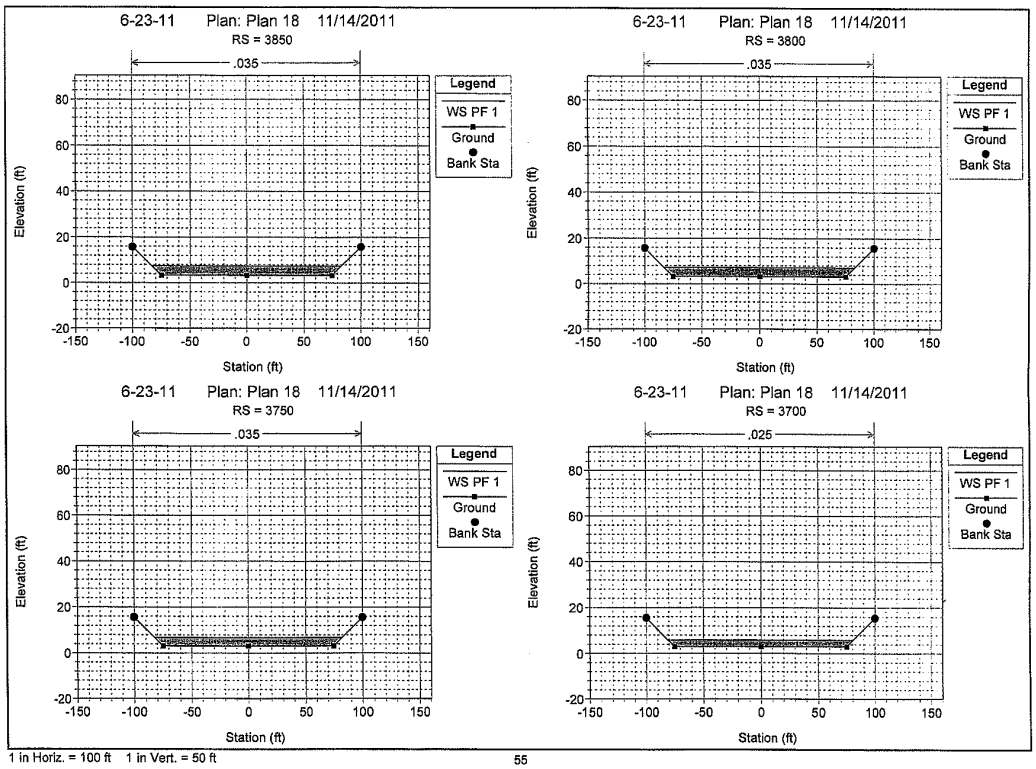



1 in Horiz. = 100 ft 1 in Vert. = 50 ft


6-23-11 Plan: Plan 18 11/14/2011
RS = 4250
RS = 4200
RS = 4150
RS = 4100
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

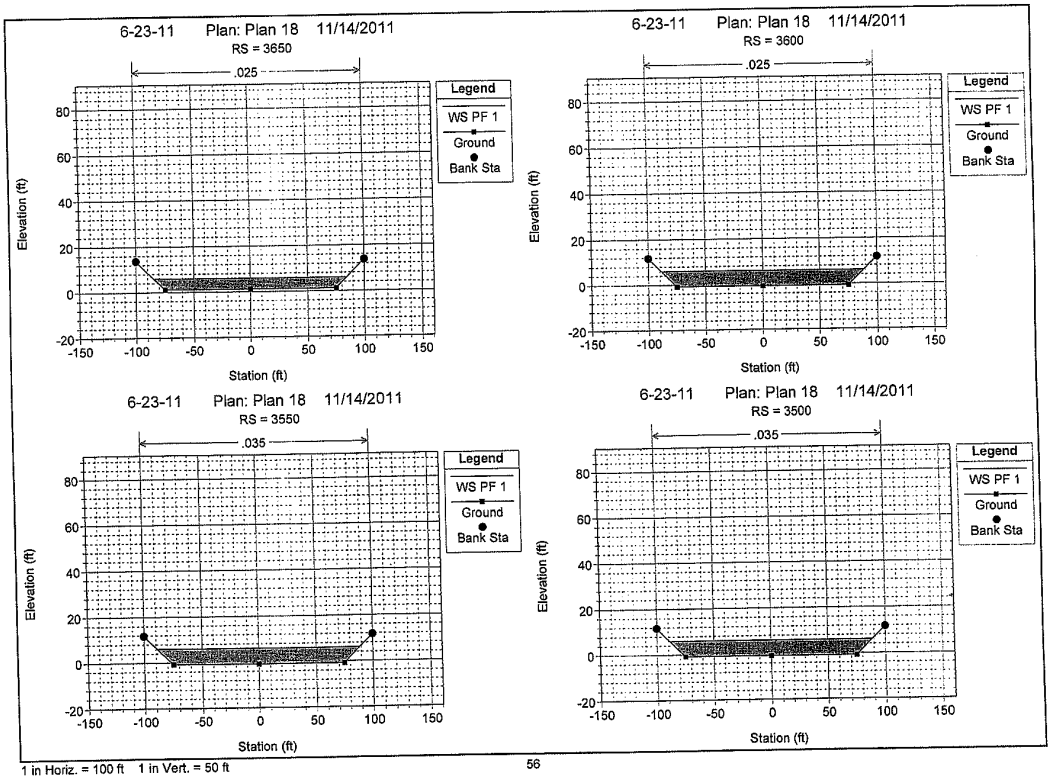



6-23-11 Plan: Plan 18 11/14/2011
RS = 4050
RS = 4000
RS = 3950
RS = 3900
.035
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 100 ft 1 in Vert. = 50 ft

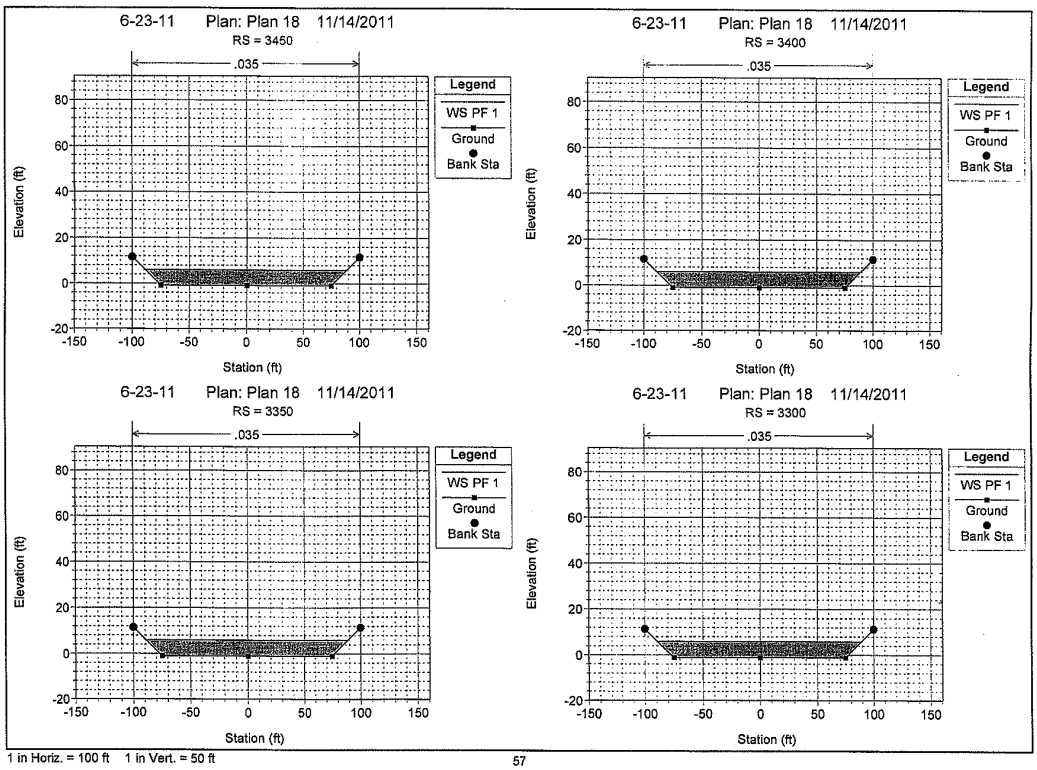



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



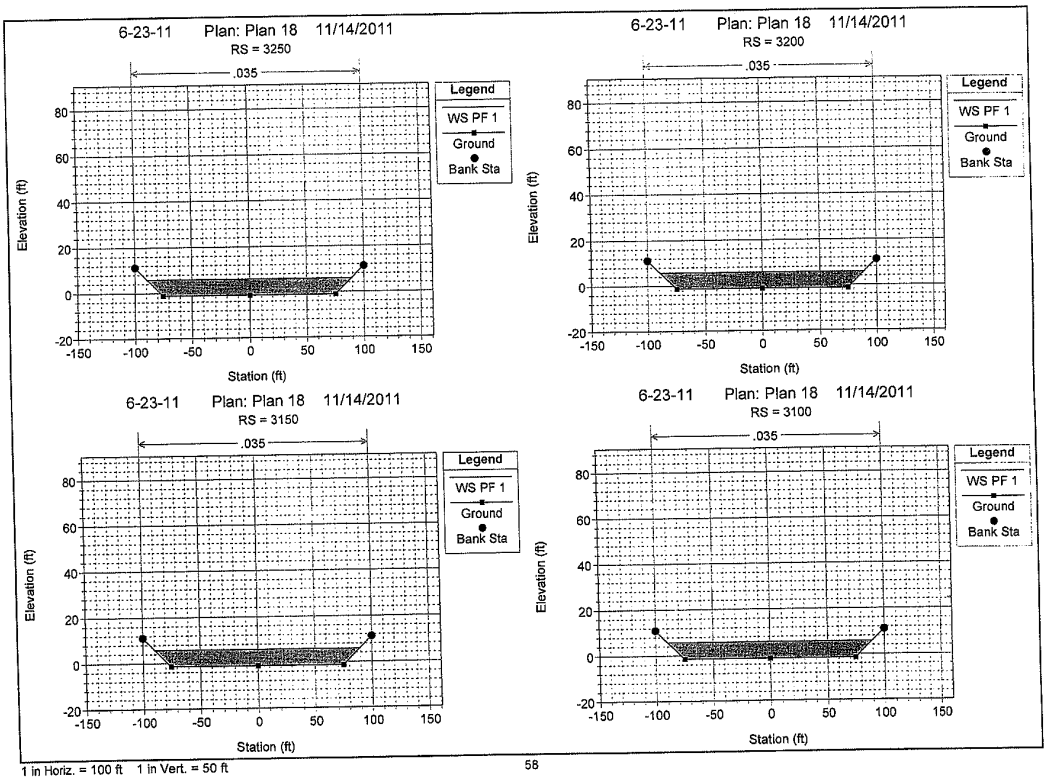



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

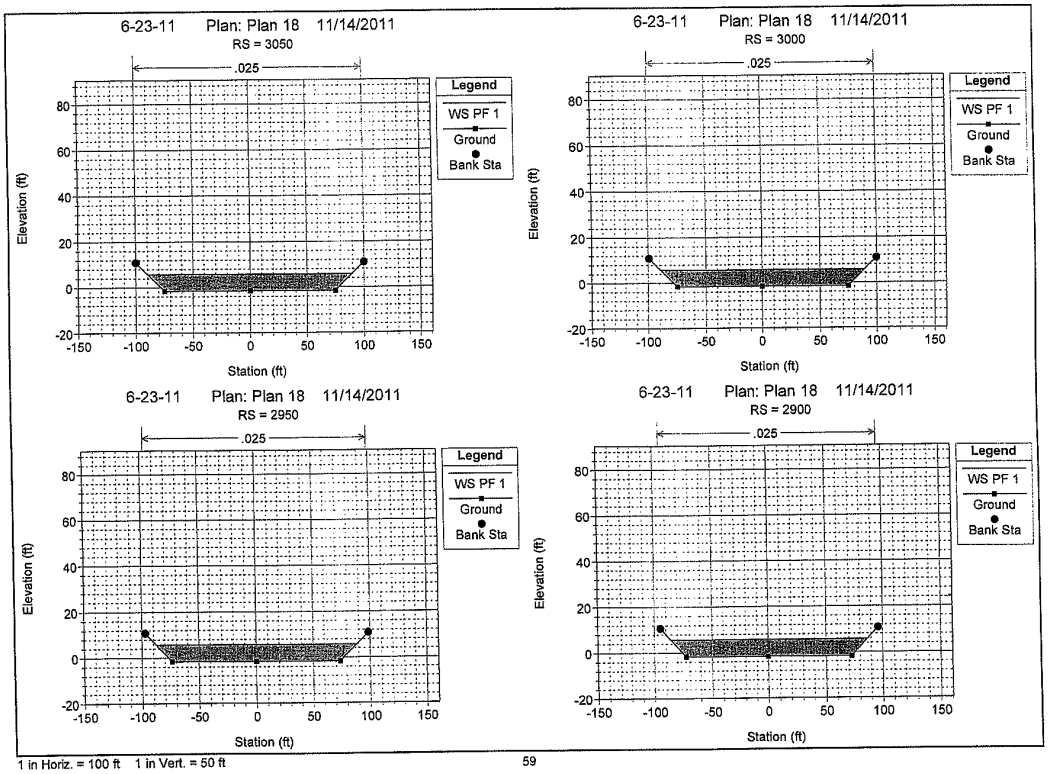



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



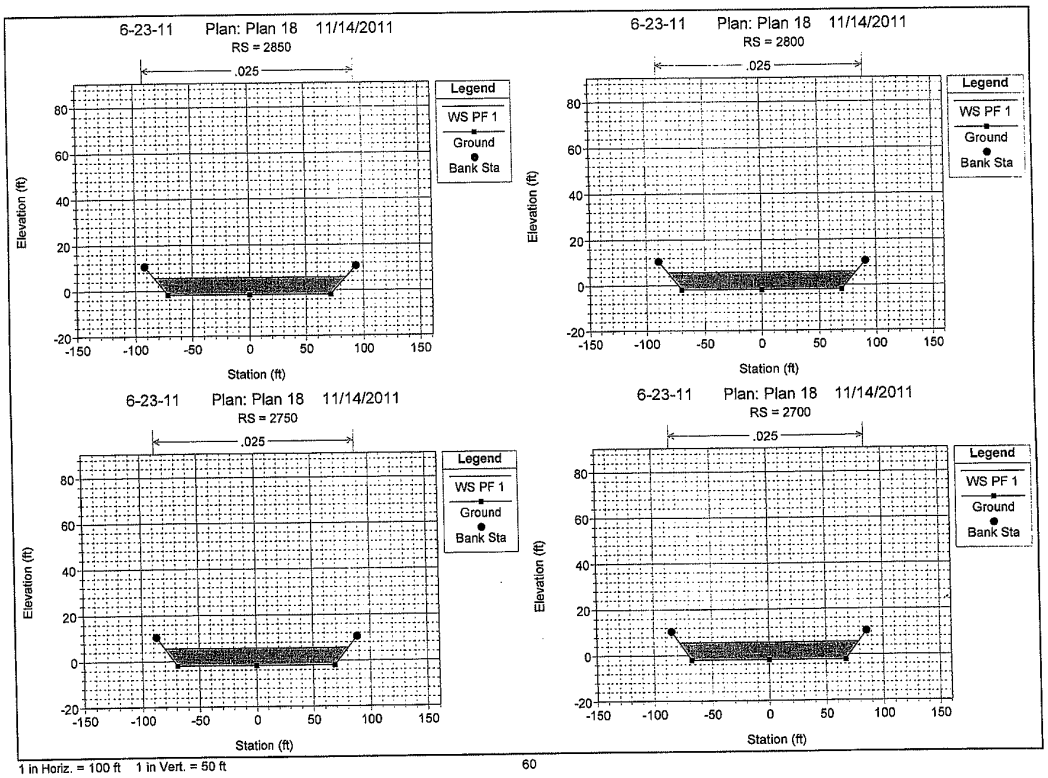



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

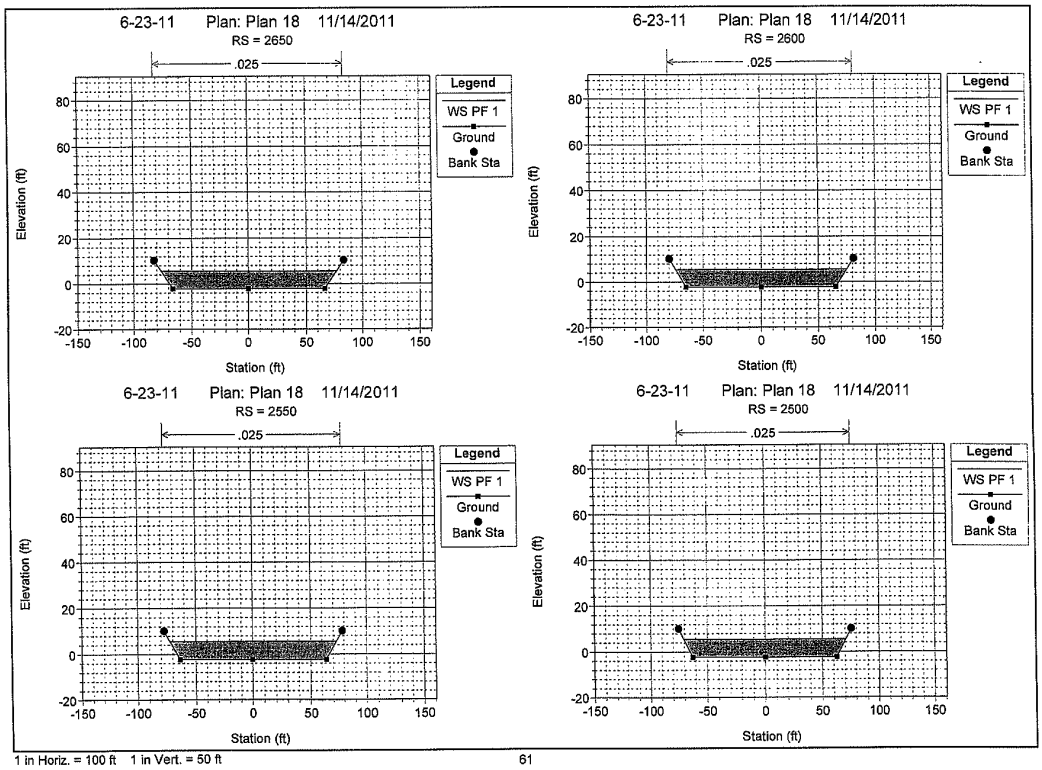



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



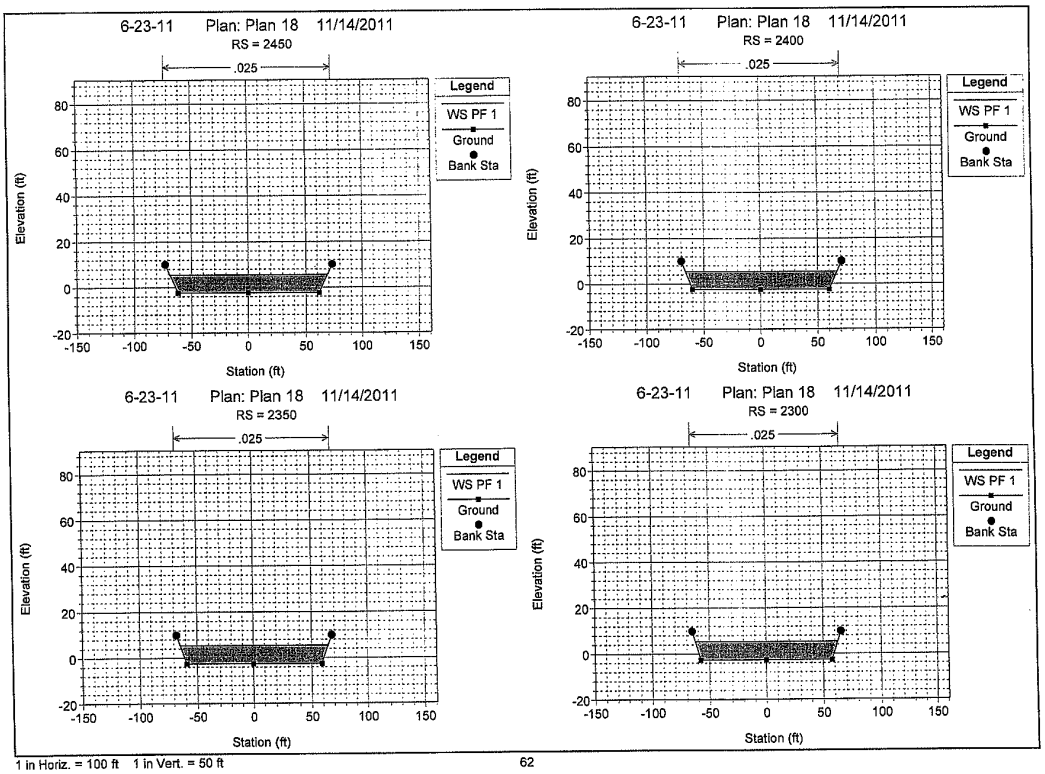



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

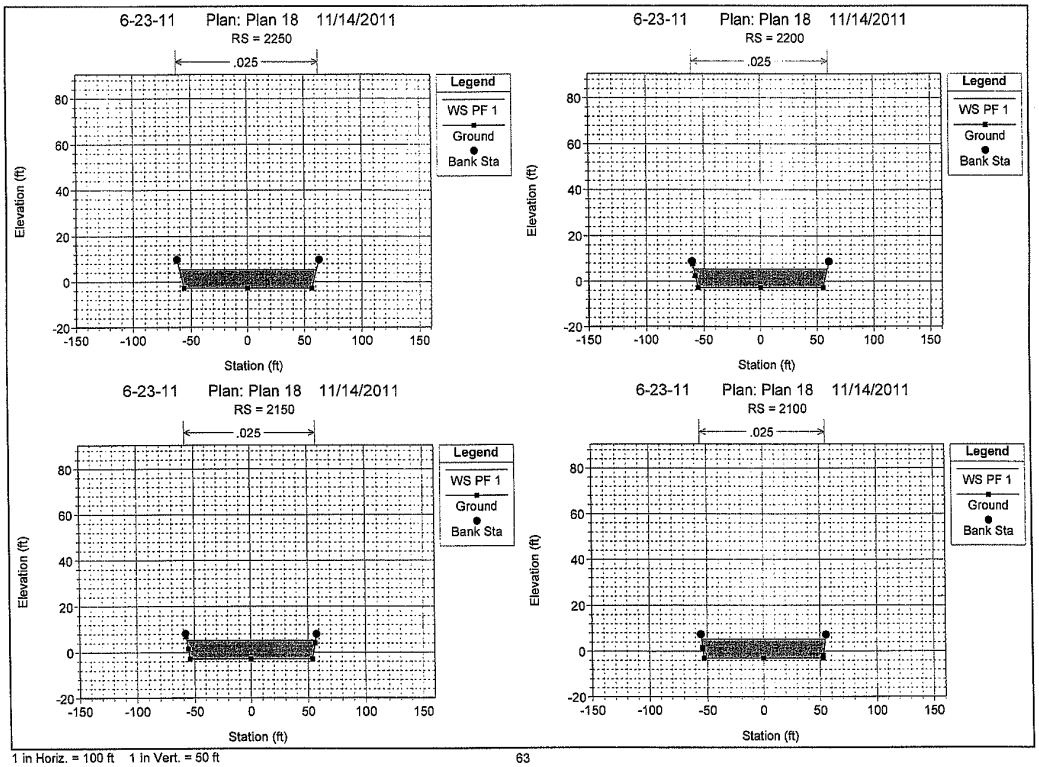



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



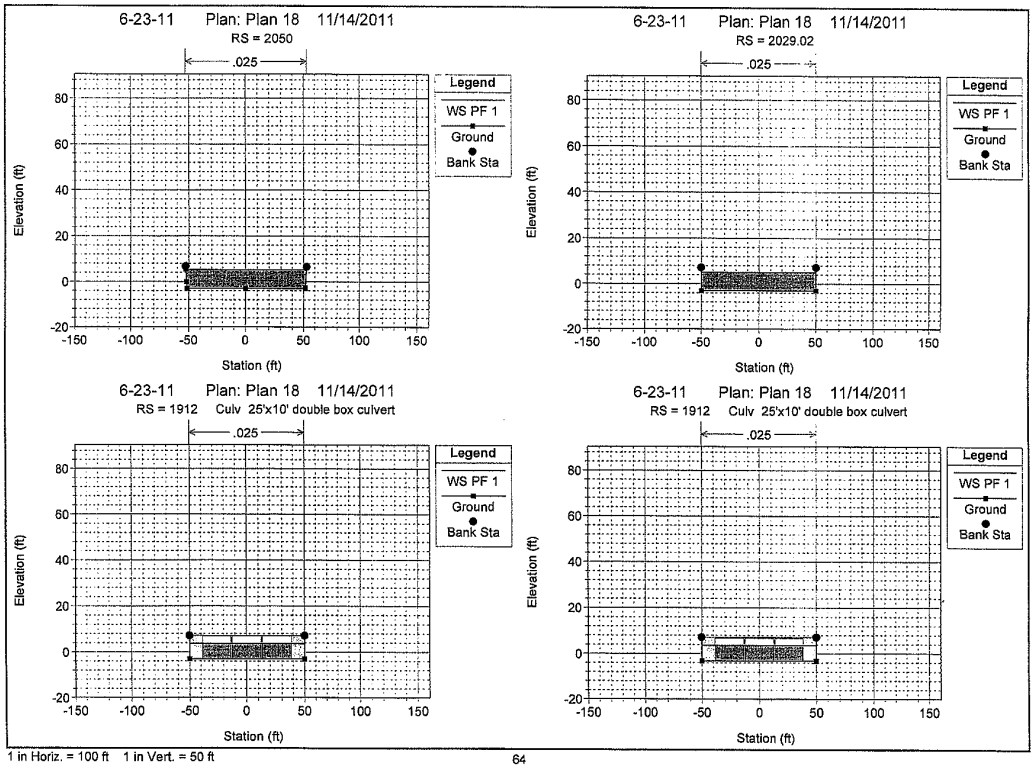



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

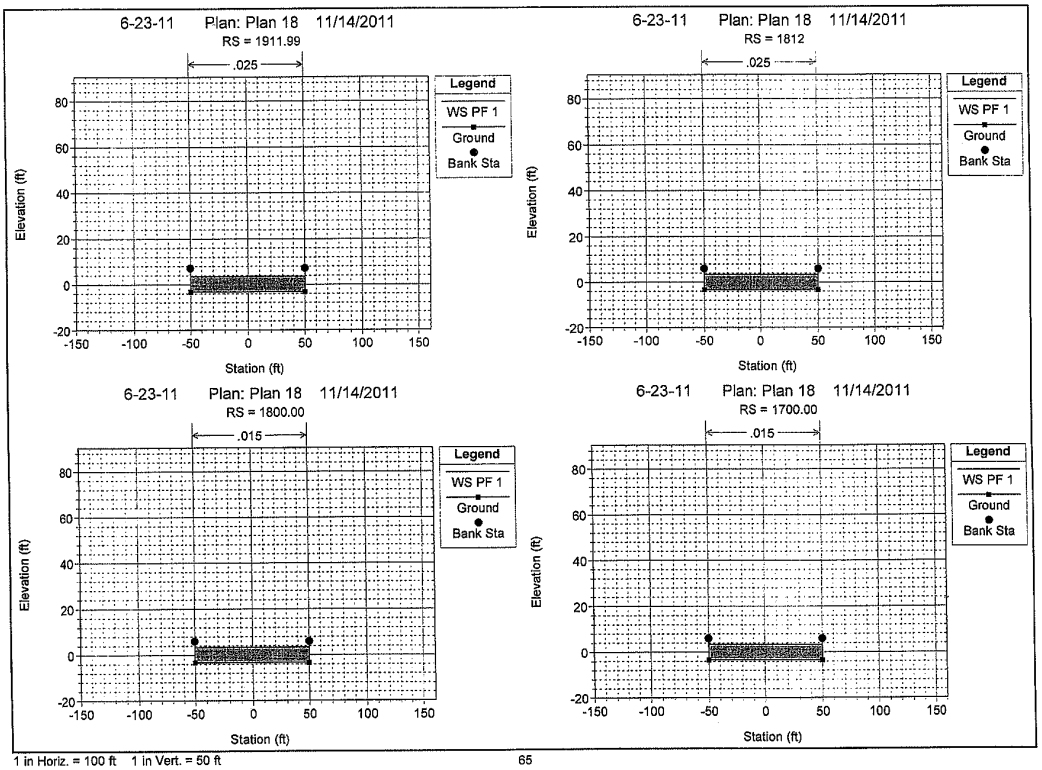



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



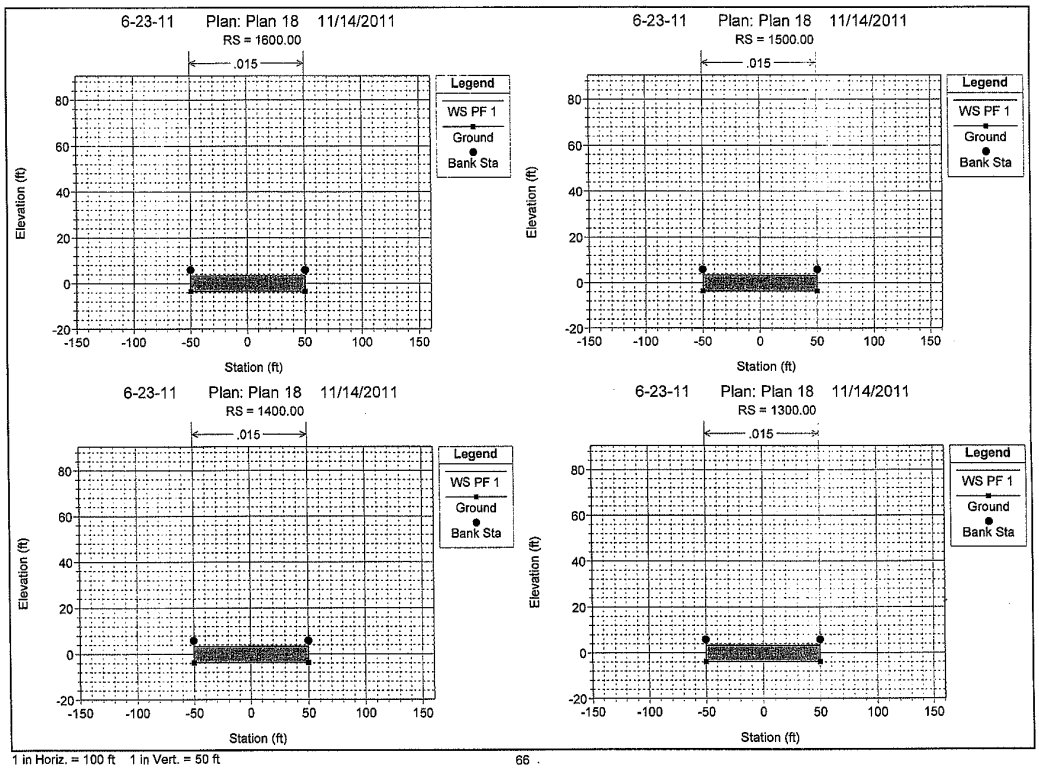



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

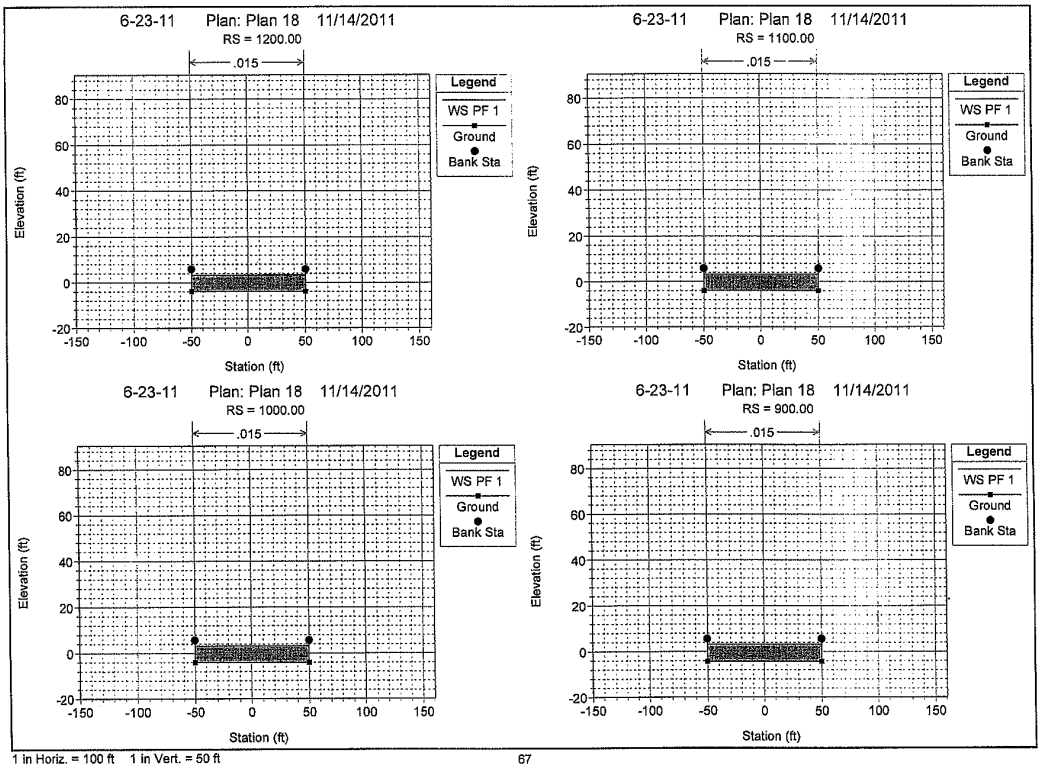



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



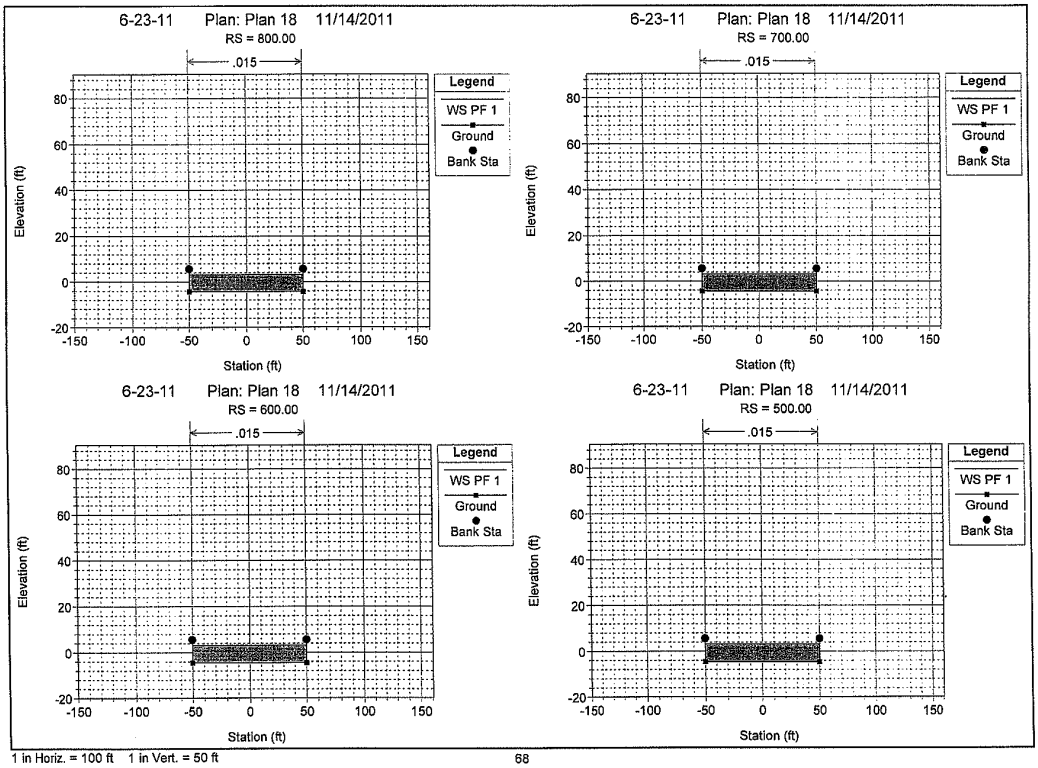



1 in Horiz. = 100 ft 1 in Vert. = 50 ft

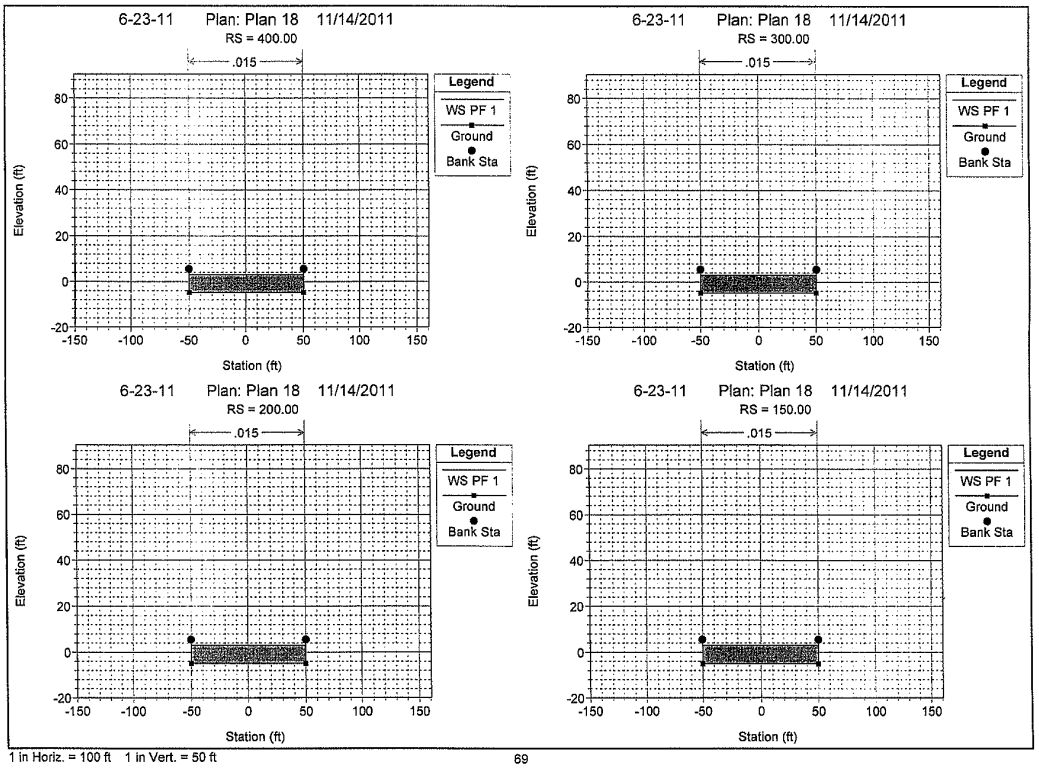



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



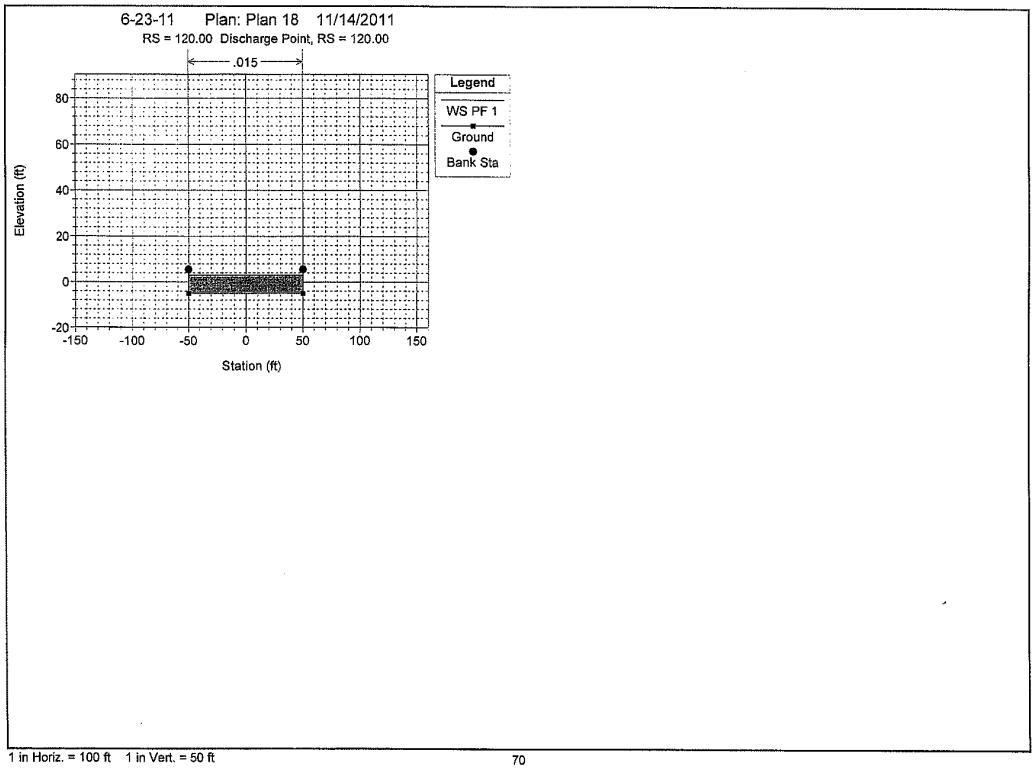



1 in Horiz. = 100 ft 1 in Vert. = 50 ft



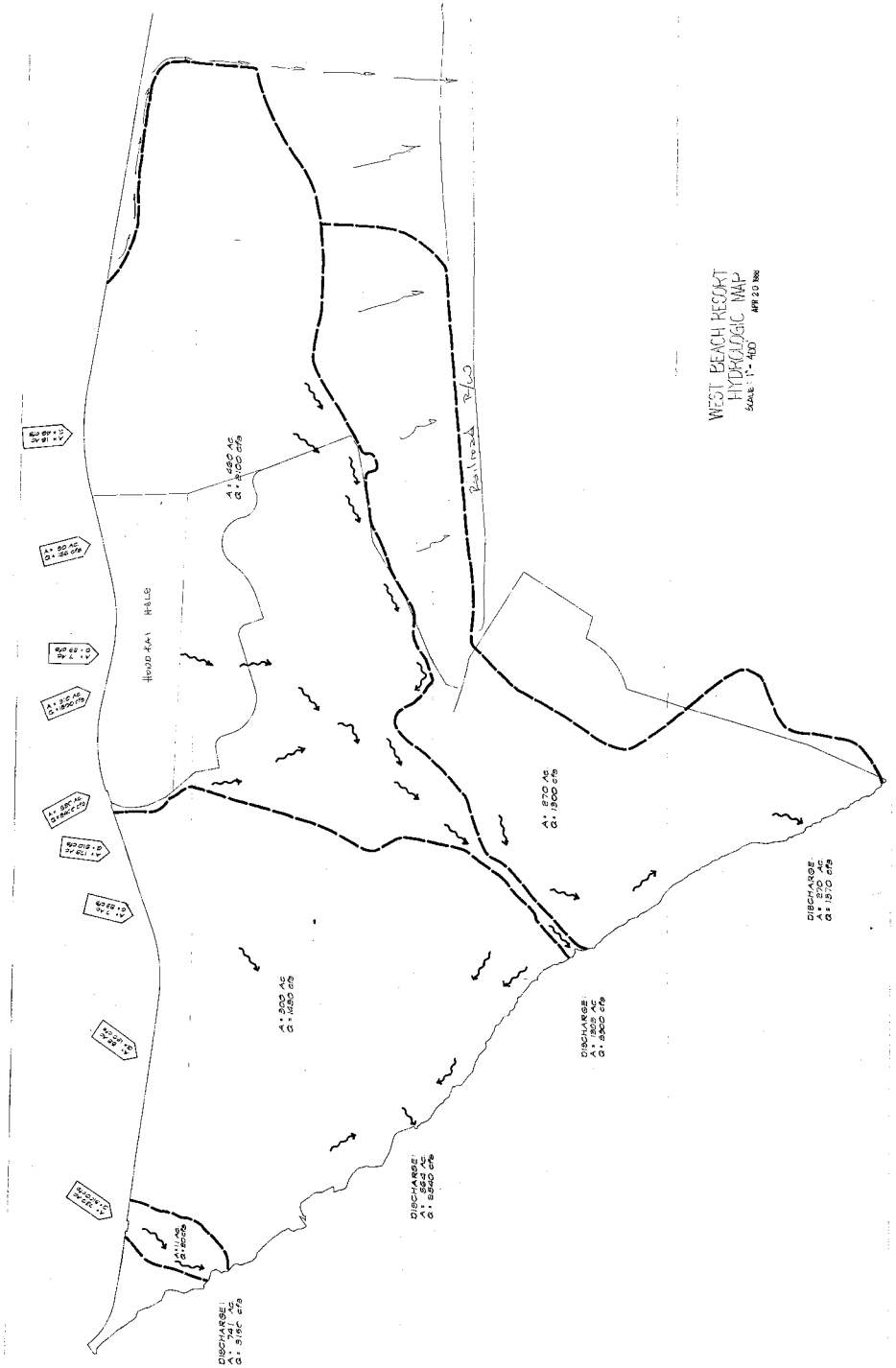

1 in Horiz. = 100 ft 1 in Vert. = 50 ft

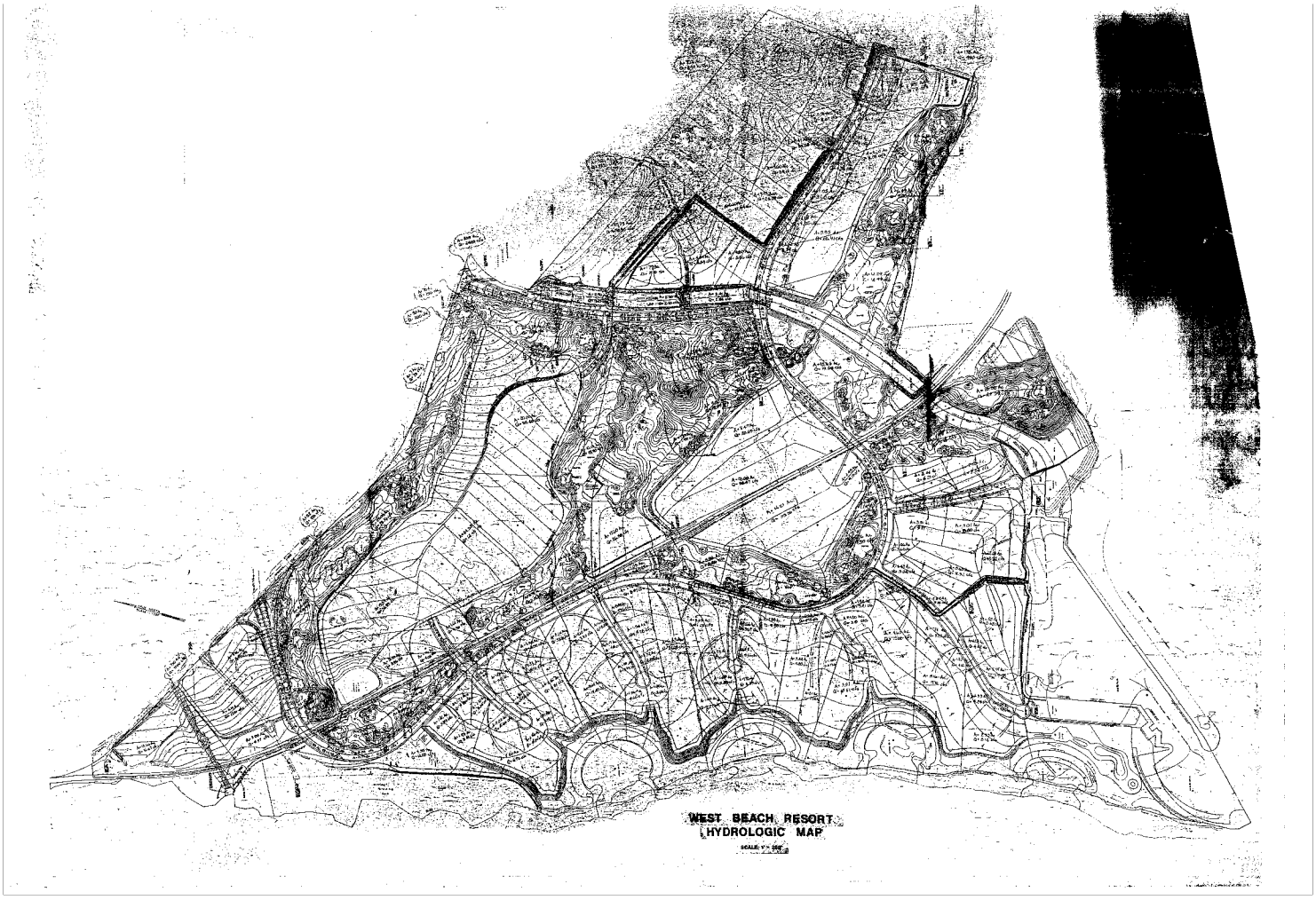





1 in Horiz. = 100 ft 1 in Vert. = 50 ft

WEST BEACH RUNOFF MAPS




WEST BEACH RESORT
HYDROLOGIC MAP

# APPENDIX C: AECOS reconnaissance biological surveys of the marine environment fronting a drainage channel in Campbell Industrial Park, Kapolei, O‘ahu, Hawai‘i dated May 9, 2011

*AECOS* No. 583 E

# Reconnaissance biological surveys of the marine environment fronting a drainage channel in Campbell Industrial Park, Kapolei, O'ahu, Hawai'i

Prepared by:

*AECOS* Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe, Hawai'i 96744-3221

May 9, 2011

# Reconnaissance biological surveys of the marine environment fronting a drainage channel in Campbell Industrial Park, Kapolei, O'ahu, Hawai'i

May 9, 2011 | ***Draft*** | *AECOS* No. 583 E

Chad Linebaugh
*AECOS*, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe , Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

## Introduction

In November 2009, *AECOS*, Inc. biologists conducted a reconnaissance biological survey of the nearshore marine environment and tidal solution bench fronting a drainage channel in Campbell Industrial Park, Kapolei, O'ahu. The existing drainage (also known as Campbell Drain) enters the Pacific Ocean 0.5 mi (0.9 km) south of the mouth of Barbers Point (Kalaeloa) Deep Draft Harbor along the west shore of O'ahu (Fig. 1). Improvements to this drainage channel are proposed to accommodate runoff from development of land around the Deep Draft Harbor. *AECOS*, Inc. was contracted by Engineering Concepts, Inc.[1] to assess whether historical reports on the biota present in the marine environment and on the limestone solution bench in the project area adequately represent the biota present today. This report details findings from a November 2009 survey.

The survey area is situated off the western edge of the 'Ewa Plain in west O'ahu, an area consisting of limestone substrata and receiving little precipitation most of the year. The shore at the drainage channel consists of a limestone solution bench with a storm beach of boulders and coarse sand landward of the bench formation. Behind the storm beach is a narrow coastal strand vegetation (see David & Guinther, 2010).

[1] This document will be incorporated into the Environmental Assessment (EA) for the Campbell Drain Expansion Project and will become part of the public record.

Figure 1. General location of the project site on O'ahu.

## Survey Methods

On November 13, 2009, *AECOS* biologists conducted a survey of the shore and intertidal (littoral zone) off the channel mouth along a transect extending from the strand vegetation at the mouth of the drain to the seaward edge of a limestone solution bench. A reconnaissance survey of the nearshore marine environment up to approximately 60 m (200 ft) off the bench fronting the drain was also conducted using mask and snorkel. Identification of all species observed was conducted in the field and no collection of specimens was required.

## Survey Results

Table 1 depicts transect data from the littoral and supralittoral zones fronting the drain mouth. The uppermost splash pools on the limestone bench are home to but a few fishes and invertebrate species. Zebra blennies (*Istiblennius zebra*) and rockskippers (*Blenniella gibbifrons*) are common, usually hiding in crevices





or holes in the wetted limestone. A few *pipipi* (*Nerita picea*) and false *'opihi* (*Siphonaria normalis*) are present along margins of splash pools and attached to the vertical face of the subaerial slope behind the solution bench.

Figure 2. Characteristics and biota along transect extending perpendicular to shore fronting the Campbell Drain.

| Meter Mark | Description |
|---|---|
| 0.0 | Private property enclosed by chain link fence. *Pluchea carolinensis* shrubs occasional. |
| 3.0 | Limestone gravel; dune edge to the north; jeep trails to the south. No vegetation present. |
| 6.0 | Limestone boulders. Coarse sand, gravel beach to the north. Sand dunes to the south. *Sesuvium portulacastrum* present. |
| 13.0 | Begin limestone bench formatiion. No sand. |
| 13.5 | Small isolated splash pools (<0.3 m depth) begin. |
| 20.5 | Begin large pool (0.5 m depth) on subaerial pitted zone above bench. *Istiblennius zebra, Blenniella gibbifrons* present. |
| 22.0 | End large pool. *Bathygobius* sp. *Cypraea* sp. in pool. |
| 35.0 | Nearly vertical face of pitted zone (<1.0 m height) with *Nerita picea* and *Siphonaria normalis.* |
| 36.0 | Begin solution bench *Littorina pintado.* Tidal pools (0.7 m depth) *Sargassum* sp. and *Padina* sp. dominant numerous spp present. In pool *Laurencia* sp. dominant. |
| 39.0 | *Asparagopsis taxiformis* present. Some corals present in pools (*Poc. damicornis, Por. lobata, Pav. varians, Montipora patula*). *Stenopus hispidus, Morula granulata, Cypraea caputserpentis* rare. |
| 40.0 | *Padina* sp. and *Laurencia* sp. dominant. *Hydroolithon onkodes* common. *A. taxiformis* occasional. |
| 43.0 | *Laurencia* spp. and *H. onkodes* dominant. Coral colonies and *Dictyota* sp. occasional. *Colobocentrotus atratus* in holes. |
| 46.0 | *Haliptolon subulatum* and *Astronema breviarticulatum* common. |
| 50.0 | Crustose and coralline sp dominant. *Hydrolithon* spp., *Pterocladiella* capillaecea. |
| 53.0 | Begin slope down into sublittoral. *Echinometra mathaei* common, numerous fish species present. |

Tidal pools on the bench are host to a diverse assemblage of algae and invertebrates. *Sargassum echinocarpum* and *Padina* spp. are the most common algae, and several species of corals (*Poc. damicornis, Por. lobata, Montipora patula, Pav. varians*) are present here, although sparse. Banded coral shrimp (*Stenopus hispidus*), hermit crabs (Family Diogenidae), and rock boring urchins (*Echinometra mathaei, Echinometra oblonga*) are present in pools and crevices in the bench. Crustose coralline algal coverage increases where the front of the solution bench slopes down into the subtidal. *Pterocladiella capillacea* is conspicuous along the nearly vertical face at the front of the solution bench.

The near vertical front face of the limestone formation is 3-6 ft (1-2 m) in height and descends into the sublittoral zone providing habitat for numerous demersal fishes (Fig. 2). Blackspot sergeant (*Abudefduf sordidus*), *manini* (*Acanthurus triostegus*), and white bar surgeonfish (*Acanthurus leucoparieus*) are common here. The limestone supports rock boring urchins and scattered colonies, mostly cauliflower coral (*Poc. meandrina*) and lobe coral (*Porites lobata*). Coralline algae—*Hydrolithon reinboldii* and *Pneuphyllum conicum*—are noticeable as lavender or pink crusts covering the substratum.

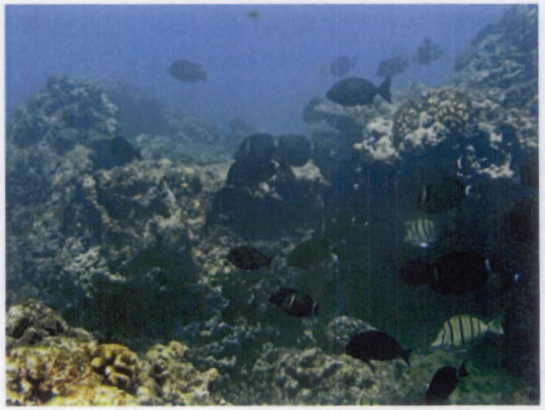


Figure 2. Fishes aggregating along the front of the limestone bench to seaward of the proposed Campbell Drain.





The limestone bottom extending seaward from the shore bench is mostly flat with scattered outcrops and crevices present. Estimated coral coverage ranges from 1 to 15% of predominantly finger coral (*Porites compressa*), lobe coral, and cauliflower coral. Other invertebrates present here include blue-grey zooanthid (*Palythoa caesia*), white spotted sea cucumber (*Actinopygna mauritiana*), and yellow plump sea cucumber (*Actinopygna obese*). Fishes occur here in much lesser numbers than along the offshore face of the bench. Black durgon (*Melichtys niger*), saddle wrasse (*Thalassoma duperrey*), and belted wrasse (*Stethojulis balteata*) comprise the bulk of fishes encountered in waters ranging from 6 to 12 ft (2 to 4 m) deep. Appendix A lists all marine species encountered during the survey.

## Assessment

The results from historical, quantitative surveys of the tidal solution bench and nearshore marine environment conducted at the drainage canal were reported (*AECOS*, 1991) as follows:

> At the time of the survey, this upper zone (designated herein as Zone 5) was showing the damaging effects of a series of low tides, low surf, and increasing temperatures: much of the limestone was barren or covered by deteriorating thalli of partially dried seaweeds. Observations made elsewhere along this coast confirmed that the deterioration of the high intertidal algae was a general phenomenon probably caused by a combination of very low tides and low surf conditions. The various species identified from the marine bench, and a qualitative assessment of abundance within each of five designated zones across the bench, are given in Table 11. Within Zone 5, the limestone surface is a gentle slope down to the level of the bench, which is relatively broad at this location. The inner bench habitat is here designated as Zone 4. A small, sub-tidal inlet extends inward across the bench, providing habitat for small tidepool and juvenile reef fishes. Most common are two damsel fishes (*kupipi* – *Abudefduf sordidus* and *Chromis ovalis*). The most conspicuous alga in this Zone is *Padina japonica*, abundant both on the bench surface and in water-filled depressions. However, only the growth in the depressions was not showing degradation from exposure at the time of the survey. Towards the outer part of the bench where wave wash is more or less constant even at low tide, a band of *Sargassum echinocarpum* (designated Zone 3) is present. Seaward of the *Sargassum*, the surface starts to slopes gently downward and is densely covered by *limu kohu* (*Asparagopsis taxiformis*; Zone 2). The *Asparagopsis* Zone gives way to a narrow but conspicuous

band of *Pterocladia capillacea* (Zone 1) along the outer lip of the bench. The *Pterocladia* and a colorful variety of calcareous species (*Corallina*, *Porolithon*, and *Amphiroa*) and deep green *Dictyosphaeria versluysi* extend down the nearly vertical face of the front margin of the limestone formation. Typically, algal abundance declines into the sub-tidal, presumably owing to grazing by herbivorous fishes.

The nearshore bottom directly off the proposed drainage channel is limestone with a veneer of sand. The sea urchin, *Echinometra mathaei*, is very abundant. Coral growth reaches perhaps 20% cover, with *Porites lobata*, *Montipora verrucosa*, *Montipora patula*, *Pocillopora meandrina* and *Leptastrea* all present. A variety of macrothallic algae, including *Asparagopsis taxiformis*, *Hydrolithon reinboldi*, *Amansia glomerata*, *Neomeris annulata*, *Halimeda opuntia* and *Martensia*, occur here. Nearly all of these species were observed on the marine bench (mostly in pools), although not in the seaward most Zone 1. The transition between the species dominating the seaward face of the bench (mostly encrusting and branching calcareous forms) and the nearshore bottom occurs in the area deemed too dangerous to survey.

A cursory examination of results from both surveys indicates the species composition and abundances in both the tidal (solution bench) and nearshore subtidal remain similar in November 2009 as compared to the historical survey. The proposed expansion of the drainage canal will require removal of a segment of the solution bench and storm beach landward of the shore in order to construct a sloped trapezoidal channel.

A Best Management Practices (BMP) plan should be designed and implemented to minimize environmental impacts to water quality and marine resources in the vicinity of the project site during project construction. The presence of marine resources including coral colonies and essential fish habitat (EFH) within the project area of direct impact will likely result in quantitative surveys being required for permitting of the project.

Marine projects of similar scale are typically required to conduct quantitative surveys of marine resources, in this case probably algae, fishes, corals and invertebrates. Surveys should, at a minimum include data extending from near the shoreline to beyond the 15-ft (4.5 m) depth contour, as preliminary modeling data (AECOS, 1991) indicates the effect of brackish plumes anticipated at the project site typically extend to that depth into the water column. Data from such surveys would then be used to assess impacts, including total loss of resources associated with the project and aid in the mitigation process.





The mitigation process requires the analysis of project design alternatives, avoidance measures, and minimization of loss. If unavoidable loss to marine resources still exist then compensatory mitigation may be require to replace the loss of resource functions and values. Compensatory mitigation procedures for the unavoidable loss of aquatic or marine resources require the calculation of the amount of resource loss and a replacement of ecosystem functions of at least a one to one ratio. Though no quantitative survey of corals has been conducted in the area to be impacted, the number of colonies and percent coverage is quite low close to the shore. Mitigation for coral loss should be focused on the analysis of design alternatives, and the avoidance and minimization of project related impacts.

None of the marine species observed during the November 13, 2009 surveys is listed as threatened or endangered under the Endangered Species Act of 1973 as amended, or by the State of Hawai'i under its endangered species program (DLNR 1998; USFWS, 2011). One species of scleratinian coral found off the project site—spreading rice coral (*Montipora patula*)—is currently under status review, along with 82 other species in U.S. and territorial waters, for listing (NOAA, 2010). The National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS) is the agency responsible for the review of the status of the coral species and will conduct a 12-month status review of all species petitioned before any determination of listing could occur. *M. patula* is a common species in many nearshore locations in the Hawaiian Islands and a listing as "endangered" or "threatened" would seem unlikely.

A few listed species—including the green sea turtle (*Chelonia mydas*) and spinner dolphin (*Stenella longirostris*)—do frequent waters offshore of the project site. Green sea turtle was obsrved in close proximity to the project site in April and May of 2010, during water quality surveys being conducted near the drainage outlet. Humpback whale (*Megaptera novaeangliae*), another listed species, frequent waters well offshore of the project site in winter months (peak season is December 15 through April 30).

## References

*AECOS*, Inc. 1991. A Marine Environmental Impact Assessment for the Kapolei Business-Industrial Park Drainage Channel at Barbers Point, O'ahu. Prep. for Engineering Concepts, Inc. *AECOS* No. 583B: 50 pp.

_____. 2010. Water quality assessment for the expansion of a drainage canal in Campbell Industrial Park, Kapolei, O'ahu, Hawai'i. Prep. for Engineering Concepts, Inc. *AECOS* No. 583D: 15 pp

David, R. E. and E. B. Guinther. 2010. Update biological surveys conducted for the Campbell Drainage Channel, Kapolei, O'ahu. Prep. For Kapolei Property Development LLC. 17 pp.

Hawai'i Department of Land and Natural Resources (DLNR). 1998. Indigenous Wildlife, Endangered and Threatened Wildlife and Plants, and Introduced Wild Birds. Department of Land and Natural Resources. State of Hawai'i. Administrative Rule §13-134-1 through §13-134-10, dated March 2, 1998.

Hawai'i Coastal Geology Group (HCGG). 2010. O'ahu : Oblique Aerial Photography. West O'ahu Region. Available online at URL: http://www.soest.hawaii.edu/coasts/data/oahu/obliquephoto.html; last accessed on July 26, 2010.

National Oceanic and Atmospheric Administration (NOAA). 2010. Endangered and Threatened Wildlife; Notice of 90–Day Finding on a Petition to List 83 Species of Corals as Threatened or Endangered Under the Endangered Species Act (ESA). *Federal Register,* 75 (27, Wednesday, Feb 10, 2010).

U.S. Fish & Wildlife Service (USFWS). 2011. Endangered and Threatened Wildlife and Plants. 50CFR 17:11 and 17:12. Available online at URL: http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=HI&status=listed; last accessed on May 5, 2011.



## Appendix A

List of all marine species encountered during the November 13, 2009 reconnaissance surveys of tidal solution bench and nearshore marine environment.

| PHYLUM, CLASS, ORDER, FAMILY *Genus species* | Common name | Abundance | Status |
|---|---|---|---|
| **ALGAE** | | | |
| **RHODOPHYTA** | | | |
| *Acanthophora spicifera* | | R | Ind. |
| *Asparagopsis taxiformis* | *limu kohu* | A | Ind. |
| *Haliptilon subulatum* | | O | Ind. |
| *Hydrolithon gardineri* | | O | Ind. |
| *Hydrolithon onkodes* | | O | Ind. |
| *Hydrolithon reinboldii* | | O | Ind. |
| *Hypnea chordacea* | | O | Ind. |
| *Laurencia mcdermidiae* | | R | End. |
| *Laurencia nidifica* | | R | Ind. |
| *Peyssonelia rubra* | | O | Ind. |
| *Pneophyllum conicum* | | O | Ind. |
| *Pterocladiella capillacea* | | C | Ind. |
| *Sporolithon erythraeum* | | U | Ind. |
| **CHLOROPHYTA** | | | |
| *Caulerpa racemosa* | | O | Ind. |
| *Cladophora* sp. | | R | Ind. |
| *Dictyosphaeria versluyii* | | R | Ind. |
| *Halimeda discoidea* | | O | Ind. |
| *Neomeris* sp. | | R | Ind. |
| **PHAEOPHTYA** | | | |
| *Asteronema breviarticulatum* | | O | Ind. |
| *Chnoospora minima* | | R | Ind. |
| *Dictyota ceylanica* | | C | Ind. |
| *Dictyota friabilis* | | O | Ind. |
| *Padina* spp. | | A | Ind. |
| *Ralfsia expansa* | | O | Ind. |
| *Sargassum echinocarpum* | | C | Ind. |
| *Sargassum polyphyllum* | | R | Ind. |
| *Spatoglossum macrodontum* | | R | Ind. |
| *Sphacelaria novae-hollandiae* | | U | Ind. |
| *Stypopodium flabelliforme* | | C | Ind. |
| *Turbinaria ornata* | | U | Ind. |
| **INVERTEBRATES** | | | |
| **CNIDARIA, HYDROZOA** | | | |
| **PENNARIIDAE** | | | |
| *Pennaria disticha* | Christmas tree hydroid | R | Ind. |



| PHYLUM, CLASS, ORDER, FAMILY *Genus species* | Common name | Abundance | Status |
|---|---|---|---|
| **CNIDARIA, ANTHOZOA** | | | |
| **ACTINARIA** | | | |
| **ACTINIDAE** | | | |
| *Aiptasia pulchella* | glass anemone | O | Ind. |
| **CNIDARIA, ANTHOZOA** | | | |
| **ZOANTHINARIA** | | | |
| *Palythoa caesia* | blue-grey zooanthid | R | Ind. |
| **CNIDARIA, ANTHOZOA** | | | |
| **SCLERACTINIA** | | | |
| **POCILLOPORIDAE** | | | |
| *Pocillopora damicornis* | lace coral | U | Ind. |
| *Pocillopora meandrina* | cauliflower coral | O | Ind. |
| **PORITIDAE** | | | |
| *Porites lobata* | lobe coral; *pōhaku puna* | O | Ind. |
| *Porites compressa* | finger coral | O | **End.** |
| **ACROPORIDAE** | | | |
| *Montipora capitata* | rice coral | U | Ind. |
| *Montipora patula* | spreading rice coral | U | Ind. † |
| **AGARICIIDAE** | | | |
| *Pavona duerdeni* | pork chop coral | R | Ind. |
| *Pavona varians* | corrugated coral | R | **End.** |
| **ANNELIDA, POLYCHAETA** | | | |
| **SABELLIDAE** | | | |
| *Sabellastarte spectabilis* | feather duster worm | O | Ind. |
| **MOLLUSCA, GASTROPODA** | | | |
| **PATELLIDAE** | | | |
| *Siphonaria normalis* | false *'opihi* | R | Ind. |
| **NERITIDAE** | | | |
| *Nerita picea* | black nerite; *pipipi* | R | **End.** |
| **LITTORINIDAE** | | | |
| *Littorina pintado* | periwinkle *pipipi kōlea* | R | Ind. |
| **CYPRAEIDAE** | | | |
| *Cypraea caputserpentis* | snakehead cowry *leho kupa* | O | Ind. |
| **THAIDIDAE** | | | |
| *Morula granulata* | granular drupe *maka'awa* | R | Ind. |
| **MOLLUSCA, GASTROPODA** | | | |
| **SACOGLOSSA** | | | |
| **ELYSIIDAE** | | | |
| *Plakobranchus ocellatus* | ringed sap-sucking slug | R | Ind. |

| PHYLUM, CLASS, ORDER, FAMILY *Genus species* | Common name | Abundance | Status |
|---|---|---|---|
| **MOLLUSCA, BIVALVIA** | | | |
| **OSTREIDAE** | | | |
| *Dendostrea sandvicensis* | Hawaiian oyster | U | Ind. |
| **ARTHROPODA, CRUSTACEA, DECAPODA** | | | |
| **STENOPODIDAE** | | | |
| *Stenopus hispidus* | banded coral shrimp | R | Ind. |
| **CALLIANASSIDAE** | | | |
| *Corallianassa borradailei* | Borradaile's ghost shrimp | R | Ind. |
| **DIOGENIDAE** | | | |
| unid. | hermit crab | O | -- |
| **XANTHIDAE** | | | |
| unid. | xanthid crab | R | -- |
| **TRAPEZIIDAE** | | | |
| *Trapezia intermedia* | common guard crab | R | Ind. |
| **GRAPSIDAE** | | | |
| *Grapsus tenuicrustatus* | thin shelled rock crab *'a'ama* | R | Ind. |
| **ECHINODERMATA, OPHUIROIDEA** | | | |
| **OPHIOCOMIDAE** | | | |
| *Ophicoma erinaceus* | spiny brittle star | R | Ind. |
| **ECHINODERMATA, ECHINOIDEA** | | | |
| **DIADEMATIDAE** | | | |
| *Echinothrix calamaris* | banded urchin; *wana* | O | Ind. |
| **ECHINOMETRIDAE** | | | |
| *Colobocentrotus atratus* | helmet urchin *hā'uke'uke kaupali* | U | Ind. |
| *Echinometra mathaei* | rock boring urchin *'ina kea* | C | Ind. |
| *Echinometra oblonga* | oblong urchin; *'ina* | C | Ind. |
| *Heterocentrotus mammillatus* | red pencil urchin *hā'uke'uke'ula'ula* | R | Ind. |
| **ECHINODERMATA, HOLOTHUROIDEA** | | | |
| **HOLOTHURIIDAE** | | | |
| *Actinopyga mauritiana* | white spotted sea cucumber; *loli* | R | Ind. |
| *Actinopyga obesa* | plump sea cucumber | R | Ind. |



| PHYLUM, CLASS, ORDER, FAMILY *Genus species* | Common name | Abundance | Status |
|---|---|---|---|
| **FISHES** | | | |
| **LUTJANIDAE** | | | |
| *Lutjanus fulvus* | blacktail snapper; *to'au* | R | Nat. |
| **MULLIDAE** | | | |
| *Parupeneus bisfasciatus* | doublebar goatfish *munu* | R | Ind. |
| **KYPHOSIDAE** | | | |
| *Kyphosus bigibbus* | grey chub; *nenue* | R | Ind. |
| **CHAETODINTIDAE** | | | |
| *Chaetodon quadrimaculatus* | fourspot butterflyfish *lauhau* | U | Ind. |
| **POMACENTRIDAE** | | | |
| *Abudefduf abdominalis* | Hawaiian sergeant *mamo* | O | **End.** |
| *Abudefduf sordidus* | blackspot sergeant *kūpipi* | C | Ind. |
| *Dascyllus albisella* | Hawaiian dascyllus *'alo'ilo'i* | U | **End.** |
| *Plectroglyphidodon impairipennis* | brighteye damselfish | O | Ind. |
| **LABRIDAE** | | | |
| *Bodianus bilunulatus albotaeniatus* | Hawaiian hogfish; *'a'awa* | R | **End.** |
| *Stethojulis balteata* | belted wrasse; *'ōmaka* | O | **End.** |
| *Thalassoma duperrey* | saddle wrasse *hinālea lauwili* | O | **End.** |
| *Thalassoma trilobatum* | Christmas wrasse *'awela* | R | Ind. |
| **BLENNIDAE** | | | |
| *Blenniella gibbifrons* | bullethead rockskipper | R | Ind. |
| *Cirripectes vanderbilti* | scarface blenny | R | **End.** |
| *Istiblennius zebra* | zebra rockskipper; *pāo'o* | C | **End.** |
| **GOBIIDAE** | | | |
| *Bathygobius* spp. | tide pool goby | O | Ind. |
| **ZANCLIDAE** | | | |
| *Zanclus cornutus* | Moorish idol; *kihikihi* | R | Ind. |
| **ACANTHURIDAE** | | | |
| *Acanthurus guttatus* | whitespotted surgeonfish *'api* | O | Ind. |
| *Acanthurus leucopareius* | whitebar surgeonfish *māikoiko* | C | Ind. |

APPENDIX A

| PHYLUM, CLASS, ORDER, FAMILY<br>*Genus species* | Common name | Abundance | Status |
|---|---|---|---|
| **ACANTHURIDAE cont.** | | | |
| *Acanthurus nigrofuscus* | brown surgeonfish<br>*mā'i'i'i* | O | Ind. |
| *Acanthurus triostegus sandvicensis* | convict surgeonfish<br>*manini* | C | **End.** |
| *Naso lituratus* | orangespine unicornfish<br>*umaumalei* | R | Ind. |
| *Naso unicornis* | bluespine unicornfish<br>*kala* | R | Ind. |
| **BALISTIDAE** | | | |
| *Melichthys niger* | black durgon<br>humuhumu 'ele'ele | O | Ind. |
| *Rhinecanthus rectangulus* | reef triggerfish<br>*humuhumu nukunuku apua'a* | O | Ind. |
| **OSTRACIIDAE** | | | |
| *Ostracion melagris camurum* | spotted boxfish; *moa* | R | **End.** |
| **TETRAODONTIDAE** | | | |
| *Arothron hispidus* | stripebelly puffer<br>*o'opu hue* | R | Ind. |
| *Canthigaster amboinensis* | ambon toby | R | Ind. |
| *Canthigater jactator* | whitespotted toby | R | **End.** |

KEY TO SYMBOLS USED:

Abundance categories:

P – Present – identified but abundance not assessed
R –Rare – only one or two individuals observed.
U – Uncommon – several to a dozen individuals observed.
C – Common – observed everywhere, generally not in large numbers.
A – Abundant – observed in large numbers and widely distributed.

Status categories:

**End.** – Endemic – species found only in Hawaii
Ind. – Indigenous – species found in Hawaii and elsewhere
Nat. – Naturalized – species were introduced to Hawaii intentionally or accidentally.

Notes:

† – species under status review for Endangered Species Act listing

# APPENDIX D: Memorandum of Agreement for Compensatory Mitigation dated December 1997

ORIGINAL

**MEMORANDUM OF AGREEMENT**

Agreement No. A01096200

Between the U.S. Army Corps of Engineers,
Honolulu Engineer District,
Ducks Unlimited, Inc. Western Regional Office, and The Estate of
James Campbell Regarding Compensatory Mitigation for Loss of
Waters of the United States Associated with
Department of the Army Permit File Number 970000035

**Background and Purpose**

Pursuant to Section 404 of the Clean Water Act (33 USC 1344, as amended), the Estate of James Campbell (Estate) has applied to the U.S. Army Corps of Engineers, Honolulu Engineer District (Corps) for a Department of the Army (DA) permit for work in navigable waters, including discharge of dredged and fill material associated with construction of drainage improvements at Campbell Industrial Park, Ewa, Oahu, Hawaii. Discharges include fill of approximately 0.15 acres of wetland dominated by pickleweed (*Batis maritima)* for construction of the walls of the drainage channel and service roads. In addition, the project will include discharge of dredged material incidental to excavation of 1.5 acres of the *batis* wetland. The total area of wetland that would be lost is 1.7 acres.

The *batis* wetland area is isolated and the work in the wetland could be authorized by the Corps Nationwide permit (NWP) authority (December 13, 1996 Federal Register, Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits, 61 FR 65874) NWP #26, Headwaters and Isolated Waters Discharges. The proposed wetland excavation and fill is minor in scope and is expected to cause minimal adverse environmental impacts. Nevertheless, the national goal of no net loss of wetlands and the long-term goal of increasing the quality and quantity of the country's aquatic resource base compels the Corps to require compensatory mitigation for even minor wetland losses.

In preparing their DA permit application, the Estate developed a compensatory mitigation plan that was intended to result in creation of approximately 1.7 acres of wetland habitat approximately 4000 feet south of the project site (Exhibit 1). The Corps and U.S. Fish and Wildlife Service (USFWS) agreed to the low compensation ratio because of the degraded nature of the existing wetland, which is expected to provide minimal foraging habitat for federally-listed water birds. The estimated cost

AMENDED BY LETTER
DATED 12/30/05, 7/2/07

F# 236a

OFFICE COPY
The Estate of James Campbell
MICROFILMED

for construction of 1.7 acres of wetland, as proposed in the Estate's mitigation plan, would be $53,000.

However, there are no guarantees that the 1.7 acres resulting from this expenditure would actually attain wetland characteristics or, and more importantly, provide adequate wildlife habitat value. In fact, in the Corps' experience in Hawaii and other Pacific islands, such small mitigation efforts frequently fail to achieve the desired intent.

An alternative to individual compensatory mitigation projects for permits is a fee-based system in which a DA permit applicant make a monetary payment in lieu of construction of project-specific mitigation. Those monies are then used by a third party to replace, as much as is practicable, the aquatic functions lost through undertaking the permitted project. Fee-based wetland compensatory mitigation has its basis in mitigation banking and has been used successfully on the mainland. The recently reauthorized Nationwide Permit program encourages use of in lieu fee mitigation, particularly for minor projects and small acreages. Important advantages of in lieu mitigation are the environmental benefits that accrue from economies of scale and involvement of parties with expertise and experience in wetland restoration. Such is the case in the proposed mitigation scheme for DA Permit File Number 970000035.

The Pouhala Marsh restoration project is a multi-cooperator effort, the goal of which is to restore nearly 70 acres of wetlands in Pearl Harbor West Loch (Exhibit 2). The project is a joint effort of Ducks Unlimited, Inc. (DU), the USFWS, State of Hawaii and the City and County of Honolulu. A primary goal of the restoration project is to enhance the habitat for three endangered water birds, at least one of which may use the existing project area for foraging.

Based on the foregoing, the Corps finds that an in lieu payment to the Pouhala Marsh restoration account in the sum of $52,000 (see stipulation #1) provides adequate mitigation to compensate for the loss of 1.7 acres of wetlands associated with construction of the proposed drainage improvements at Campbell Industrial Park.

**Stipulations**

1. The Corps will accept the in lieu fee payment described below as adequate compensatory mitigation for the loss of 1.7 acres of jurisdictional wetlands associated with construction of

drainage improvements at TMK 9-4-14-4. No additional compensatory mitigation will be required.

2. The Estate will deposit Fifty-Two Thousand and 00/100 dollars ($52,000)[1] into the Pouhala Marsh restoration account. The restoration account is identified as Project #HI-0010-002-0001, which is administered by DU and maintained at DU headquarters in Memphis, Tennessee. This dedicated account was created on August 22, 1996, and currently holds funds from the Wetlands America Trust, DU and Wildlife Forever. The Estate's contribution will be held in the dedicated account until expended by DU for the purposes of this project.

The Estate's contribution will be used by DU as detailed below:

a. Northwest Basin A (as shown on Exhibit 3): Creation of approximately 2.0 acres of seasonally flooded wetland habitat (critical habitat for endangered Hawaiian stilts). The wetland will be created by excavation to an elevation of 1.3 feet. Cost per acre: $17,000.

b. Northwest Basin B (as shown on Exhibit 3): Enhancement of approximately 2.0 acres of existing degraded wetland. Enhancement will include removal of an existing levee, clearing of vegetation and removal of trash and debris. Cost per acre: $9,000.

3. Within sixty (60) days of the date of the final signature of this Memorandum, the Estate shall deposit with the Corps and DU a bond or other financial instrument acceptable to the Corps and DU naming the Corps and DU as co-obligee(s) and guaranteeing the Estate's obligation for payment under the terms and conditions of this Memorandum, for a total of not less than one hundred percent (100%) of such obligation, in form and content and with surety satisfactory to the Corps and DU.

4. DU will invoice the Estate following completion of the work described in #2 above no earlier than January 1, 1999. The Estate will, in turn, transfer funds no later than thirty (30) days following receipt of the invoice from DU. In the event that work in areas "Northwest Basin A" and "Northwest Basin B" is significantly delayed, the Estate will transfer funds at least sixty (60 days) prior to the start of any work in waters

[1] Please note that this value, which is based on DU's determination of costs for creation and enhancement of Northwest Basins A and B, differs slightly from the estimated cost of wetland creation as described in Background and Purpose.



of the U.S. associated with DA Permit File Number 970000035.

5. DU will notify the Corps and the Estate at least thirty (30) days prior to issuing the notice to proceed.

6. DU will negotiate in good faith with the property owner, the City and County of Honolulu, to provide the Estate access to the Pouhala Marsh project site during construction and up to five (5) years following project completion. It is anticipated that such access will be provided within forty-eight (48) hours notice by the Estate. Nothing herein shall require DU to expend any funds or provide additional consideration to attain such access for the Estate.

7. DU will prepare bi-monthly project reports during construction. DU will provide copies to both the Estate and the Corps.

8. Following the completion of construction, DU will prepare a final report to the Corps and the Estate. The report should include, as appropriate, description of the construction activities, discussion(s) of any deviations from the proposed project design and the cause of these deviations, discussion(s) of any necessary corrective action(s), and photographs documenting the progress of the work (including photos before, during and after restoration activities).

9. This Memorandum of Agreement takes effect on the date of the last signature and remains in effect until December 31, 2005.

HONOLULU ENGINEER DISTRICT, U.S. ARMY CORPS OF ENGINEERS

By: Ralph H. Graves Date: 4 Dec 97

RALPH H. GRAVES
Lieutenant Colonel, U.S. Army
District Engineer

DUCKS UNLIMITED, INC.

By: James L. Ware Date: 12/22/97

JAMES L. WARE
Senior Group Manager

APPROVED AS TO FORM

McCUTCHEN, DOYLE, BROWN & ENERSEN, LLP

By: _____
DAVID E. MOSER

TRUSTEES UNDER THE WILL AND OF THE ESTATE OF JAMES CAMPBELL, DECEASED, acting in their fiduciary and not in their individual capacities

_____
C. R. Churchill

_____
Chief Operating Officer

_____
Director, Finance & Accounting

APPROVED NON STANDARD FORM
Contents:
Checked _____
Approved _____
_____
Date 3/2/98

# APPENDIX E-1 SHPD Preservation Plan Acceptance Notice dated April 28, 2011

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

April 28, 2011

Hallett Hammatt
Cultural Surveys Hawaii
P.O. Box 1114
Kailua, Hawaii 96734

LOG NO: 2009.2360
DOC NO: 1104MV18
Archaeology

**SUBJECT:** **Chapter 6E-42 Historic Preservation Review –**
**FINAL Preservation Plan for Seven Historic Properties Located in or Adjacent to the Kapolei West Project (SIHP # 50-80-12-4896, -6687, -6688, -9545, -9617, -9633 & -9714)**
**Honouliuli Ahupua'a, 'Ewa District, O'ahu**
**TMK: [1] 9-1-14:33 & 9-1-15:20**

Thank you for the opportunity to review the revised draft of this preservation plan titled *Revised FINAL Preservation Plan for Seven Historic Properties Located in or Adjacent to the Kapolei West Project (SIHP # 50-80-12-4896, -6687, -6688, -9545, -9617, -9633 & -9714) Honouliuli Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1-14:33 & 9-1-15:20 (Hammatt et al. May 2009)* This Final was received by SHPD on May 29, 2009. We apologize for the delayed acceptance notice. The revisions made to this document were the result of comments from the review of an earlier draft (Log No 2009.2360; Doc No 0905WT82). The revisions made to this document adequately address the concerns raised in our prior correspondence. This revised plan meets the standards set forth in HAR §13-277-3 and is accepted by SHPD. This Plan has been logged into the SHPD library and is recorded as Report No. O-02738. There is no need to submit any additional copies of this report.

Please contact Mike Vitousek at (808) 692-8029 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Pua Aiu
Administrator
State Historic Preservation Division

# Appendix E-2: Correspondence relating to O.R.&L. Railroad Right-of-Way crossings dated March 2008

# Appendix C OR&L Related Correspondence

Hawaiian Railway Society – 3/7/08 Letter
Aina Nui Corporation, Kapolei Property Development LLC Comments:

We acknowledge that the HRS operates in the 40-foot Oahu Railroad and Land Company (OR&L) railroad right of way (ROW) under conditions prescribed by the Hawaii Department of Transportation and that there is a State bikeway planned in the ROW. We anticipate that the historic railway and future bikeway will be features that will be integrated into the Kapolei West community synergistically similar to what exists in the Ko Olina Resort today.

Aina Nui Corporation retains two easements for road and utility purposes and two easements for drainage purposes across the OR&L ROW that were granted by the Department of the Navy on December 28, 1978 to the Estate of James Campbell. At that point in time, the OR&L ROW was owned by the United States Government and referred to as the Naval Magazine, Lualualei Railroad ROW. Currently, Aina Nui Corporation, Kapolei Property Development LLC and State and County governments plan vehicular and drainage crossings of the OR&L ROW at locations that differ from, and in addition to, the crossing easements currently recorded. In addition to changes to the location and number of existing roadway crossing easements, the widths of the roadway easements will likely need to be expanded to meet State and County roadway standards.

The vehicular OR&L ROW crossings planned between Kapolei West and Kapolei Harborside will be at-grade by necessity. Preliminarily, a new State highway and two County-standard roads are planned to provide access between these major project areas. These three roadways planned strike a balance between the need for connectivity between future population and job centers in the area and minimizing crossings of the historic ROW that generally operates once a week and for special events. On either side of the OR&L ROW, there are major and minor at-grade intersections planned along these roadways which provide east-west access to the projects. Similar major at-grade crossings of the OR&L ROW are currently in design or construction in the region at Kalaeloa Boulevard, Kamokila Boulevard and Kapolei Parkway. The use of automated crossing guards is subject to approval through State and County roadway review processes, but where they are used, they should alleviate the need to create more stops for the relatively infrequent train trips along the ROW.

Drainage crossings will also be necessary and are planned to divert the current drainage course patterns from Kapolei West to Kapolei Harborside that may differ from the easement locations that are currently in place.

The necessary roadway and drainage crossings will be coordinated closely with the applicable governmental agencies as the roadway and drainage master planning for the project proceed. We anticipate Department of Transportation involvement in the planning of the crossings not only because of their ownership of the OR&L ROW and the need to modify the existing easements, but because of their desire for the State Harbor Access Highway crossing and the need to alleviate current drainage problems in and around Kalaeloa Harbor.

DPP Follow-up Comments:

*1. re: the planned vehicular & drainage crossings of the ROW will be at locations that differ from and in addition to the 4 crossing easements currently recorded for Aina Nui Corp.*

Will the new crossings pose a problem? Isn't the ROW on the State Historic Register? Could you please explain KPD's plans, if currently known, for obtaining the crossing easements (I assume from the owner of the ROW, the State DOT)?

*2. re: HRS' comment that they would like to examine the conceptual drawings including drainage & utilities locations as soon as they are available: I assume KPD will be keeping HRS in the "planning loop" and will solicit and implement (up to a reasonable limit) HRS' comments as deemed practicable. Please advise if the last paragraph of your 3/18 email ("The necessary roadway and drainage crossings will be coordinated closely with the applicable governmental agencies as the … master planning for the project proceed") will also include the HRS.*

Aina Nui Corporation, Kapolei Property Development LLC Responses:

1. We don't anticipate the crossings as posing a problem. We feel the three crossings currently planned strike a balance between providing the connectivity between the projects necessary to make them successful and limiting the impact to the historic railroad ROW. Of the three crossings, one will be a State highway which the DOT has identified as a priority roadway for them. The two others are planned as County roadways to provide connectivity between the projects and surrounding areas. As with other County roadway crossings in the area currently under design or construction such as Kalaeloa Blvd., Kamokila Blvd. extension and Kapolei Parkway in East Kapolei, we will work with DOT Right of Way branch to adjust the existing easements and create new easements where necessary. Since the crossings have already been reviewed by DOT in both the Kapolei West and Kapolei Harborside EIS processes and now with the respective zone change applications, we feel obtaining the easements should be a matter of course.

2. We will coordinating closely with DOT Right of Way Branch on the proposed crossings of the railroad ROW and they will in turn require or solicit comments from the HRS as they feel is appropriate. Since the ROW is DOT property, we will defer to them on the level of involvement HRS has. Typically, a fee is required to be negotiated with HRS even though the impact to their operations due to roadway construction is negligible given their infrequent operation schedule.

**Hawaiian Railway**

2008/2-1
2008/2-2
2008/2-3
RECEIVED

'08 MAR 12 A10:54

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLU

March 7, 2008

Mr. Henry Eng
FAICP, Director
CITY AND COUNTY OF HONOLULU
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

Subject: Comments on Zone Change Applications, Kapolei West and Kapolei Harborside

Both of the subject proposed developments will affect the OR&L Right of Way and the historic train operated by the Hawaiian Railway Society (HRS).

HRS operates in the 40' OR&L Right of Way under conditions prescribed by the Hawaii Department of Transportation, Highways Division. A State bikeway is planned to fit in the right of way adjacent to the single narrow-gage railroad track.

We recommend that road or golf course crossings of the railroad and bikeway for these two developments be accomplished by means of bridges or tunnels rather than at-grade. Additional at-grade crossings will create more stops for the train and degrade the character of the historic track which is on the National Register of Historic Places.

If at-grade crossings must be used they should have automated crossing guards.

Drainage of these two developments is a concern. If our railroad bridge 28A is to be affected we will require coordination. This bridge passes considerable stormwater during major storms.

We would like the opportunity to examine conceptual drawings including drainage and utilities locations as soon as they are available.

If you have any questions, please contact Ben Schlapak at 836-6533.

Sincerely,

ROBERT YATCHMENOFF
President

**HAWAIIAN RAILWAY SOCIETY**
*A Chapter of the National Railway Historical Society*
P. O. Box 60369 • Ewa Station, Ewa Beach, Hawaii 96706 • Ph: (808) 681-5461 • Fax: (808) 681-4860

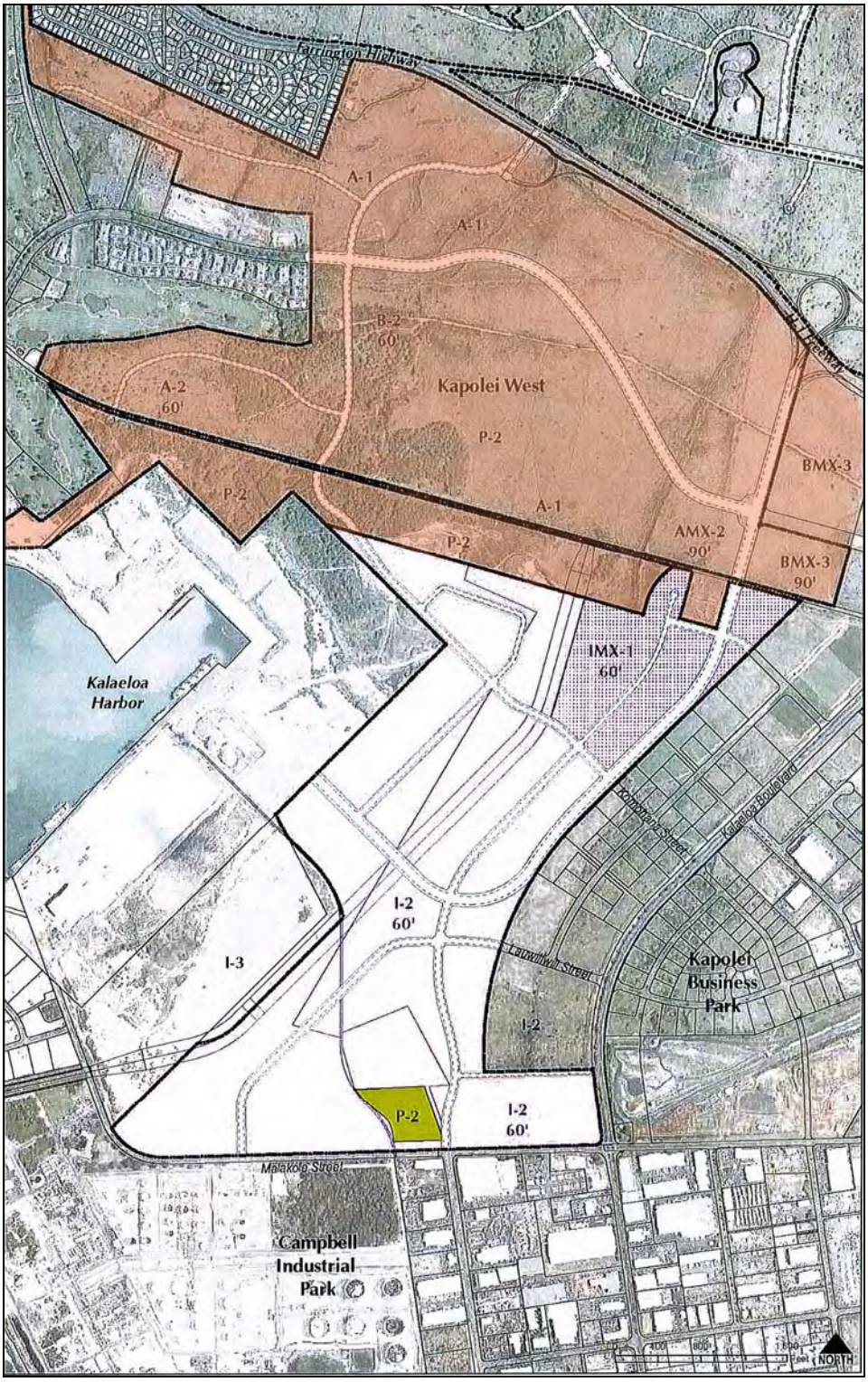



Figure 29. Map showing the Kapolei West project area, both north and south of the O.R.&L. alignment, note the white proposed roads crossing the railway alignment

## Appendix F: EKNA letter regarding Stormwater Flow Modeling dated September 24, 2010

EKNA Services, Inc.

Engineers
and
Environmental
Consultants

Engineering
Planning
Surveys
Computer
Modeling

615 Piikoi Street
Suite 300
Honolulu, Hawaii
96814-3139

Telephone:
(808) 591-8553
Facsimile:
(808) 593-8551

CN 1192 September 24, 2010

Engineering Concepts, Inc.
1150 South King Street, Suite 700
Honolulu, Hawaii 96814

Attn: Mr. Craig Arakaki, P.E.

Subject: Stormwater Flow Modeling in the Ocean Waters for the Proposed Campbell Drainage Channel, Kapolei Business-Industrial Park, Oahu

Dear Mr. Arakaki:

In response to your request, we provide this clarification regarding the previous modeling that Edward K. Noda and Associates, Inc. (now EKNA Services, Inc.) performed for the subject project. The modeling of the stormwater discharge from the proposed drainage channel to the ocean was documented in our report dated May 1990, as described in the August 1991 Final EIS for the Campbell Drainage Channel.

The nearfield plume modeling was based on the characteristics of the ocean receiving waters (temperature, salinity), the stormwater effluent discharged from the channel (flow rate, suspended sediment concentration), and the geometry of the channel outlet. The characteristics of the ocean receiving waters have not materially changed, and you have stated that the stormwater effluent characteristics and the geometry of the channel are also materially unchanged. Therefore, the results from our previous nearfield modeling effort remain valid.

The farfield plume modeling utilized a Monte Carlo simulation of the transport processes in the ocean that affect the nearfield plume. Two months of current data obtained offshore the project site was used to simulate the transport of the plume. The results are plotted as contours of suspended solids concentration that indicate the probability of impact (spatially) at time t after discharge. The current data used for the modeling was characteristic of the typical tidal current regime offshore this coastline. Therefore, the results from our previous farfield modeling effort remain valid.

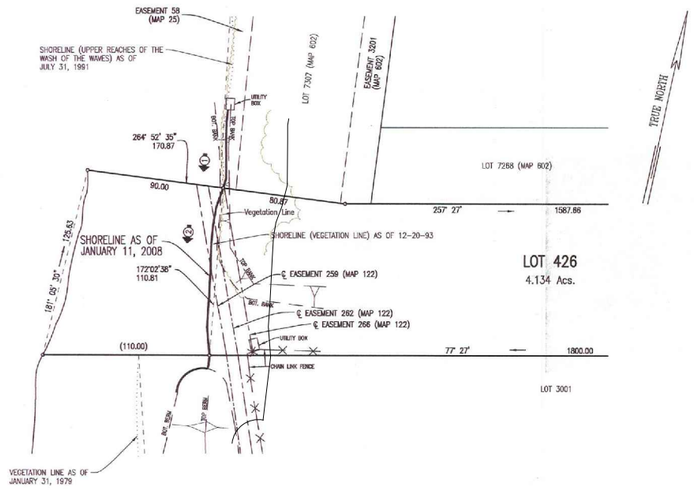
To our knowledge, there has been no shoreline/offshore development subsequent to the modeling effort that would alter the modeling parameters. Please contact me if you have any further questions.

Very truly yours,

Elaine E. Tamaye
President

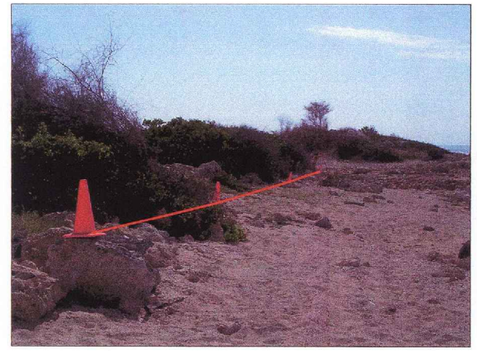
# Appendix G Previously proposed Certified Shoreline Map and 40-setback line dated 2008

***THIS PAGE INTENTIONALLY LEFT BLANK***

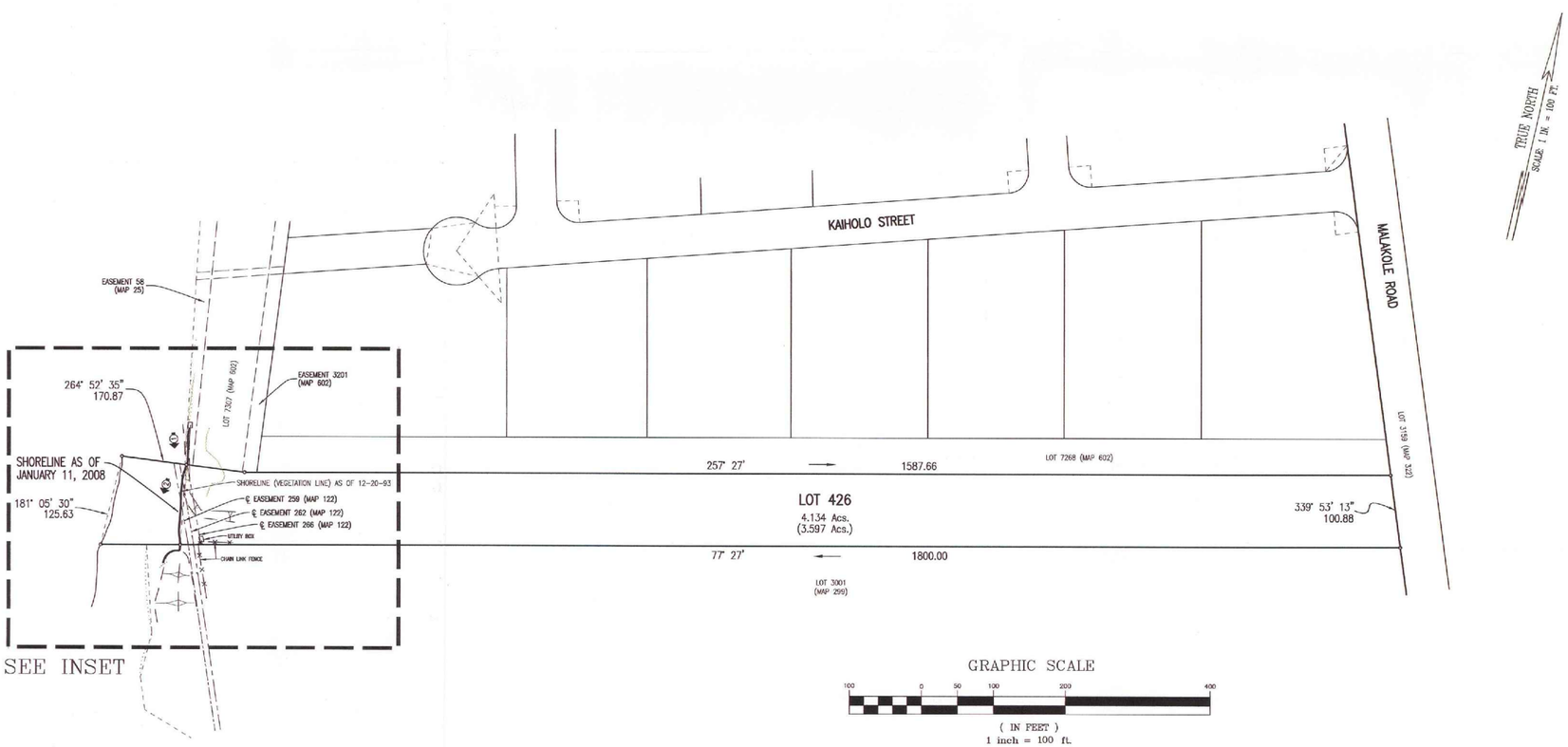



INSET

Scale: 1 in. = 50 ft.



PHOTOS TAKEN ON JANUARY 11, 2008




# SHORELINE SURVEY MAP
## LOT 426 (MAP 79)
## LAND COURT APPLICATION 1069
HONOULIULI, EWA, OAHU, HAWAII

Fee Owner: James Campbell Company LLC

Address: 1001 Kamokila Blvd., Suite 250
Kapolei, HI 96707

Property Address:
91-400 Malakole Street
Kapolei, HI 96707

This work was prepared by me
or under my direct supervision

By:
Licensed Professional Land Surveyor
Certificate Number 11249
License Expire 4/08

FN: 07017-19 WKSHT.dwg