DOCKET	
09-AFC-7	
DATE	FEB 11 2010
RECD.	FEB 16 2010

February 11, 2010

Alan Solomon
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: **Palen Solar Power Project, Docket No. 09-AFC-7**
Responses to January 14, 2010 CEC Workshop Queries
Technical Areas:
Soil & Water Resources (supplemental data for DR-S&W-242)

Dear Mr. Solomon:

During the January 14, 2010, CEC Workshop staff requested additional information and clarification on several matters in the technical areas of Soil and Water Resources. Attached please find our responses to those specific questions.

If you have any questions on these data responses to the staff's workshop queries, please feel free to contact me directly.

Sincerely,

Alice Harron
Senior Director, Development

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fax (1) 510-524-5516
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Responses to CEC Workshop, January 14, 2010

Soil and Water Resources (Supplemental Data for DR-S&W-242)

Palen Solar Power Project

Docket No. 09-AFC-7

Alice Harron
Senior Director of Project Development
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709-1161

Soil and Water Data Responses to January 14, 2010 CEC Workshop Queries

DR#242 Supplemental---Soil and Water:

For response to DR-S&W-242, provide fuller explanation of relationship of cut slopes to berms and how water will be managed to avoid headcutting. Provide more detail needed on how water from the west enters the main channel at Palen. For the west channel at Palen, provide greater level of detail on drawings to indicate relationship of cut slopes to berms, channel, and relocated public roadway. Provide section drawings that show gaps in berms to allow water passage from upslope areas.

The issue of headcutting of channels upstream of the site will be precluded primarily by use of soil cement where existing and proposed channels enter into the primary offsite channels and by use of small (20 foot wide and 2.5 feet high) embankments placed upstream of the primary channel to direct existing drainage flows as well as future flows that may migrate into specific localized drainage inlets to the primary off-site drainage channels.

In essence, the small embankment is placed immediately upstream (5 feet away) from the upstream face of all perimeter channels that receive off site flows. This embankment runs the entire length of the perimeter channel. This embankment is then opened up at all locations where it is intercepted by off site ephemeral channels. The opening is constructed at the same current width as the existing ephemeral channel. The drainage path is then carried over the face and down the slope of the primary drainage in a defined “side slope” down-drain. Soil cement is placed within the ephemeral channel upstream of the embankment, through the opening in the embankment, along the full extent of the “side slope” down-drain, and out into the channel with an apron structure. Soil cement is also placed along the faces of the embankment on the upstream and downstream edges to preclude erosion and loss of embankment slope.

Additional details have been provided as part of this response that show this embankment barrier and the interception channels; how they operate, and how they are protected with soil cement, which in turn precludes head-cutting. This detail is shown on Sheet 32 of the revised plans.

The flow into the westerly channel, the relationship of cut slopes to berms, the openings in the berms, and the location of the relocated public road are all addressed by the above discussion as well as the additional details that are provided with this response.

Add channel stationing on plan view drawings to match channel profile drawings (DR-S&W-242).

Channel stationing is being added to the plans and will be provided as part of this response. Channel stationing is shown on the grading sheets 5-8.

Add 100-yr. water surface elevations on profiles for main channels (both collectors and conveyance).

The 100-year water surface profile has been added to the plans and is provided as part of this response.

Explain why slope of channel floor is only 0.07%; Psomas expects slope to be more in range of 0.3%

The channel slopes for the primary channels was set at 0.07% as a result of the HEC RAS modeling that was performed on the channels. The slope of the channel was kept very flat to minimize scour of the channel bottom and side slopes within the primary channels inasmuch as they are not protected from erosion by any placement of rip-rap, stabilization fabric, or soil cement. The only locations were the channel is protected is at channel bends and at the drop structures where the bottom and sides are fully protected with soil cement. The design criteria were established to avoid scour in the channels, and as such the velocities were intended to be kept below 5 fps. When greater slopes were modeled with HEC RAS, the velocities increased, which was unacceptable for scour.

Explain how erosion on sides of channel floors will be controlled.

The side slopes and bottom of the channels are constructed of on-site materials and they are not protected from erosion by any placement of rip-rap, stabilization fabric, or soil cement. The only locations were the channel is protected is at channel bends and at the drop structures where the bottom and sides are fully protected with soil cement. The primary control measure for the side slopes and the bottom is control of the velocity within the channel. This is accomplished by establishing a channel slope that does not create erosive velocities. The channel slopes as currently designed meet these design criteria.

Add 1 ft contours to Palen post-development drainage drawings; drawings currently show only 5 ft contours.

The 1-foot contours have been added to the plans and are being provided as part of this response. The contours are shown on sheets 5-8.

Submit digital data sets for post-development drainage condition modeling.

Digital data for the hydraulic modeling was previously provided as part of the Data Responses. The FLO 2D report and modeling for post-development flows are provided on CD with this submittal.

Palen Solar Power Project
Docket No. 09-AFC-7

Soil & Water Figures

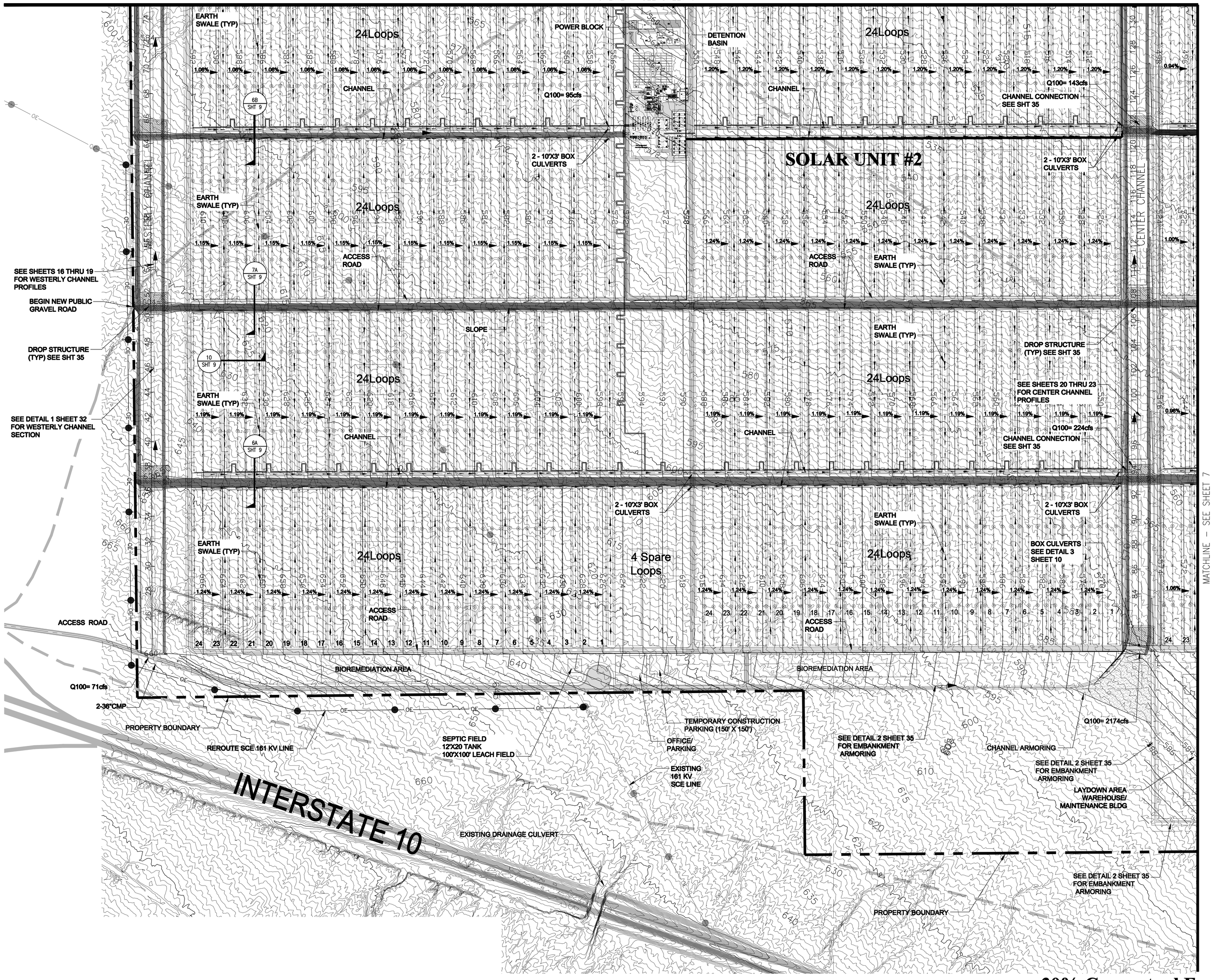
Preliminary Grading Plan 01 – 04

Channel Profiles West Channel - Sheets 16-20

Channel Profiles Center Channel - Sheets 21- 25

Channel Profiles East Channel – Sheet 26

Interception Channels at Embankment – Sheet 32



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DATED: January 28, 2010

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Phone 714.567.2618
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Designed:	Tomas Gonzales	-
Checked:	Dennis Lucas	-
Drawn:	Tomas Gonzales	DTG

Record Drawing by/date: November,2009

Revisions:

#	DATE	DESCRIPTION
1	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG PD1_GEN_ARR_00103-2007
2	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG BL1_BTP_GEN_ARR_001_rev4
3	JULY,2009	REV INCREASED BIOREMEDIATION AREA TO 4-4 ACRES SITES.
4	Jan,2010	Tawill Survey data & Topo, Fagnel powerblock dated 7-23-09.

Prepared for:

Chevron
345 California Street
San Francisco, California 94104

Solar Millennium LLC

LEGEND:

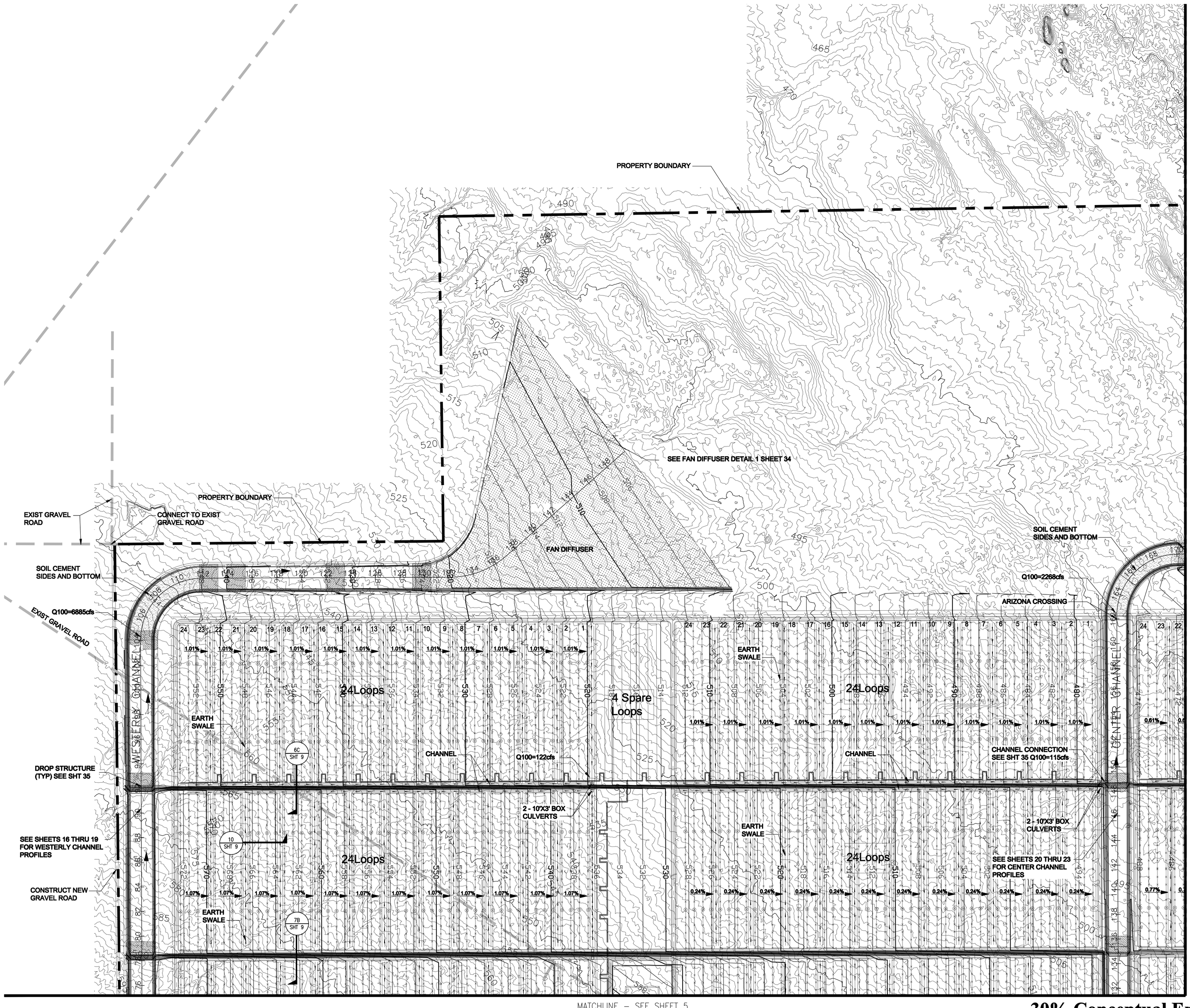
- BALANCE OF PLANT FACILITIES
- SOIL CEMENT
- CHANNEL DIFFUSER
- DROP STRUCTURES WITH SOIL CEMENT
- CHANNEL CONNECTION
- BOX CULVERT
- SLOPE
- HEADER PIPES
- LOOPS
- DITCH
- PROPOSED CHANNEL
- PROPOSED ACCESS ROAD (PAVED)
- PROPOSED ACCESS ROAD CENTER LINE
- PROPOSED WIND FENCE
- PROPOSED SILT FENCE
- FR PROPOSED FIBER ROLLS
- PROPOSED SECURITY FENCE
- 880 PROPOSED CONTOURS
- EXISTING GRAVEL ROAD
- EXISTING CONTOURS
- SITE BOUNDARY
- PROPOSED OVERHEAD ELECTRIC
- WATER LINE
- ELECTRICAL LINE
- G GAS LINE

Palen Solar Power Project

Riverside County, California

Preliminary Grading Plan 01

Date: 1/--/2010
Sheet: 5 of 36



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REGISTERED PROFESSIONAL ENGINEER
WILLIAM C. HAGMAIER
No. 44325
Exp. 6-30-09
CIVIL
STATE OF CALIFORNIA

Designed:	Tomas Gonzales	-
Checked:	Dennis Lucas	-
Drawn:	Tomas Gonzales	DTG

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Revisions:

#	DATE	DESCRIPTION
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2	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG BL1_BTP_GEN_ARR_001_rev4
3	JULY,2009	REV INCREASED BIODEGRADATION AREA TO 4 - 4 ACRES SITES.
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- PROPOSED SECURITY FENCE
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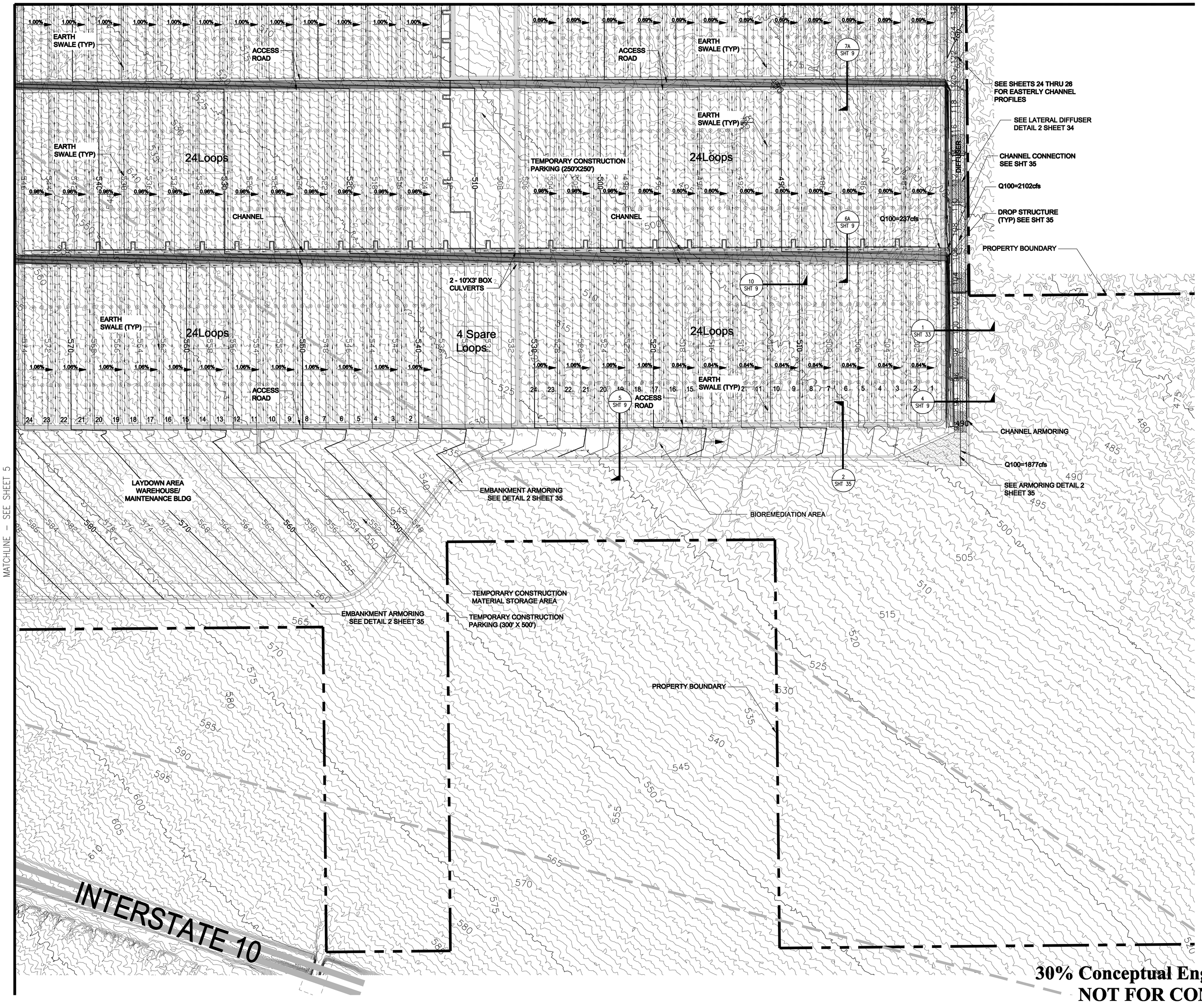
- EXISTING CONTOURS
- SITE BOUNDARY
- PROPOSED OVERHEAD ELECTRIC
- WATER LINE
- ELECTRICAL LINE
- GAS LINE

Palen Solar Power Project

Riverside County, California

Preliminary Grading Plan 02

Date: 1/--/2010
Sheet: 6 of 36



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Drawn:	Tomas Gonzales	DTG

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4	Jan,2010	Tweill Survey data & Topo, Fugesi powerblock dated 7-23-09.

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- EXISTING CONTOURS
- SITE BOUNDARY
- PROPOSED OVERHEAD ELECTRIC
- WATER LINE
- ELECTRICAL LINE
- G GAS LINE

Palen Solar Power Project

Riverside County, California

Preliminary Grading Plan 03

Date: 1/--/2010
Sheet: 7 of 36

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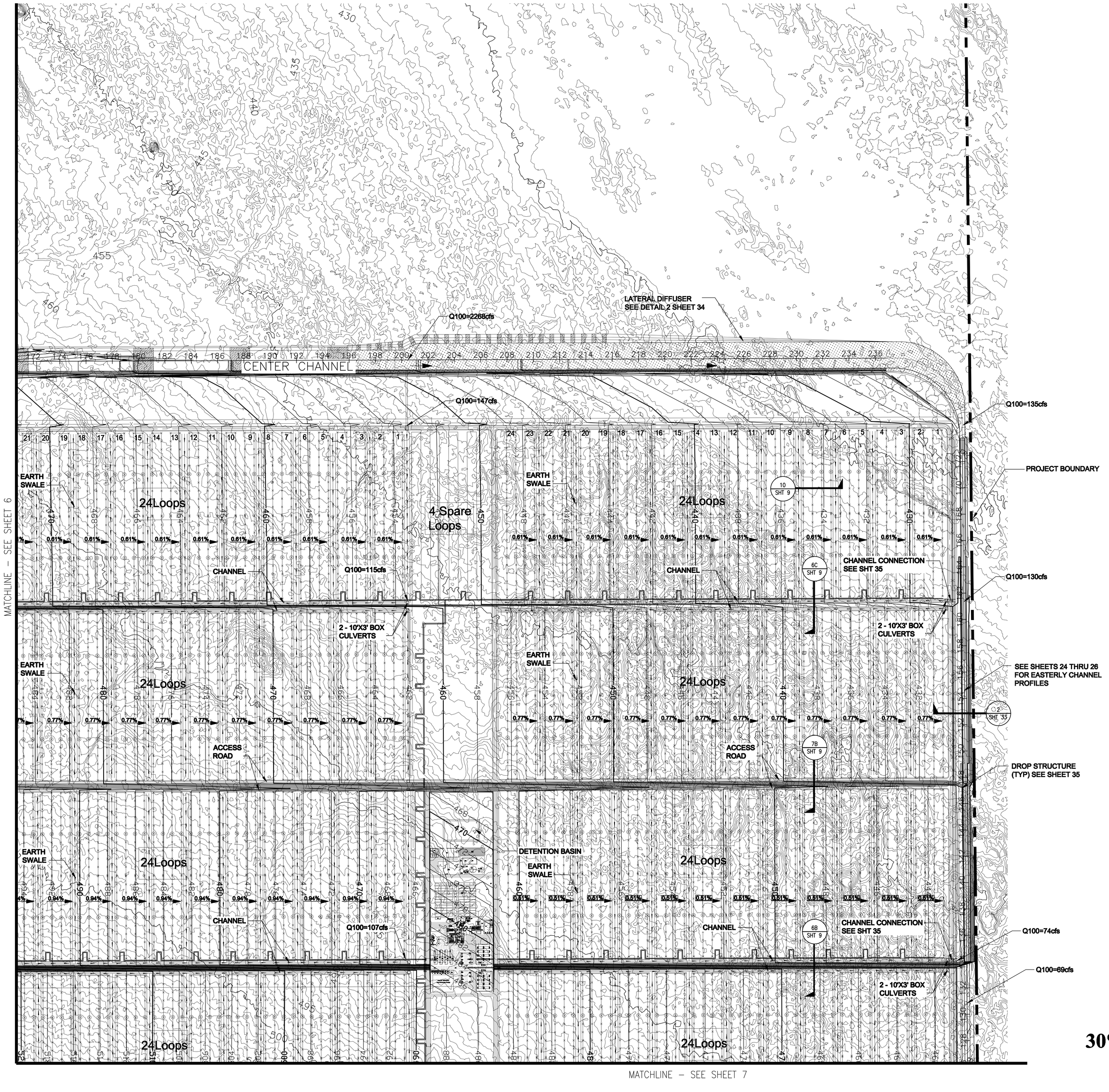

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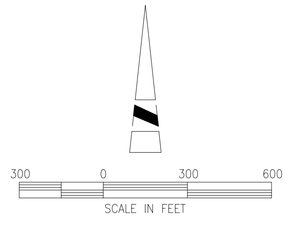

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Revisions:

#	DATE	DESCRIPTION
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2	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG BL1_BTP_GEN_ARR_001_rev4
3	JULY,2009	REV INCREASED BIODEGREDATION AREA TO 4-4 ACRES SITES.
4	Jan,2010	Topo Survey data & Topo, Fagnel powerblock dated 7-23-09.

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- G — GAS LINE

Palen Solar Power Project

Riverside County, California

Preliminary Grading Plan 04

Date: 1/--/2010
Sheet: 8 of 36

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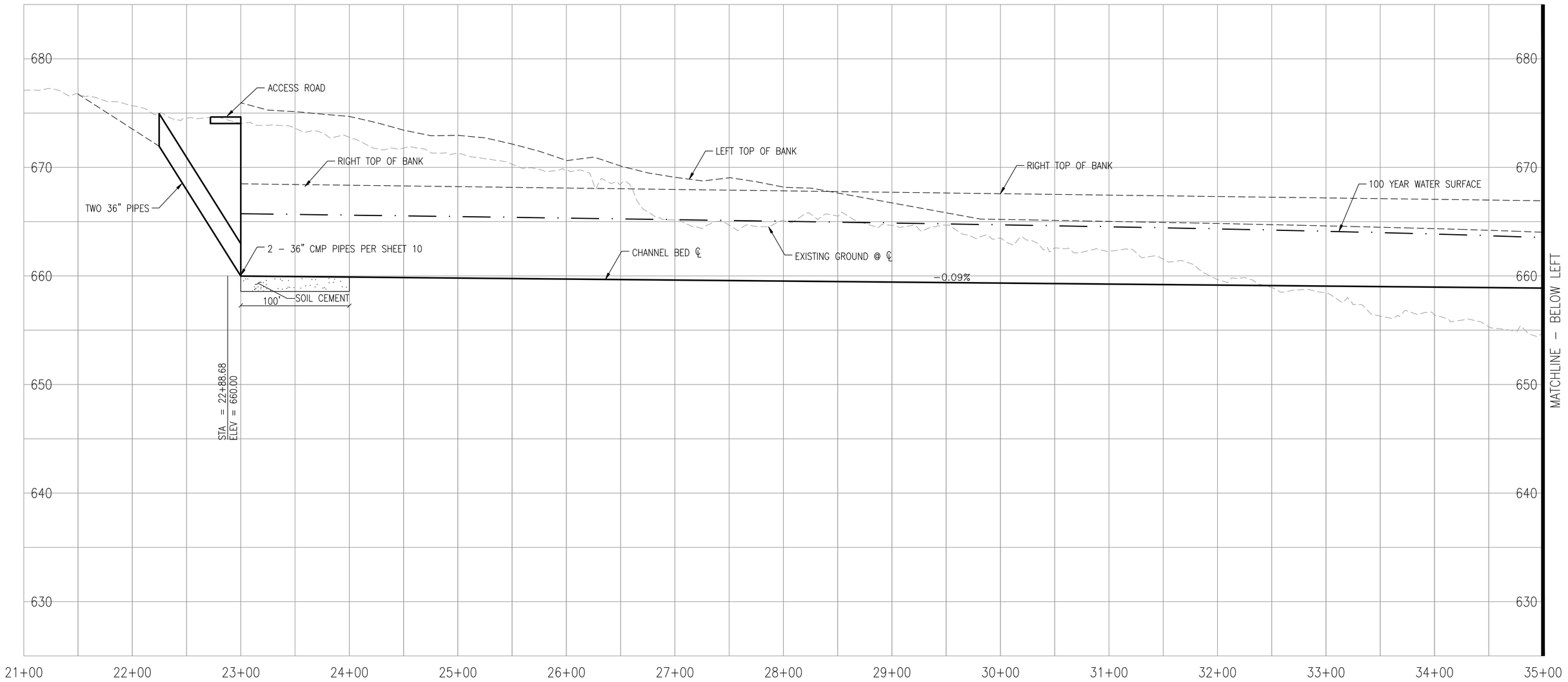

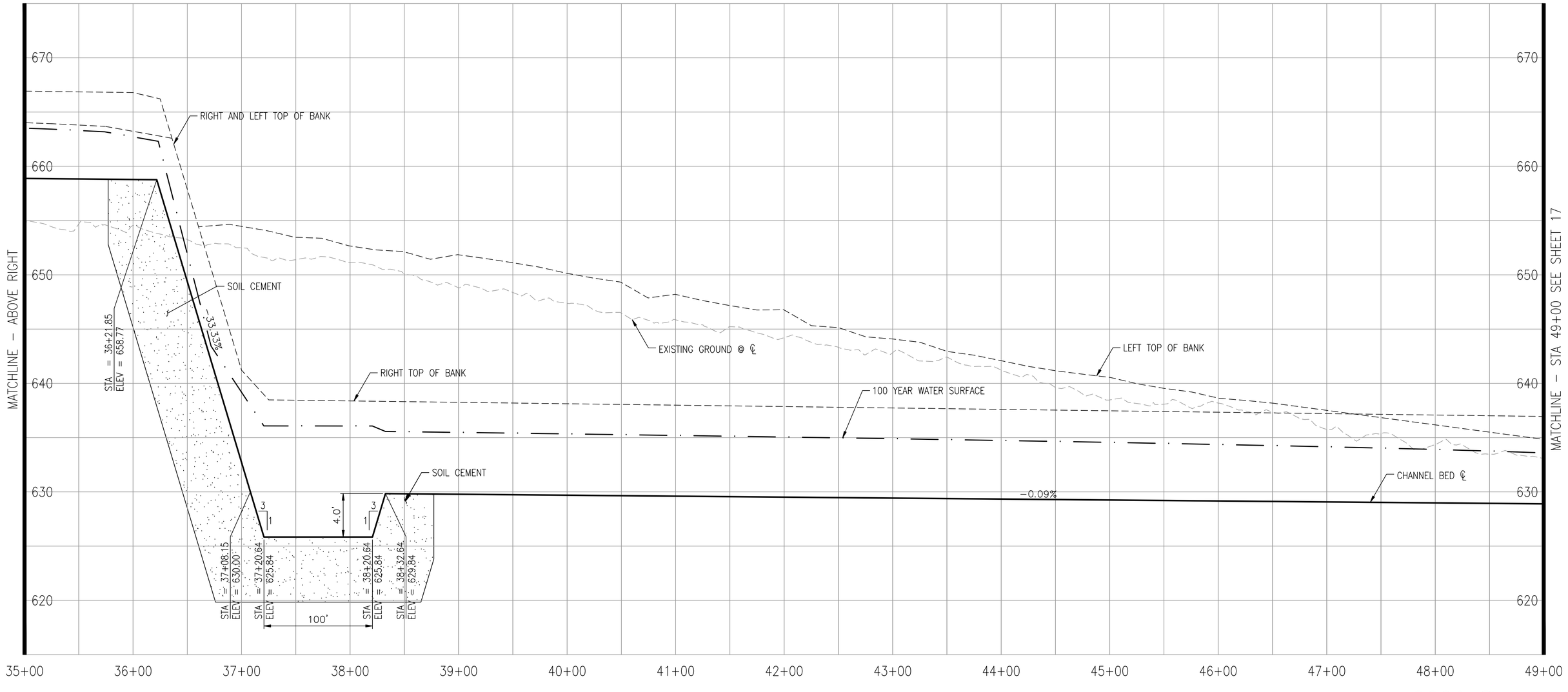

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Palen Solar Power Project

Riverside County, California

Channel Profiles
West Channel

Date: 1/ -/2010
Sheet: 16 of 36

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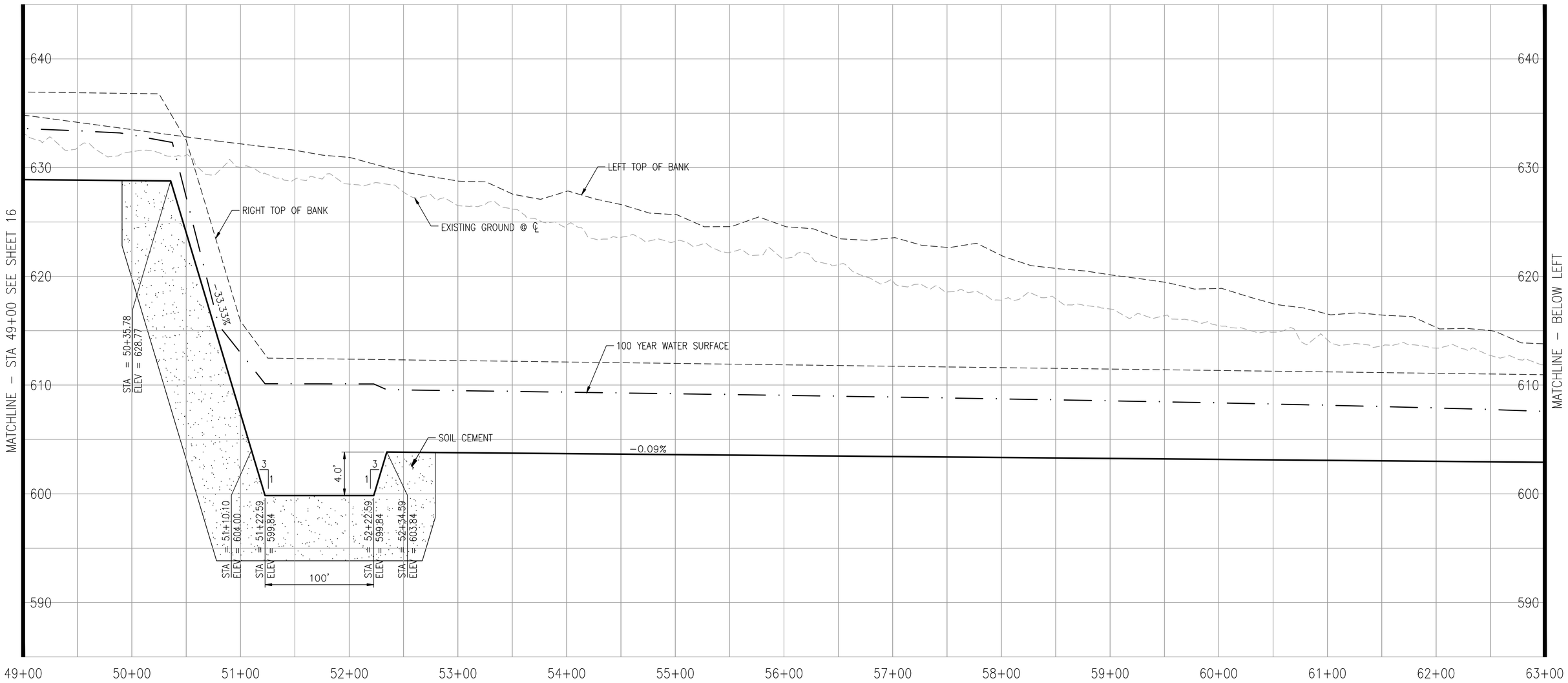

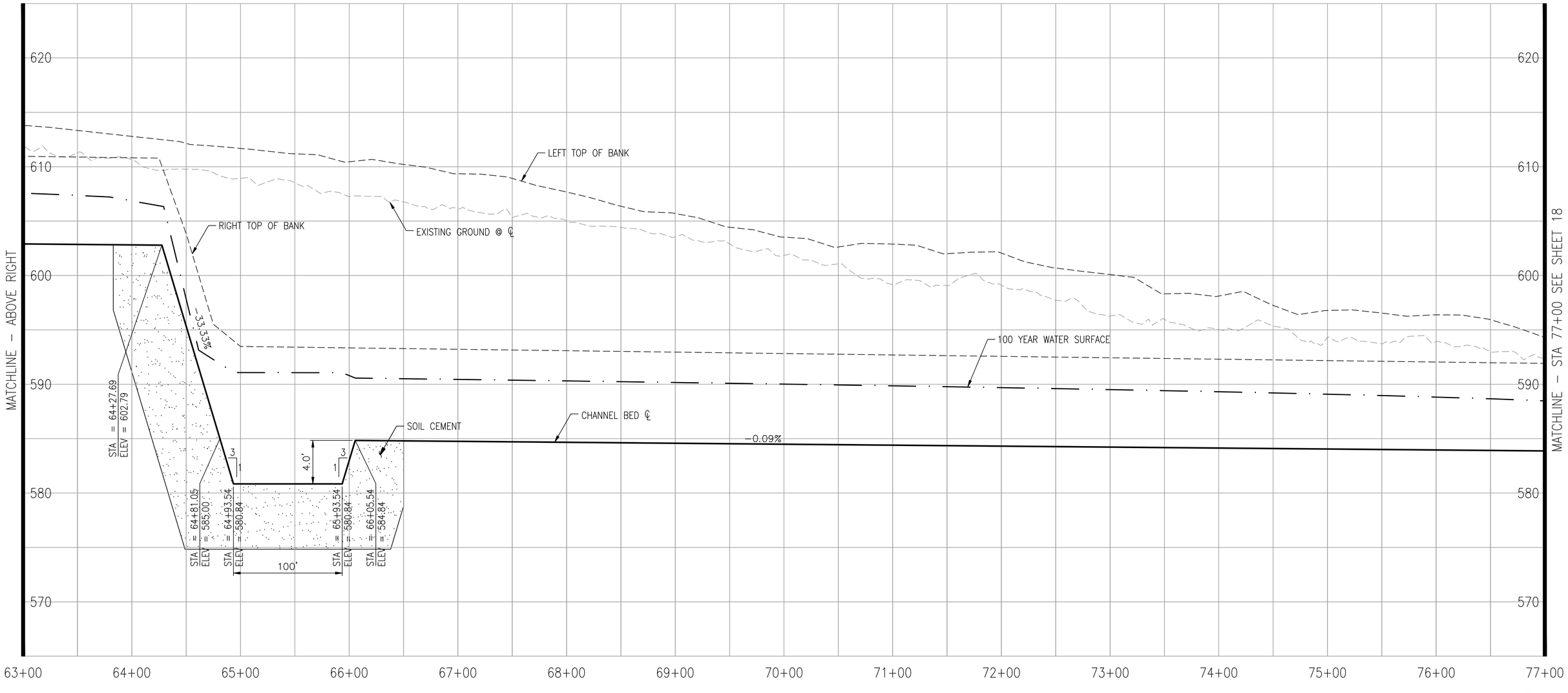

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West Channel

Date: 1/ -/2010
Sheet: 17 of 36

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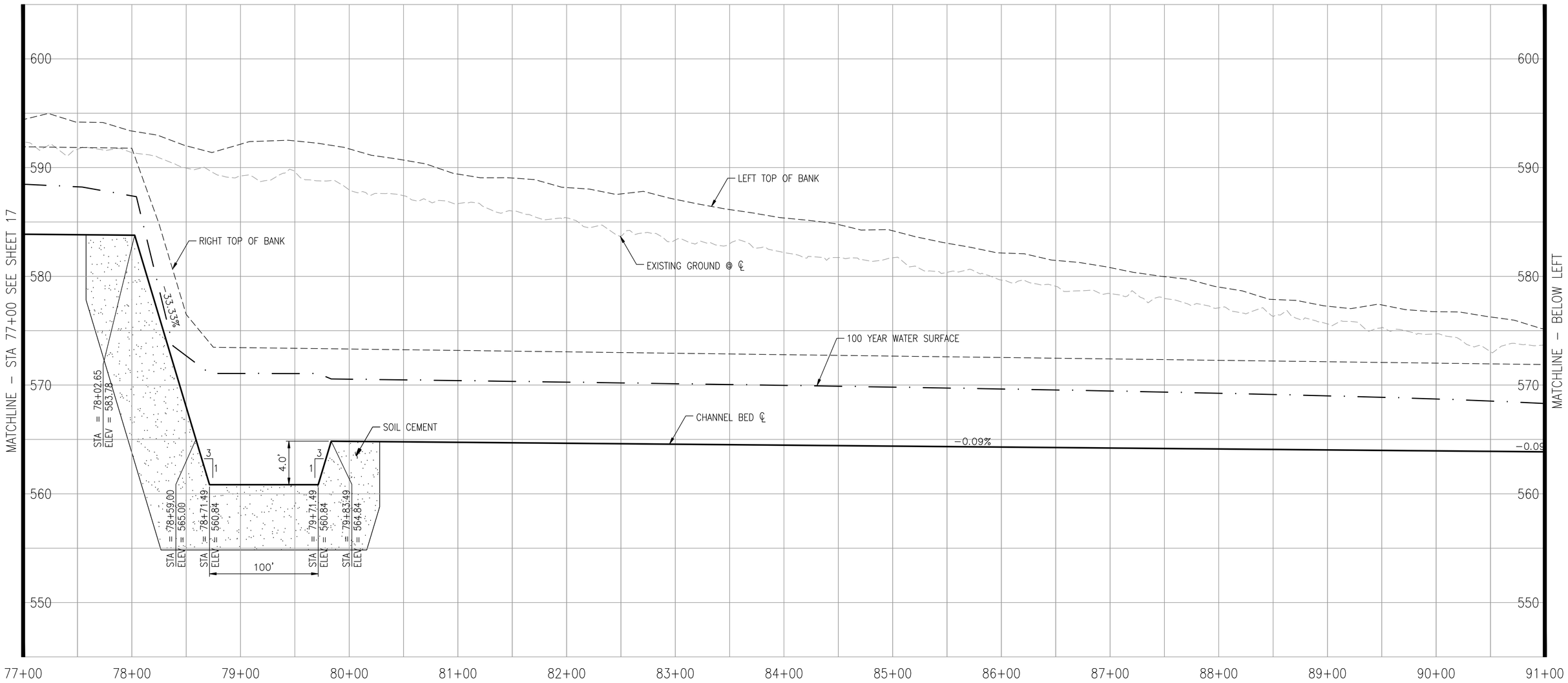

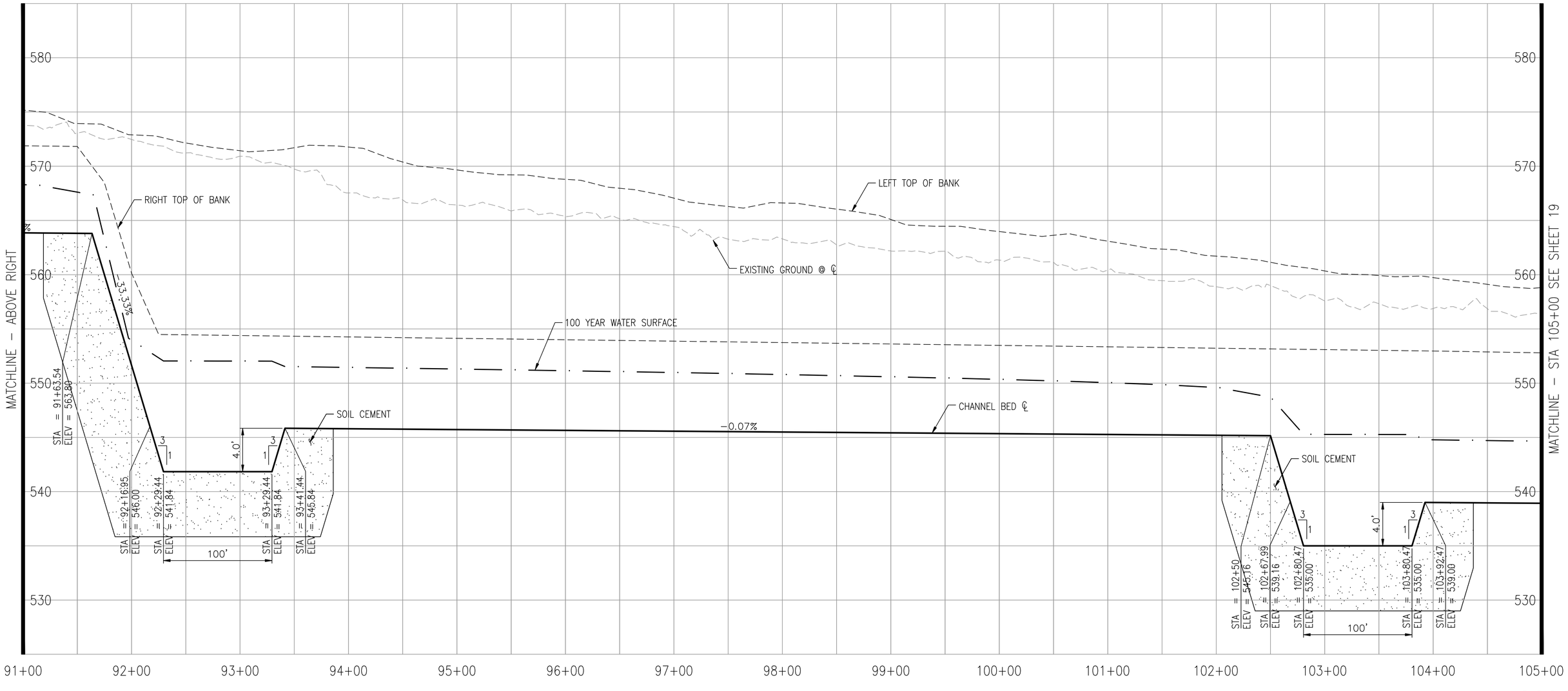

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Palen Solar Power Project

Riverside County, California

Channel Profiles
West Channel

Date: 1/ -/2010
Sheet: 18 of 36

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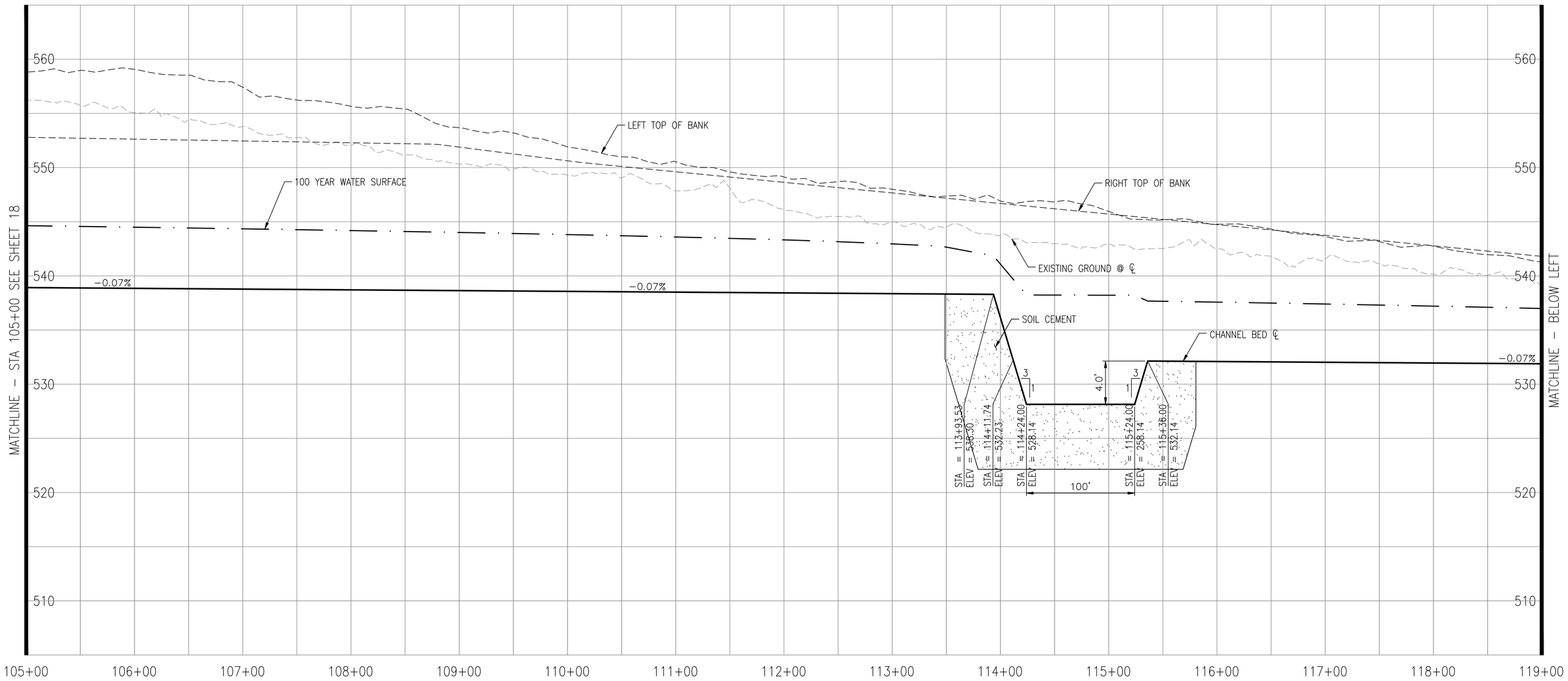

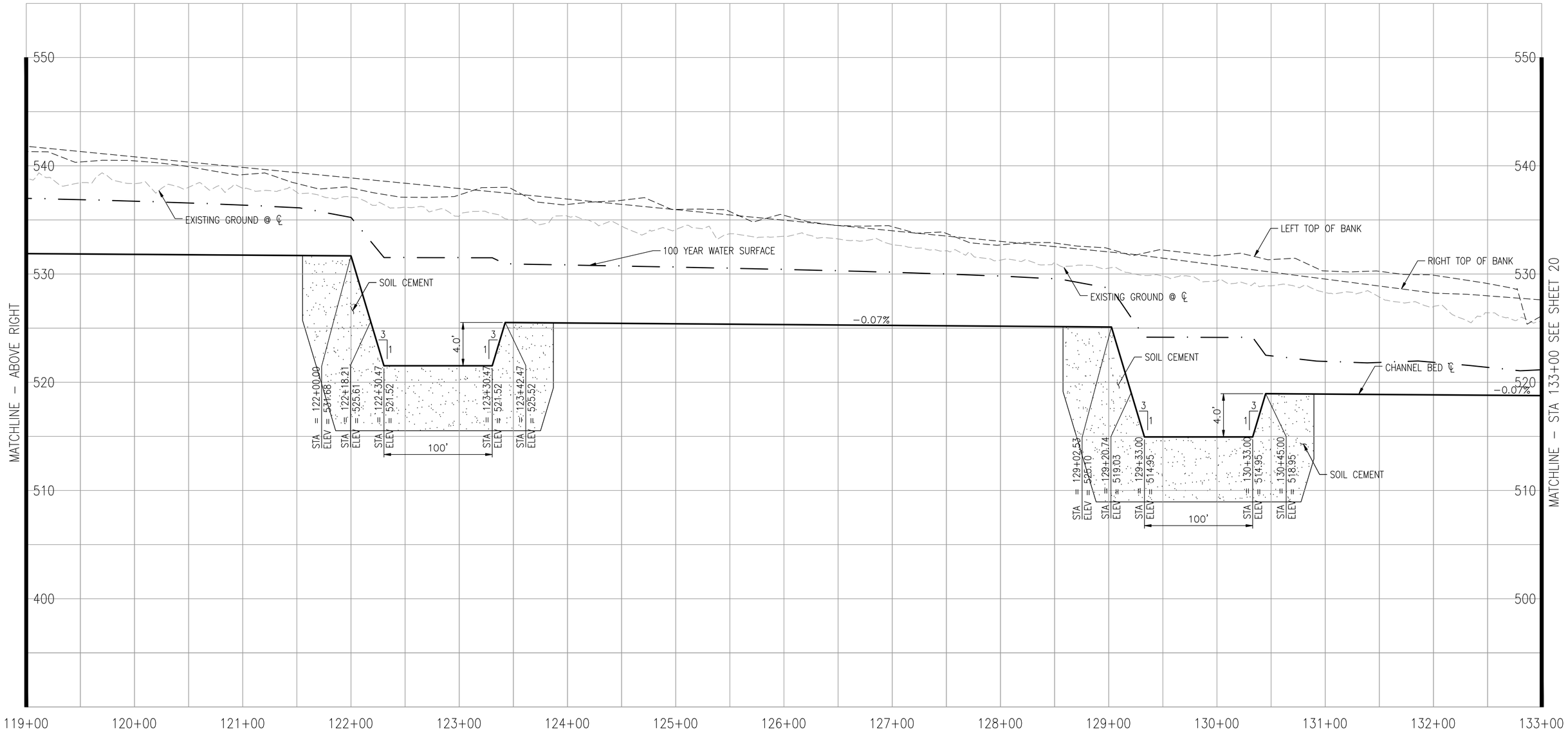

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Palen Solar Power Project

Riverside County, California

Channel Profiles
West Channel

Date: 1/ -/2010
Sheet: 19 of 36

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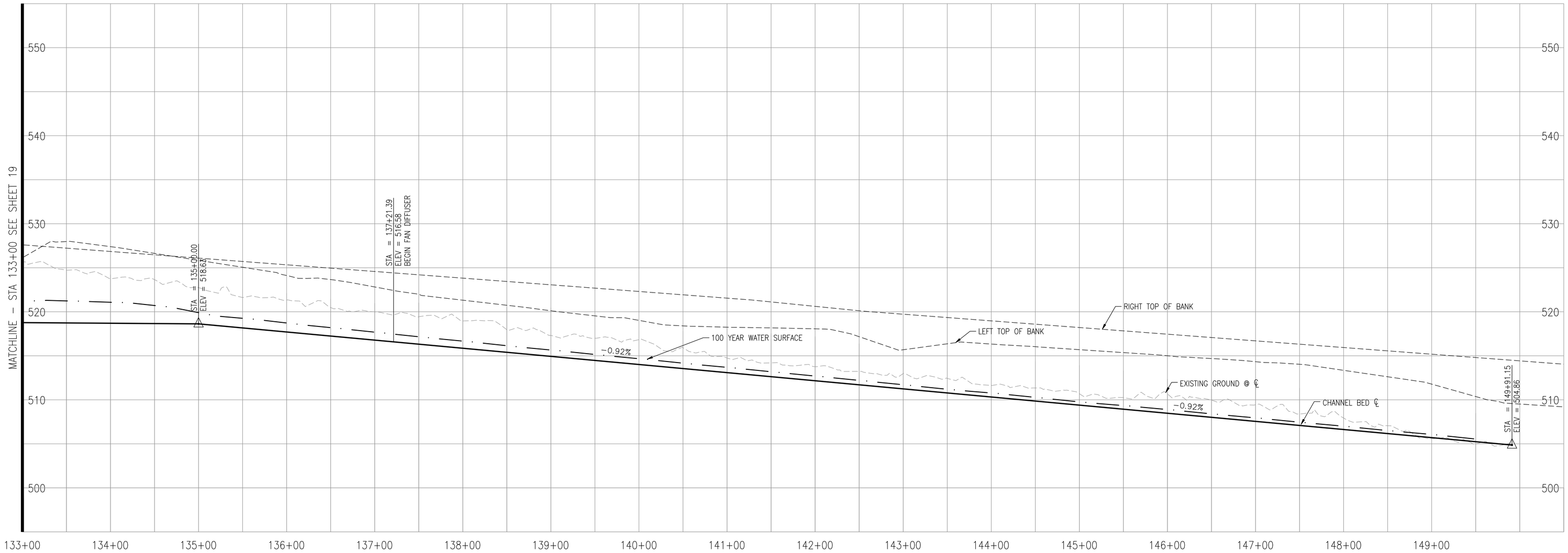

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Palen Solar Power Project

Riverside County, California

Channel Profiles
West Channel

Date: 1/ -/2010
Sheet: 20 of 36

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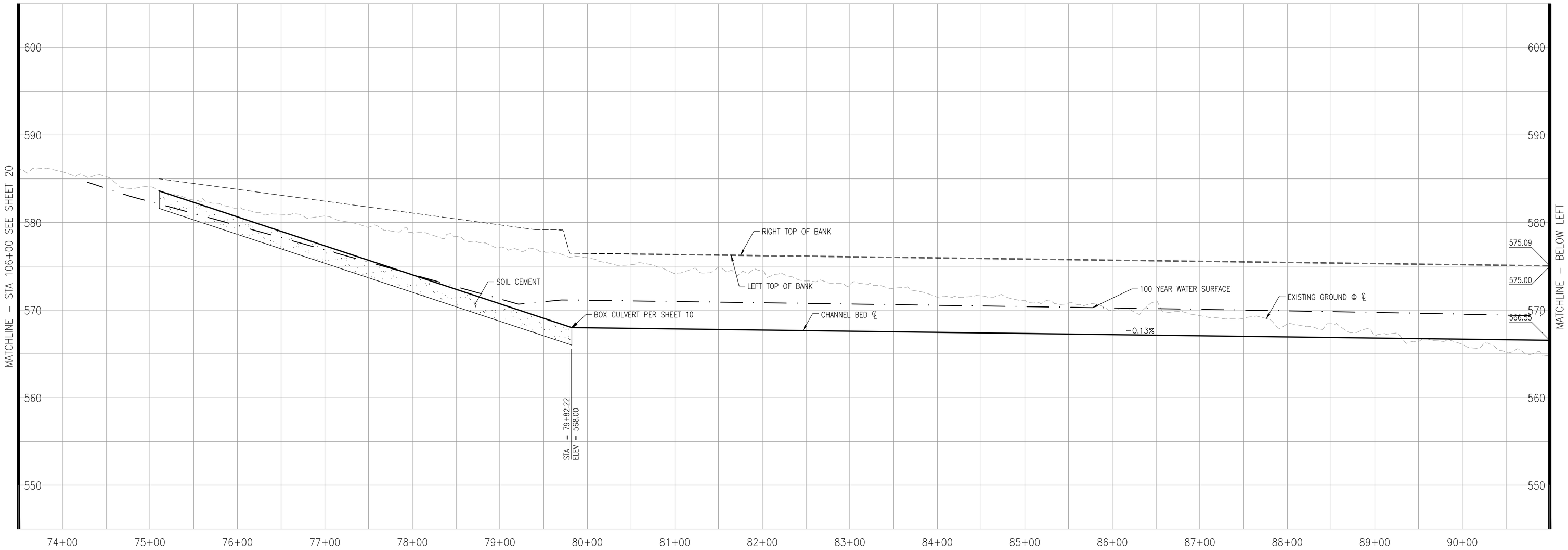

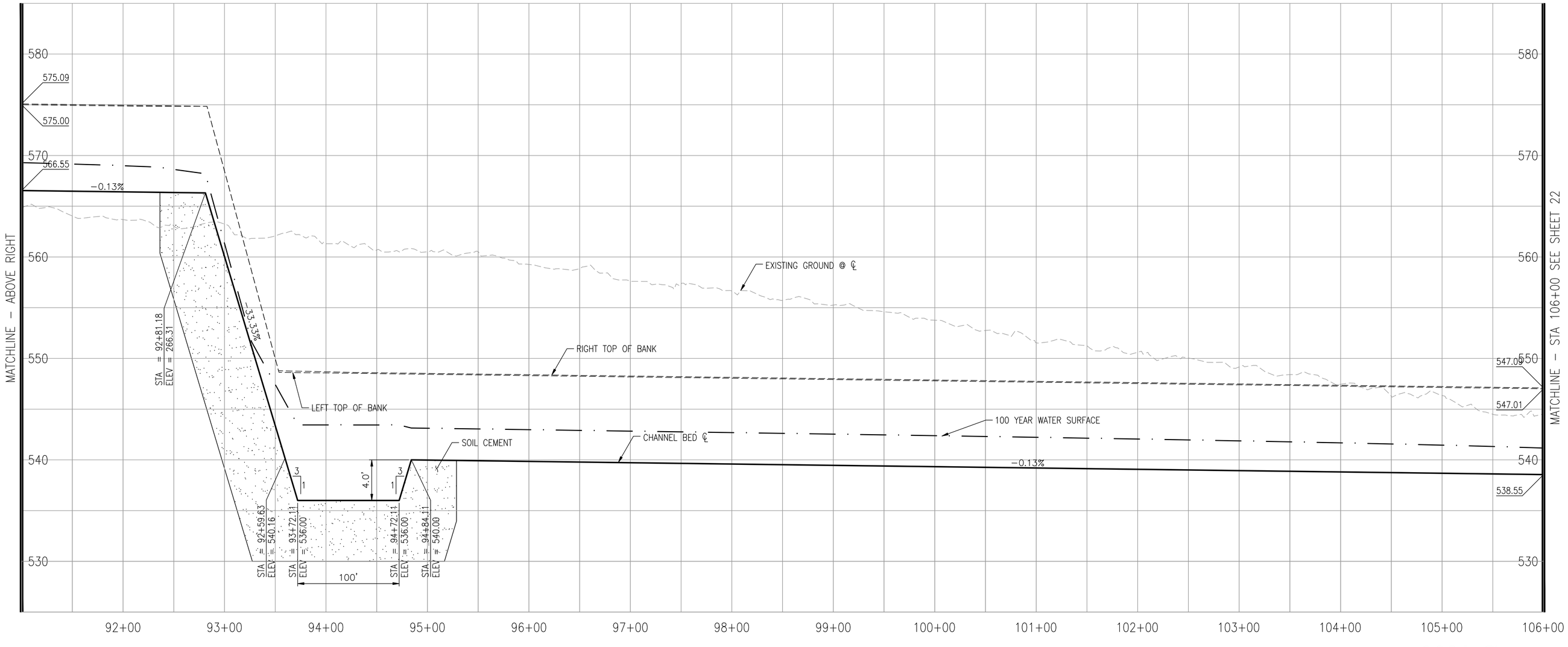

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Palen Solar Power Project

Riverside County, California

Channel Profiles
Center Channel

Date: 1/ -/2010
Sheet: 21 of 36

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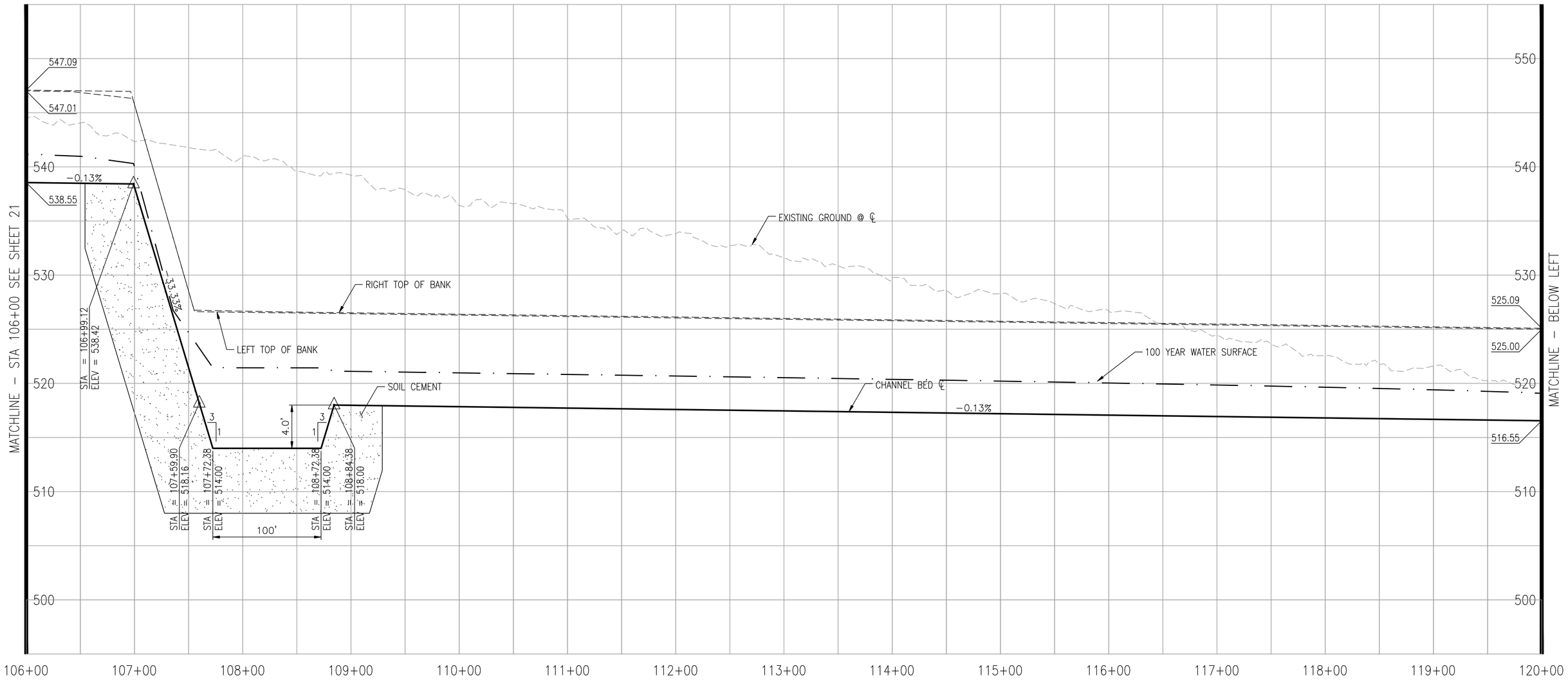

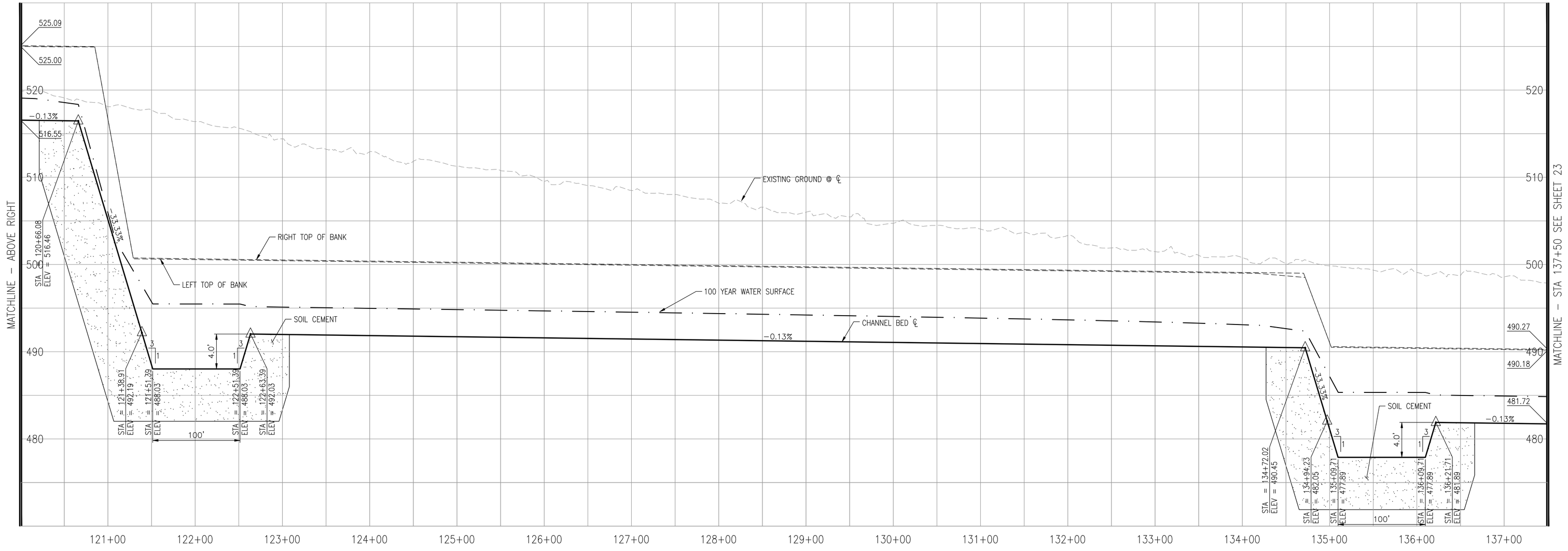

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NOT FOR CONSTRUCTION
DATED: January 28, 2010

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Phone 714.567.2618

www.aecom.com

Designed: TG
Checked: GFD
Drawn: RDL
Record Drawing by/date: December, 2009

Revisions:

#	DATE	DESCRIPTION
-	-	-

Prepared for:

Chevron
345 California Street
San Francisco, California 94104

Solar Millennium LLC

Palen Solar Power Project

Riverside County, California

Channel Profiles
Center Channel

Date: 1/ -/2010
Sheet: 22 of 36

DWG: H:\60202528 Solar Millennium\Palen\CADD\Civil\Sheet\conceptual civil plans\C-022 PALENC-PD-107.dwg Layout Name: PD-107 - Plotted by: Gonzales, Tom Date: 1/26/2010 - 1:12 PM
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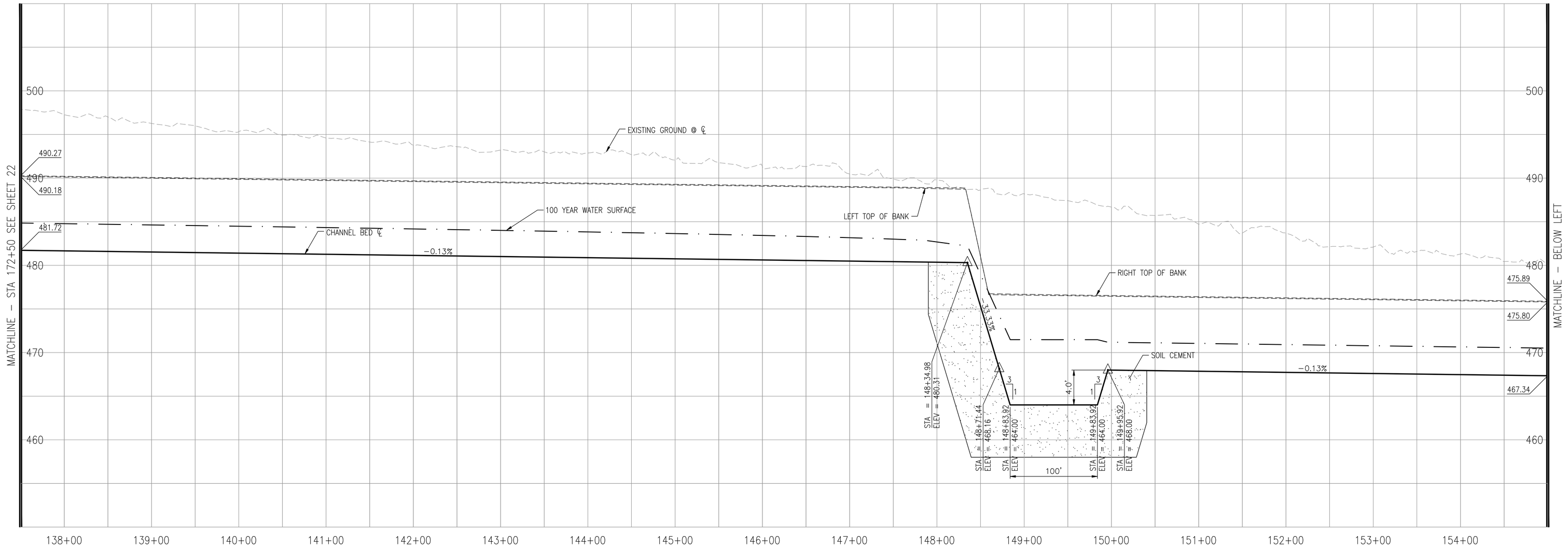

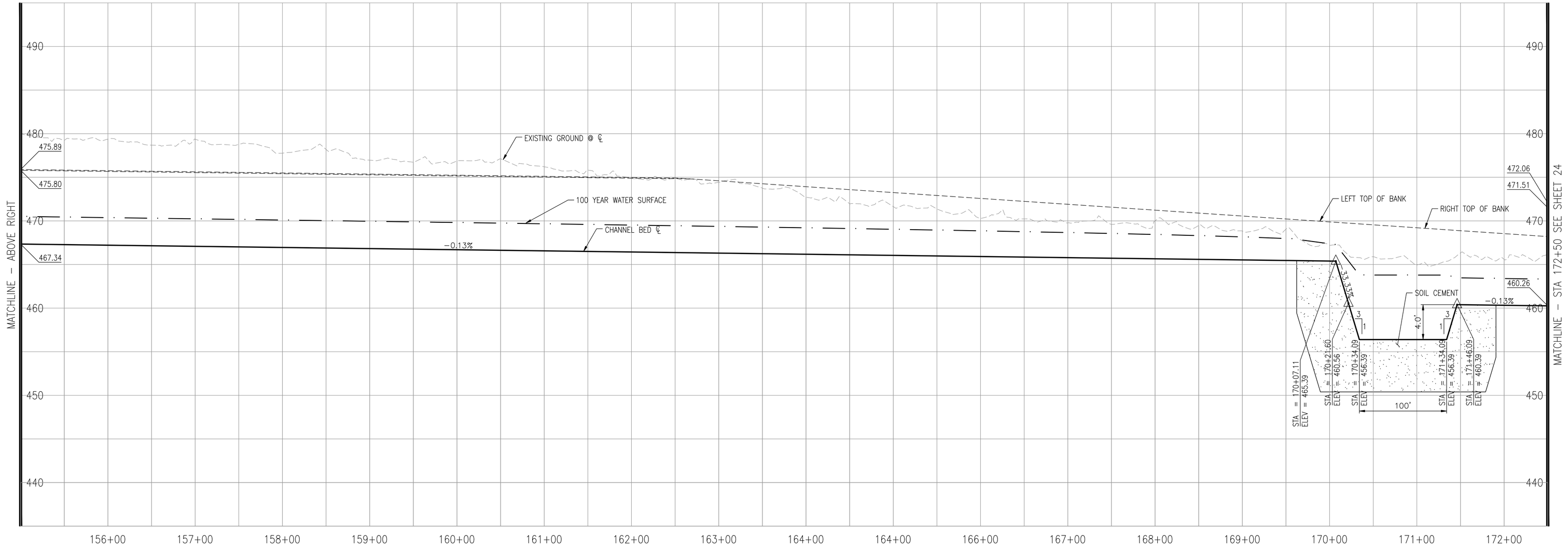

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Riverside County, California

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Center Channel

Date: 1/ -/2010
Sheet: 23 of 36

DWG: H:\60202528 Solar Millennium\Palen\CADD\Civil\Sheet\conceptual civil plans\C-023 PALENC-PD-108.dwg Layout Name: PD-108 - Plotted by: Gonzales, Tom Date: 1/26/2010 - 1:13 PM
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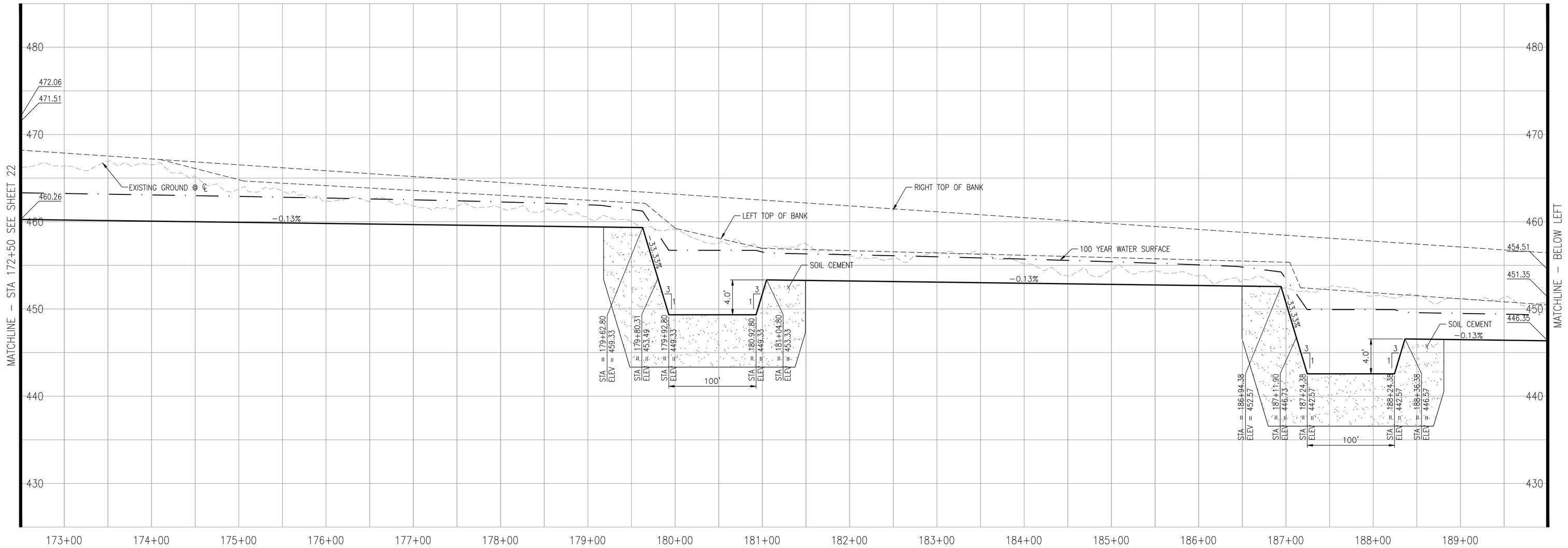

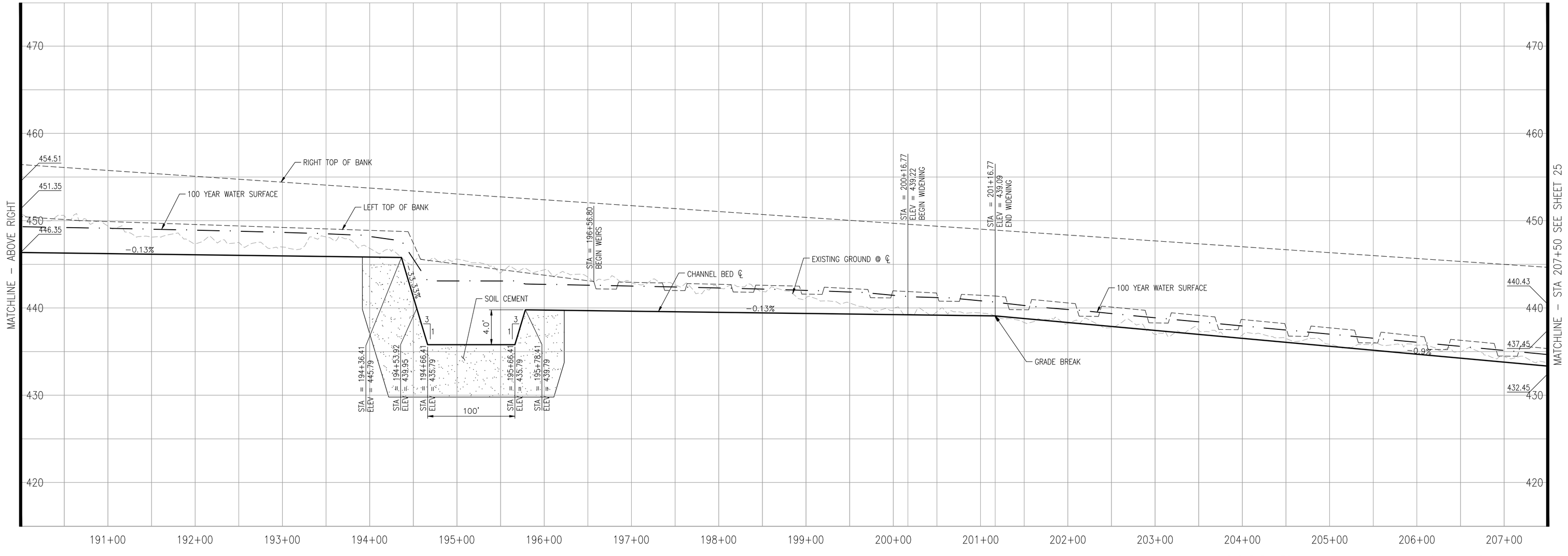

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Revisions:

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Center Channel

Date: 1/ -/2010
Sheet: 24 of 36

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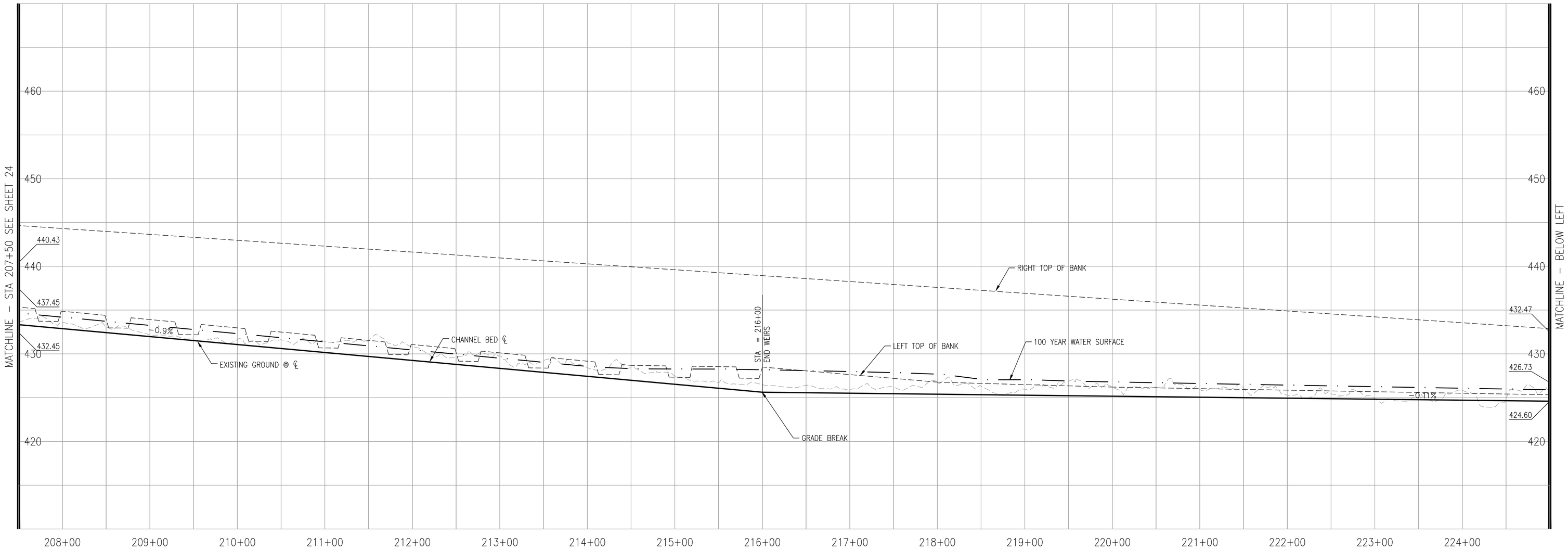

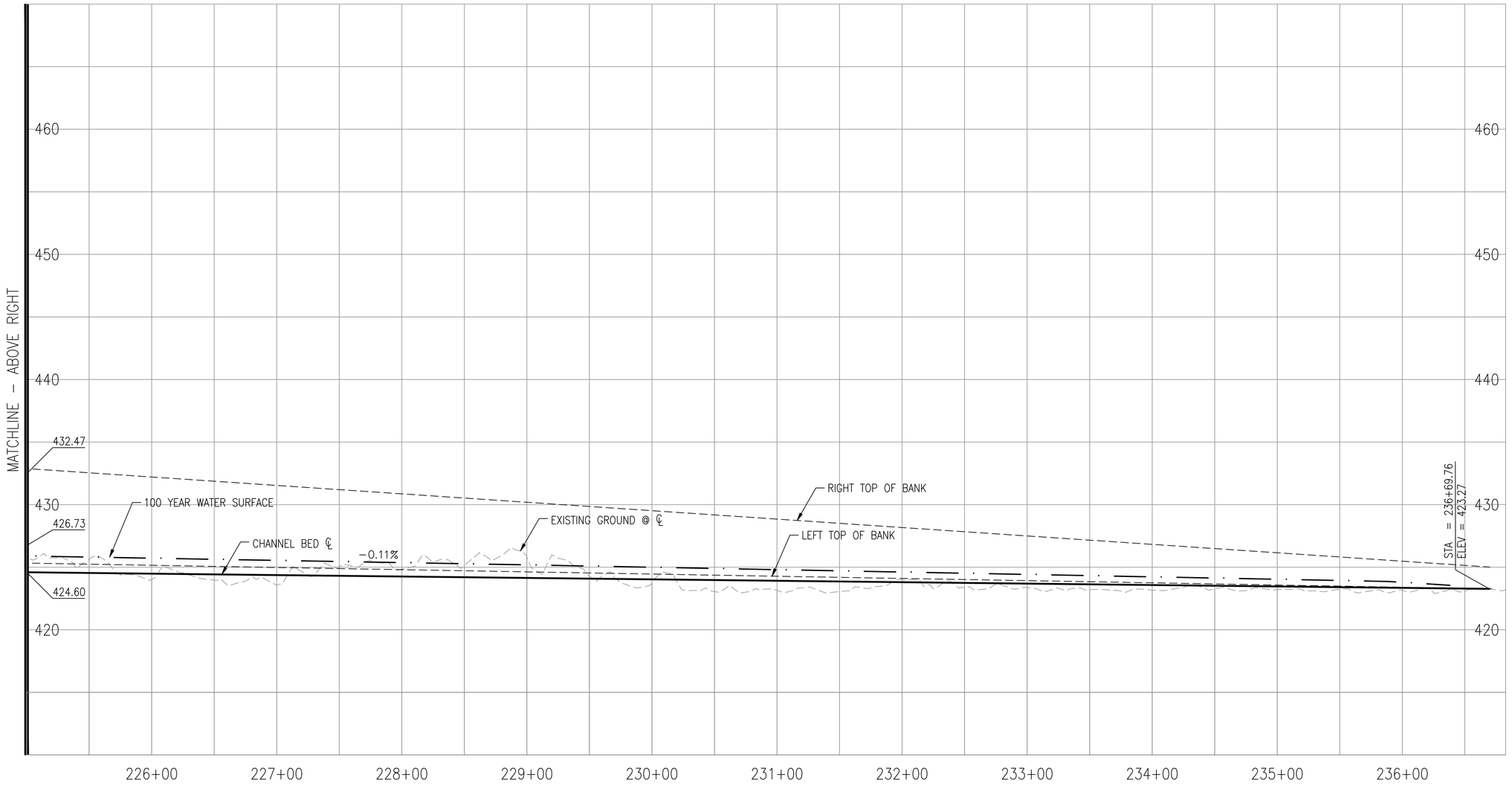

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Revisions:

#	DATE	DESCRIPTION
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Solar Millennium LLC

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Riverside County, California

Channel Profiles
Center Channel

Date: 1/ -/2010
Sheet: 25 of 36

DWG: H:\60202528 Solar Millennium\Palen\CADD\Civil\Sheet\conceptual civil plans\C-025 PALENC-PD-110.dwg Layout Name: PD-110 – Plotted by: Gonzales, Tom Date: 1/26/2010 – 1:14 PM
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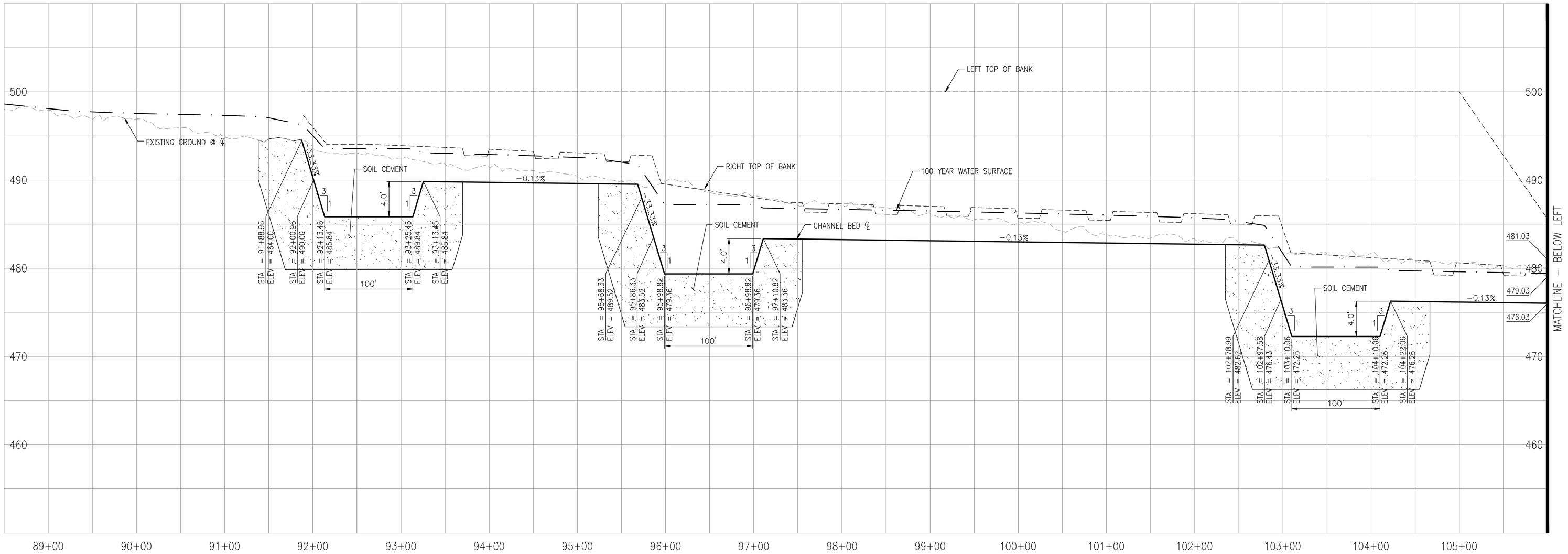

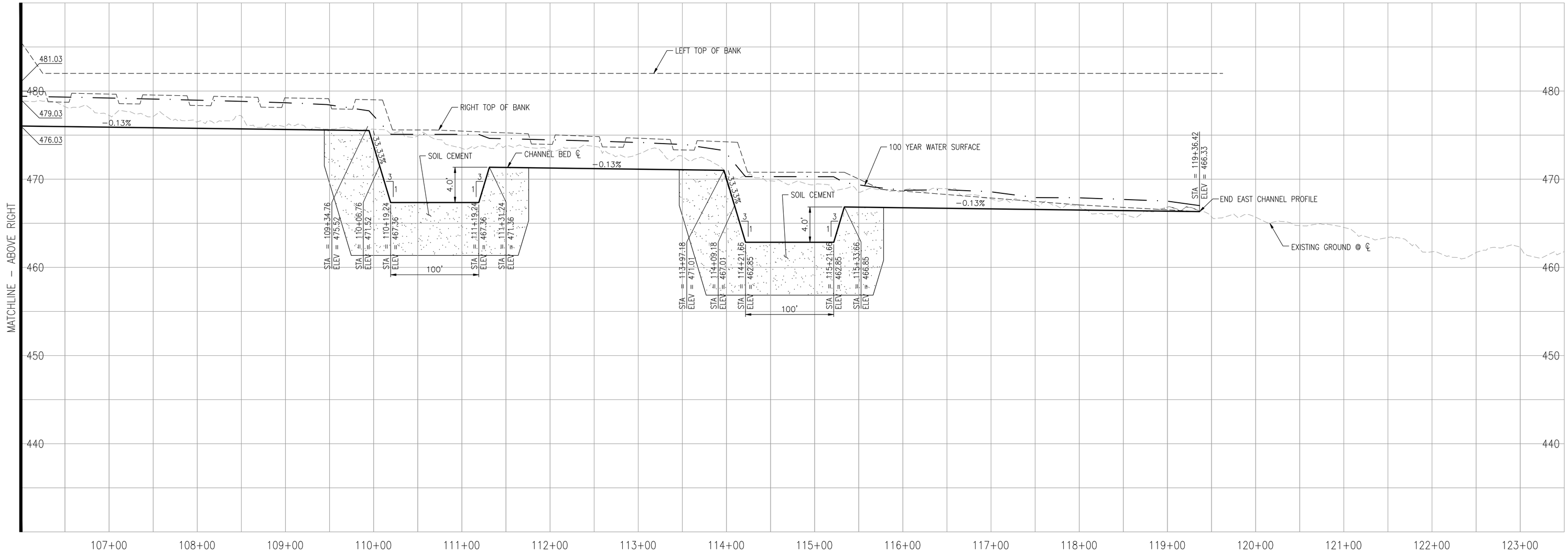

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Designed: TG
Checked: GFD
Drawn: RDL
Record Drawing by/date: December, 2009

Revisions:

#	DATE	DESCRIPTION
-	-	-

Prepared for:

Chevron
345 California Street
San Francisco, California 94104

Solar Millennium LLC

Palen Solar Power Project

Riverside County, California

Channel Profiles
East Channel

Date: 1/ -/2010
Sheet: 26 of 36

DWG: H:\60202528 Solar Millennium\Palen\CADD\Civil\Sheet\conceptual civil plans\C-026 PALENC-PD-111.dwg Layout Name: PD-111 - Plotted by: Gonzales, Tom Date: 1/26/2010 - 1:14 PM
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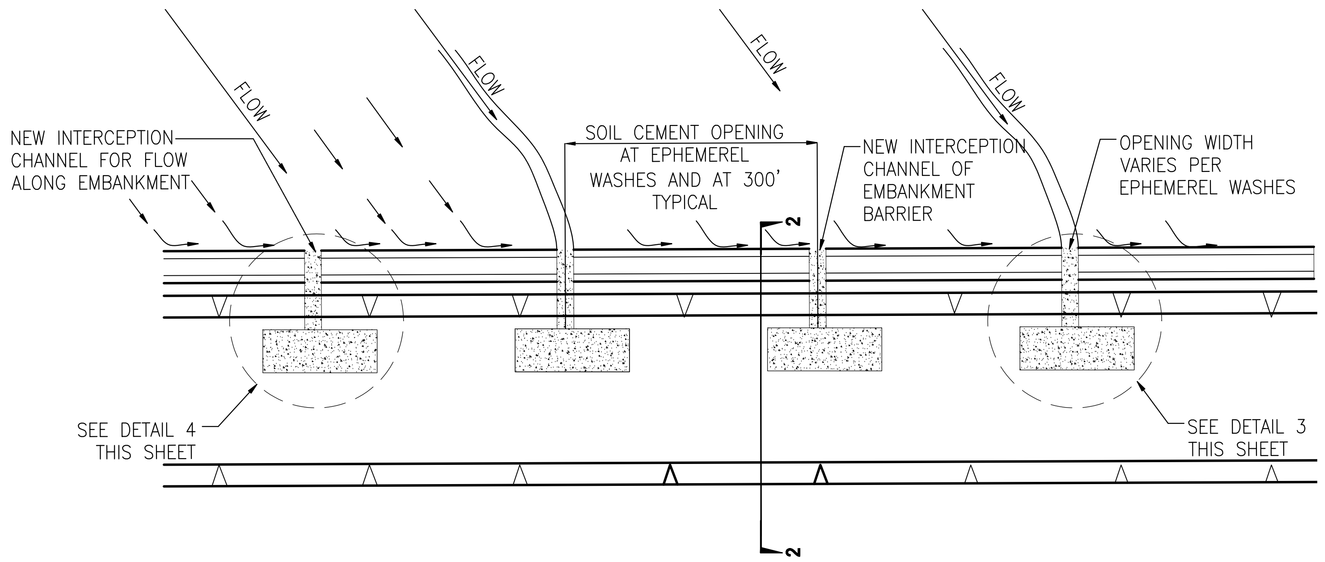
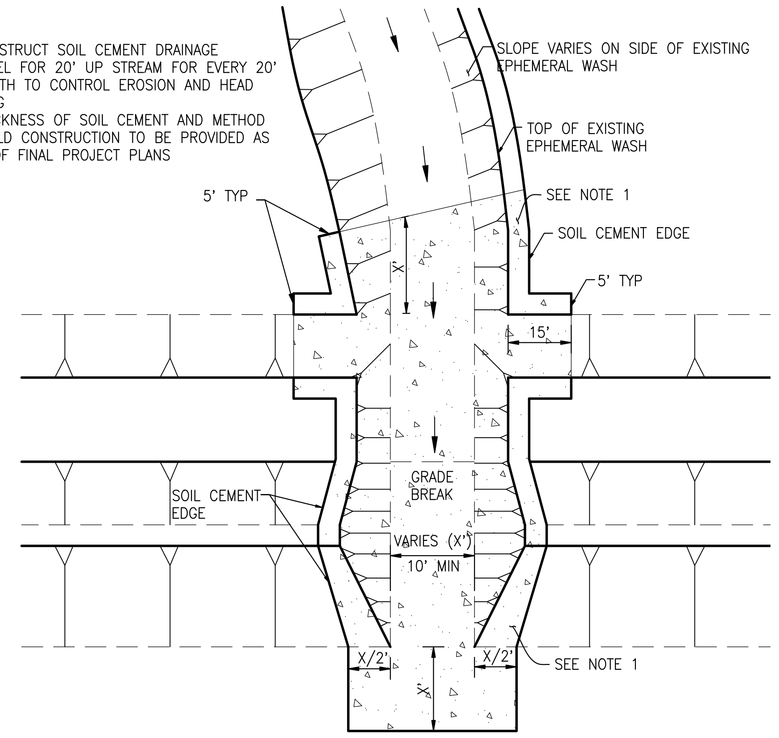


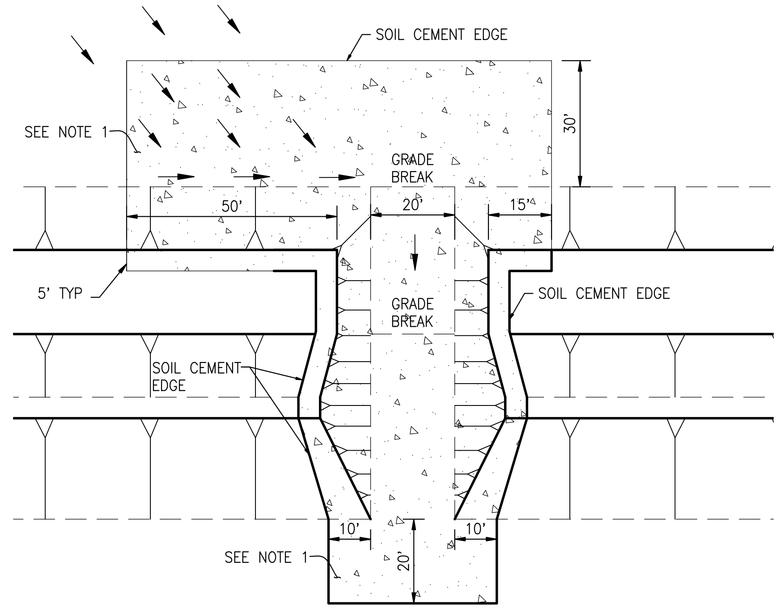
1 **WESTERLY CHANNEL DETAIL**
SCALE: 1"=100'

NOTES:
1. CONSTRUCT SOIL CEMENT DRAINAGE CHANNEL FOR 20' UP STREAM FOR EVERY 20' OF WIDTH TO CONTROL EROSION AND HEAD CUTTING
2. THICKNESS OF SOIL CEMENT AND METHOD OF FIELD CONSTRUCTION TO BE PROVIDED AS PART OF FINAL PROJECT PLANS

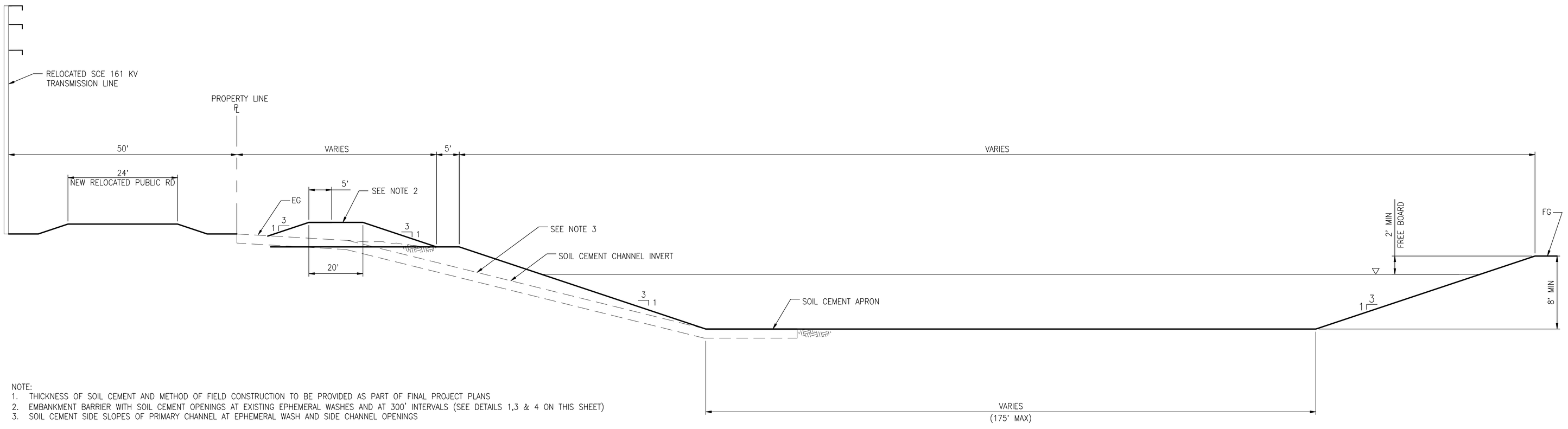


3 **INTERCEPTION OF EPHEMERAL WASH AT PRIMARY CHANNEL**
SCALE: 1"=20'

NOTE:
THICKNESS OF SOIL CEMENT AND METHOD OF FIELD CONSTRUCTION TO BE PROVIDED AS PART OF FINAL PROJECT PLANS



4 **INTERCEPTION OF UN-CHANNELIZED LOCAL FLOWS AT PRIMARY CHANNEL**
SCALE: 1"=20'



NOTE:
1. THICKNESS OF SOIL CEMENT AND METHOD OF FIELD CONSTRUCTION TO BE PROVIDED AS PART OF FINAL PROJECT PLANS
2. EMBANKMENT BARRIER WITH SOIL CEMENT OPENINGS AT EXISTING EPHEMERAL WASHES AND AT 300' INTERVALS (SEE DETAILS 1,3 & 4 ON THIS SHEET)
3. SOIL CEMENT SIDE SLOPES OF PRIMARY CHANNEL AT EPHEMERAL WASH AND SIDE CHANNEL OPENINGS

2 **WESTERLY CHANNEL TYPICAL SECTION**
SCALE: 1"=10'

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DATED: January 28, 2010

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Designed: Tomas Gonzales
Checked: Dennis Lucas
Drawn: Tomas Gonzales
Record Drawing by/date: November,2009

Revisions:

#	DATE	DESCRIPTION
1	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG PD1_GEN_ARR_00103-2007
2	JULY,2009	REV SITE PLAN AND POWER BLOCK PER-FLAGSOL DWG BL1_BTP_GEN_ARR_001_rev4
3	JULY,2009	REV INCREASED BIOREMEDIATION AREA TO 4-4 ACRES SITES.
4	Jan,2010	Tzwill Survey data & Topo, Fugesi powerblock dated 7-23-09.

Prepared for:

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345 California Street
San Francisco, California 94104

Solar Millennium LLC

Palen Solar Power Project

Riverside County, California

INTERCEPTION CHANNELS AT EMBANKMENT

Date: 1/--/2010
Sheet: 32 of 36

DWG: H:\60202528 Solar Millennium\Palen\CADD\Civil\Sheet\conceptual civil plans\C-032 Detail Westerly Channel.dwg Layout Name: End Diffuser Details & Cross Sects - Plotted by: Gonzales, Tom Date: 1/27/2010 - 3:15 PM
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STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:
APPLICATION FOR CERTIFICATION
for the *PALEN SOLAR POWER PROJECT*

Docket No. 09-AFC-7
PROOF OF SERVICE
(Revised 12/28/2009)

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DECLARATION OF SERVICE

I, Carl Lindner, declare that on, February 11, 2010, I served and filed copies of the attached Palen Solar Power Project Data Response materials:

Data Responses to January 14, 2010 CEC Workshop Queries
Technical Areas: Soil & Water Resources (supplemental data for DR-S&W-242)

The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[http://www.energy.ca.gov/sitingcases/solar_millennium_palen]

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)
For service to all other parties:

_____ sent electronically to all email addresses on the Proof of Service list;

__X__ by personal delivery or by overnight delivery service or depositing in the United States mail at Camarillo, California with postage or fees thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

__X_ sending an original paper copy and one electronic copy, mailed to the address below (preferred method);

OR

_____ depositing in the mail an original and 12 paper copies, along with 13 CDs, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-7
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Carl E. Lindner