

APPENDIX I – HYDROLOGY AND WATER QUALITY

Preliminary Drainage Study



Preliminary Drainage Study

Westside Canal Battery Storage Complex

Project No. 110578

Revision C
04/03/2020



CED WESTSIDE CANAL BATTERY STORAGE COMPLEX PRELIMINARY DRAINAGE REPORT

Introduction

Burns and McDonnell has been retained to provide engineering support for the Westside Canal Battery Storage Complex Conditional Use Permit, a project for ConEdison Development.

The purpose of this report is to describe and document the preliminary drainage design of the project. This report is intended to fulfill the drainage study requirements of the reviewing agencies and meets the drainage standards of Imperial County.

PROJECT DESCRIPTION

Location

The project is located in unincorporated Imperial County, California, approximately 3 miles south of Kumeyaay Highway (Interstate 8) and Jessup Rd. The project is south of the Westside Canal that is owned and operated by the Imperial Irrigation District. See attached figure for existing site conditions and vicinity map. The project comprises approximately 148 acres. The property is located in Flood Zone X (Unshaded) Map No. 060065 2050 C. Flood Zone X (Unshaded) is defined as an area of minimal flood hazard, is an area outside the Special Flood Hazard Area, and higher than the elevation of the 0.2 percent annual chance flood.

Existing Conditions

Under existing conditions, the project area is a fallow farm field consisting of sandy soils with minimal vegetation. The site is divided into eastern and western halves by an existing transmission corridor that follows the Liebert Road alignment. The western portion of the site slopes from the southeast to the northwest while the eastern portion of the site slopes from the southwest to the northeast. The site is relatively flat with slopes varying from 0.2% to 2.5%. The site currently has a berm along the western and southern boundaries which divert all offsite flows around the site. The berm elevation on the western portion varies from approximately 10 to 15 feet above adjacent grade. The berm along the southern boundary is approximately three feet in height.

Proposed Conditions

The proposed site will consist of approximately 2000MW of battery storage using a mixture of flow cell and lithium ion technologies. The project is expected to be constructed over multiple phases, with phases ranging from 25 MW to a maximum size of 300 MW. The first phase of the project will consist of an operations and maintenance building, water and fire suppression, stormwater retention, substations and either a lithium-ion battery storage facility or a flow cell energy storage facility. Large industrial buildings, warehouses and/or containers will be the structures to house the storage equipment including battery cells, modules, racks and controls for lithium ion and cell stack modules, tanks, pumps, and controls for flow batteries. Dependent on the technology deployed within a specific storage facility (warehouse/industrial building), the building may have heating, ventilation, and air condition (HVAC) units. Each building is

planned to have roof top solar installed and if there is any open space on the project site, ground mounted solar may be installed for distribution project site power. Building pads will be designed so that they are a minimum of one foot above adjacent grade to protect from the 100-year storm event.

Due to the increase in impervious area, detention basins will need to be constructed to capture the increase in runoff. The site will be graded to divert on-site flows to detention basins via roadside swales. Culverts will be installed under roadway/driveway crossings to connect the drainage swales. The detention basins will be located in the northeast and northwest corners of the site at the historic discharge locations. The Westside Main Canal bounds the project to the north and has elevated banks approximately 2' tall which prevents runoff from leaving the site. Ultimate outfall for the site occurs when stormwater ponds to a height to overtop the canal bank. Proposed battery storage structures and equipment pads for the site will need to be elevated above the ultimate outfall elevation at the top of the bank as indicated on the drainage plan.

The detention basins will be designed such that stormwater will percolate within 72 hours in accordance with Imperial County requirements. A geotechnical study will be performed as part of final design to verify the infiltration rates. In the event that testing shows poor infiltration rates for the basins, injection/dry wells will be installed as needed to meet the 72 hour percolation requirement. Installation of detention basins and grading of the site may be phased to match the phasing of the energy storage facilities.

Drainage Calculations

The County of Imperial Department of Public Works "Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage and Grading Plans within Imperial County" was used to calculate the size of the detention basins needed for the site. Per Section III. Drainage Improvements, General Requirement number four states, "Retention volume on retention or detention basins should have a total volume capacity for a three (3) inch minimum precipitation covering the entire site with no C reduction factors. Volume can be considered by a combination of basin size and volume considered within parking and/or landscaped areas". Thus, the retention required on site is calculated by:

$$V = C \left(\frac{P}{12} \right) A$$

Where;

V = Volume Required (acre-ft)

C = Runoff Coefficient

P = Precipitation, 3 inches

A = Drainage area (acres)

	West Basin	East Basin
Drainage Area (A)	91.1	57.1 acres
Runoff Coefficient (C)	1	1
Precipitation (P)	3 inches	3 inches
Volume Required (V_r)	22.78 ac-ft	14.28 ac-ft
Volume Provided (V_p)	23.90 ac-ft	16.46 ac-ft

Summary

The Westside Canal Energy Center is a 148-acre project located on fallow farmland. The proposed site features berms along the western and southern boundaries which divert offsite flows around the site. Historic drainage patterns will be preserved by routing flows using swales and culverts to two detention basins located at the northwest and northeast corners of the site. The basins will provide a detention volume of approximately 40.4 ac-ft to capture the three-inch precipitation as stated in the Engineering Design Guidelines manual for Imperial Irrigation District.

ATTACHMENTS

National Flood Hazard Layer FIRMette

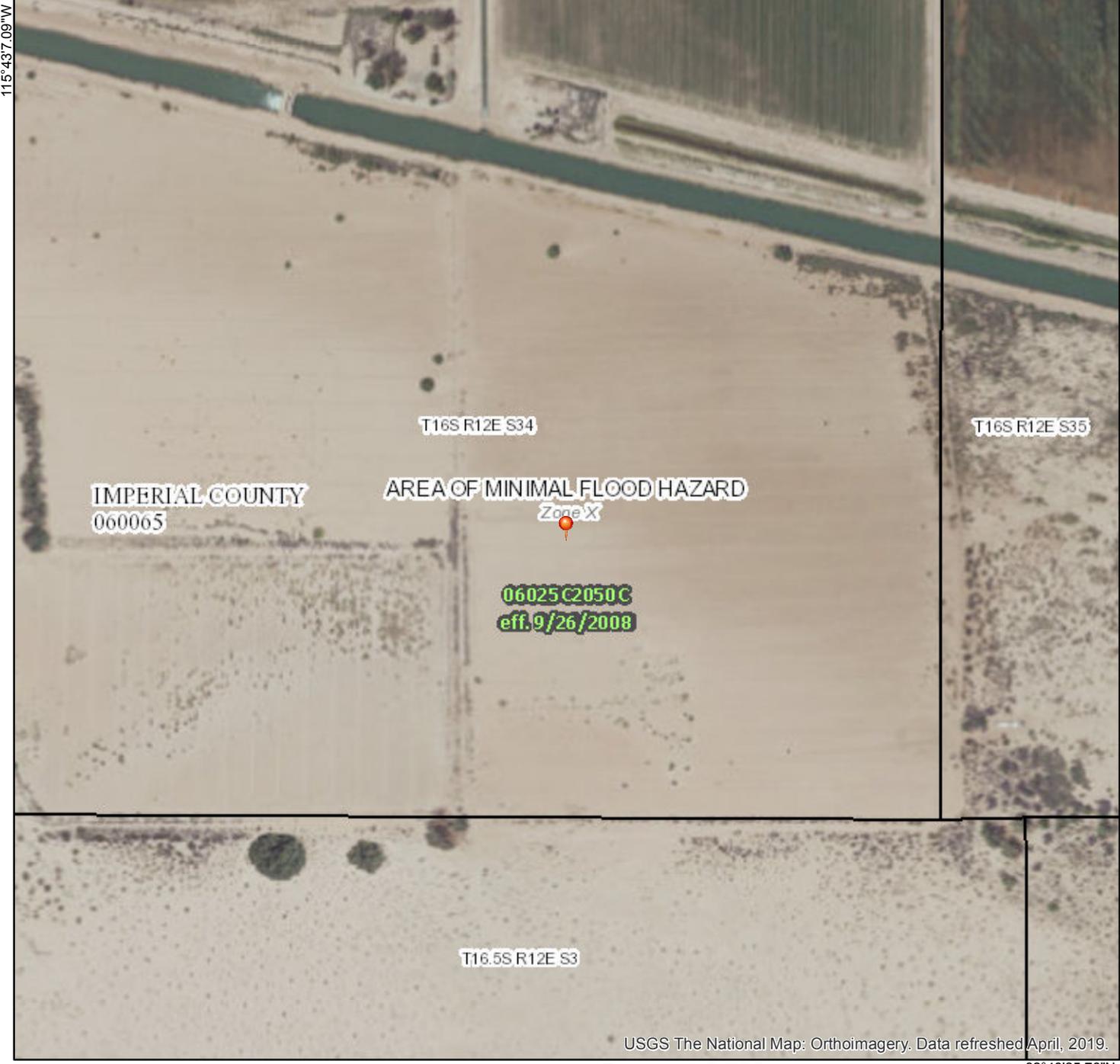


Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | | |
|------------------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| GENERAL STRUCTURES | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |
| | | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location. |

32°43'55.99"N



1:6,000

32°43'25.73"N

confidential

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/24/2019 at 2:18:09 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

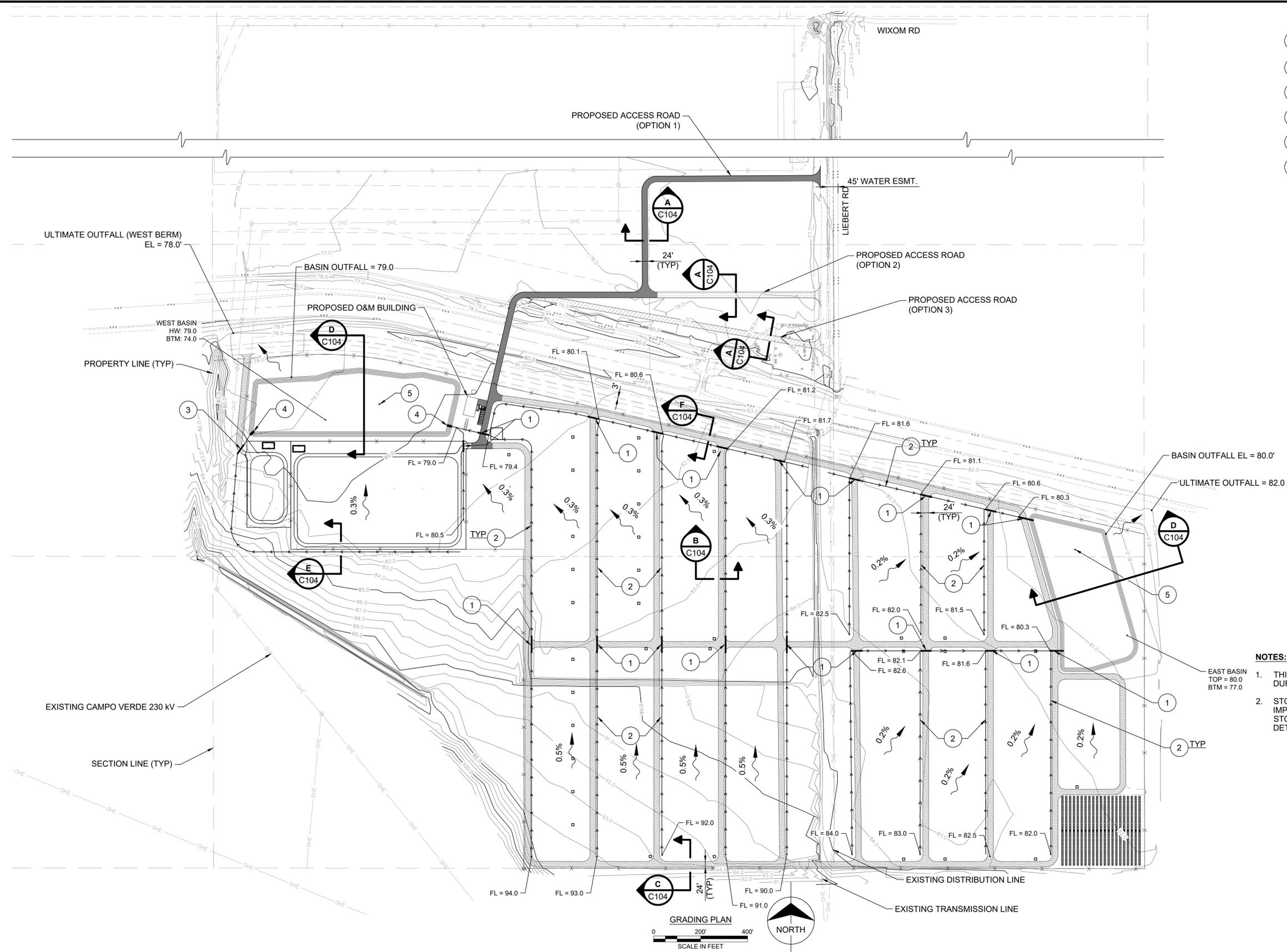
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



115°42'29.63"W

115°43'7.09"W

- KEY NOTES:**
- 1 18"-24" HDPE CULVERT
 - 2 DRAINAGE SWALE
 - 3 LOW FLOW CROSSING
 - 4 RIP RAP SPILLWAY
 - 5 INJECTION/DRY WELL (IF REQUIRED FOR BASIN TO PERCOLATE WITHIN 72 HOURS)



- NOTES:**
1. THIS LAYOUT IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE DURING DETAILED DESIGN.
 2. STORMWATER BASINS WILL BE DESIGNED IN ACCORDANCE WITH IMPERIAL COUNTY REGULATIONS. FINAL LOCATION AND SIZE OF STORMWATER FACILITIES AND BEST MANAGEMENT PRACTICES TO BE DETERMINED AT FINAL DESIGN.



Scale For Microfitting
Millimeters
Inches

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E	07/16/19	BNS	JTD	ISSUED FOR PERMITTING
D	07/01/19	BNS	JTD	ISSUED FOR PERMITTING
C	06/14/19	BNS	JTD	ISSUED FOR REVIEW
B	05/24/19	BNS	JTD	ISSUED FOR REVIEW
A	04/26/19	BNS	JTD	ISSUED FOR REVIEW
no.	date	by	ckd	description

C	06/14/19	BNS	JTD	ISSUED FOR REVIEW
no.	date	by	ckd	description

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KANSAS CITY, MO 64114
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FIRM LICENSE NO. 11523

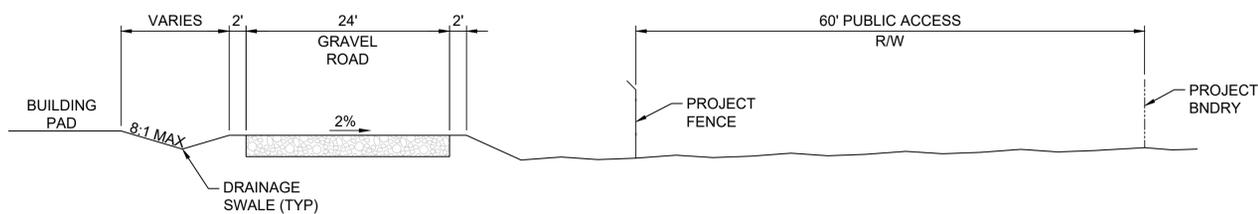
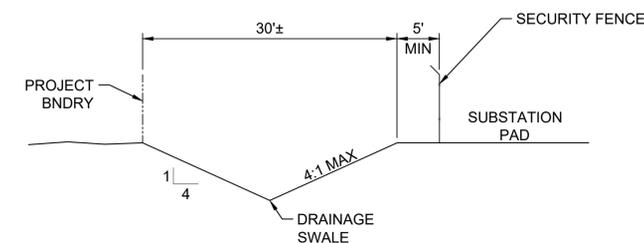
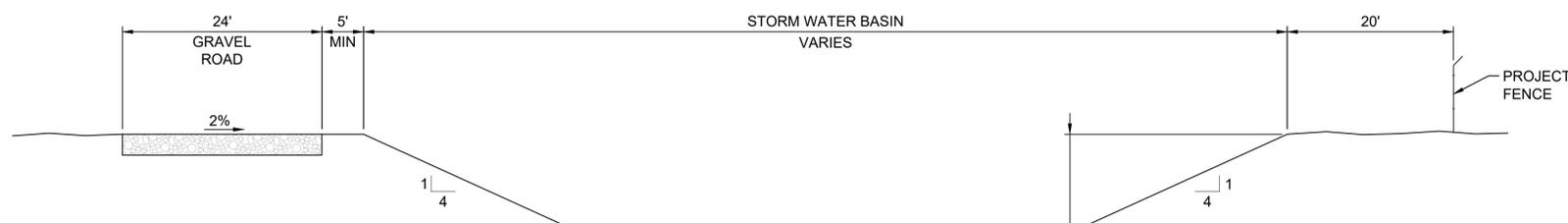
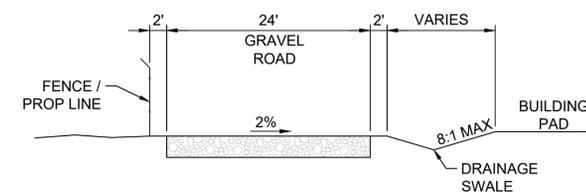
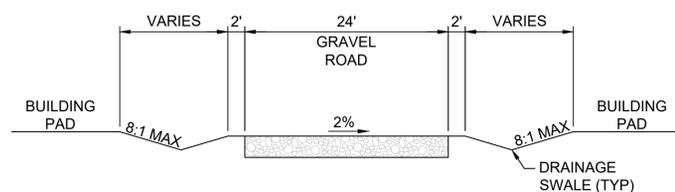
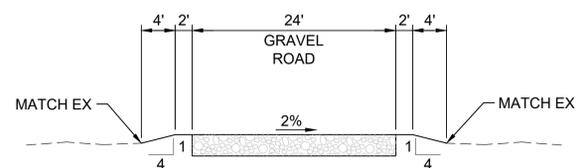
designed: T. DOWELL
detailed: B. SVOR

conEdison Development

IMPERIAL COUNTY, CA

WESTSIDE CANAL BATTERY STORAGE COMPLEX
CONDITIONAL USE PERMIT
GRADING PLAN

project: 110578 contract: -
drawing: C103 - C rev. -
sheet: - of - sheets
file: 110578C103.dwg



Scale For Microfining
Millimeters
Inches

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no.	date	by	ckd	description	no.	date	by	ckd	description
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A	04/26/19	BNS	JTD	ISSUED FOR REVIEW					

 9400 WARD PARKWAY KANSAS CITY, MO 64114 816-333-9400 FIRM LICENSE NO. 11523	 IMPERIAL COUNTY, CA	WESTSIDE CANAL BATTERY STORAGE COMPLEX CONDITIONAL USE PERMIT GRADING SECTIONS
		project 110578 contract - drawing C104 - rev. D sheet - of - sheets file 110578C104.dwg



CREATE AMAZING.

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