DWR-808

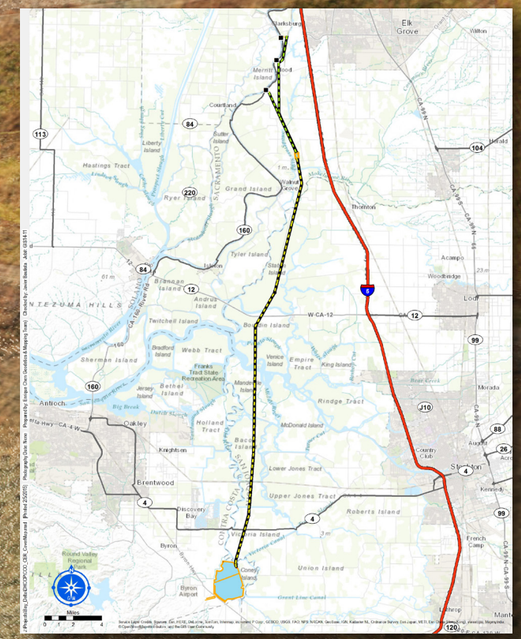
California Department of Water Resources

Advancing the Bay Delta Conservation Plan

Delta Habitat Conservation & Conveyance Program

DHCCP Team

PRELIMINARY
NOT FOR CONSTRUCTION



Delta Habitat Conservation & Conveyance Program (DHCCP)

Final Draft: July 1, 2015

2 Conceptual Engineering Report

Modified Pipeline / Tunnel Option – Clifton Court Forebay Pumping Plant

Volume 2 – Conceptual Engineering Report Drawings

901 P Street Suite 411 B, Sacramento, CA 95814

STATE OF CALIFORNIA

CALIFORNIA NATURAL RESOURCES AGENCY

DEPARTMENT OF WATER RESOURCES

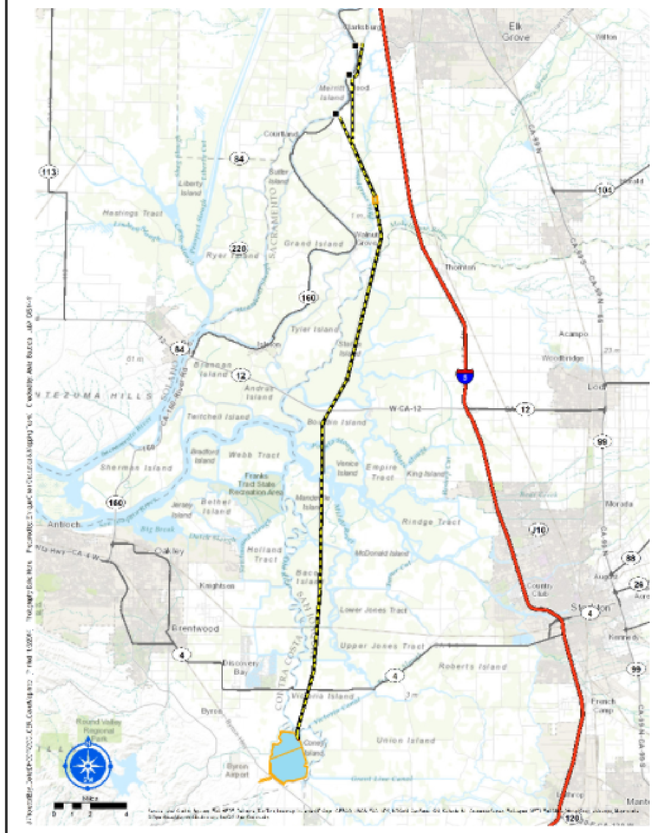
DELTA HABITAT CONSERVATION AND CONVEYANCE PROGRAM

DUAL CONVEYANCE FACILITY

MODIFIED PIPELINE/TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

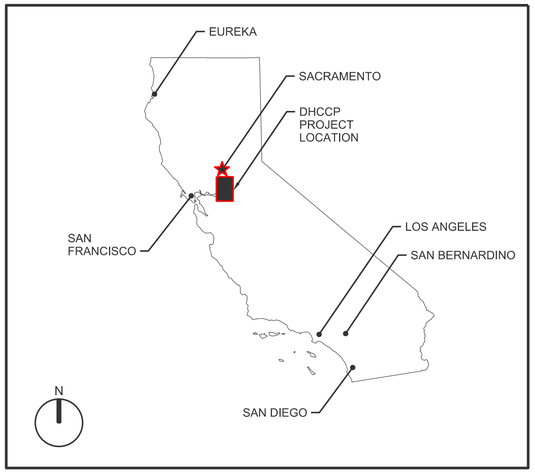
PROJECT NO. 240010

CONCEPTUAL ENGINEERING REPORT
VOLUME 2
CONCEPT DRAWINGS - FINAL DRAFT



VICINITY MAP

N



LOCATION MAP

NOTES:

1. CONCEPT DRAWINGS INCLUDED IN CER-VOLUME 2 DO NOT REPRESENT A DETAILED PRELIMINARY ENGINEERING DESIGN EFFORT. INFORMATION SHOWN HAS BEEN LAID OUT USING AVAILABLE RESOURCES TO CONVEY DESIGN INTENT. FACILITY LOCATIONS AND INDICATED DIMENSIONS, STATIONS, AND ELEVATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE DURING SUBSEQUENT ENGINEERING EFFORTS.
2. TOPOGRAPHIC AND BATHYMETRIC INFORMATION USED IN THE DEVELOPMENT OF THIS CER HAS NOT BEEN GROUND PROOFED AND SHOULD BE CONSIDERED APPROXIMATE.
3. HORIZONTAL DATUM IS CALIFORNIA STATE PLAN E, ZONE 3, NORTH AMERICAN DATUM OF 1983 (NAD 83), SURVEY FEET.
4. ALL ELEVATIONS ARE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) UNLESS OTHERWISE SHOWN.
5. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL DATASET (NED), DATA IS FOR PRELIMINARY USE ONLY.

FINAL DRAFT
DATE: APRIL 1, 2015

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

APPROVAL RECOMMENDED: APPROVED DATE

DEPUTY CHIEF
DIVISION OF ENGINEERING
REG CE NO. _____

CHIEF
DIVISION OF ENGINEERING
REG CE NO. _____

PROJECT NO. 240010
SHEET NO. CCO-G-0001GN
REV
SEQUENCE NO. 1 of 96

FILENAME: CCO-G-0001-24010.dgn PLOT DATE: $PLOTDATE PLOT TIME: $PLOTTIME

SEQUENCE NUMBER	SHEET NUMBER	TITLE
GENERAL		
1	CCO-G-0001GN	COVER SHEET
2	CCO-G-0002GN	DRAWING SHEET INDEX
3	CCO-G-1003GN	CONVEYANCE OVERVIEW 1 OF 2
4	CCO-G-1004GN	CONVEYANCE OVERVIEW 2 OF 2
HYDRAULICS		
5	CCO-C-4005HH	OVERALL HYDRAULIC PLAN AND PROFILE
6	CCO-C-4006HH	NORTH TUNNELS - HYDRAULIC PLAN AND PROFILES
7	CCO-C-4007HH	MAIN TUNNELS - HYDRAULIC PLAN AND PROFILE
CONTROL SYSTEM		
8	CCO-I-6008GN	OVERALL PROCESS FLOW DIAGRAM
9	CCO-I-6009GN	CONTROL SYSTEM ARCHITECTURE
INTAKES		
10	CCO-G-9010IT	TYPICAL INTAKE FACILITY RENDERING
11	CCO-C-1011IT	INTAKE NO. 2 SITE PLAN
12	CCO-C-1012IT	INTAKE NO. 3 SITE PLAN
13	CCO-C-1013IT	INTAKE NO. 5 SITE PLAN
14	CCO-C-3014IT	STATE ROUTE 160 REALIGNMENT AND SED. BASINS - TYPICAL CROSS SECTIONS
15	CCO-M-1015IT	TYPICAL INTAKE FACILITY GENERAL ARRANGEMENT & KEY PLAN
16	CCO-M-4016IT	INTAKE STRUCTURE TYPICAL PLANS
17	CCO-M-3017IT	INTAKE STRUCTURE TYPICAL SECTION
18	CCO-M-3018IT	SEDIMENTATION BASIN TYPICAL SECTION
19	CCO-M-4019IT	TYPICAL CONCRETE BOX CONDUIT ISOMETRIC
20	CCO-M-4020IT	TYPICAL OUTLET SHAFT ISOMETRIC
21	CCO-M-4021IT	INTAKE SEDIMENT JETTING PARTIAL PLAN AND DETAILS
22	CCO-M-2022IT	INTAKE STRUCTURE ELEVATION
23	CCO-M-2023IT	INTAKE FISH SCREEN PANEL ELEVATIONS
24	CCO-M-4024IT	OUTLET SHAFT @ INTAKE NO. 2 - PLAN AND SECTION
25	CCO-M-4025IT	OUTLET SHAFT @ INTAKE NO. 3 - PLAN AND SECTION
26	CCO-M-3026IT	OUTLET SHAFT @ INTAKE NO. 3- SECTIONS
27	CCO-M-4027IT	OUTLET SHAFT @ INTAKE NO. 5 - PLAN AND SECTION
28	CCO-C-4028IT	SEDIMENTATION DRYING LAGOON - TYPICAL PLAN
29	CCO-C-3029IT	SEDIMENTATION DRYING LAGOON - TYPICAL SECTIONS
30	CCO-C-4030IT	SEDIMENTATION DRYING LAGOON OUTLET PLAN AND SECTION
31	CCO-I-6031IT	INTAKE PROCESS FLOW DIAGRAM
32	CCO-E-6032IT	INTAKE NO. 3 SINGLE LINE DIAGRAM
TUNNELS		
33	CCO-C-1033TN	NORTH TUNNELS - PLAN AND PROFILE INTAKE NO. 2 TO INTERMEDIATE FOREBAY
34	CCO-C-1034TN	NORTH TUNNELS - PLAN AND PROFILE INTAKE NO. 5 TO INTERMEDIATE FOREBAY
35	CCO-C-1035TN	MAIN TUNNELS PLAN AND PROFILE - SHEET 1 OF 4
36	CCO-C-1036TN	MAIN TUNNELS PLAN AND PROFILE - SHEET 2 OF 4
37	CCO-C-1037TN	MAIN TUNNELS PLAN AND PROFILE - SHEET 3 OF 4
38	CCO-C-1038TN	MAIN TUNNELS PLAN AND PROFILE - SHEET 4 OF 4
39	CCO-S-4039TN	28' DIA. NORTH TUNNELS LINING DETAILS
40	CCO-S-4040TN	40' DIA. NORTH TUNNEL LINING DETAILS
41	CCO-S-4041TN	40' DIA. MAIN TUNNELS LINING DETAILS
42	CCO-S-4042TN	40' DIA. MAIN TUNNELS ALTERNATIVE LINING DETAILS - SHEET 1 OF 2
43	CCO-S-4043TN	40' DIA. MAIN TUNNELS ALTERNATIVE LINING DETAILS - SHEET 2 OF 2
44	CCO-C-1044TN	NORTH TUNNELS - INTAKES NO. 2 AND NO. 3 DRIVE AND RECEPTION SHAFTS - SITE PLAN
45	CCO-C-1045TN	NORTH TUNNELS - INTAKES NO. 5 RECEPTION SHAFT - SITE PLAN
46	CCO-C-1046TN	NORTH TUNNELS - CONSTRUCTION ACCESS - SITE PLAN
47	CCO-C-1047TN	NORTH TUNNELS/MAIN TUNNELS INTERMEDIATE FOREBAY - DRIVE SHAFTS - SITE PLAN
48	CCO-C-1048TN	MAIN TUNNELS - STATEN ISLAND CONSTRUCTION ACCESS - SITE PLAN
49	CCO-C-1049TN	MAIN TUNNELS - STATEN ISLAND RECEPTION SHAFTS - SITE PLAN
50	CCO-C-1050TN	MAIN TUNNELS - BOULDIN ISLAND DRIVE SHAFTS - SITE PLAN
51	CCO-C-1051TN	MAIN TUNNELS - MANDEVILLE ISLAND CONSTRUCTION ACCESS - SITE PLAN
52	CCO-C-1052TN	MAIN TUNNELS - BACON ISLAND RECEPTION SHAFTS - SITE PLAN
53	CCO-C-1053TN	MAIN TUNNELS - VICTORIA ISLAND CONSTRUCTION ACCESS - SITE PLAN
54	CCO-C-1054TN	MAIN TUNNELS - CLIFTON COURT FOREBAY DRIVE SHAFTS - SITE PLAN
INTERMEDIATE FOREBAY		
55	CCO-G-9055IF	INTERMEDIATE FOREBAY RENDERING
56	CCO-C-1056IF	INTERMEDIATE FOREBAY SITE PLAN
57	CCO-C-3057IF	INTERMEDIATE FOREBAY SECTIONS
58	CCO-M-4058IF	INTERMEDIATE FOREBAY INLET STRUCTURE PLAN
59	CCO-M-3059IF	INTERMEDIATE FOREBAY INLET STRUCTURE LONGITUDINAL SECTION

SEQUENCE NUMBER	SHEET NUMBER	TITLE
INTERM. FOREBAY-CONT.		
60	CCO-M-5060IF	INTERMEDIATE FOREBAY INLET STRUCTURE SECTION AND DETAILS
61	CCO-M-4061IF	INTERMEDIATE FOREBAY OUTLET STRUCTURE PLAN
62	CCO-M-3062IF	INTERMEDIATE FOREBAY OUTLET STRUCTURE LONGITUDINAL SECTION
63	CCO-M-5063IF	INTERMEDIATE FOREBAY OUTLET STRUCTURE SECTION AND DETAILS
64	CCO-M-4064IF	TYPICAL GENERAL ARRANGEMENT FILL AND DRAIN PIPING UPPER LEVEL - PLAN
65	CCO-M-4065IF	FILL AND DRAIN PIPING UPPER LEVEL - SECTION
66	CCO-M-4066IF	FILL AND DRAIN PIPING DETAIL PLAN AND SECTION
67	CCO-M-4067IF	TYPICAL FOREBAY DRAIN/FILL PLAN AND SECTION
68	CCO-E-6068IF	INTERMEDIATE FOREBAY SINGLE LINE DIAGRAM
TUNNEL SHAFTS		
69	CCO-C-1069TS	TYPICAL TUNNEL SHAFTS WORK AREA PLAN
70	CCO-C-1070TS	TYPICAL TUNNEL SHAFTS FINISHED PLAN
71	CCO-S-5071TS	NORTH AND MAIN TUNNELS TYPICAL DRIVE AND RECEPTION SHAFT - PLAN AND SECTION
72	CCO-S-5072TS	NORTH AND MAIN TUNNELS TYPICAL VENT SHAFT - PLAN AND SECTION
73	CCO-S-5073TS	NORTH AND MAIN TUNNELS TYPICAL FINAL SHAFT CONFIRGURATION - SECTIONS
CLIFTON COURT FOREBAY PUMPING PLANT		
74	CCO-G-9074PP	CLIFTON COURT FOREBAY PUMPING PLANT RENDERING
75	CCO-C-1075PP	CLIFTON COURT FOREBAY PUMPING PLANT SITE PLAN
76	CCO-M-1076PP	CLIFTON COURT FOREBAY PUMPING PLANT PLAN
77	CCO-M-1077PP	CLIFTON COURT FOREBAY PUMPING PLANT PLAN
78	CCO-M-3078PP	CLIFTON COURT FOREBAY PUMPING PLANT SECTIONS
79	CCO-E-6079PP	CLIFTON COURT FOREBAY PUMPING PLANT OVERALL SINGLE LINE DIAGRAM
80	CCO-E-6080PP	CLIFTON COURT FOREBAY PUMPING PLANT SINGLE LINE DIAGRAM
81	—	NOT USED
CLIFTON COURT FOREBAY		
82	CCO-C-1082FB	MODIFIED CLIFTON COURT FOREBAY OVERALL SITE PLAN
83	CCO-C-1083FB	MODIFIED CLIFTON COURT FOREBAY INLET ANFD OUTLETS - SITE PLANS
84	CCO-C-1084FB	CHANNEL APPROACHES TO PUMPING PLANTS SITE PLANS
85	CCO-C-3085FB	MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS I
86	CCO-C-3086FB	MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS II
87	CCO-C-3087FB	MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS III
88	CCO-C-4088FB	CHANNEL CONTROL STRUCTURES PLANS, SECTION, AND DETAIL
89	CCO-C-5089FB	CHANNEL CONTROL STRUCTURES PLAN AND SECTIONS
90	CCO-C-5090FB	NORTH CLIFTON FOREBAY SPILLWAY PLAN
91	CCO-C-3091FB	NORTH CLIFTON COURT FOREBAY SPILLWAY SECTIONS
92	CCO-C-1092FB	MODIFIED CLIFTON COURT FOREBAY SEDIMENT AREA PLAN AND SECTION
POWER AND COMMUNICATIONS		
93	CCO-E-1193GN	CONTROL AND COMMUNICATIONS OVERVIEW
94	CCO-E-1194GN	POWER SUPPLY AND GRID CONNECTIONS VICINITY MAP
OPERABLE BARRIERS		
95	CCO-C-1195OP	OLD RIVER FISH CONTROL STRUCTURE PLAN
96	CCO-C-4096OP	OLD RIVER FISH CONTROL STRUCTURE PROFILE

SHEET NO. LEGEND:

CCO-C-1001PP

- FACILITY CODE
- SHEET NUMBER
- SHEET TYPE
- DISCIPLINE
- OPTION

FACILITY CODES:

GN	GENERAL
HH	HYDRAULICS
IT	INTAKES
TN	TUNNELS
IF	INTERMEDIATE FOREBAY
TS	TUNNEL SHAFTS
PP	CLIFTON COURT PUMPING PLANT
FB	CLIFTON COURT FOREBAY
OP	OPERABLE BARRIERS

SHEET TYPES:

0	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	PLAN, SECTION AND DETAILS
5	DETAILS
6	SCHEDULES AND DIAGRAMS
7	USER DEFINED
8	USER DEFINED
9	3D REPRESENTATIONS

ABBREVIATIONS

@	AT
A	AMPERES
AF	AMPERE FRAME
APPD	APPROVED
APPROX	APPROXIMATE
AT	AMP TRIP
ATO	ALL TUNNEL OPTION
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
BFV	BUTTERFLY VALVE
BOT	BOTTOM
BTF	BYRON TRACT FOREBAY
BUS	BINARY UNIT SYSTEM
C/C	CENTER TO CENTER
CCF	CLIFTON COURT FOREBAY
CDFG	CALIFORNIA DEPARTMENT OF FISH AND GAME
CE	CIVIL ENGINEER
CFS	CUBIC FEET PER SECOND
CL	CENTERLINE
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CONC	CONCRETE
CS	CONSTANT SPEED
CVP	CENTRAL VALLEY PROJECT

ABBREVIATIONS -CONTINUED

DRF	DECANT RETURN FLOW
DIA	DIAMETER
DIMS	DIMENSIONS
DN	DOWN
DS	DOWNSTREAM, DREDGED SEDIMENT
DWG	DRAWING
E	EAST
(E), EXST	EXISTING
EG	EXISTING GRADE
EL	ELEVATION
FB	FOREBAY
FF	FINISH FLOOR
FG	FINISH GRADE
FLA	FULL LOAD AMPERE
FM	FLOW METER
FPS	FEET PER SECOND
FT	FEET
H	HEIGHT
HGL	HYDRAULIC GRADE LINE
HP	HORSE POWER
HPU	HYDRAULIC POWER UNIT
HS	HAND SWITCH
HWY	HIGHWAY
HZ	HERTZ
ICF	ISOLATED CONVEYANCE FACILITY
ID	INSIDE DIAMETER
IF	INTERMEDIATE FOREBAY
INV	INVERT
IPP	INTERMEDIATE PUMPING PLANT
KSI	KIPS PER SQUARE INCH
KV	KILOVOLTS
KVA	KILOVOLT-AMPERE
KW	KILOWATTS
LOR	LOCAL-OFF-REMOTE
LWL	LOW WATER LINE
M	MOTOR
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MIN	MINIMUM
MM	MILLIMETER
MVA	MEGAVOLT AMPERE
(N)	NEW
NAD	NORTH AMERICAN DATUM OF 1983
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
NO	NUMBER
NOAA	NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION
NORM	NORMAL
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
OG	ORIGINAL GROUND
OSC	OPEN/ STOP CLOSE
PF	POWER FACTOR
PH	PHASE
PNL	PANEL
PP	PUMPING PLANT
P&ID	PIPING AND INSTRUMENTATION DIAGRAM
PS	PUMP STATION
PSI	POUNDS PER SQUARE INCH
Q	FLOW RATE
R	RADIUS
RCC	REINFORCED CEMENT PIPE
RCP	REINFORCED CONCRETE PIPE
REG	REGISTERED
REV	REVISION
S	SLOPE
SED	SEDIMENTATION
SF	SQUARE FEET
SL	SPRING LINE
SLR	SEA LEVEL RISE
SQ	SQUARE
SS, SST	STAINLESS STEEL
STA	STATION
SUB	SUBMITTED
SWGR	SWITCHGEAR
SWP	STATE WATER PROJECT
TBD	TO BE DETERMINED
THK	THICK
TYP	TYPICAL
UD	UNDERDRAIN
UHMW	ULTRA HIGH MOLECULAR WEIGHT
UPRR	UNION PACIFIC RAILROAD
V	VELOCITY, VOLTS
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
W	WEST, WIDTH
w/	WITH
WC	WATER COIL
WL	WATERLINE
WSE	WATER SURFACE ELEVATION
WSP	WELDED STEEL PIPE
XFMR	TRANSFORMER
YR	YEAR
ZIT	POSITION INDICATING TRANSMITTER
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPEN
Ø	DIAMETER

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

DRAWING INDEX

PROJECT NO. 240010
SHEET NO. CCO - G - 0002GN
REV 0 | SEQUENCE NO. 2 OF 96

LEGEND

- FOREBAY
- INTAKE
- JUNCTION STRUCTURE
- MAIN CONSTRUCTION SHAFT
- CANAL
- SIPHON
- TUNNEL

INTERSTATE 5 FREEWAY

INTERSTATE 5 FREEWAY

HOOD FRANKLIN RD.

NORTH TUNNELS

STONE LAKE

INTERMEDIATE FOREBAY DRIVE SHAFTS - NORTH TUNNELS

INTERMEDIATE FOREBAY

INTERMEDIATE FOREBAY DRIVE SHAFTS - MAIN TUNNELS

TWIN CITIES RD.

W. WALNUT GROVE RD.

WALNUT GROVE

REACH 4 INTERMEDIATE FOREBAY TO STATEN ISLAND

MAIN TUNNELS

HIGHWAY 12

STATEN ISLAND

STATEN ISLAND RECEPTION SHAFTS

REACH 5 STATEN ISLAND TO BOULDIN ISLAND

BOULDIN ISLAND

BOULDIN ISLAND DRIVE SHAFTS

INTAKE NO. 2 DRIVE SHAFT

INTAKE NO. 3 RECEPTION SHAFT (JUNCTION STRUCTURE)

INTAKE NO. 2

INTAKE NO. 3

REACH 1 INTAKE NO. 2 TO INTAKE NO. 3

REACH 2 INTAKE NO. 3 TO INTERMEDIATE FOREBAY

INTAKE NO. 5

REACH 3 INTAKE NO. 5 TO INTERMEDIATE FOREBAY

SACRAMENTO RIVER

GRAND ISLAND

ANDRUS ISLAND

TYLER ISLAND

COURTLAND

SUTTER ISLAND

WEBB TRACT

HIGHWAY 12

BRANNAN ISLAND

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
NOT TO SCALE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED

DRAWN | APPROVAL BY

CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY

CONVEYANCE OVERVIEW
1 OF 2

PROJECT NO. 240010
SHEET NO. CCO - G - 1003GN
REV 0
SEQUENCE NO. 3 OF 96

Edited By:

Printed By:

LEGEND

- MAIN CONSTRUCTION SHAFT
- CANAL
- SIPHON
- TUNNEL

HIGHWAY 12

EMPIRE TRACT

REACH 5
STATEN ISLAND TO
BOULDIN ISLAND

MEDFORD ISLAND

VENICE ISLAND

REACH 6
BOULDIN ISLAND
TO BACON ISLAND

MILDRED ISLAND

MAIN TUNNELS

LOWER JONE TRACT

HIGHWAY 4

REACH 7
BACON ISLAND TO
CLIFTON COURT FOREBAY

WOODWARD ISLAND

CLIFTON COURT FOREBAY
DRIVE SHAFTS AND
PUMPING PLANT

CONEY ISLAND

BOULDIN ISLAND

STATEN ISLAND

BOULDIN ISLAND
DRIVE SHAFTS

BACON ISLAND
RECEPTION SHAFTS

BACON ISLAND

VICTORIA ISLAND

BYRON HWY

MANDEVILLE ISLAND

QUIMBY ISLAND

CLIFTON COURT FOREBAY

JONES
PUMPING
PLANT

SKINNER FACILITY

REACH 8
CCF TO
SWP AND CVP

BANKS
PUMPING
PLANT

HIGHWAY 4

BYRON HWY

HIGHWAY 12

N

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
NOT TO SCALE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

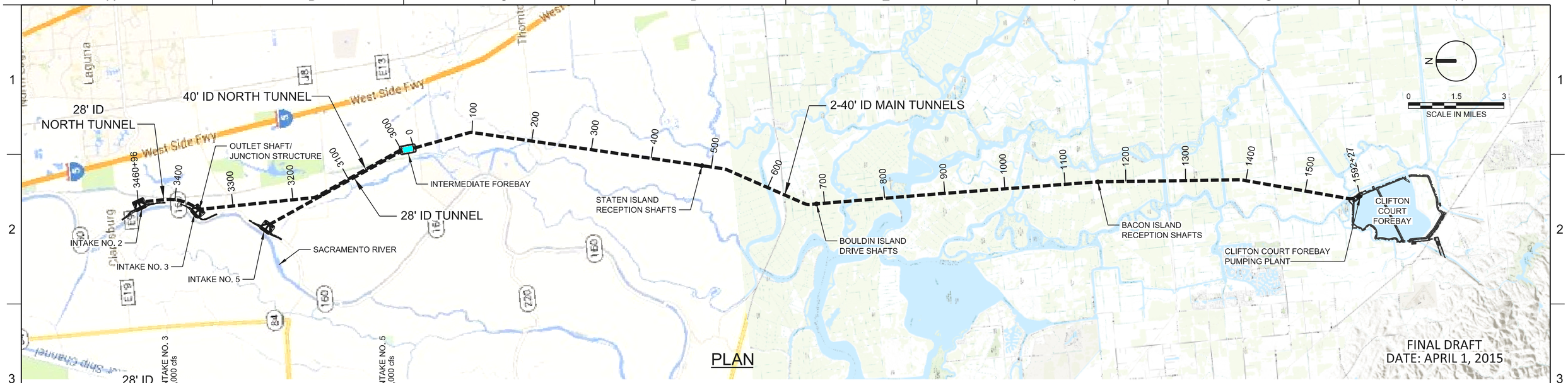
CONVEYANCE OVERVIEW
2 OF 2

PROJECT NO. 240010
SHEET NO. CCO - G - 1004GN
REV 0
SEQUENCE NO. 4 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\01 General and Approval Sheets\CCO-G-004-240010

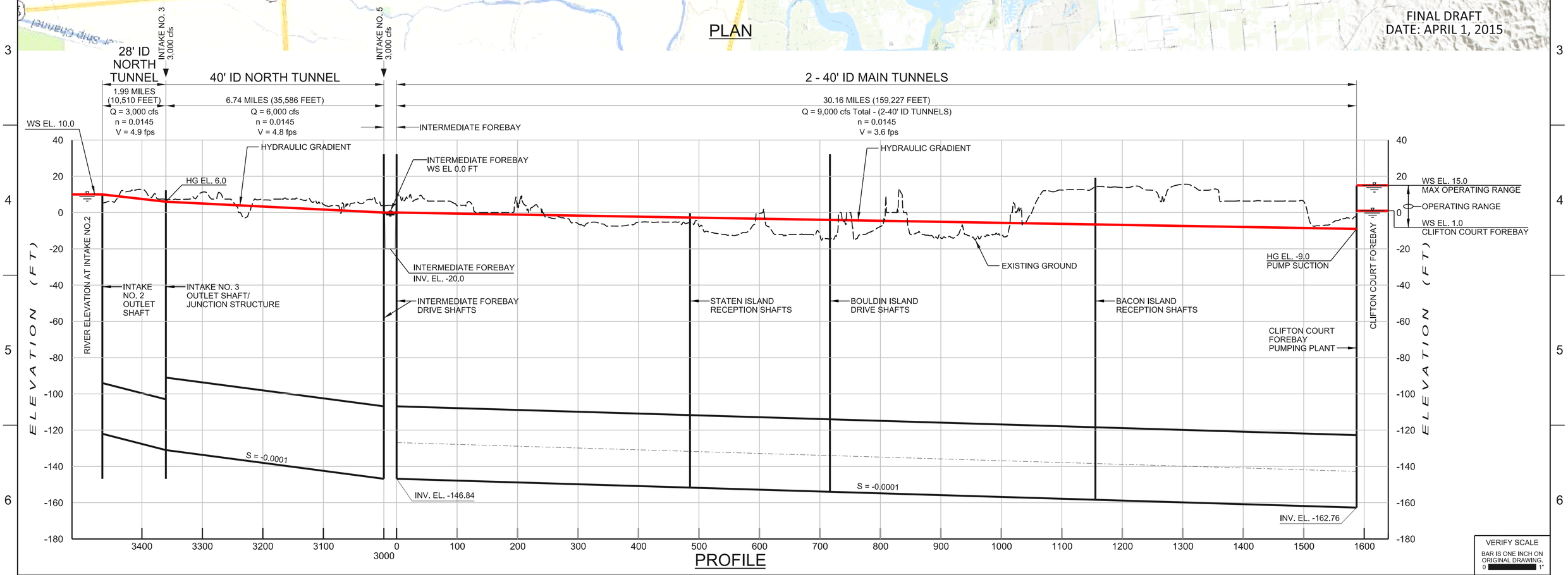
Edited By: Bautista,Jav

Printed By: Bautista,Jav



PLAN

FINAL DRAFT
DATE: APRIL 1, 2015



PROFILE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

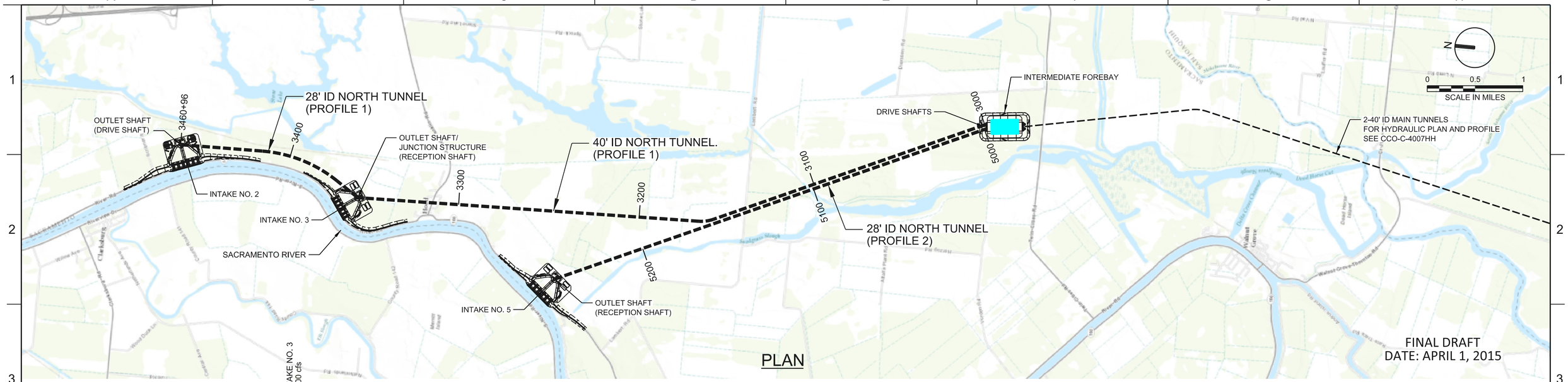
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

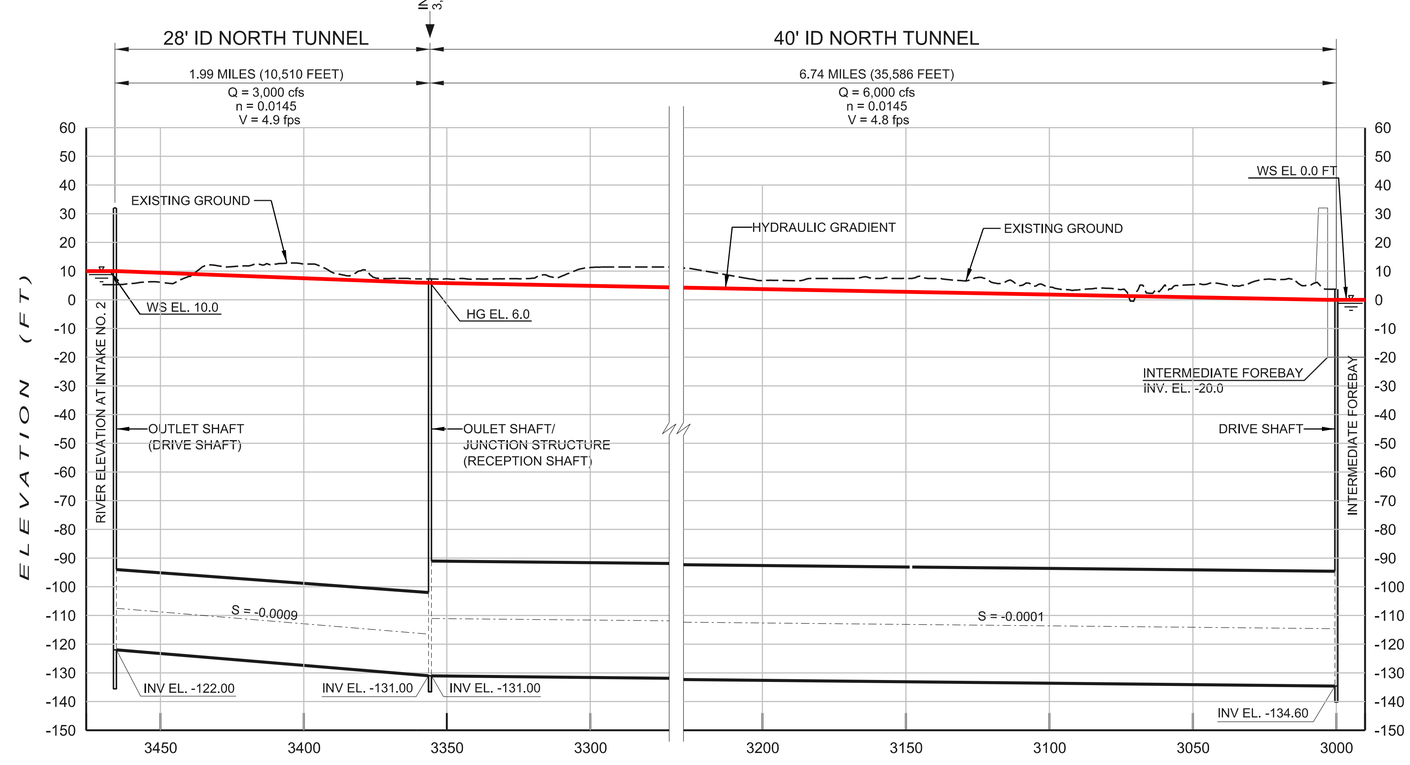
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OVERALL HYDRAULIC PLAN AND PROFILE

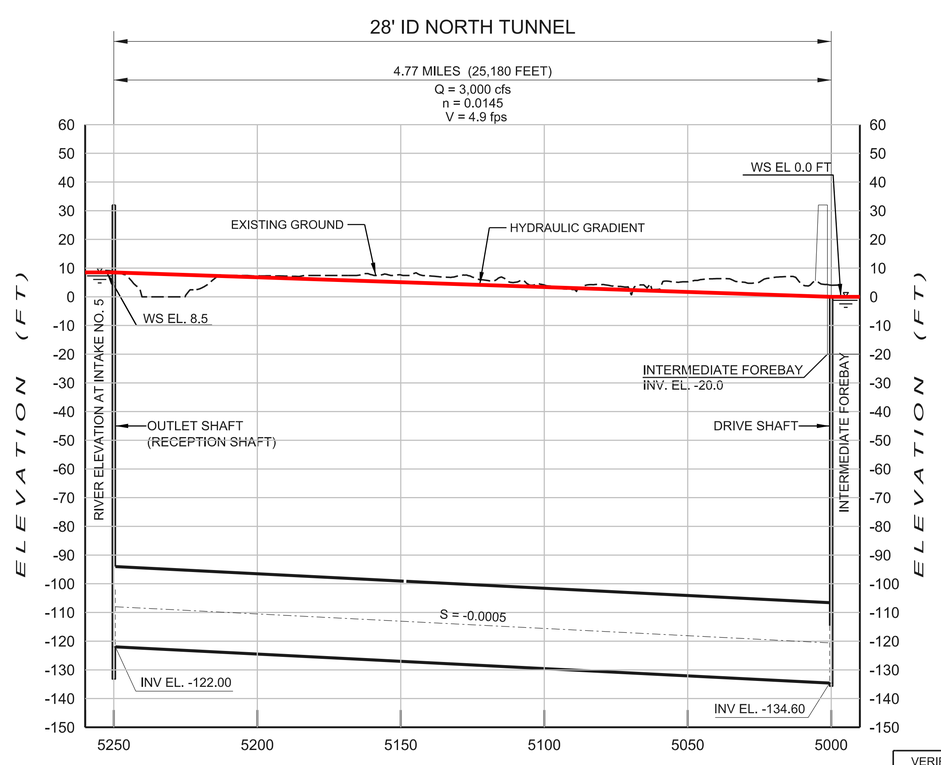
PROJECT NO. 240010
SHEET NO. CCO - C - 4005HH
REV 0
SEQUENCE NO. 5 OF 96



PLAN



PROFILE 1 - INTAKE NO. 2 TO JUNCTION STRUCTURE TO INTERMEDIATE FOREBAY



PROFILE 2 - INTAKE NO. 5 TO INTERMEDIATE FOREBAY

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

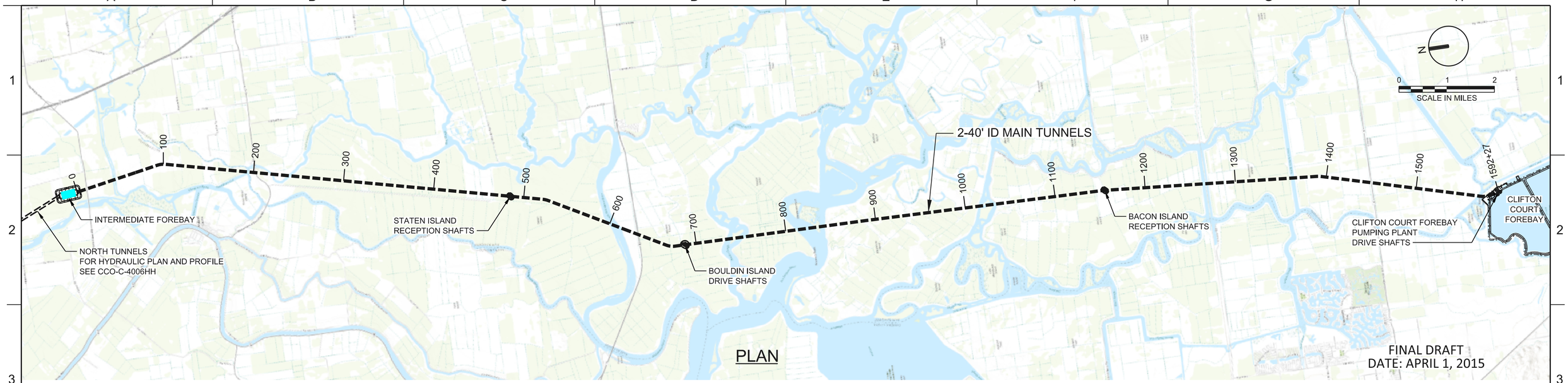
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

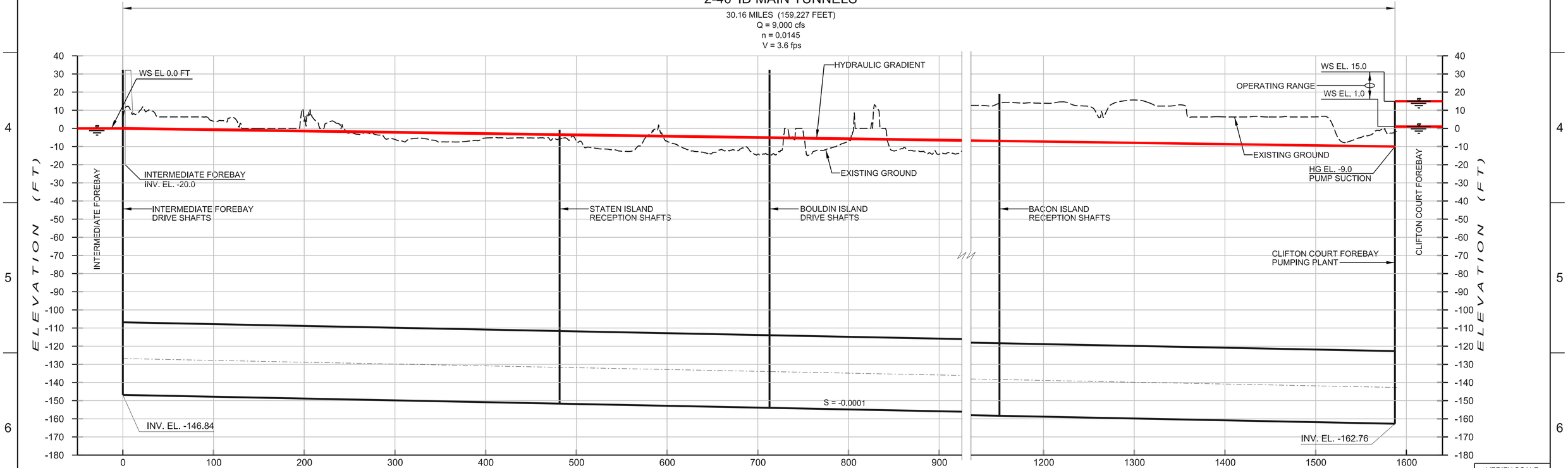
NORTH TUNNELS - HYDRAULIC PLAN AND PROFILES

PROJECT NO. 240010
SHEET NO. CCO - C - 4006HH
REV 0
SEQUENCE NO. 6 OF 96



PLAN

FINAL DRAFT
DATE: APRIL 1, 2015



PROFILE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - HYDRAULIC PLAN AND PROFILE

PROJECT NO. 240010
SHEET NO. CCO - C - 4007HH
REV 0
SEQUENCE NO. 7 OF 96

LEGEND

- MOTOR OPERATED AIR RELEASE VALVE
- MOTOR OPERATED GATE
- MANUAL DROP GATE
- MOTORIZED CONTROL WEIR GATE
- VERTICAL TURBINE PUMP
- CENTRIFUGAL PUMP
- FLOW METER
- PRESSURE INDICATING TRANSMITTER
- LEVEL INDICATING TRANSMITTER WITH STILLING WELL

NOTES:

1. ALL PUMPS ARE EQUIPPED WITH VARIABLE SPEED DRIVES.

FINAL DRAFT
DATE: APRIL 1, 2015

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

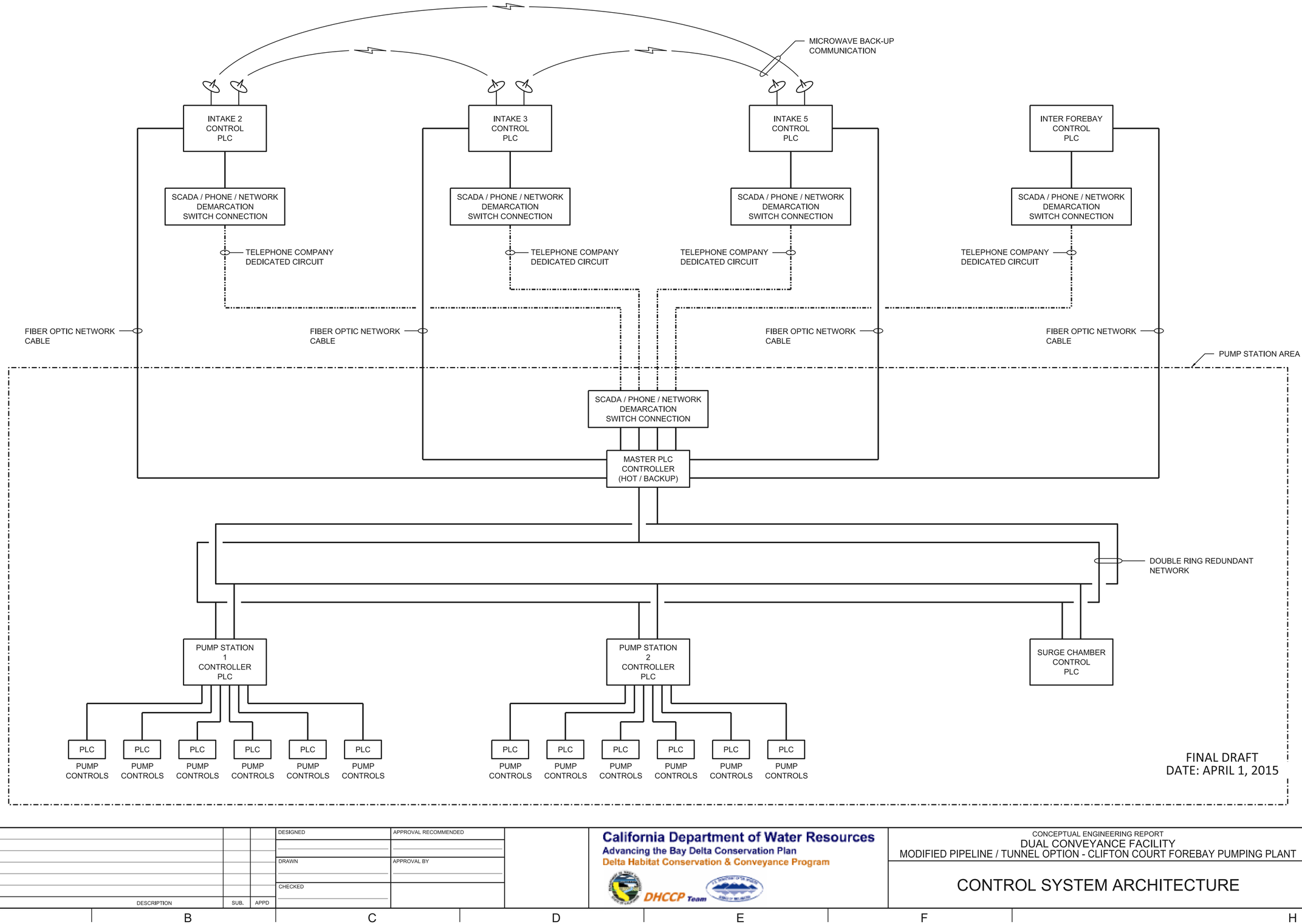
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OVERALL PROCESS FLOW DIAGRAM

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

PROJECT NO. 240010
SHEET NO. CCO - I - 6008GN
REV 0
SEQUENCE NO. 8 OF 96



FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CONTROL SYSTEM ARCHITECTURE

PROJECT NO. 240010
SHEET NO. CCO - I - 6009GN
REV 0
SEQUENCE NO. 9 OF 96

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED

DRAWN

CHECKED

APPROVAL RECOMMENDED

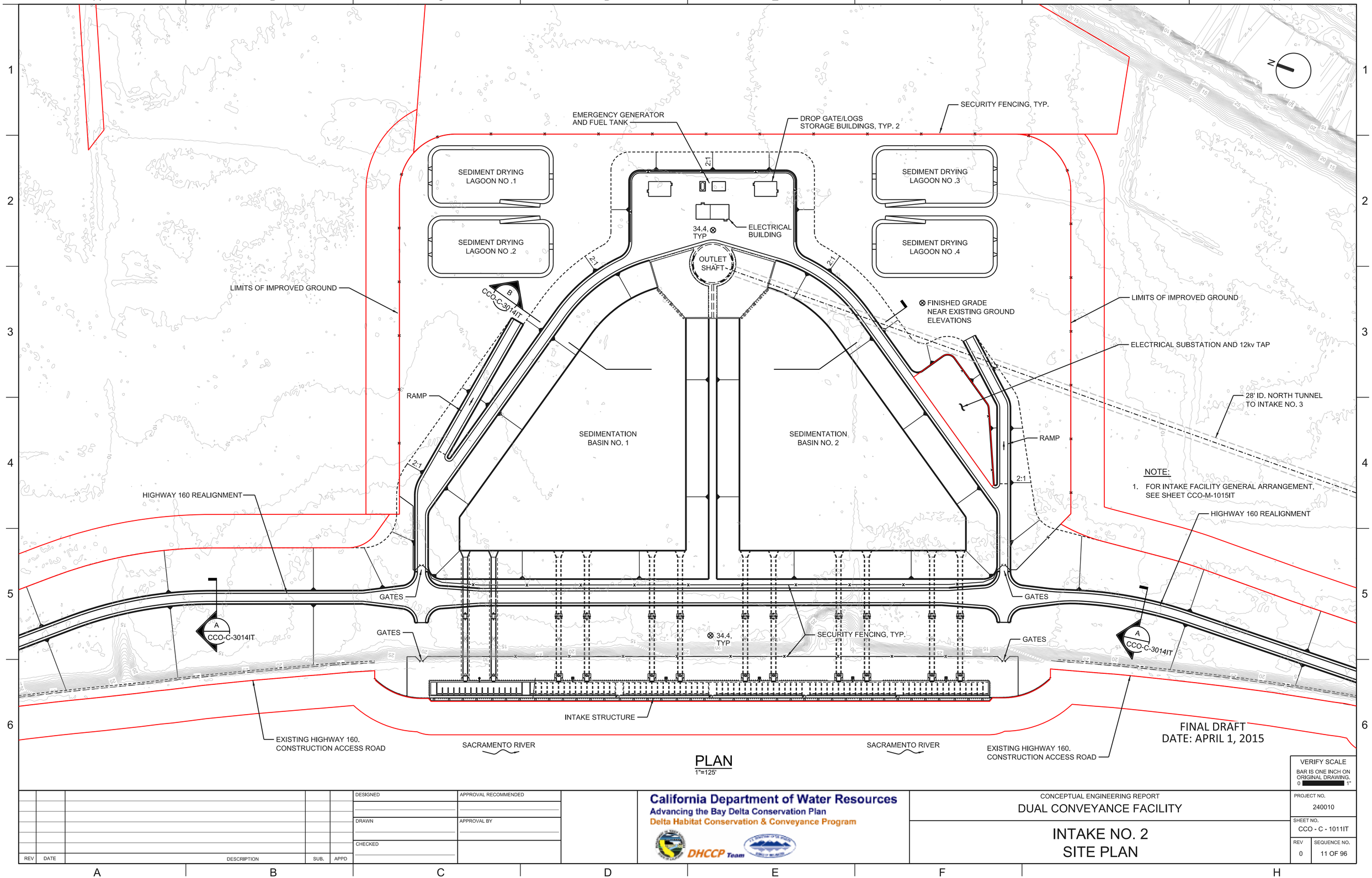
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL INTAKE FACILITY RENDERING

PROJECT NO. 240010
SHEET NO. CCO - G - 9010IT
REV 0
SEQUENCE NO. 10 OF 96



NOTE:

1. FOR INTAKE FACILITY GENERAL ARRANGEMENT, SEE SHEET CCO-M-1015IT

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
1"=125'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY

INTAKE NO. 2
SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1011IT
REV 0
SEQUENCE NO. 11 OF 96

Edited By:
Printed By:

40' ID. NORTH TUNNEL
TO INTERMEDIATE FOREBAY

EMERGENCY GENERATOR
AND FUEL TANK

DROP GATE/LOGS
STORAGE BUILDINGS, TYP. 2

SECURITY FENCING, TYP.

SEDIMENT DRYING
LAGOON NO .1

SEDIMENT DRYING
LAGOON NO .2

SEDIMENT DRYING
LAGOON NO .3

SEDIMENT DRYING
LAGOON NO .4

2:1

33.4,
TYP

ELECTRICAL
BUILDING

OUTLET
SHAFT

LIMITS OF IMPROVED GROUND

B
CCO-C-3014IT

FINISHED GRADE
NEAR EXISTING GROUND
ELEVATIONS

ELECTRICAL SUBSTATION AND 12kv TAP

RAMP

28' ID. NORTH TUNNEL
FROM INTAKE NO. 2

SEDIMENTATION
BASIN NO. 1

SEDIMENTATION
BASIN NO. 2

HIGHWAY 160 REALIGNMENT

A
CCO-C-3014IT

GATES

33.4,
TYP

SECURITY FENCING, TYP.

INTAKE STRUCTURE

EXISTING HIGHWAY 160.
CONSTRUCTION ACCESS ROAD

SACRAMENTO RIVER

NOTE:

1. FOR INTAKE FACILITY GENERAL ARRANGEMENT, SEE SHEET CCO-M-1015IT

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
1"=125'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

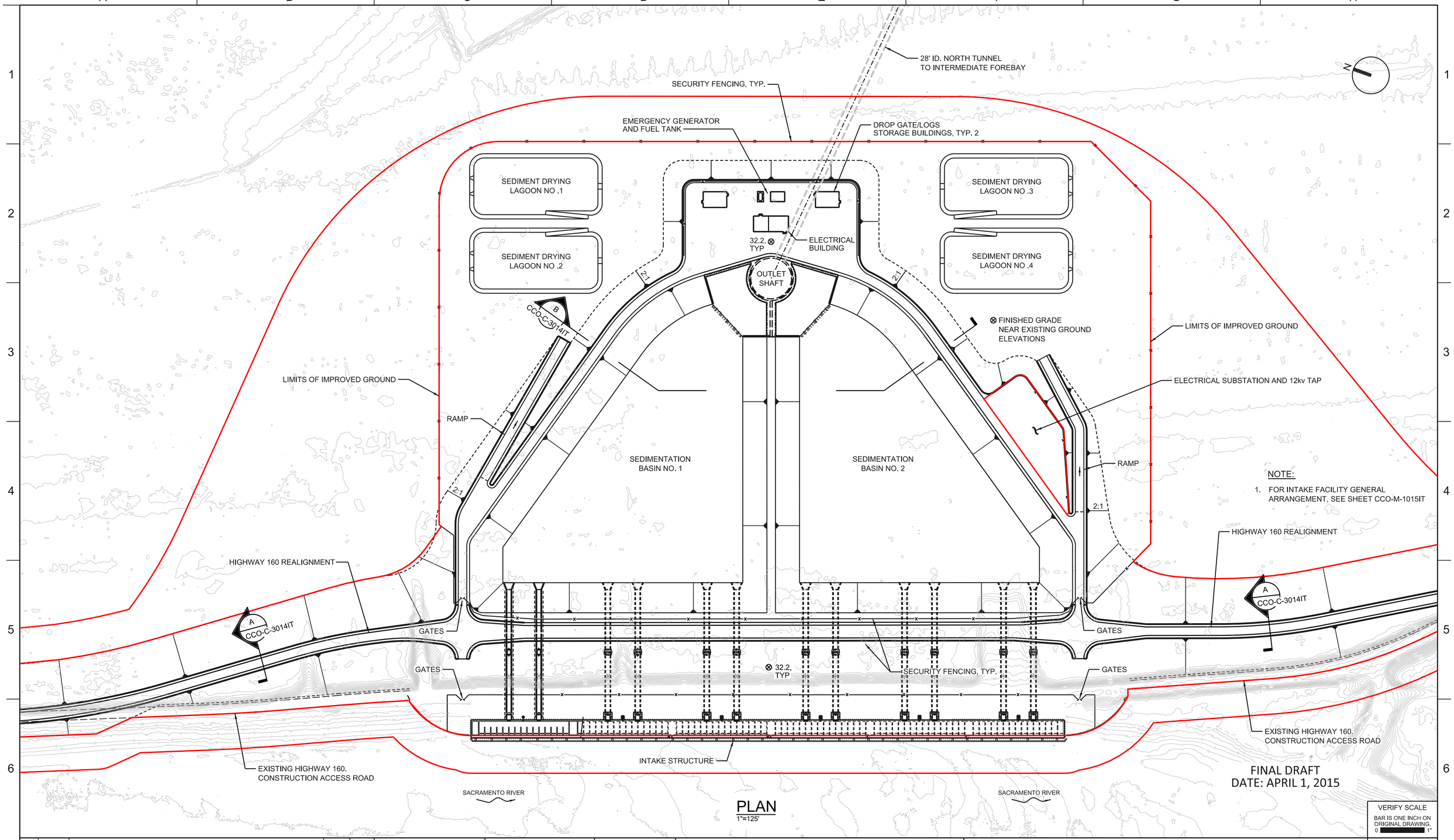
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE NO. 3
SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1012IT
REV 0
SEQUENCE NO. 12 OF 96



NOTE:

1. FOR INTAKE FACILITY GENERAL ARRANGEMENT, SEE SHEET CCO-M-1015IT

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
1"=125'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

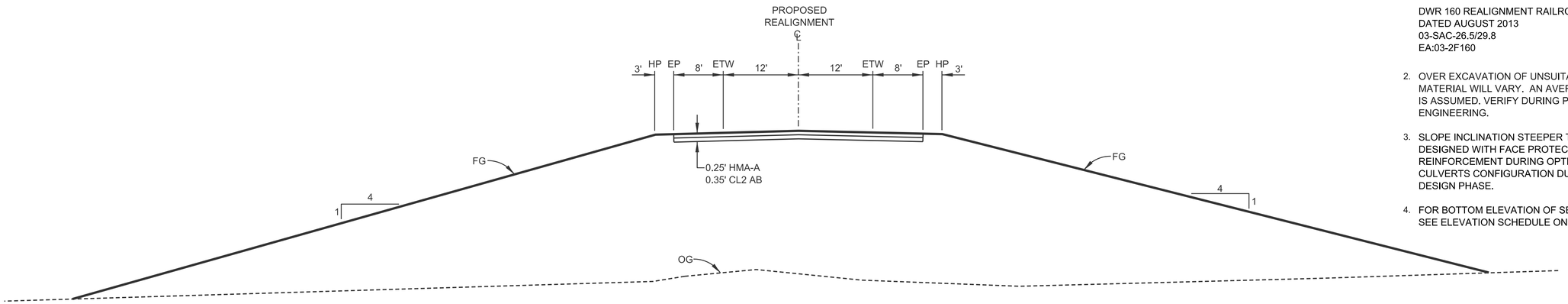
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY

INTAKE NO. 5
SITE PLAN

PROJECT NO.	
240010	
SHEET NO.	
CCO - C - 1013IT	
REV	SEQUENCE NO.
0	13 OF 96

Edited By:

Printed By:



NOTES:

1. CROSS SECTION ARE BASED ON PRELIMINARY REPORT:

   DWR 160 REALIGNMENT RAILROAD DETOUR
   DATED AUGUST 2013
   03-SAC-26.5/29.8
   EA:03-2F160

2. OVER EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY. AN AVERAGE OF 6' IS ASSUMED. VERIFY DURING PRELIMINARY ENGINEERING.

3. SLOPE INCLINATION STEEPER THAN 2:1 WILL BE DESIGNED WITH FACE PROTECTION AND/OR SOIL REINFORCEMENT DURING OPTIMIZATION OF THE BOX CULVERTS CONFIGURATION DURING PRELIMINARY DESIGN PHASE.

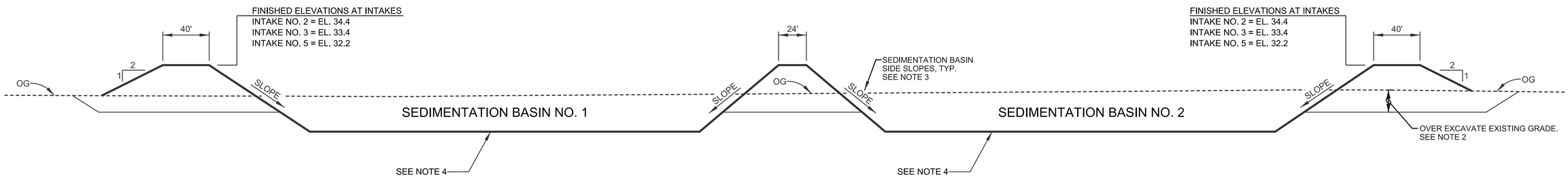
4. FOR BOTTOM ELEVATION OF SEDIMENTATION BASINS, SEE ELEVATION SCHEDULE ON SHEET CCO-M-3018IT.

STATE ROUTE 160 REALIGNMENT - TYPICAL CROSS SECTION

NOTE: TYPICAL CROSS SECTION OF HIGHWAY 160 REALIGNMENT IS LIMITED TO OUTSIDE OF INTAKE FACILITY BOUNDARY.

A SECTION
N.T.S.

CCO-C-1011IT
CCO-C-1012IT
CCO-C-1013IT



SEDIMENTATION BASINS - TYPICAL CROSS SECTION

B SECTION
N.T.S.

CCO-C-1011IT
CCO-C-1012IT
CCO-C-1013IT

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

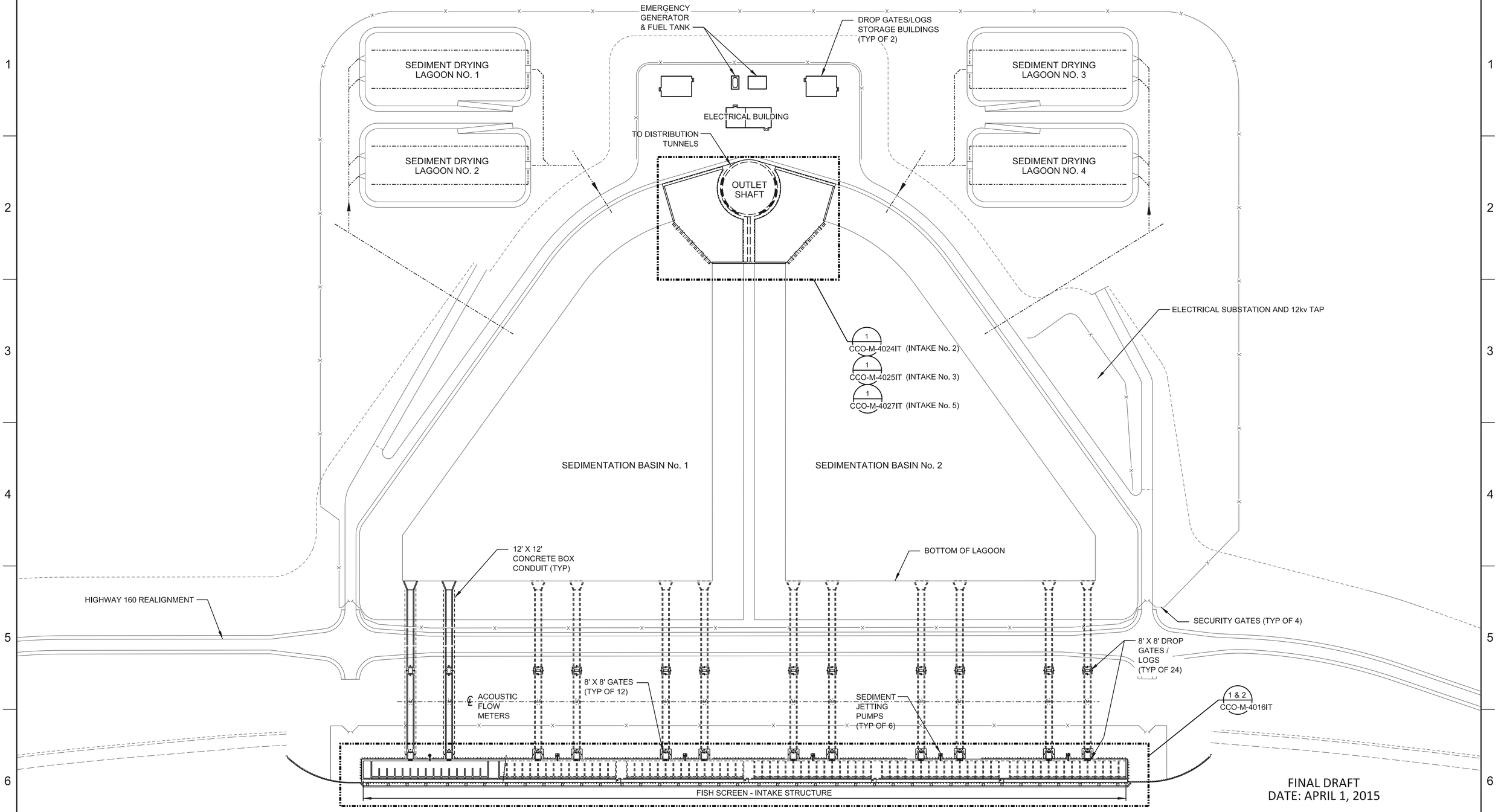
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

STATE ROUTE 160 REALIGNMENT AND SED. BASINS TYPICAL CROSS SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - C - 3014IT
REV 0
SEQUENCE NO. 14 OF 96



FINAL DRAFT
DATE: APRIL 1, 2015

1 PLAN
1" = 100'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

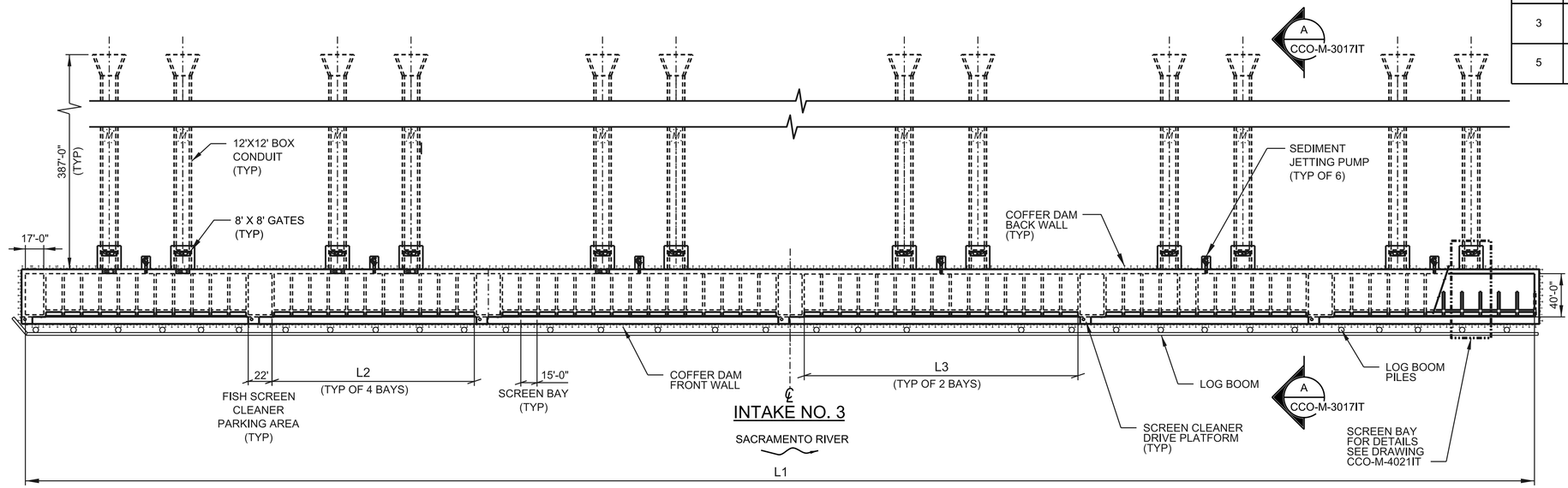
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

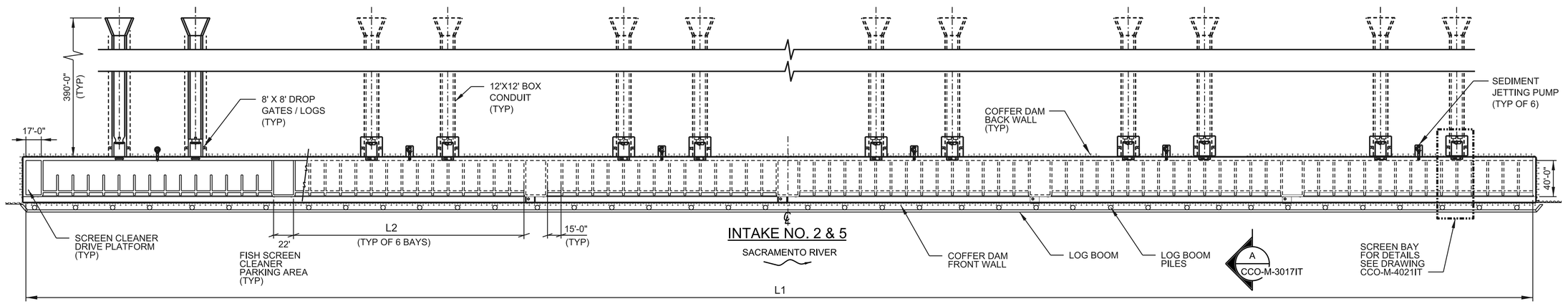
TYPICAL INTAKE FACILITY GENERAL ARRANGEMENT & KEY PLAN

PROJECT NO. 240010
SHEET NO. CCO - M - 1015IT
REV 0
SEQUENCE NO. 15 OF 96

SCHEDULE						
INTAKE NO.	APPROXIMATE RIVER MILE	NUMBER OF SCREEN BAYS	NUMBER OF STEEL CASED DRILLED PIERS	L1 (FT)	L2 (FT)	L3 (FT)
2	41.1	90	1,120	1,667	253	-
3	39.4	66	850	1,259	185	253
5	36.8	90	1,120	1,667	253	-



1 PLAN
1"=60'
CCO-M-1015IT



2 PLAN
1"=60'
CCO-M-1015IT

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

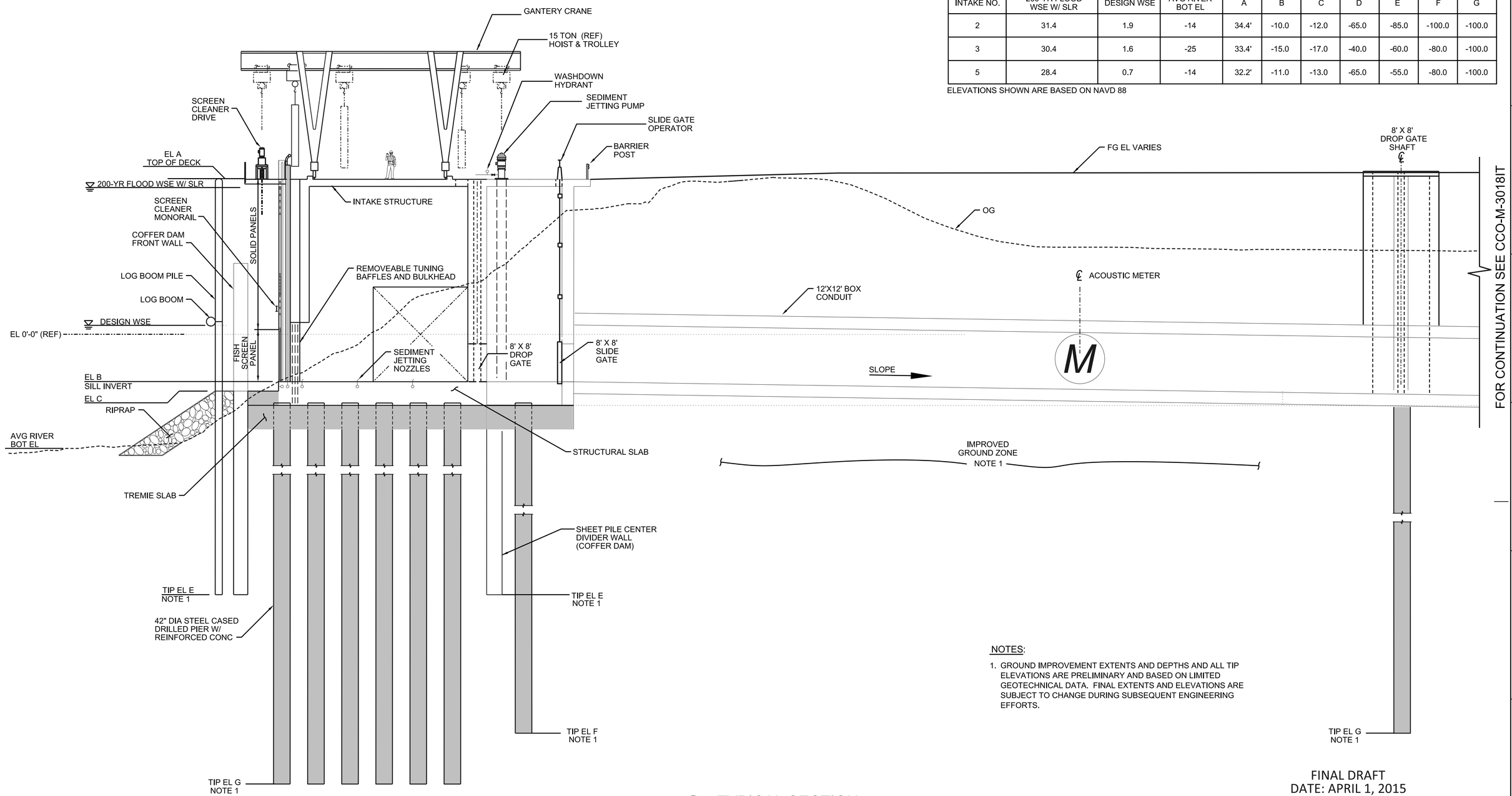
INTAKE STRUCTURE TYPICAL PLANS

PROJECT NO. 240010
SHEET NO. CCO - M - 4016IT
REV 0
SEQUENCE NO. 16 OF 96

ELEVATION SCHEDULE

INTAKE NO.	200-YR FLOOD WSE W/ SLR	DESIGN WSE	AVG RIVER BOT EL	A	B	C	D	E	F	G
2	31.4	1.9	-14	34.4'	-10.0	-12.0	-65.0	-85.0	-100.0	-100.0
3	30.4	1.6	-25	33.4'	-15.0	-17.0	-40.0	-60.0	-80.0	-100.0
5	28.4	0.7	-14	32.2'	-11.0	-13.0	-65.0	-55.0	-80.0	-100.0

ELEVATIONS SHOWN ARE BASED ON NAVD 88



NOTES:

1. GROUND IMPROVEMENT EXTENTS AND DEPTHS AND ALL TIP ELEVATIONS ARE PRELIMINARY AND BASED ON LIMITED GEOTECHNICAL DATA. FINAL EXTENTS AND ELEVATIONS ARE SUBJECT TO CHANGE DURING SUBSEQUENT ENGINEERING EFFORTS.

1" = 10' 0 10 20 30 FEET

A TYPICAL SECTION
1"=10'
CCO-M-4016IT

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

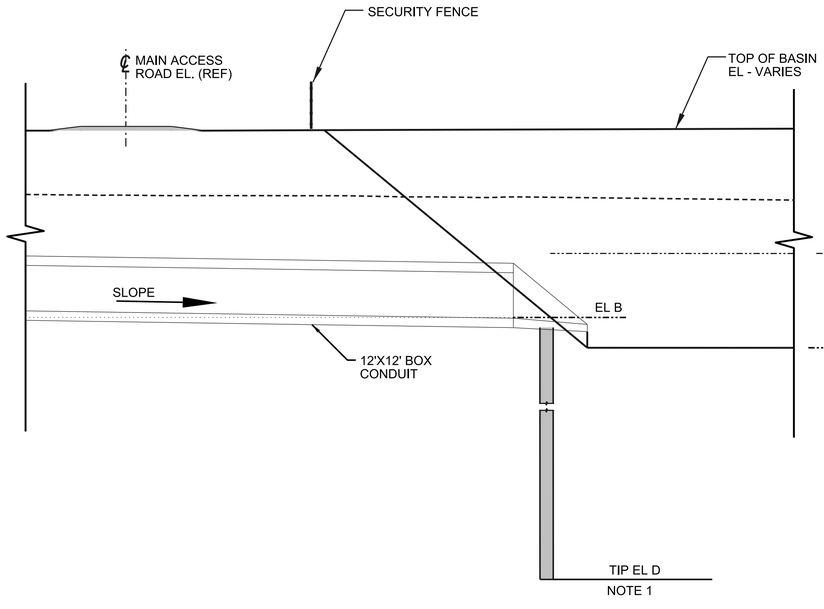
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

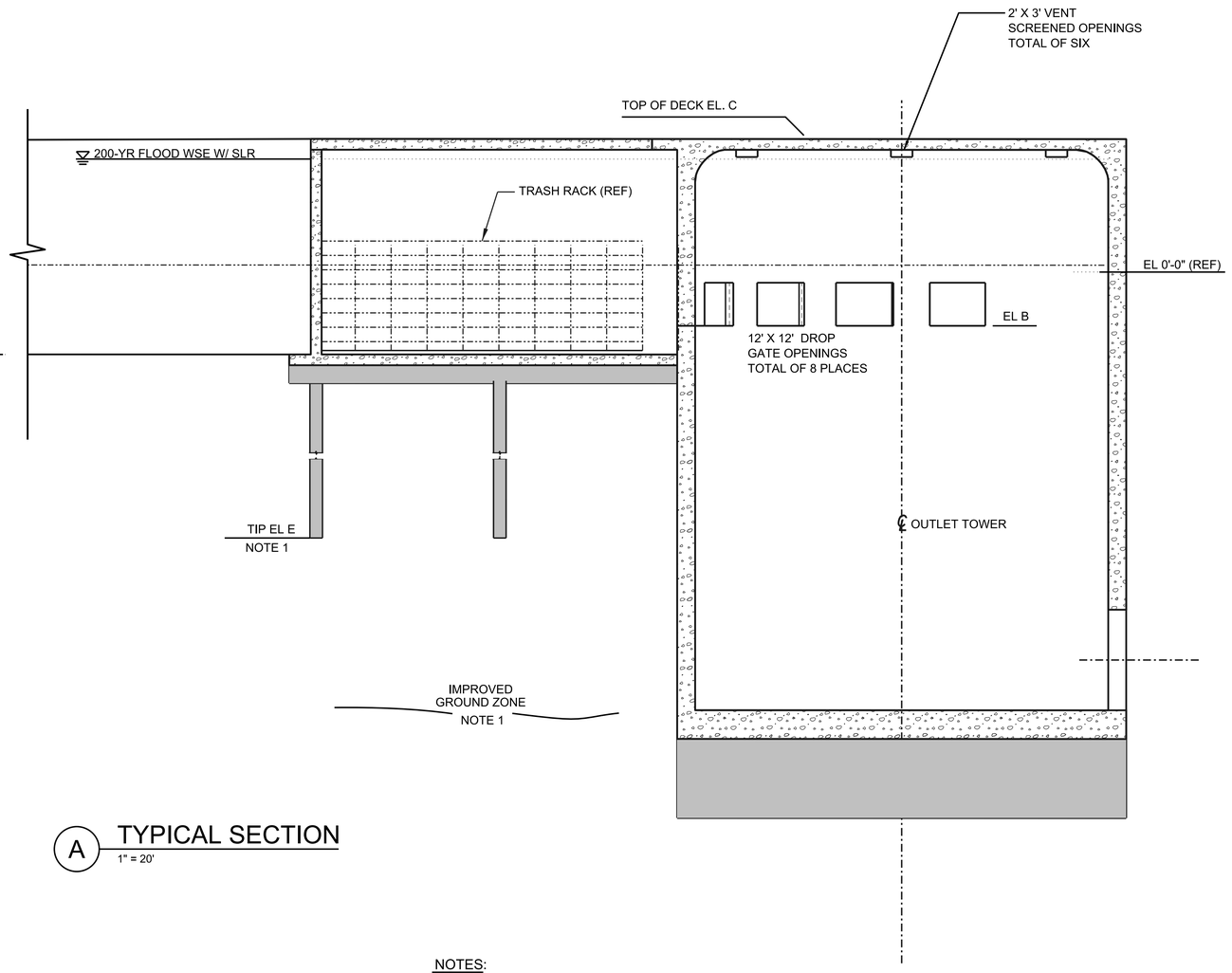
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE STRUCTURE TYPICAL SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 3017IT
REV 0
SEQUENCE NO. 17 OF 96

FOR CONTINUATION SEE CCO-M-3017IT





A TYPICAL SECTION
1" = 20'

ELEVATION SCHEDULE

INTAKE NO.	A	B	C	D	E	200-YR FLOOD WSE W/ SLR *	DESIGN WSE *
2	-23'	-15'	34.4'	-100'	-85'	31.4	1.9
3	-28'	-20'	33.4'	-80'	-65'	30.4	1.6
5	-24'	-16'	32.2'	-80'	-65'	28.4	0.7

* STATIC CONDITION IN SEDIMENTATION BASIN EQUAL TO ELEVATION IN RIVER.

NOTES:

1. GROUND IMPROVEMENT EXTENTS AND DEPTHS AND ALL TIP ELEVATIONS ARE PRELIMINARY AND BASED ON LIMITED GEOTECHNICAL DATA. FINAL EXTENTS AND ELEVATIONS ARE SUBJECT TO CHANGE DURING SUBSEQUENT ENGINEERING EFFORTS.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

SEDIMENTATION BASIN TYPICAL SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 3018IT
REV 0
SEQUENCE NO. 18 OF 96

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

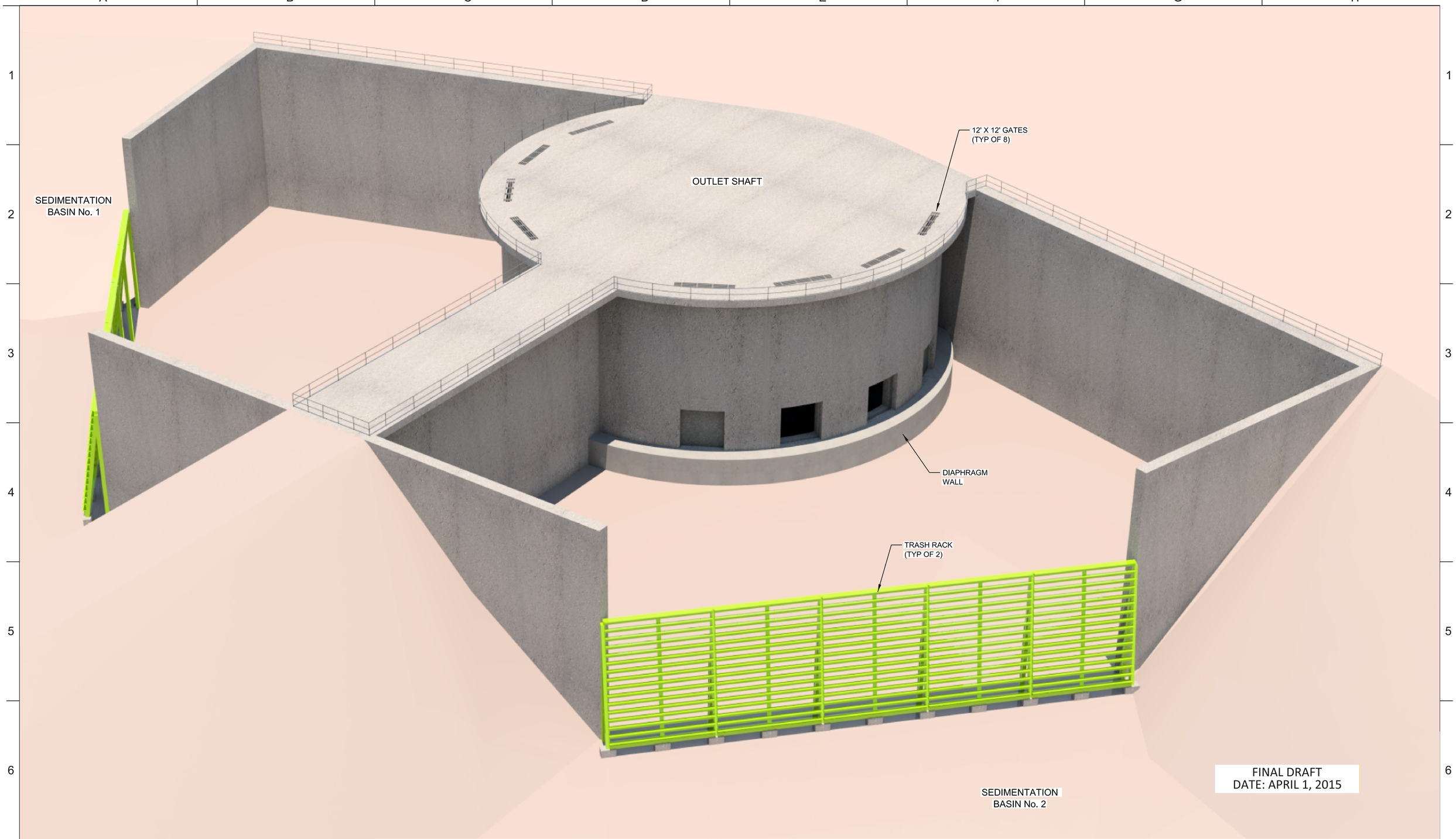
DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL CONCRETE BOX CONDUIT ISOMETRIC

PROJECT NO. 240010
SHEET NO. CCO - M - 4019IT
REV 0
SEQUENCE NO. 19 OF 96



FINAL DRAFT
DATE: APRIL 1, 2015

REV	DATE	DESCRIPTION	SUB.	APPD

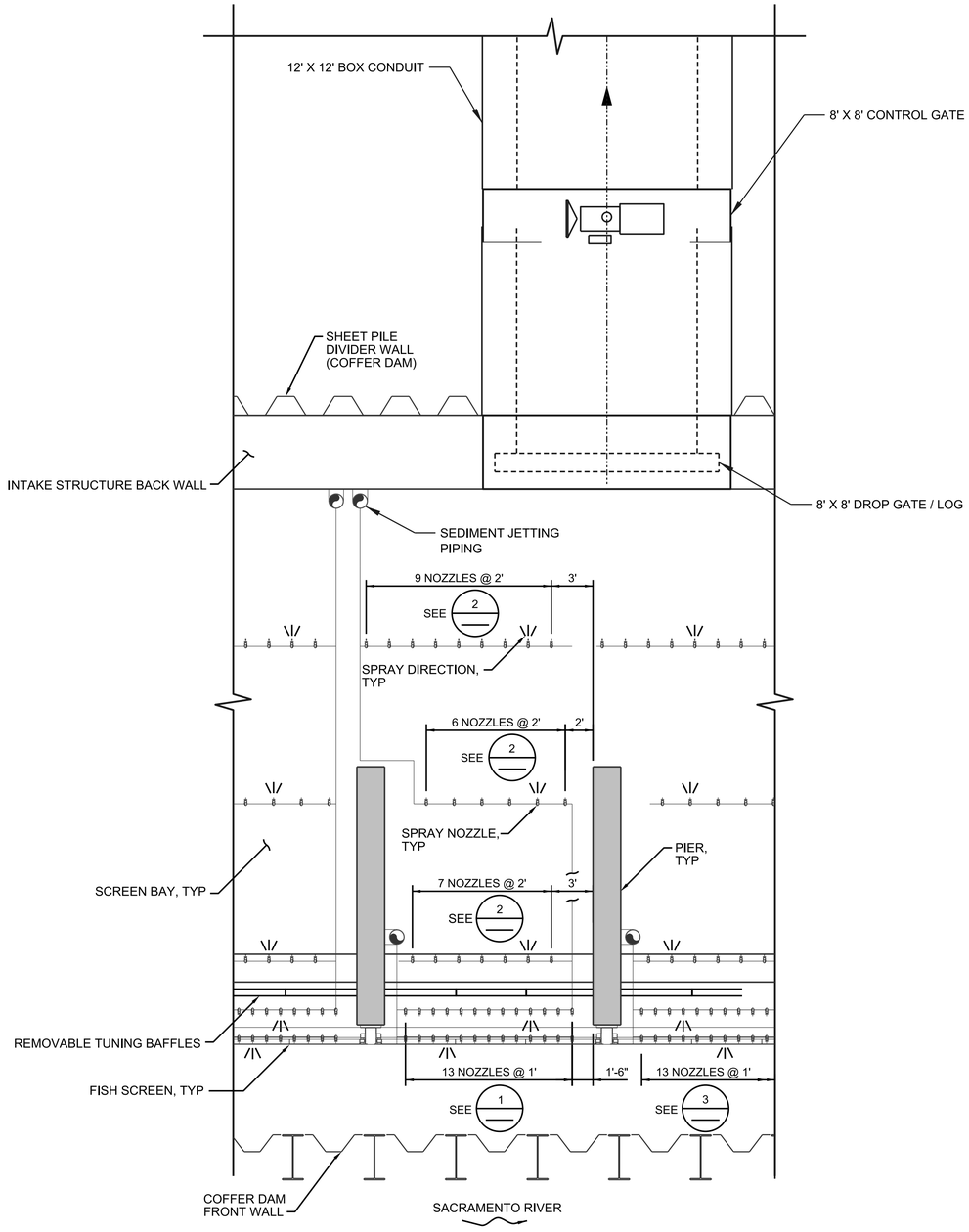
DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

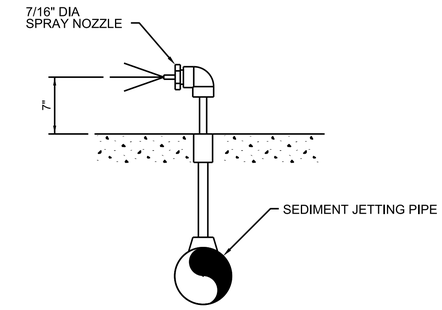
TYPICAL OUTLET SHAFT ISOMETRIC

PROJECT NO.	
240010	
SHEET NO.	
CCO - M - 4020IT	
REV	SEQUENCE NO.
0	20 OF 96



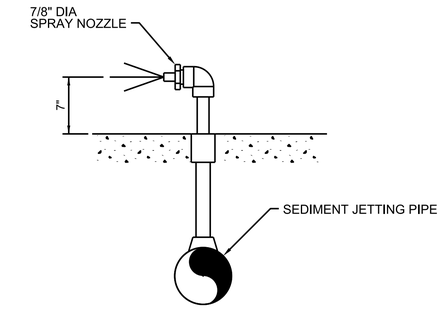
BELOW DECK

1 PARTIAL PLAN
3/16"=1'-0"



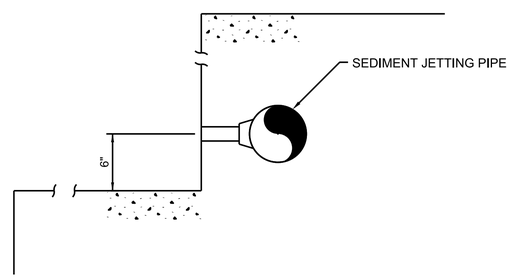
SPRAY NOZZLE

1 DETAIL
NTS



SPRAY NOZZLE

2 DETAIL
NTS



3 DETAIL
NTS

FINAL DRAFT
DATE: APRIL 1, 2015

CCO-M-4016IT

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

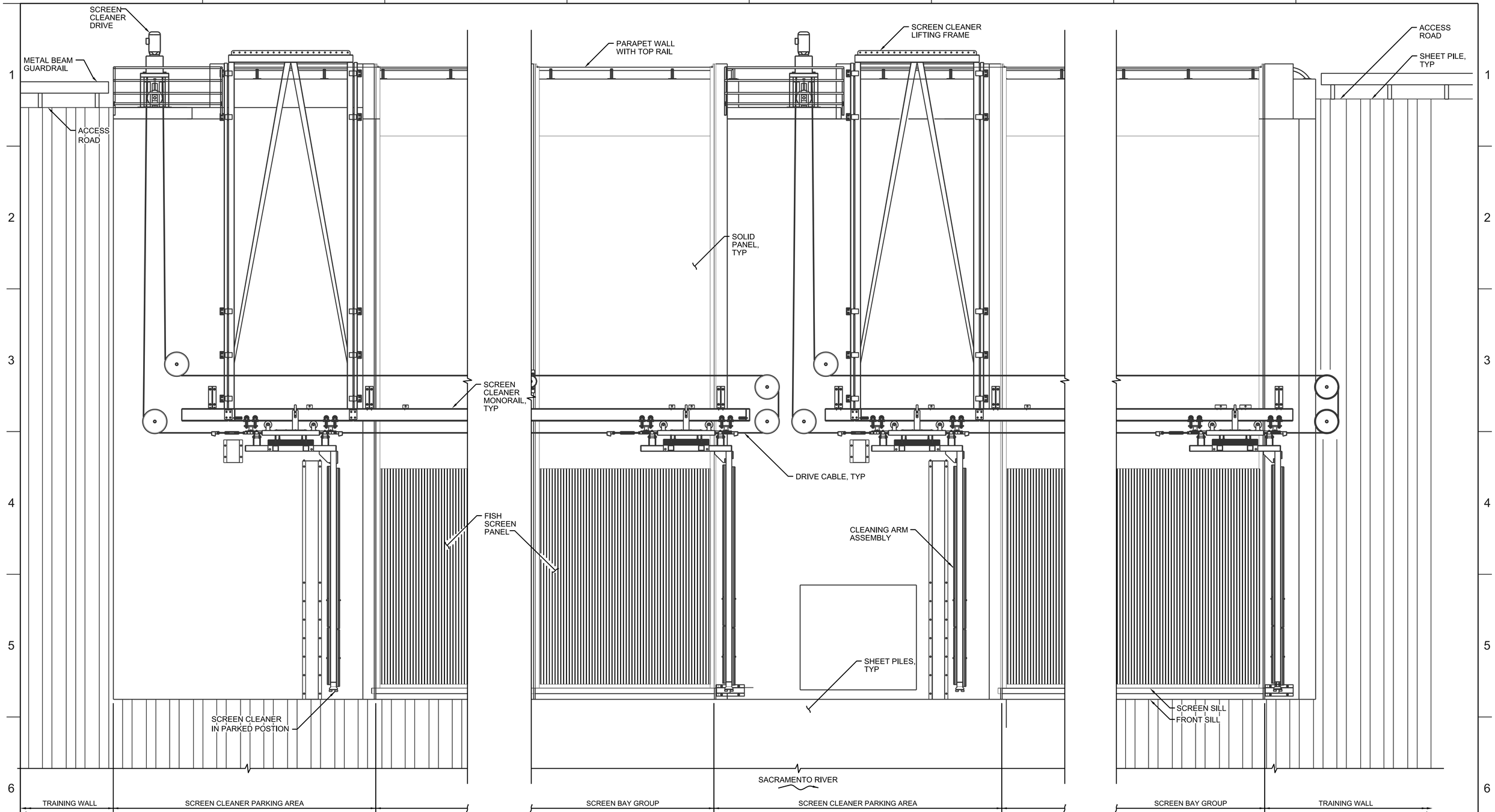
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE SEDIMENT JETTING PARTIAL PLAN AND DETAILS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

PROJECT NO. 240010
SHEET NO. CCO - M - 4021IT
REV 0
SEQUENCE NO. 21 OF 96



A ELEVATION
NTS

CCO-M-4021IT

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

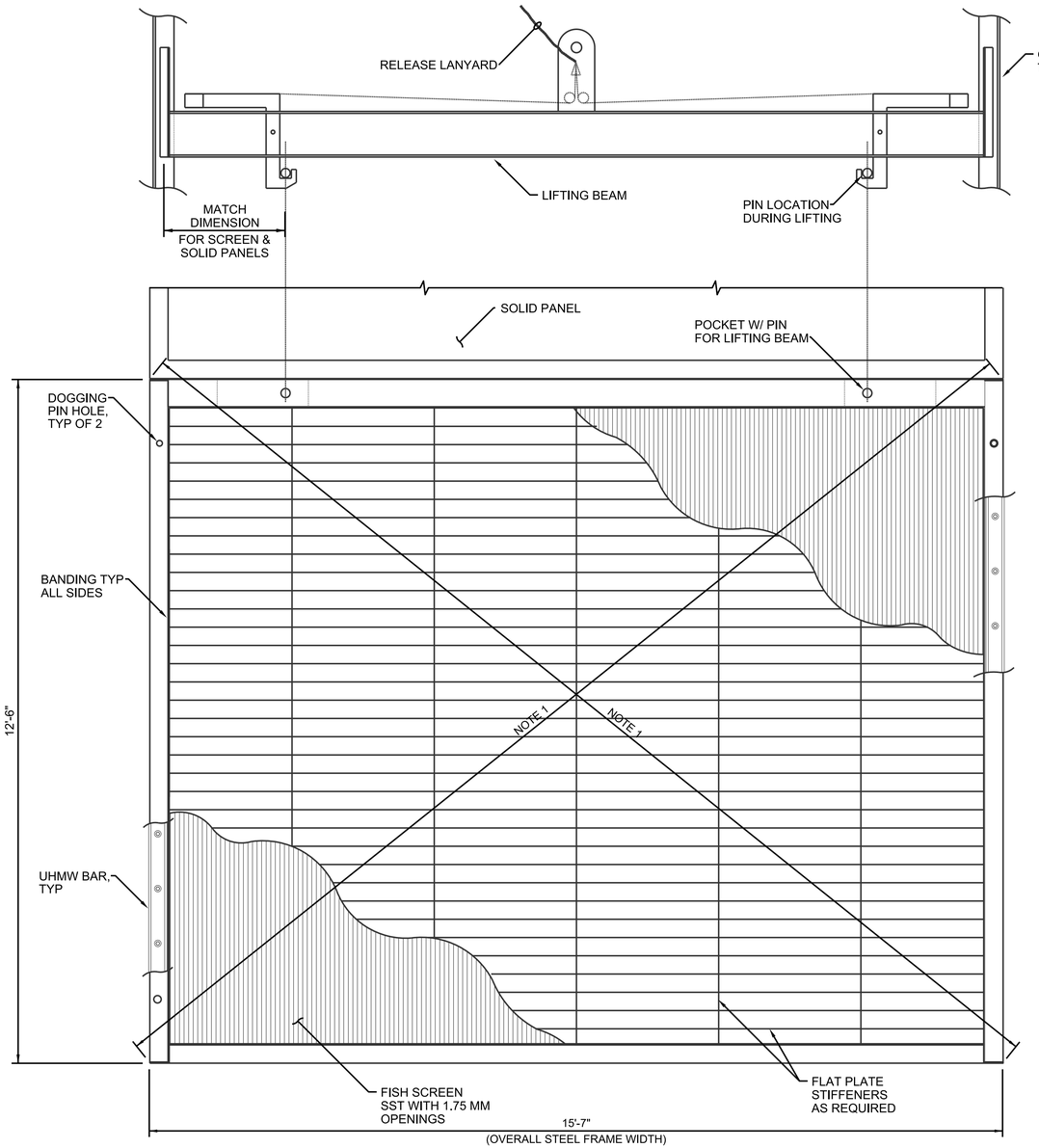
DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

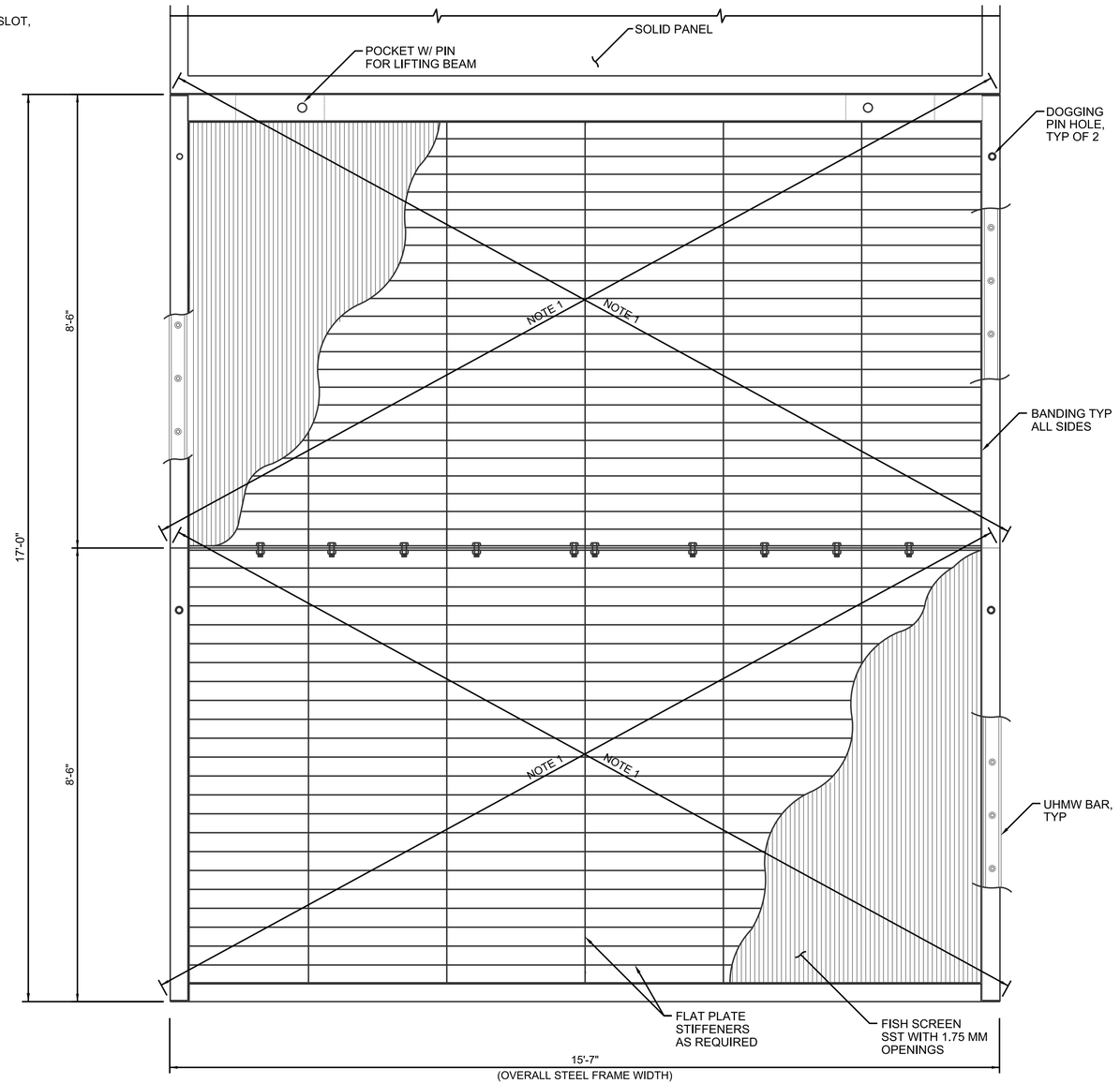
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE STRUCTURE ELEVATION

PROJECT NO. 240010
SHEET NO. CCO - M - 2022IT
REV 0
SEQUENCE NO. 22 OF 96





NOTES:

1. DIAGONAL DIMENSIONS OF ALL PANELS SHALL BE EQUAL. ALLOWABLE TOLERANCE IS +/- 1/8".
2. PROVIDE 3 SPARE FISH SCREEN PANELS PER INTAKE.

INTAKE NO. 2 & NO. 5

A ELEVATION
3/4"=1'-0"
CCO-M-4021IT

INTAKE NO. 3

B ELEVATION
3/4"=1'-0"
CCO-M-4021IT

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

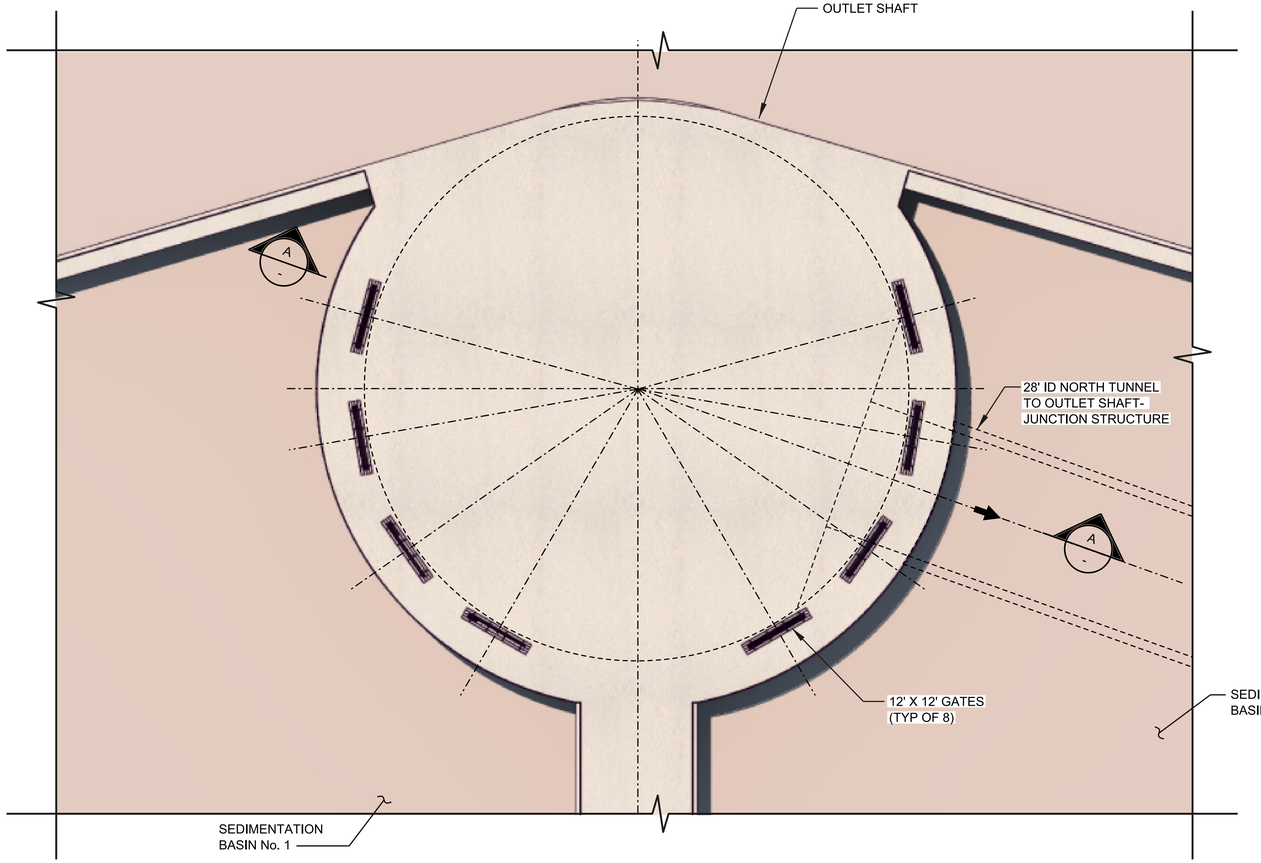
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE FISH SCREEN PANEL ELEVATIONS

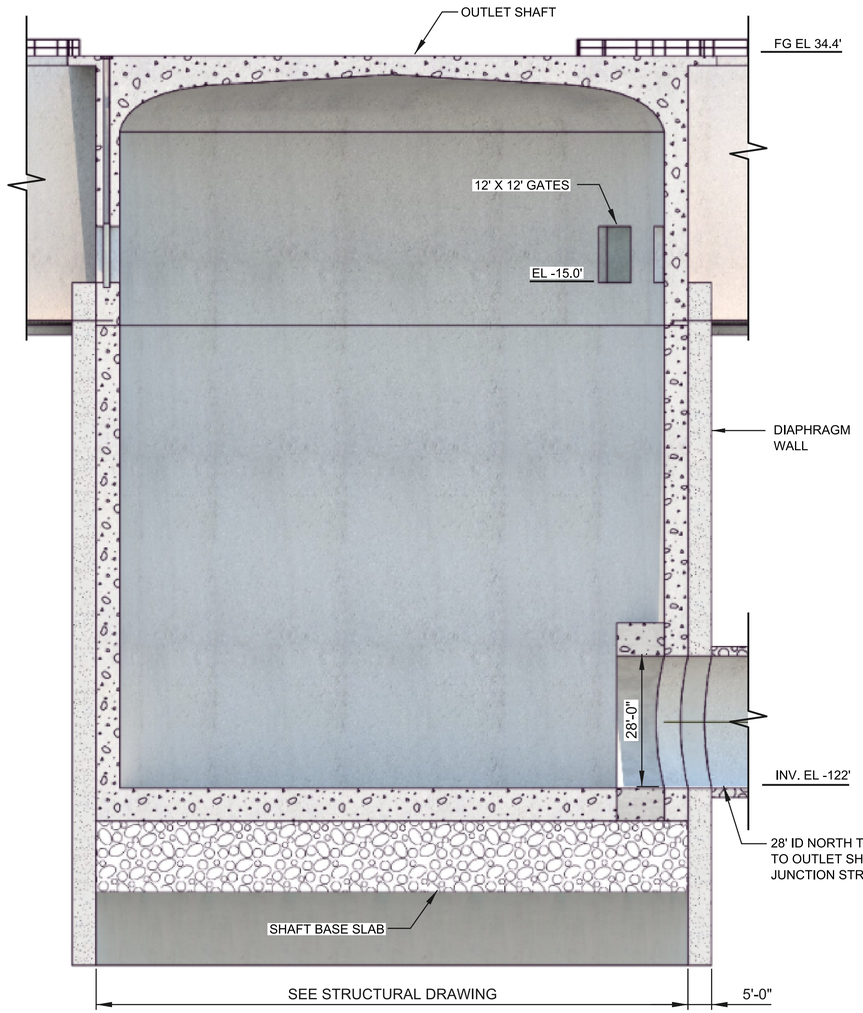
PROJECT NO. 240010
SHEET NO. CCO - M - 2023IT
REV 0
SEQUENCE NO. 23 OF 96



INTAKE No. 2

1 PLAN
1/16" = 1'-0"

CCO-M-1015IT



A SECTION
1/16" = 1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

1/16 " = 1'-0" 0 16 32 48 FEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

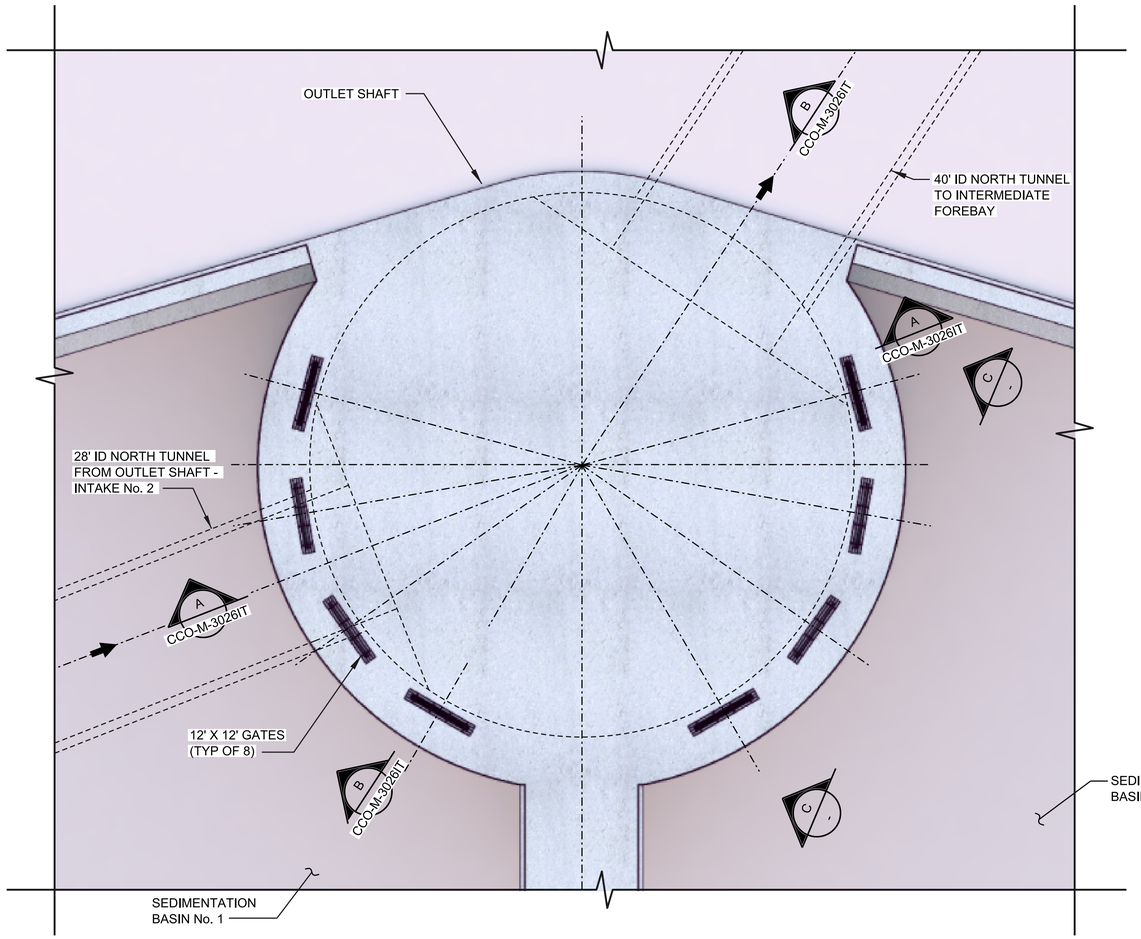
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OUTLET SHAFT @ INTAKE NO. 2
PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4024IT
REV 0
SEQUENCE NO. 24 OF 96

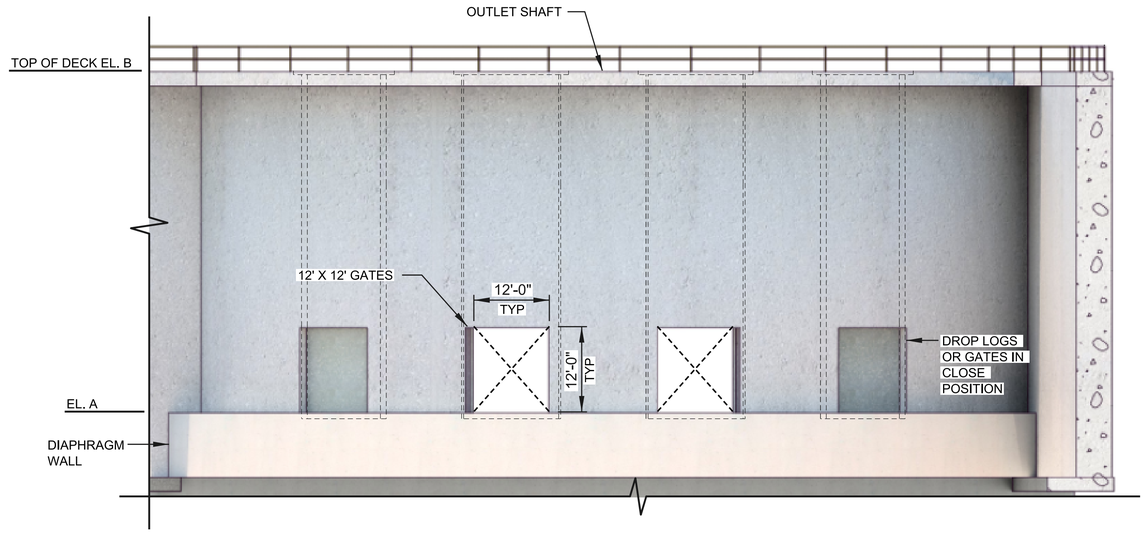


INTAKE No. 3

1 PLAN

1/16" = 1'-0"

CCO-M-1015IT



TYPICAL FOR INTAKE No. 2, 3 & 5

C SECTION

3/32" = 1'-0"

ELEVATION SCHEDULE		
INTAKE NO.	A	B
2	-15'	34.4'
3	-20'	33.4'
5	-16'	32.2'

FINAL DRAFT
DATE: APRIL 1, 2015

3/32" = 1'-0" 0 16 32 FEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

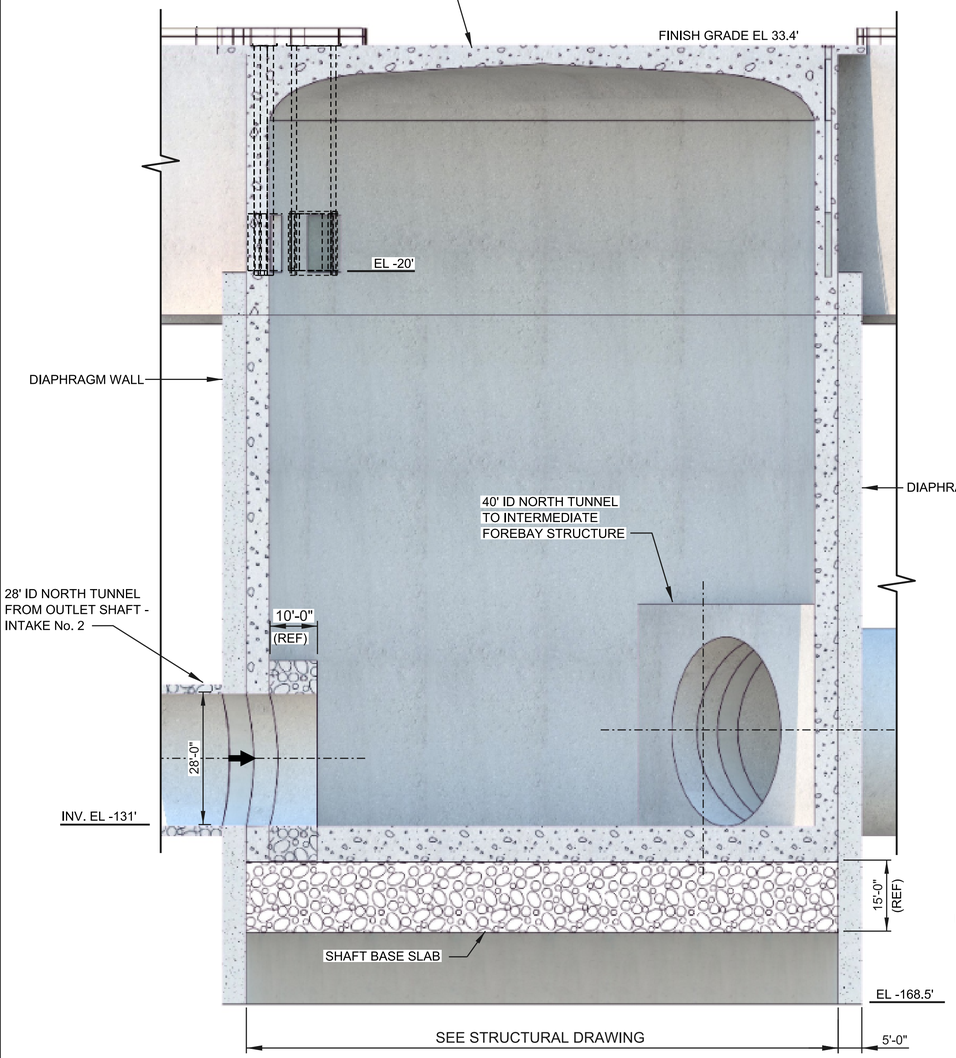
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OUTLET SHAFT @ INTAKE NO. 3 PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4025IT
REV 0
SEQUENCE NO. 25 OF 96

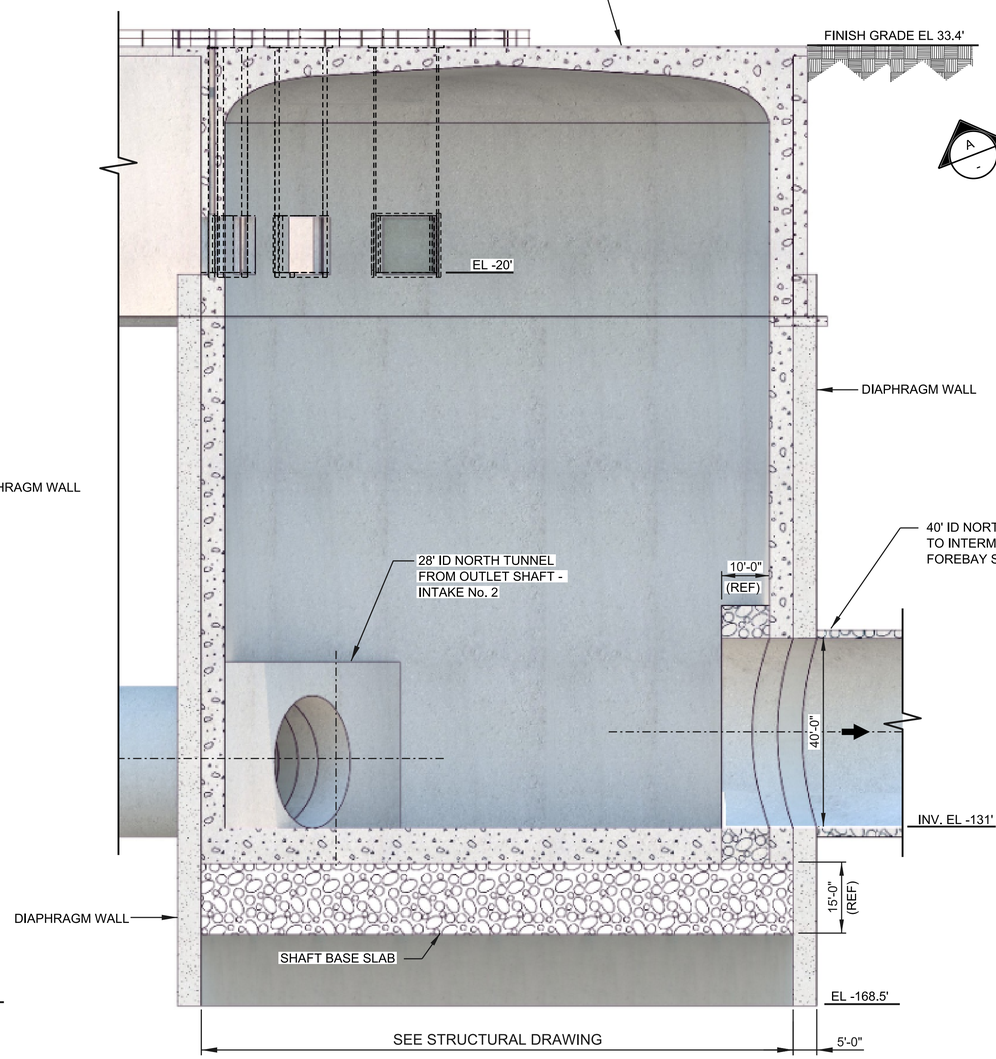


OUTLET SHAFT / JUNCTION STRUCTURE

A SECTION

1/16" = 1'-0"

CCO-M-4025IT

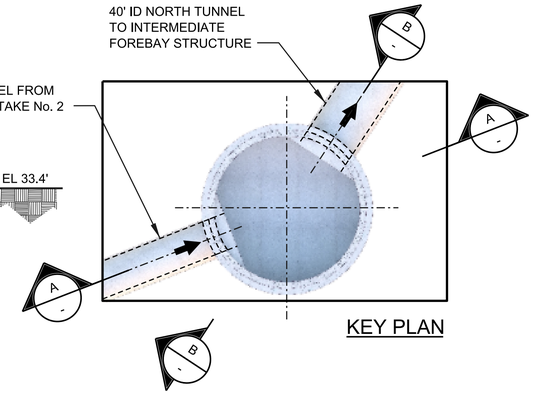


OUTLET SHAFT / JUNCTION STRUCTURE

B SECTION

1/16" = 1'-0"

CCO-M-4025IT



KEY PLAN

FINAL DRAFT
DATE: APRIL 1, 2015

1/16 " = 1'-0" 0 16 32 48 FEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED — APPROVAL RECOMMENDED

DRAWN — APPROVAL BY

CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

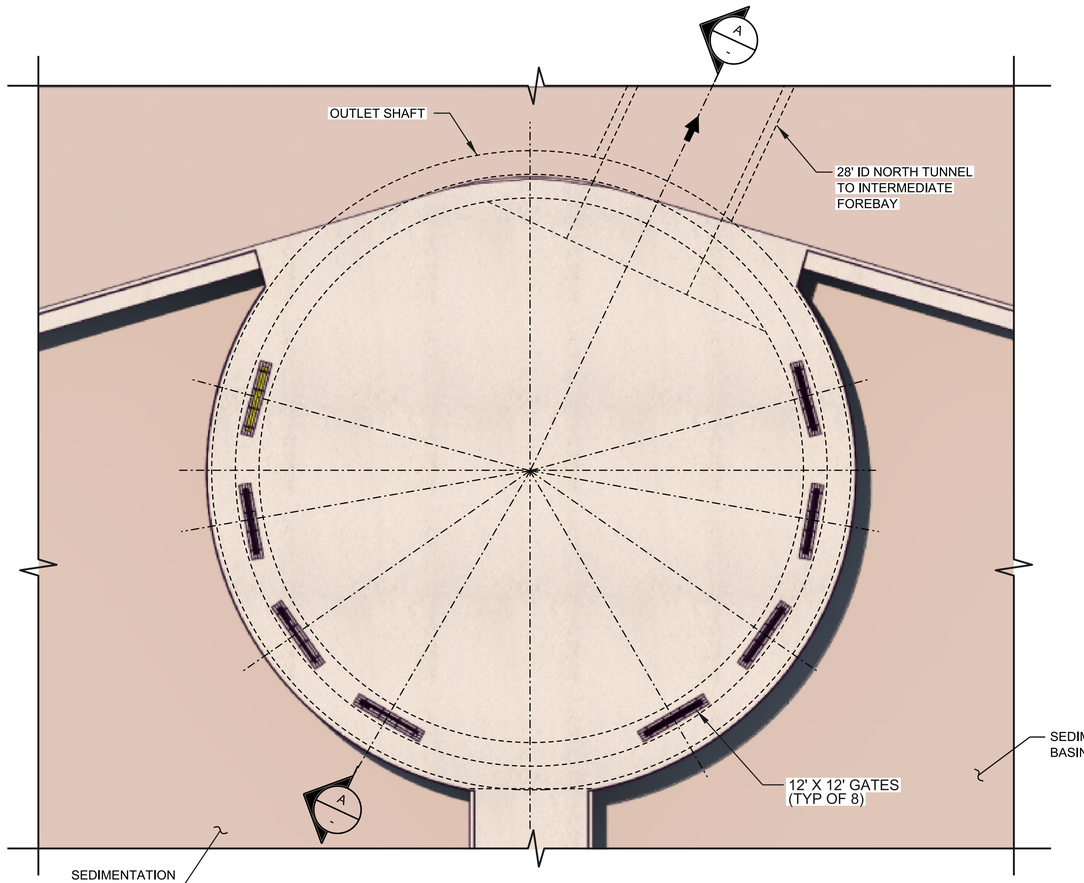
OUTLET SHAFT @ INTAKE NO. 3 SECTIONS

PROJECT NO. 240010

SHEET NO. CCO - M - 3026IT

REV 0

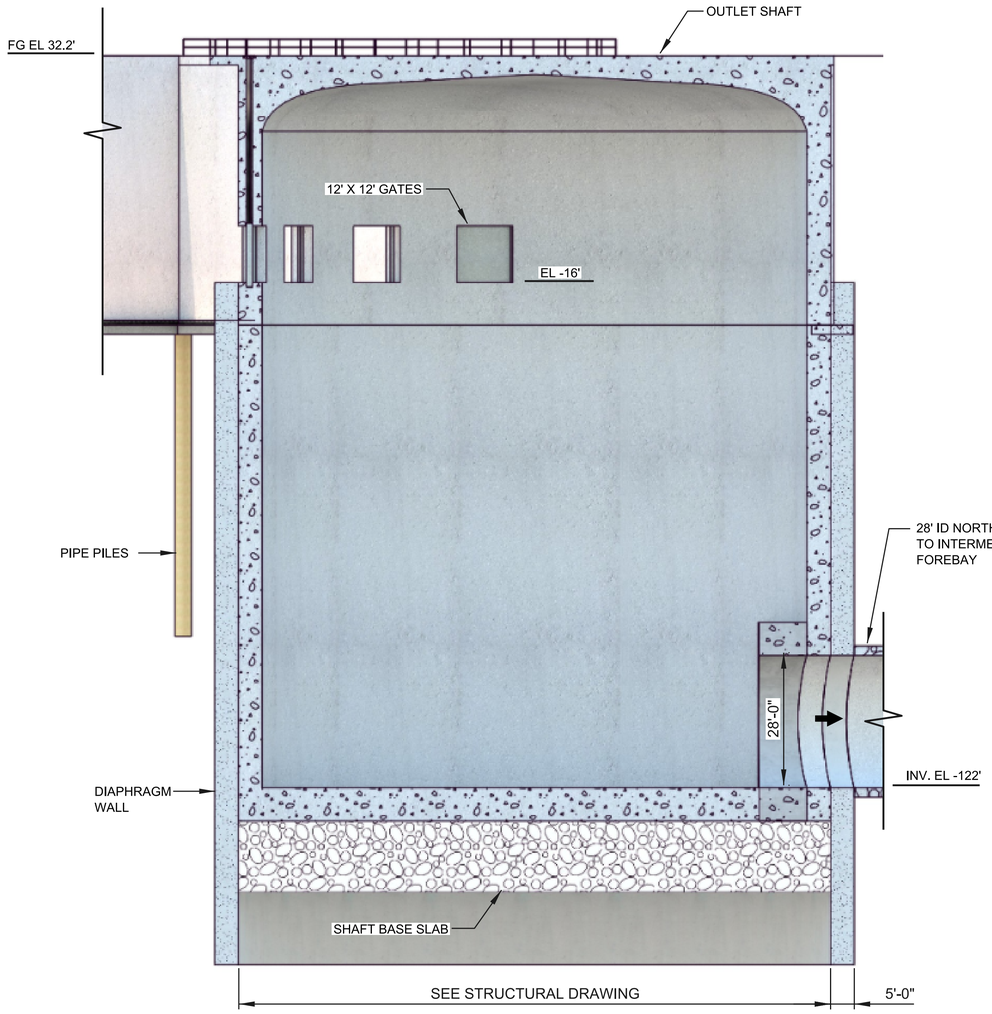
SEQUENCE NO. 26 OF 96



INTAKE No. 5

1 PLAN
1/16" = 1'-0"

CCO-M-1015IT



A SECTION
1/16" = 1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

1/16 " = 1'-0" 0 16 32 48 FEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

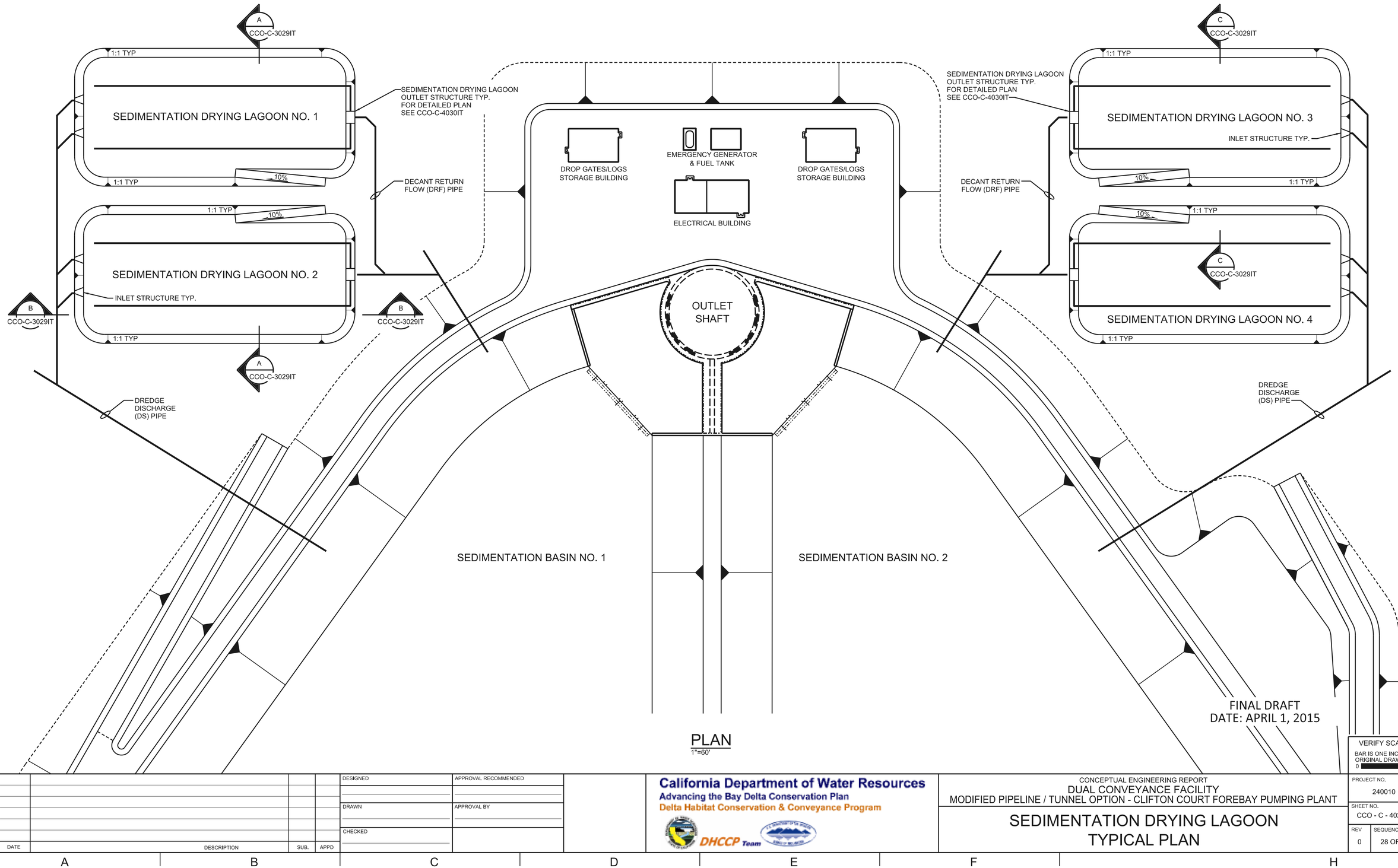
OUTLET SHAFT @ INTAKE NO. 5
PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4027IT
REV 0
SEQUENCE NO. 27 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\06 Mechanical\CCO-M-027-240010.dgn

Edited By: Mendez,Martin

Printed By: Mendez,Martin



PLAN
1"=60'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

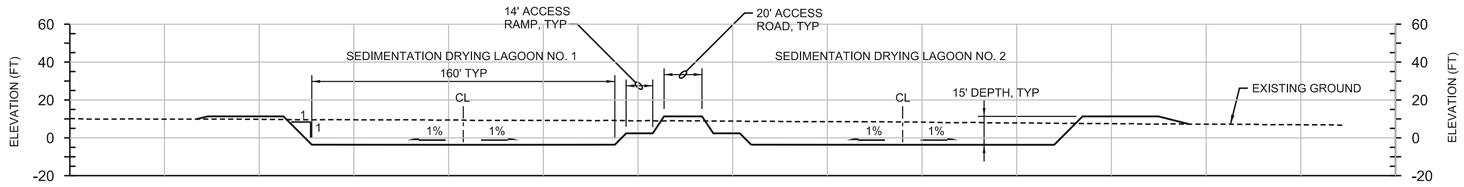
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

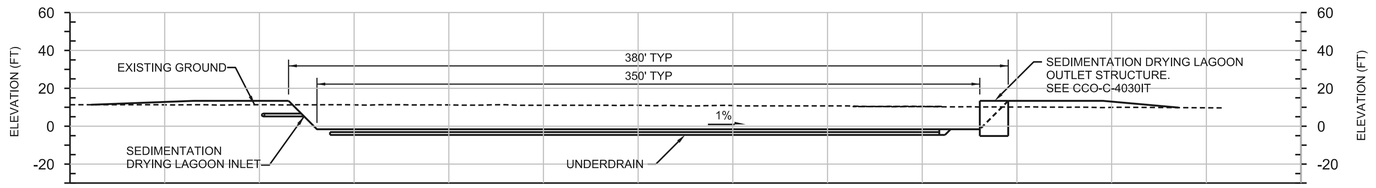
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

SEDIMENTATION DRYING LAGOON TYPICAL PLAN

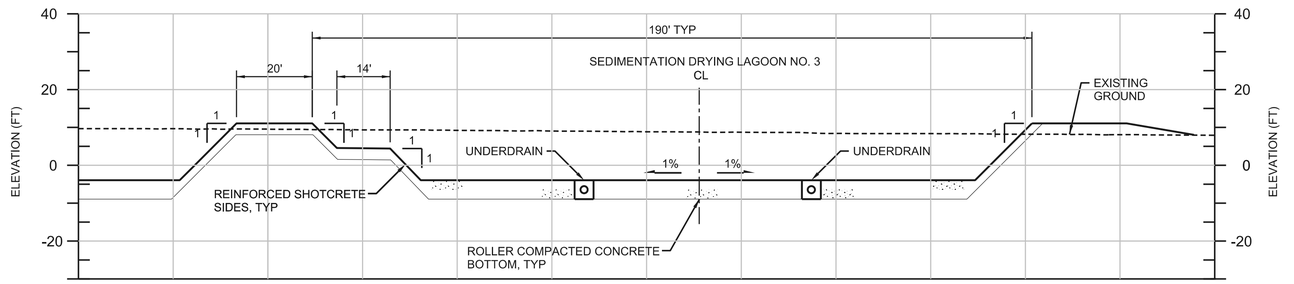
PROJECT NO. 240010
SHEET NO. CCO - C - 4028IT
REV 0
SEQUENCE NO. 28 OF 96



A SECTION
1"=40'
CCO-C-4028IT



B SECTION
1"=40'
CCO-C-4028IT



C SECTION
1"=20'
CCO-C-4028IT

NOTES:

1. SOLIDS LAGOON SECTIONS ARE REPRESENTATIVE OF INTAKE NO. 2. INTAKES NO. 3 AND 5 ARE SIMILAR IN SIZE AND DEPTH, EXCEPT SURROUNDING FINISH GRADE ELEVATIONS VARY.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

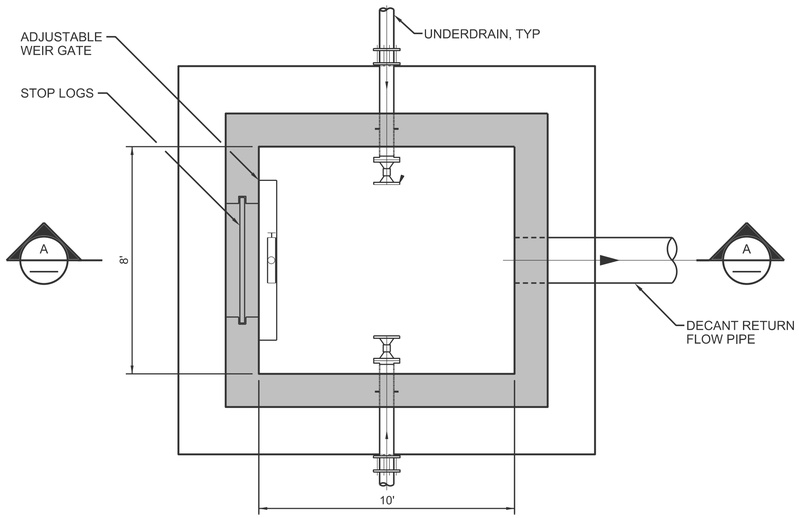
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

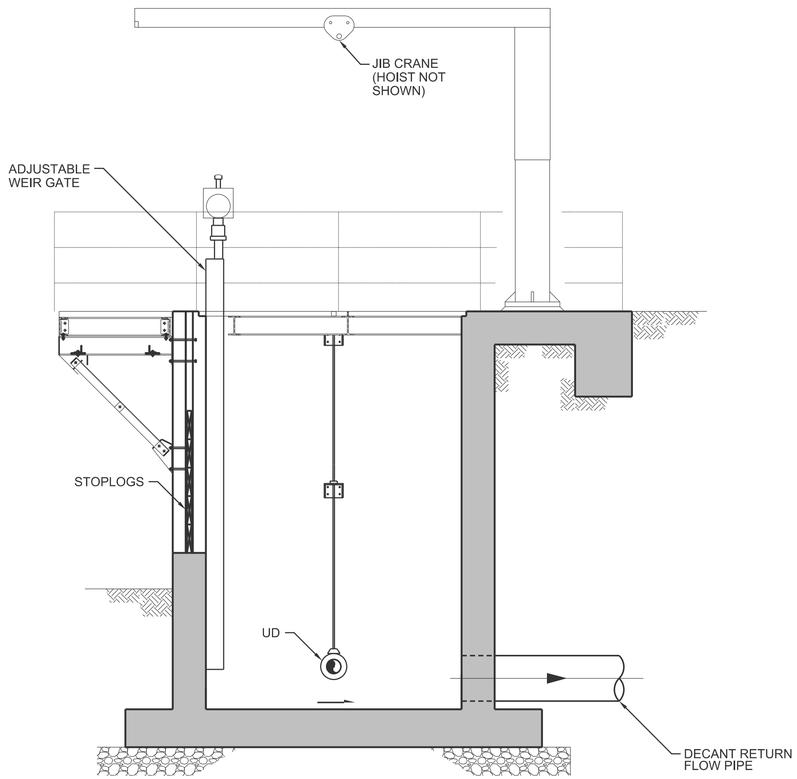
SEDIMENTATION DRYING LAGOON TYPICAL SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - C - 3029IT
REV 0
SEQUENCE NO. 29 OF 96



SOLIDS LAGOON OUTLET STRUCTURE

1 PLAN
1"=3/8"=1'-0"
CCO-C-4028IT



A SECTION
3/8"=1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

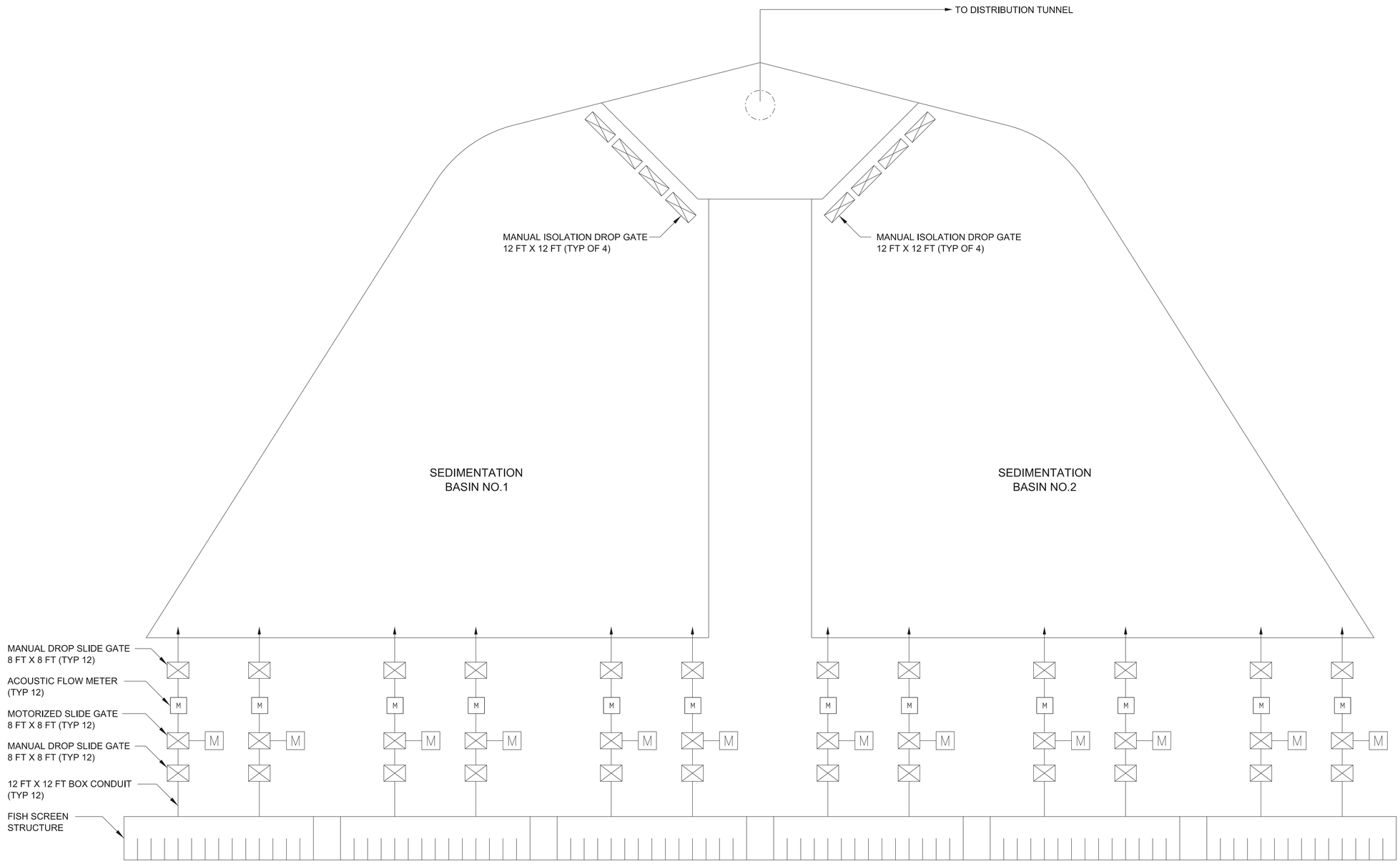
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

SEDIMENTATION DRYING LAGOON OUTLET PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - C - 4030IT
REV 0
SEQUENCE NO. 30 OF 96



INTAKE STRUCTURE (TYP 3)

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

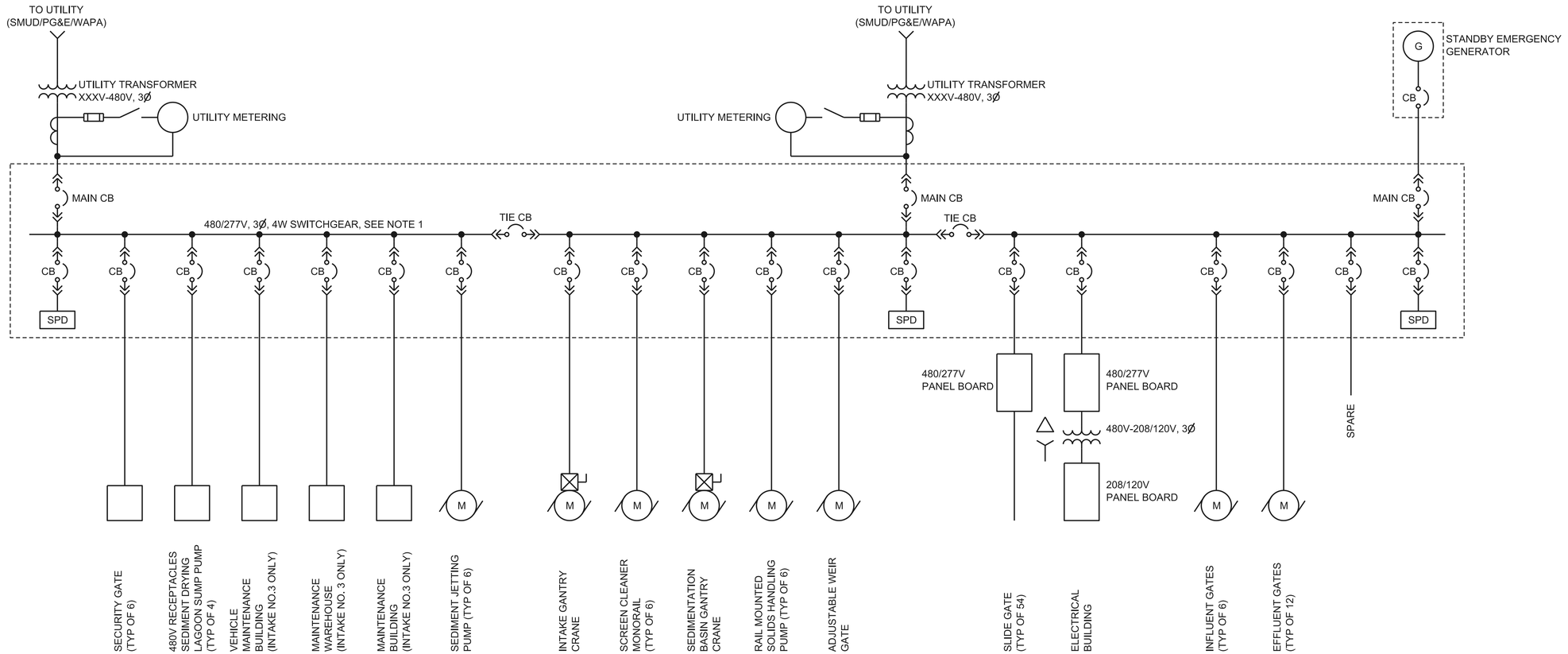
DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE PROCESS FLOW DIAGRAM

PROJECT NO. 240010
SHEET NO. CCO - I - 6031IT
REV 0
SEQUENCE NO. 31 OF 96



INTAKE NO.3 SINGLE LINE DIAGRAM

NTS

(TYPICAL OF INTAKES NO. 2 AND NO. 5)

NOTE:

1. SWITCHGEAR SHALL BE LOCATED WITHIN ELECTRICAL ROOM.

GENERAL NOTE:

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200 YEAR FLOODPLAIN.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTAKE
SINGLE LINE DIAGRAM

PROJECT NO. 240010
SHEET NO. CCO - E - 6032IT
REV 0
SEQUENCE NO. 32 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\07 Electrical\CCO-E-032-240010

Edited By: Bautista,Jav
Printed By: Mendez,Martin

DRIVE SHAFT
STA. 3460+96

28' ID NORTH TUNNEL

INTAKE No. 2

3460+96

3450

3400

R=7500'

RECEPTION SHAFT/
JUNCTION STRUCTURE
STA. 3355+86

3350

INTAKE No. 3

SACRAMENTO RIVER

3300

STONE LAKE

40' ID NORTH TUNNEL

3250

3200

R=2000'

3150

3100

3050

INTERMEDIATE FOREBAY
SEE CCO-C-1056IF

DRIVE SHAFT
NORTH TUNNEL
STA. 3000+00

28' ID TUNNEL

INTAKE No. 5

RANDALL ISLAND

N

FINAL DRAFT
DATE: APRIL 1, 2015

NOTE:
1. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL ELEVATION DATASET (NED). DATA IS FOR PRELIMINARY USE ONLY.

PLAN
1"=1500'

PROFILE
VERTICAL EXAGGERATION = x50

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

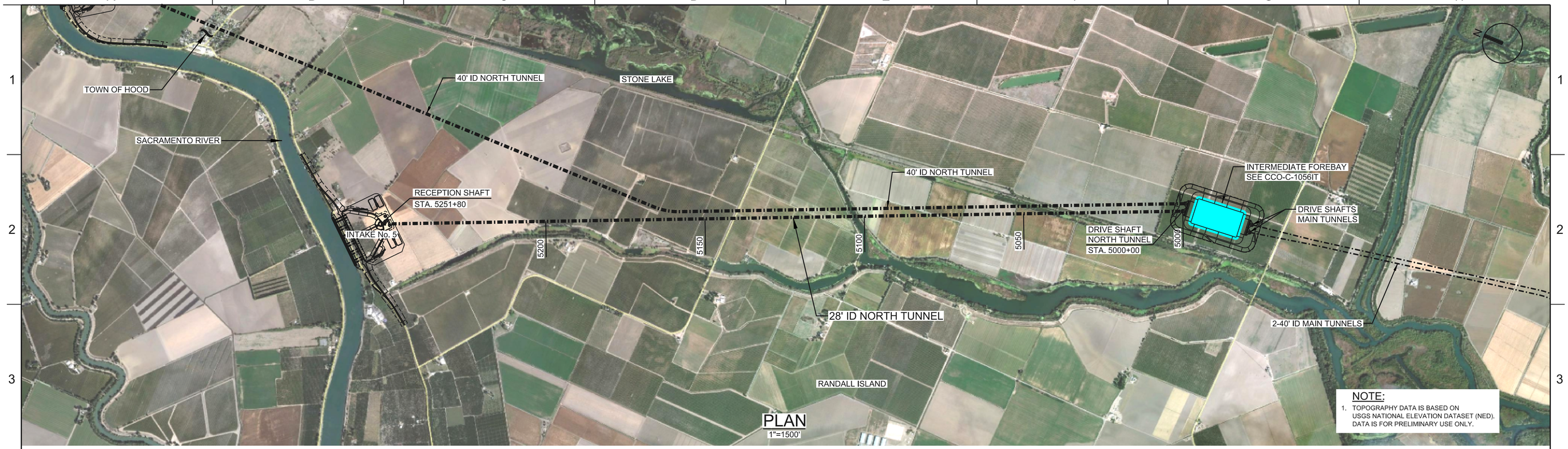
NORTH TUNNELS - PLAN AND PROFILE
INTAKE NO. 2 TO INTERMEDIATE FOREBAY

PROJECT NO. 240010
SHEET NO. CCO - C - 1033TN
REV 0
SEQUENCE NO. 33 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-033-240010

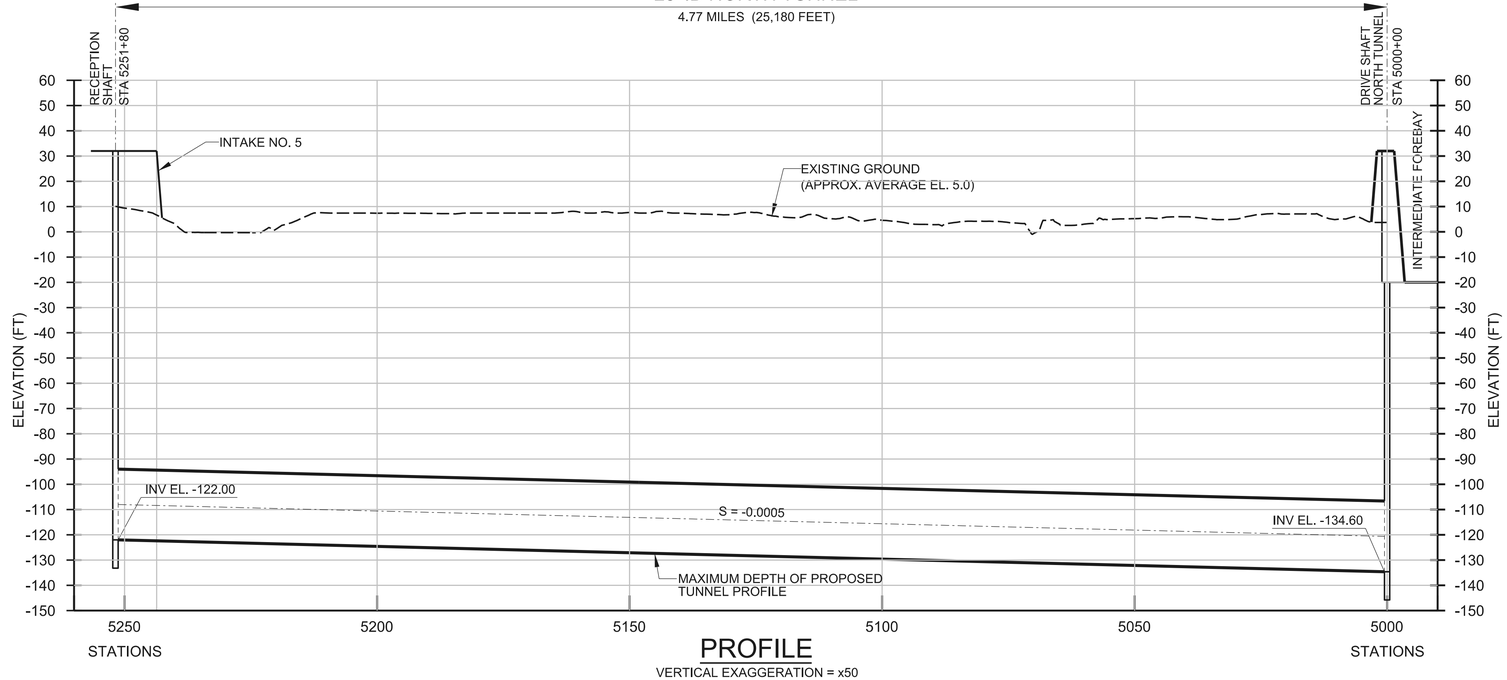
Edited By: Bautista,Jav

Printed By: Bautista,Jav



PLAN
1"=1500'

NOTE:
1. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL ELEVATION DATASET (NED). DATA IS FOR PRELIMINARY USE ONLY.



PROFILE
VERTICAL EXAGGERATION = x50

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

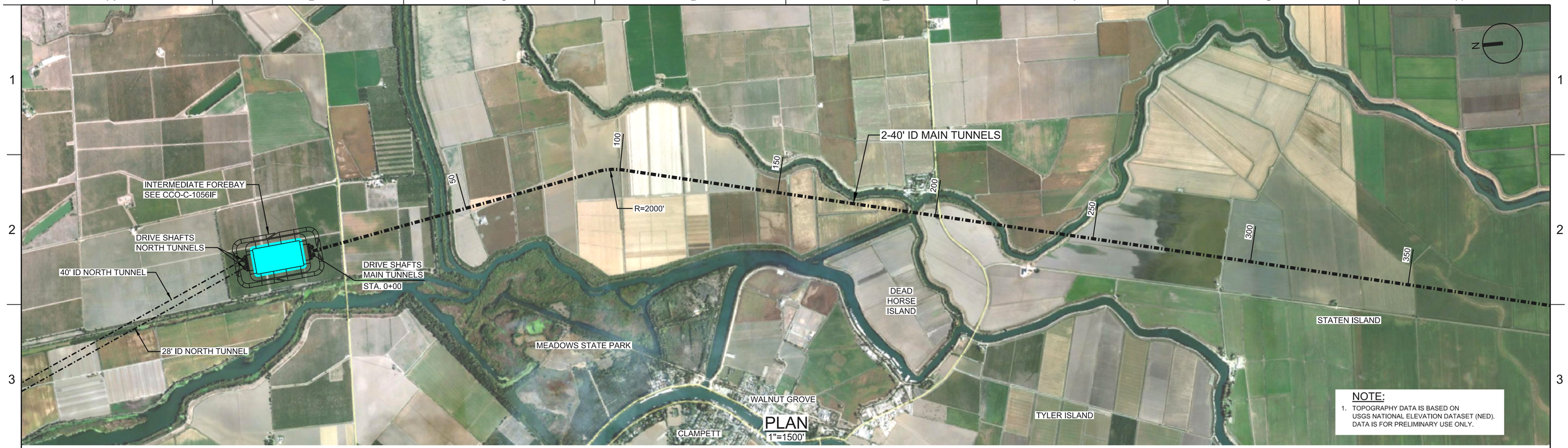
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

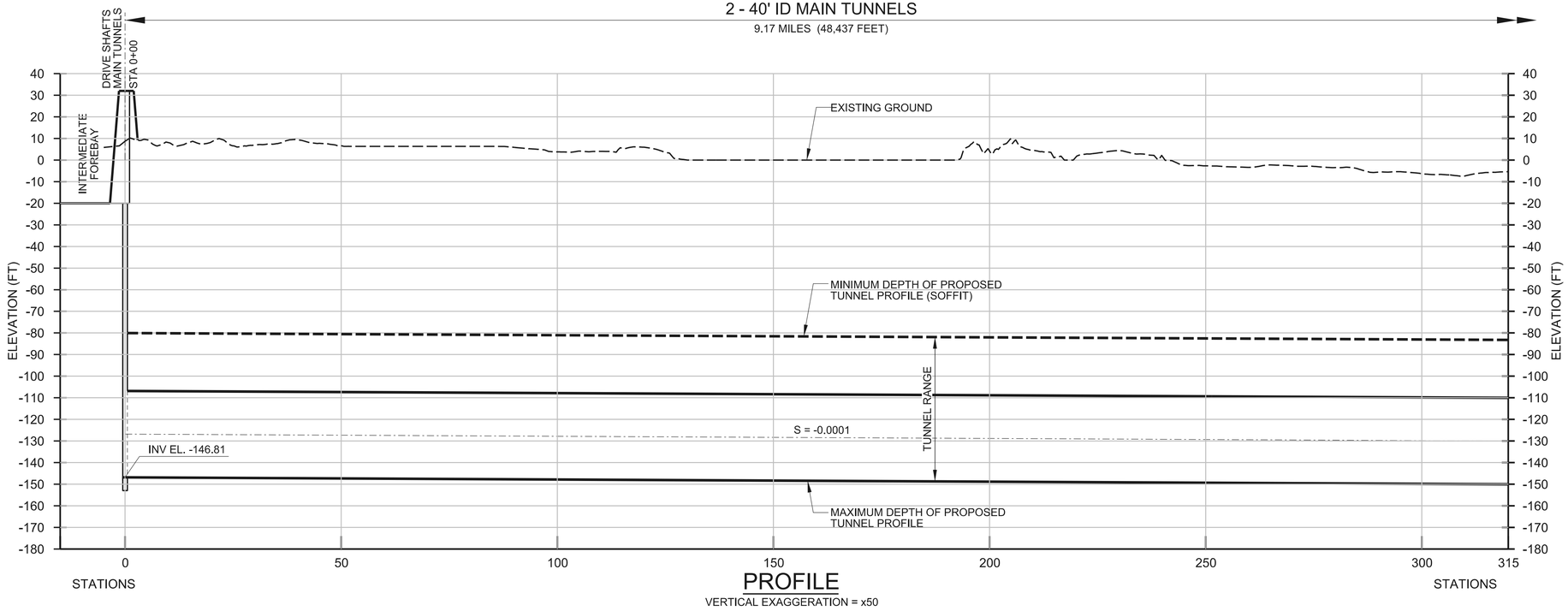
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH TUNNELS - PLAN AND PROFILE
INTAKE NO. 5 TO INTERMEDIATE FOREBAY

PROJECT NO. 240010
SHEET NO. CCO - C - 1034TN
REV 0 | SEQUENCE NO. 34 OF 96





PROFILE
VERTICAL EXAGGERATION = x50

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

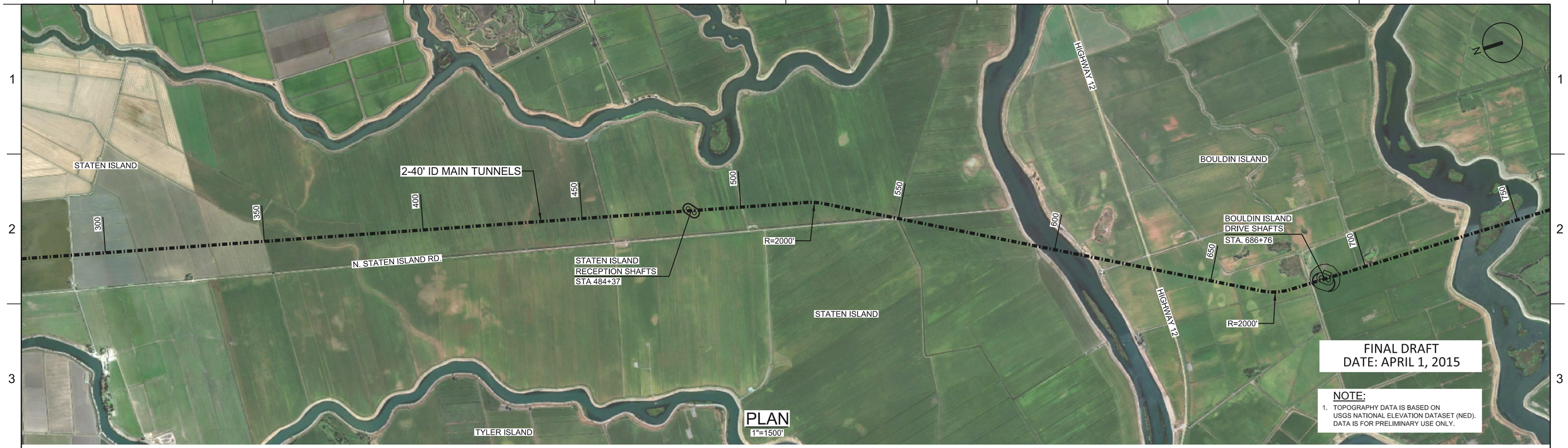
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS
PLAN AND PROFILE - SHEET 1 OF 4

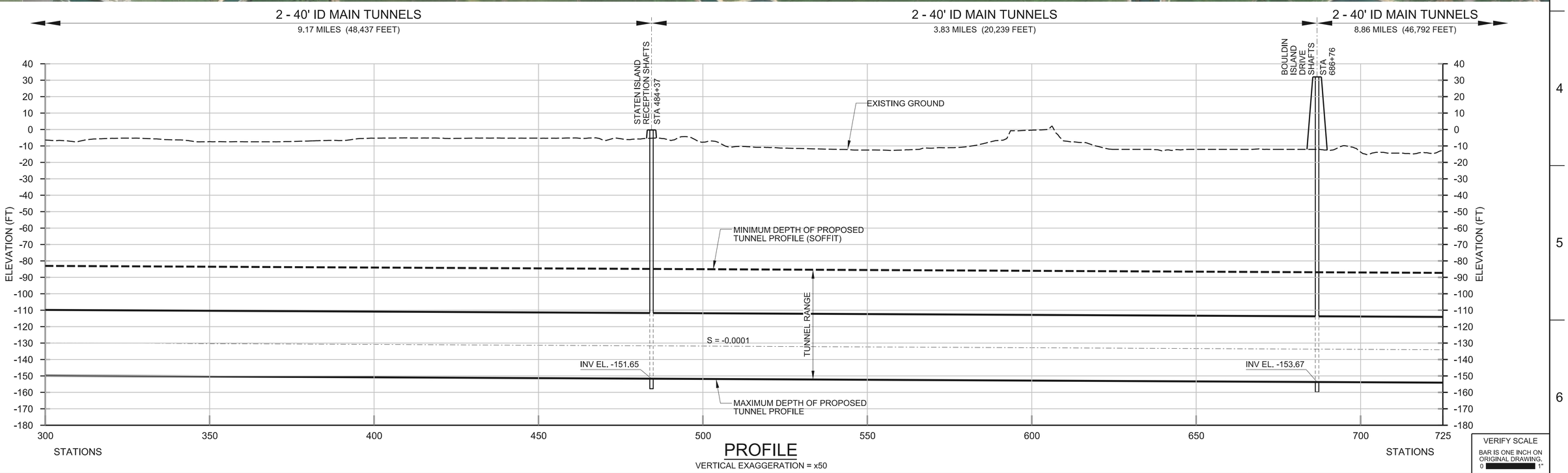
PROJECT NO. 240010
SHEET NO. CCO - C - 1035TN
REV 0
SEQUENCE NO. 35 OF 96



PLAN
1"=1500'

FINAL DRAFT
DATE: APRIL 1, 2015

NOTE:
1. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL ELEVATION DATASET (NED). DATA IS FOR PRELIMINARY USE ONLY.



PROFILE
VERTICAL EXAGGERATION = x50

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

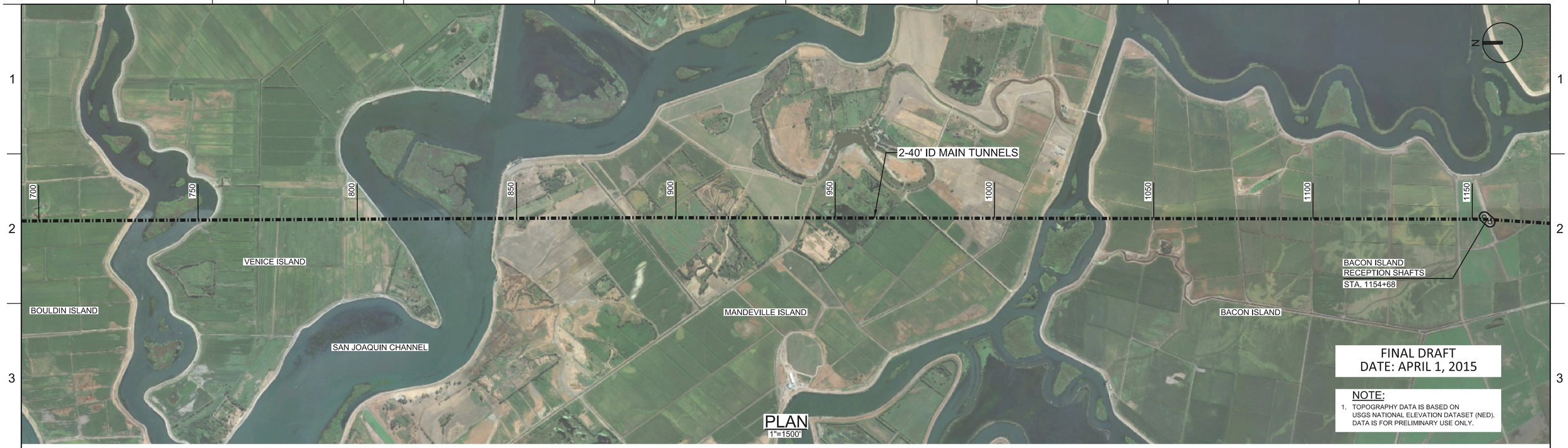
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS
PLAN AND PROFILE - SHEET 2 OF 4

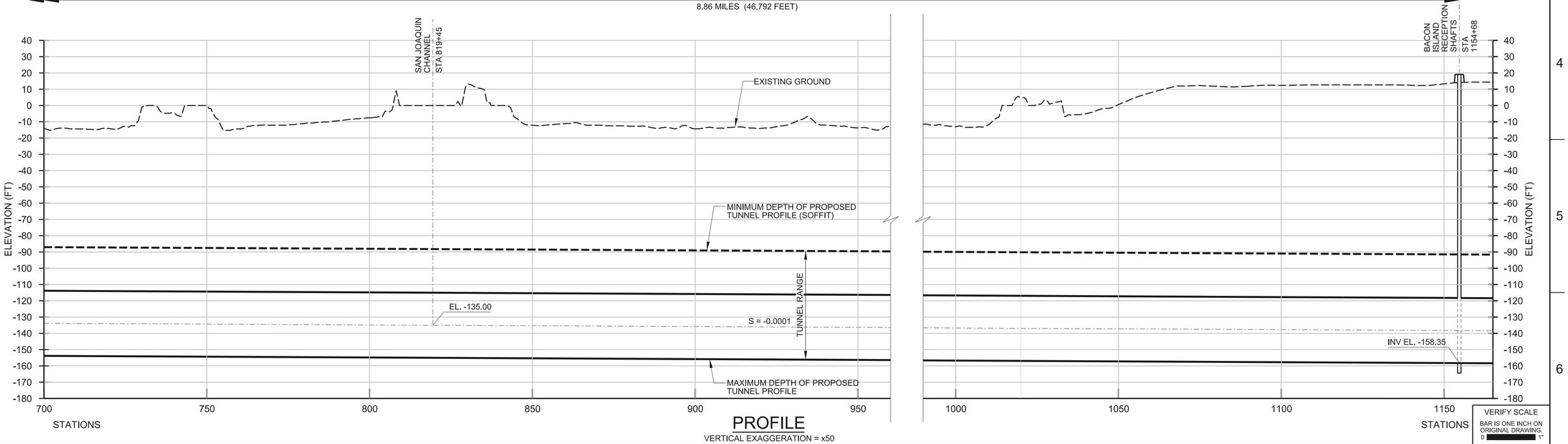
PROJECT NO. 240010
SHEET NO. CCO - C - 1036TN
REV 0
SEQUENCE NO. 36 OF 96



PLAN
1"=1500'

FINAL DRAFT
DATE: APRIL 1, 2015

NOTE:
1. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL ELEVATION DATASET (NED). DATA IS FOR PRELIMINARY USE ONLY.



PROFILE
VERTICAL EXAGGERATION = x50

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

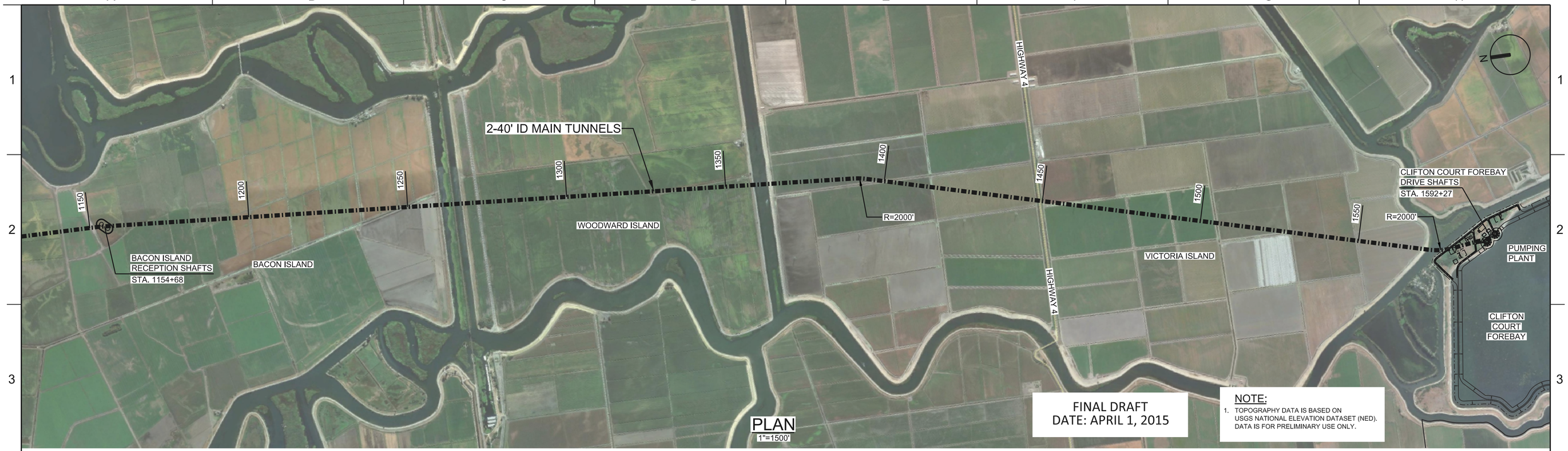
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS
PLAN AND PROFILE - SHEET 3 OF 4

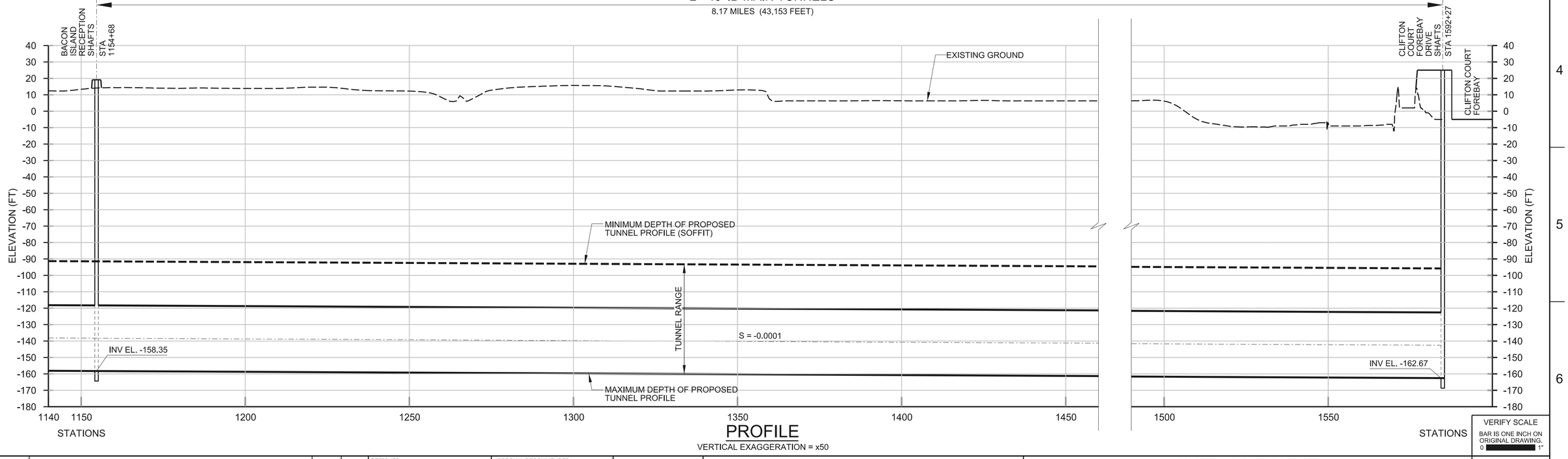
PROJECT NO. 240010
SHEET NO. CCO - C - 1037TN
REV 0
SEQUENCE NO. 37 OF 96



PLAN
1"=1500'

FINAL DRAFT
DATE: APRIL 1, 2015

NOTE:
1. TOPOGRAPHY DATA IS BASED ON USGS NATIONAL ELEVATION DATASET (NED). DATA IS FOR PRELIMINARY USE ONLY.



PROFILE
VERTICAL EXAGGERATION = x50

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

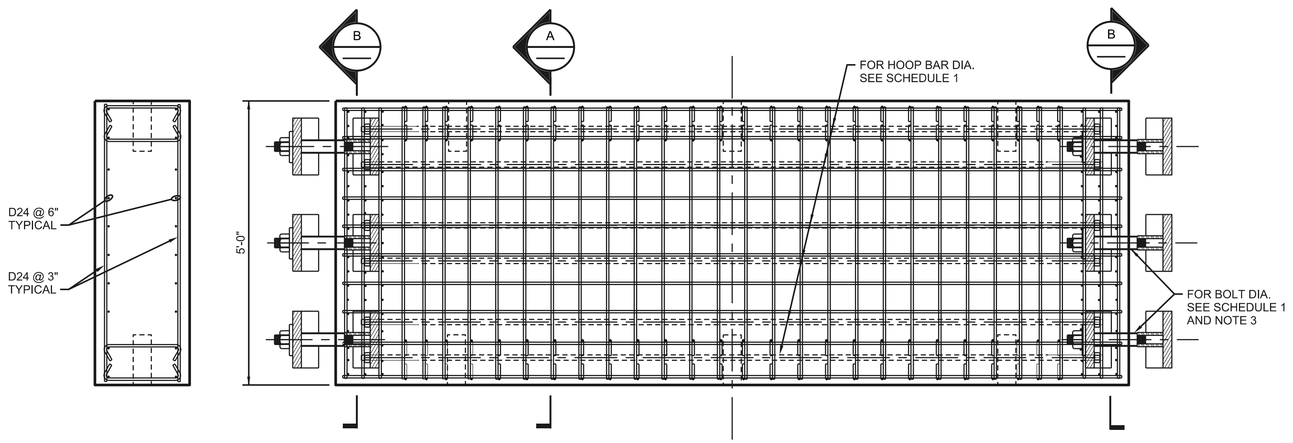
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS
PLAN AND PROFILE - SHEET 4 OF 4

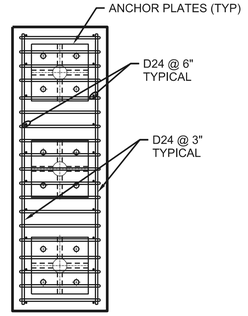
PROJECT NO. 240010
SHEET NO. CCO - C - 1038TN
REV 0
SEQUENCE NO. 38 OF 96



A SECTION
3/4"=1"

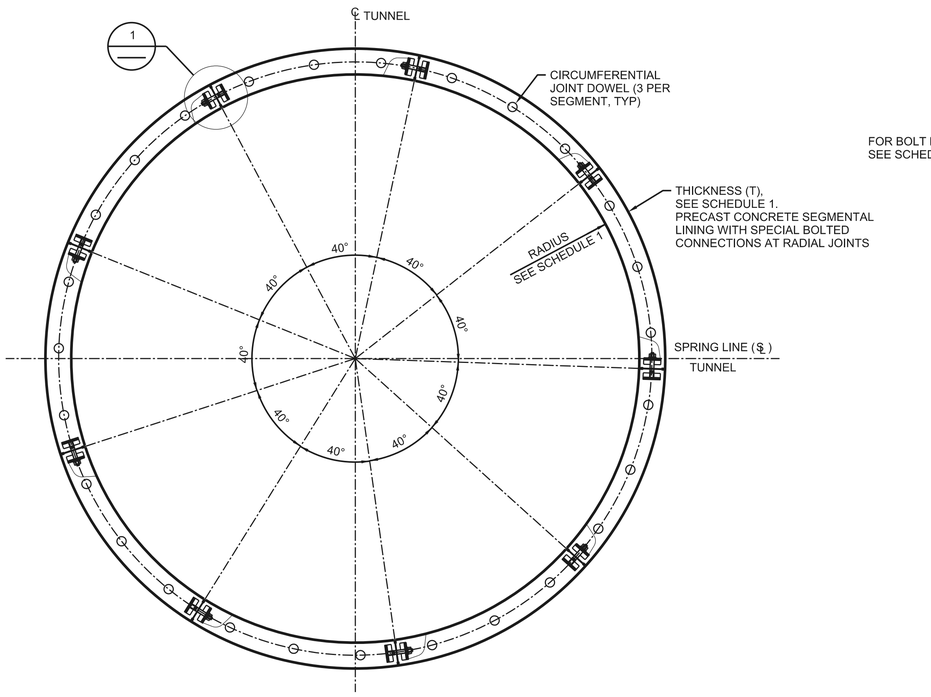
DEVELOPED INSIDE

ELEVATION
3/4"=1"

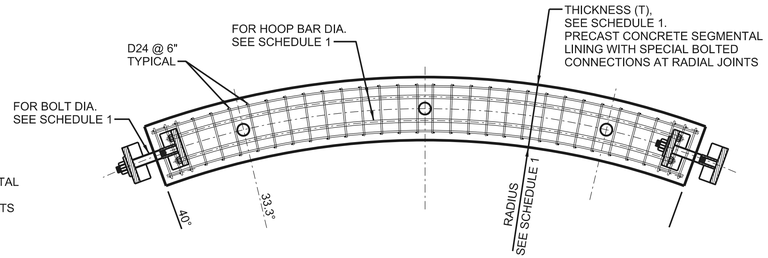


B SECTION
3/4"=1"

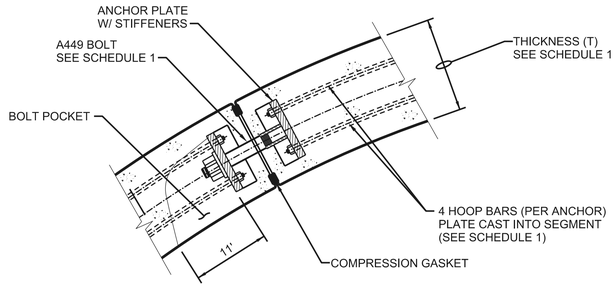
SCHEDULE 1					
REACH	MAX NET INTERNAL HEAD (FT)	INSIDE DIAMETER D (FT)	SEGMENT THICKNESS T (IN)	HOOP BAR SIZE	BOLT DIA (IN)
INTAKES 2, 5	15.5	28	16	#7	7/8



C SECTION
3/16"=1'-0"



PLAN OF SEGMENTAL CONCRETE LINING



1 DETAIL
1/8"=1'-0"

NOTES:

1. HOOP BAR STEEL fy = 60 ksi.
2. D24 REINFORCING STEEL IS FOR fy = 60 ksi.
   THE BAR SIZE MAY BE REDUCED TO D18
   FOR fy = 80ksi.
3. BOLTS SHALL CONFORM TO ASTM A325 or ASTM A449.
4. CONCRETE 28-DAY STRENGTH: 7000 psi.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

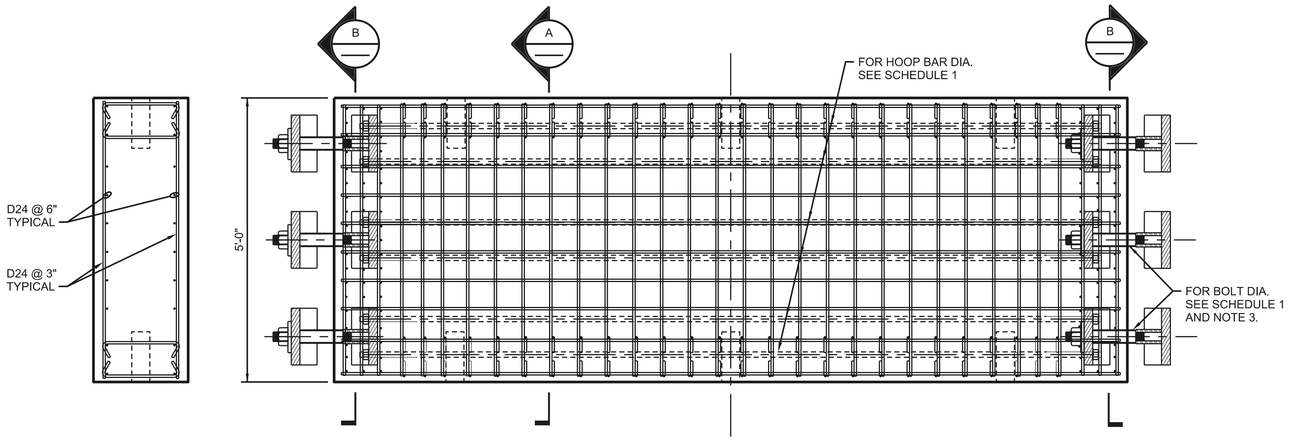
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

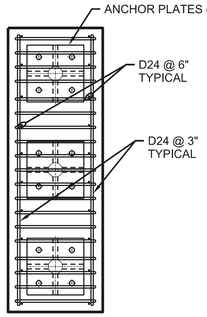
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

28' DIA. NORTH TUNNELS LINING DETAILS

PROJECT NO. 240010
SHEET NO. CCO - S - 4039TN
REV 0
SEQUENCE NO. 39 OF 96



A SECTION
3/4"=1"



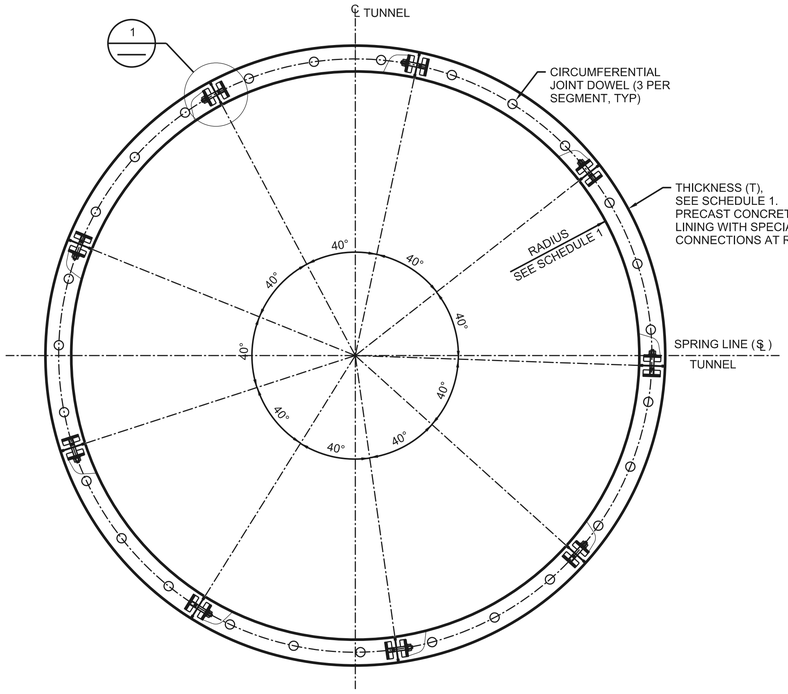
B SECTION
3/4"=1"

SCHEDULE 1

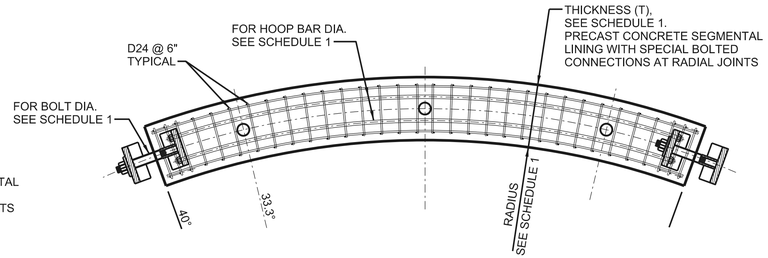
REACH	MAX NET INTERNAL HEAD (FT)	INSIDE DIAMETER D (FT)	SEGMENT THICKNESS T (IN)	HOOP BAR SIZE	BOLT DIA (IN)
JUNCTION STRUCTURE TO INTERMEDIATE FOREBAY	20	40	20	#8	1

DEVELOPED INSIDE

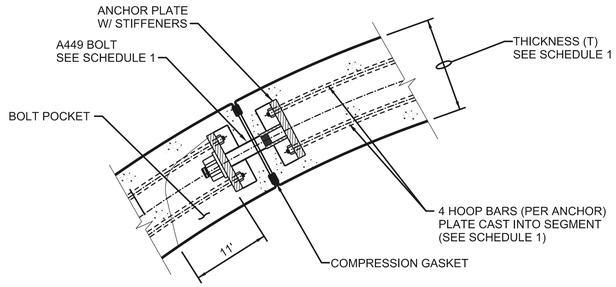
ELEVATION
3/4"=1"



C SECTION
3/16"=1'-0"



PLAN OF SEGMENTAL CONCRETE LINING



1 DETAIL
1/8"=1'-0"

NOTES:

1. HOOP BAR STEEL fy = 60 ksi.
2. D24 REINFORCING STEEL IS FOR fy = 60 ksi.
   THE BAR SIZE MAY BE REDUCED TO D18
   FOR fy = 80ksi.
3. BOLTS SHALL CONFORM TO ASTM A325 or ASTM A449.
4. CONCRETE 28-DAY STRENGTH: 7000 psi.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

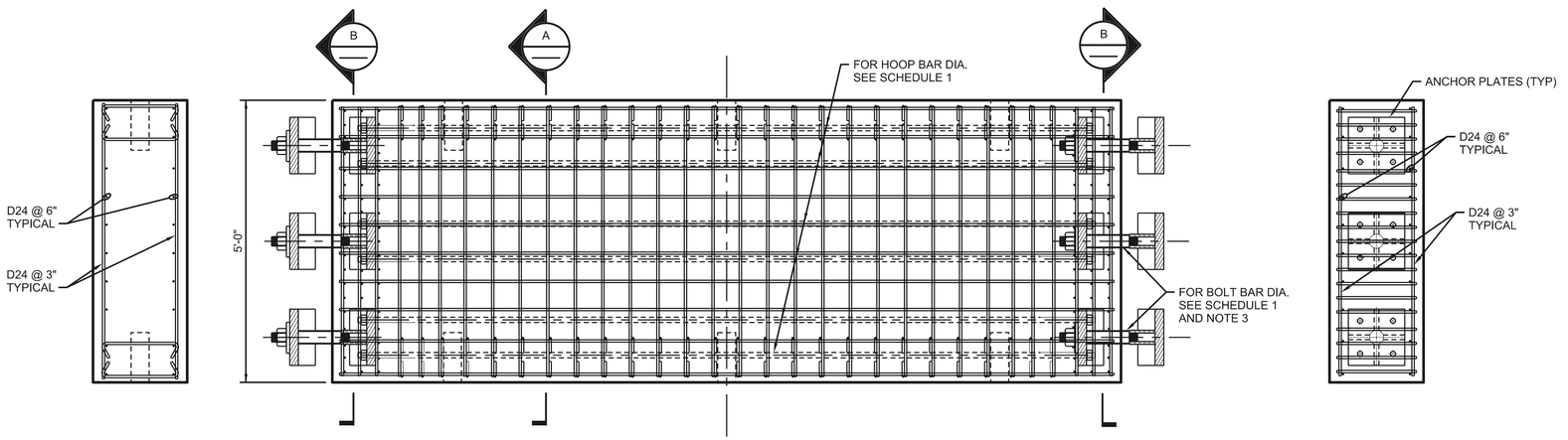
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

40' DIA. NORTH TUNNEL LINING DETAILS

PROJECT NO. 240010
SHEET NO. CCO - S - 4040TN
REV 0
SEQUENCE NO. 40 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\04 Structural\CCO-S-042-240010

Edited By: Bautista,Jav
Printed By: Bautista,Jav



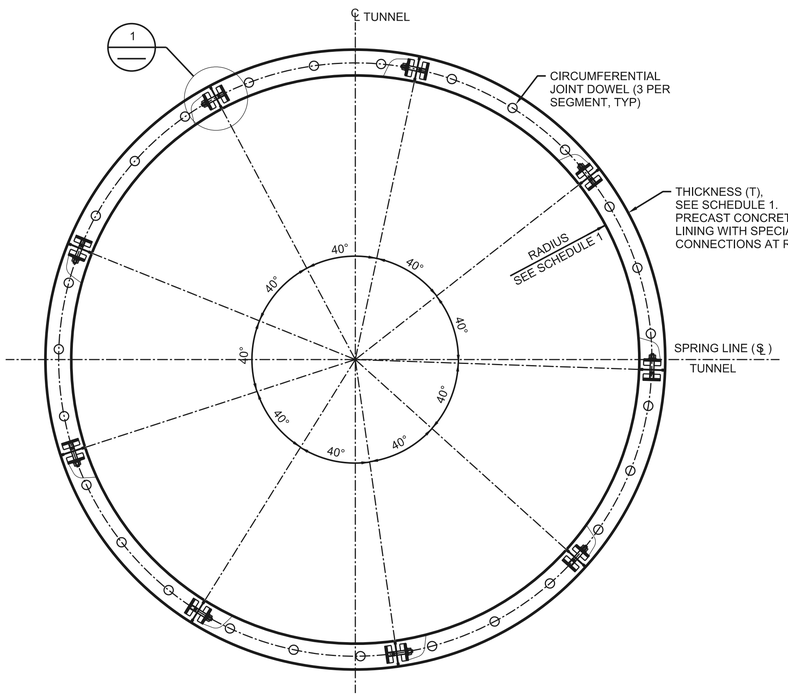
A SECTION
3/4"=1"

B SECTION
3/4"=1"

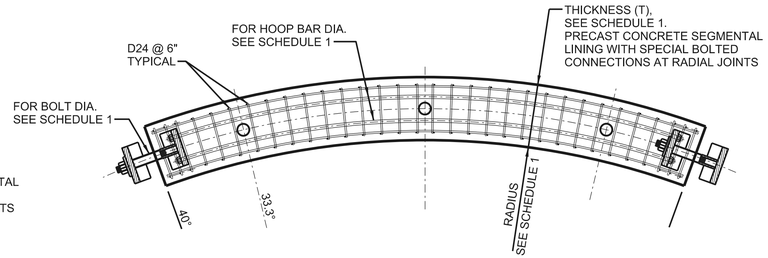
SCHEDULE 1					
REACH	MAX NET INTERNAL HEAD (FT)	INSIDE DIAMETER D (FT)	SEGMENT THICKNESS T (IN)	HOOP BAR SIZE	BOLT DIA (IN)
INTERMEDIATE FOREBAY TO STATEN ISLAND	9	40	20	#5	5/8
STATEN ISLAND TO BOULDIN ISLAND	9	40	20	#5	5/8
BOULDING ISLAND TO BACON ISLAND	9	40	20	#5	5/8
BACON ISLAND TO VICTORIA ISLAND	9	40	20	#5	5/8
VICTORIA ISLAND TO CLIFTON COURT FOREBAY	9	40	20	#5	5/8

DEVELOPED INSIDE

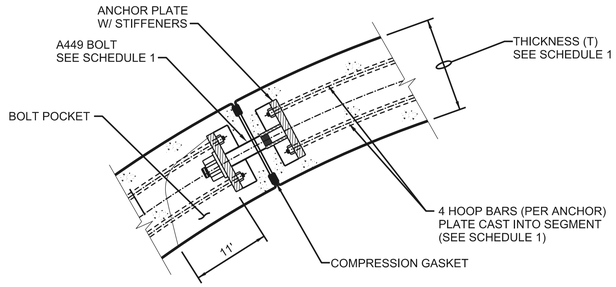
ELEVATION
3/4"=1"



C SECTION
3/16"=1'-0"



PLAN OF SEGMENTAL CONCRETE LINING



1 DETAIL
1/8"=1'-0"

NOTES:

1. HOOP BAR STEEL fy = 60 ksi.
2. D24 REINFORCING STEEL IS FOR fy = 60 ksi. THE BAR SIZE MAY BE REDUCED TO D18 FOR fy = 80ksi.
3. BOLTS SHALL CONFORM TO ASTM A325 or ASTM A449.
4. CONCRETE 28-DAY STRENGTH: 7000 psi.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

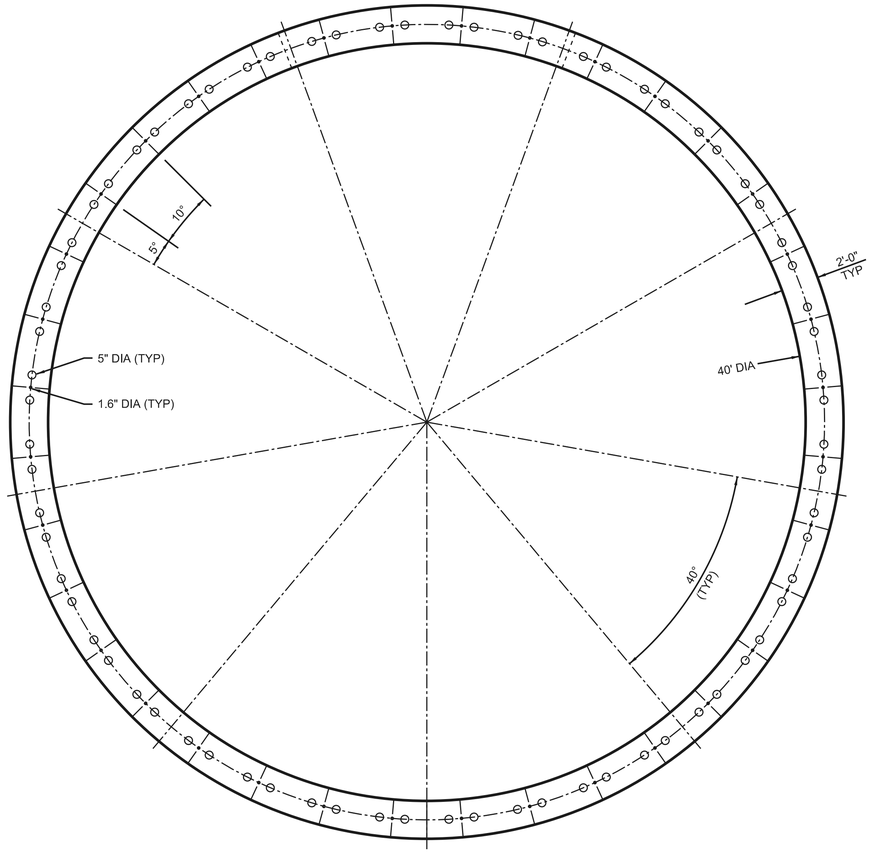
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

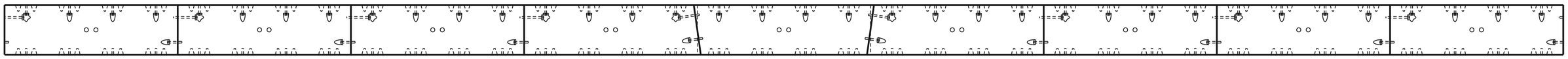
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

40' DIA. MAIN TUNNELS LINING DETAILS

PROJECT NO. 240010
SHEET NO. CCO - S - 4041TN
REV 0
SEQUENCE NO. 41 OF 96



ELEVATION ON CIRCUMFERENTIAL JOINT
(VIEWED IN DIRECTION OF DRIVE)



DEVELOPED PLAN

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

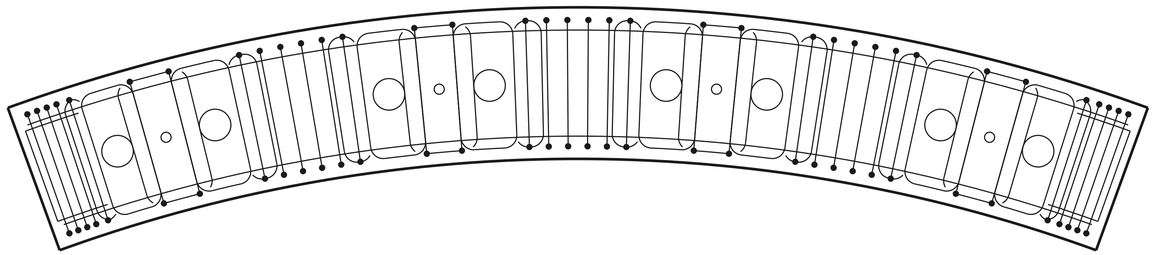
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

40' DIA. MAIN TUNNELS ALTERNATIVE LINING DETAILS - SHEET 1 OF 2

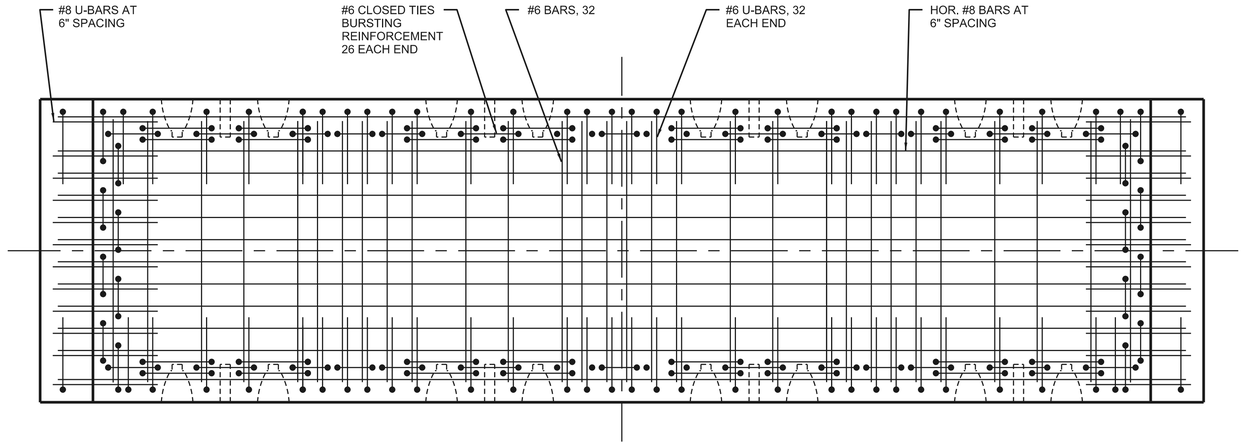
PROJECT NO. 240010
SHEET NO. CCO - S - 4042TN
REV 0
SEQUENCE NO. 42 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\04 Structural\CCO-S-060-240010

Edited By: Bautista,Jav
Printed By: Bautista,Jav



ELEVATION ON CIRCUMFERENTIAL JOINT



PLAN ON INTRADOS

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

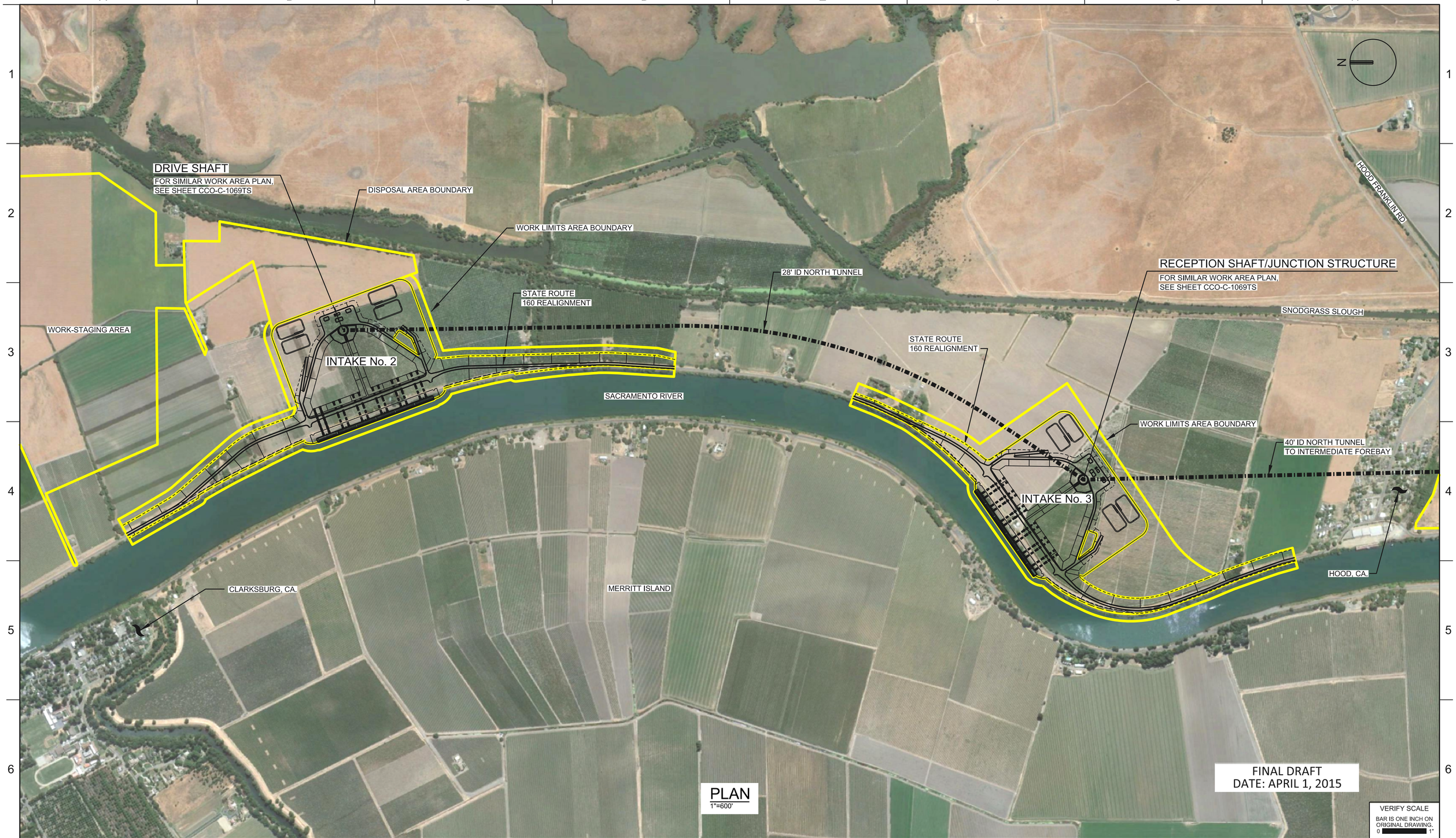
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

40' DIA. MAIN TUNNELS
ALTERNATIVE LINING DETAILS - SHEET 2 OF 2

PROJECT NO. 240010
SHEET NO. CCO - S - 4043TN
REV 0
SEQUENCE NO. 43 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\04 Structural\CCO-S-040-240010

Edited By: Bautista,Jav
Printed By: Bautista,Jav



PLAN
1"=600'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

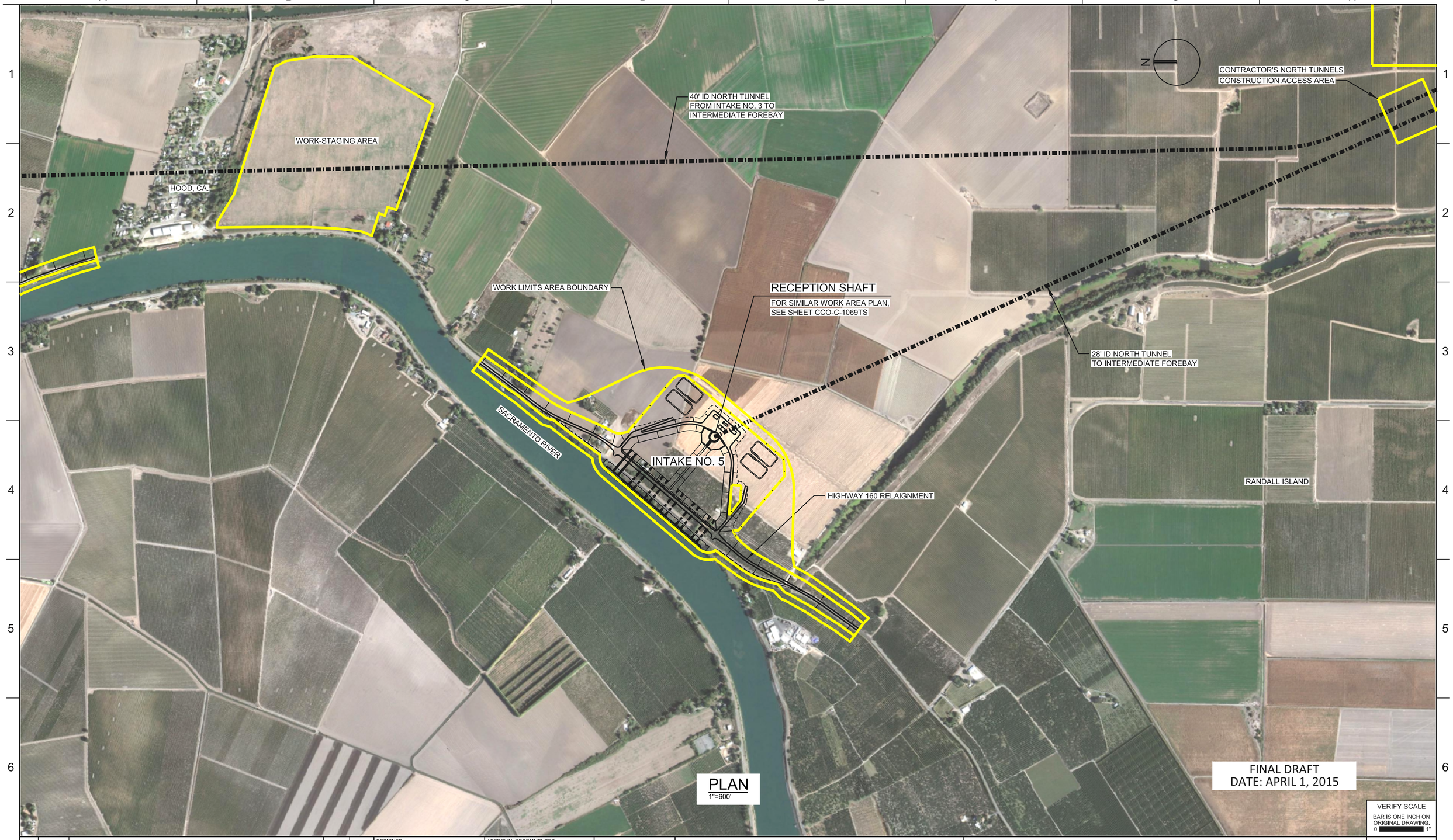
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH TUNNELS - INTAKES NO. 2 AND NO. 3 DRIVE AND RECEPTION SHAFTS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1044TN
REV 0
SEQUENCE NO. 44 OF 96

DWR-808



PLAN
1"=600'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

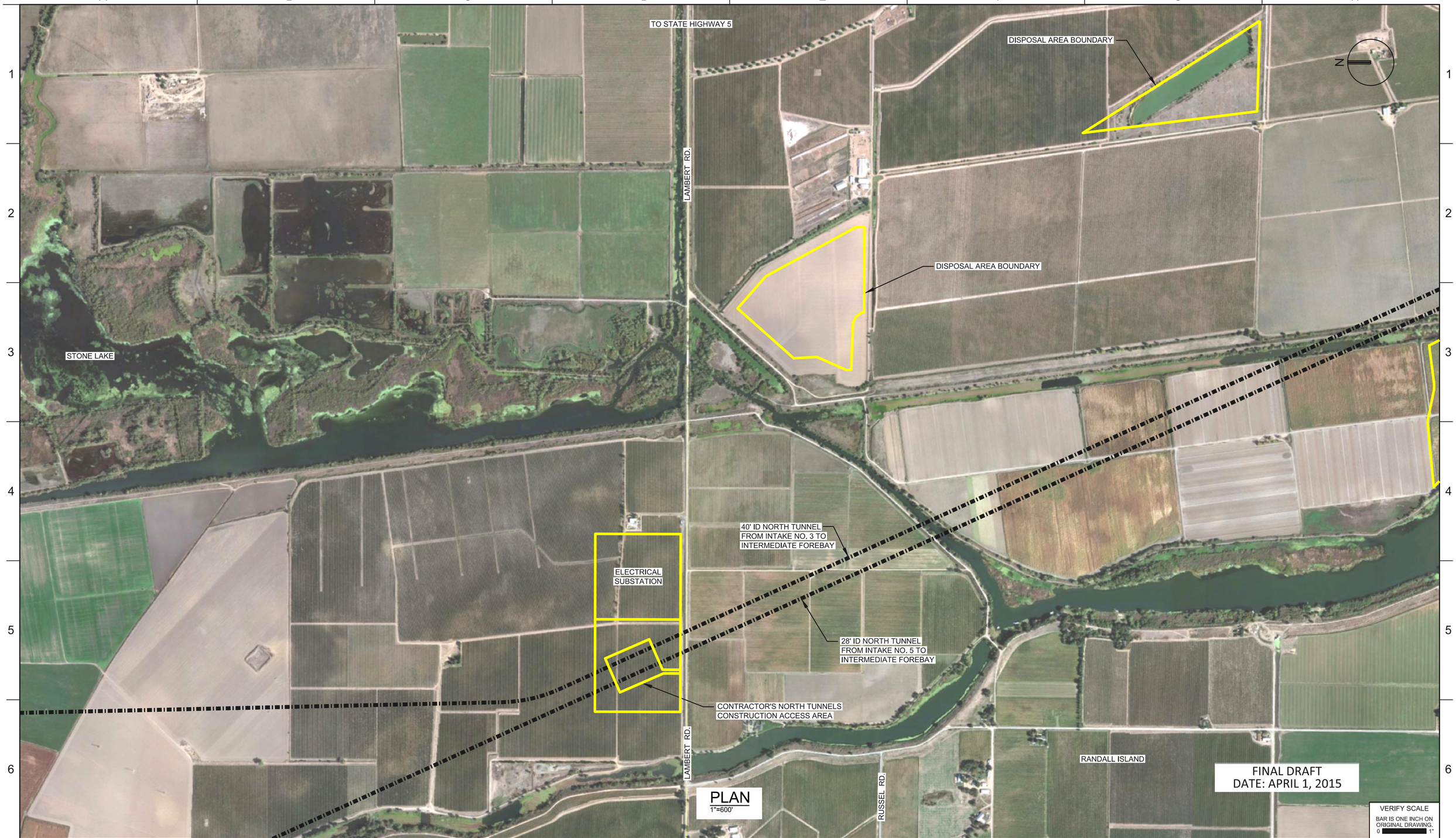
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH TUNNELS - INTAKES NO. 5
RECEPTION SHAFT - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1045TN
REV 0
SEQUENCE NO. 45 OF 96



PLAN
1"=600'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

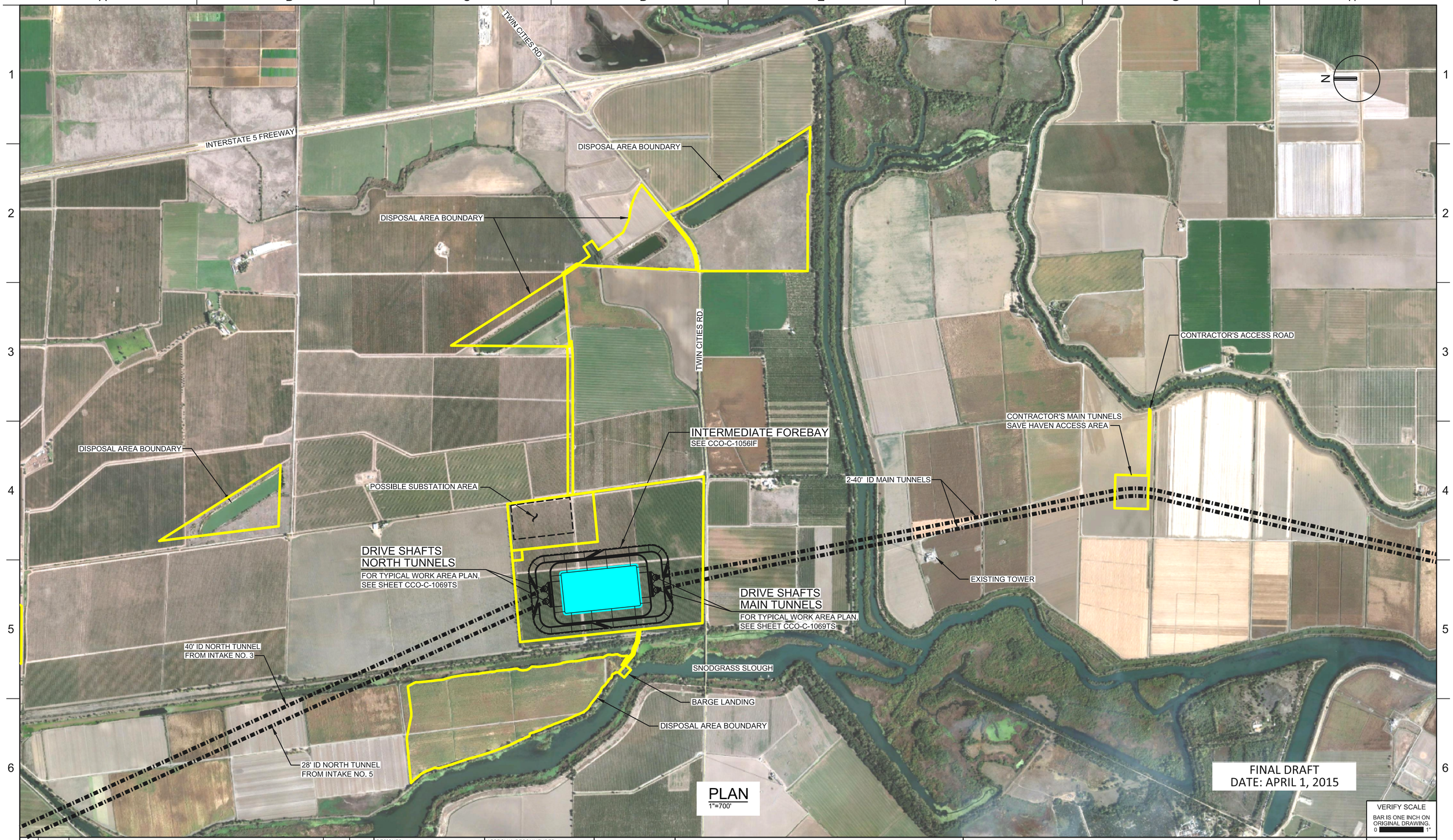
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH TUNNELS - CONSTRUCTION ACCESS SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1046TN
REV 0
SEQUENCE NO. 46 OF 96



PLAN
1"=700'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

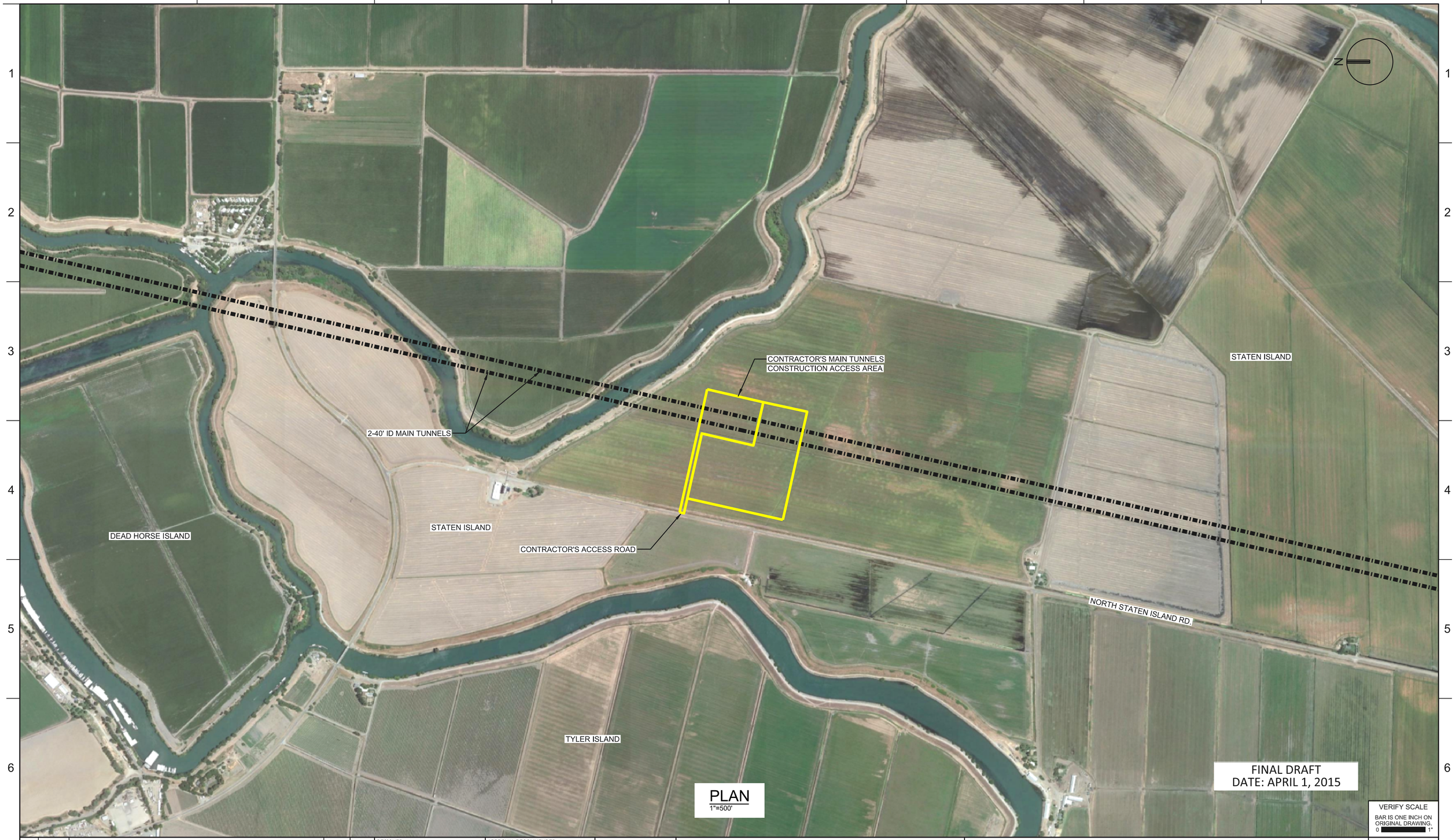
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH TUNNELS/MAIN TUNNELS
INTERMEDIATE FOREBAY - DRIVE SHAFTS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1047TN
REV 0
SEQUENCE NO. 47 OF 96

DWR-808



VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - STATEN ISLAND CONSTRUCTION ACCESS - SITE PLAN

PROJECT NO.	
240010	
SHEET NO.	
CCO - C - 1048TN	
REV	SEQUENCE NO.
0	48 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-048-240010

Edited By: Bautista,Jav

Printed By: Bautista,Jav

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

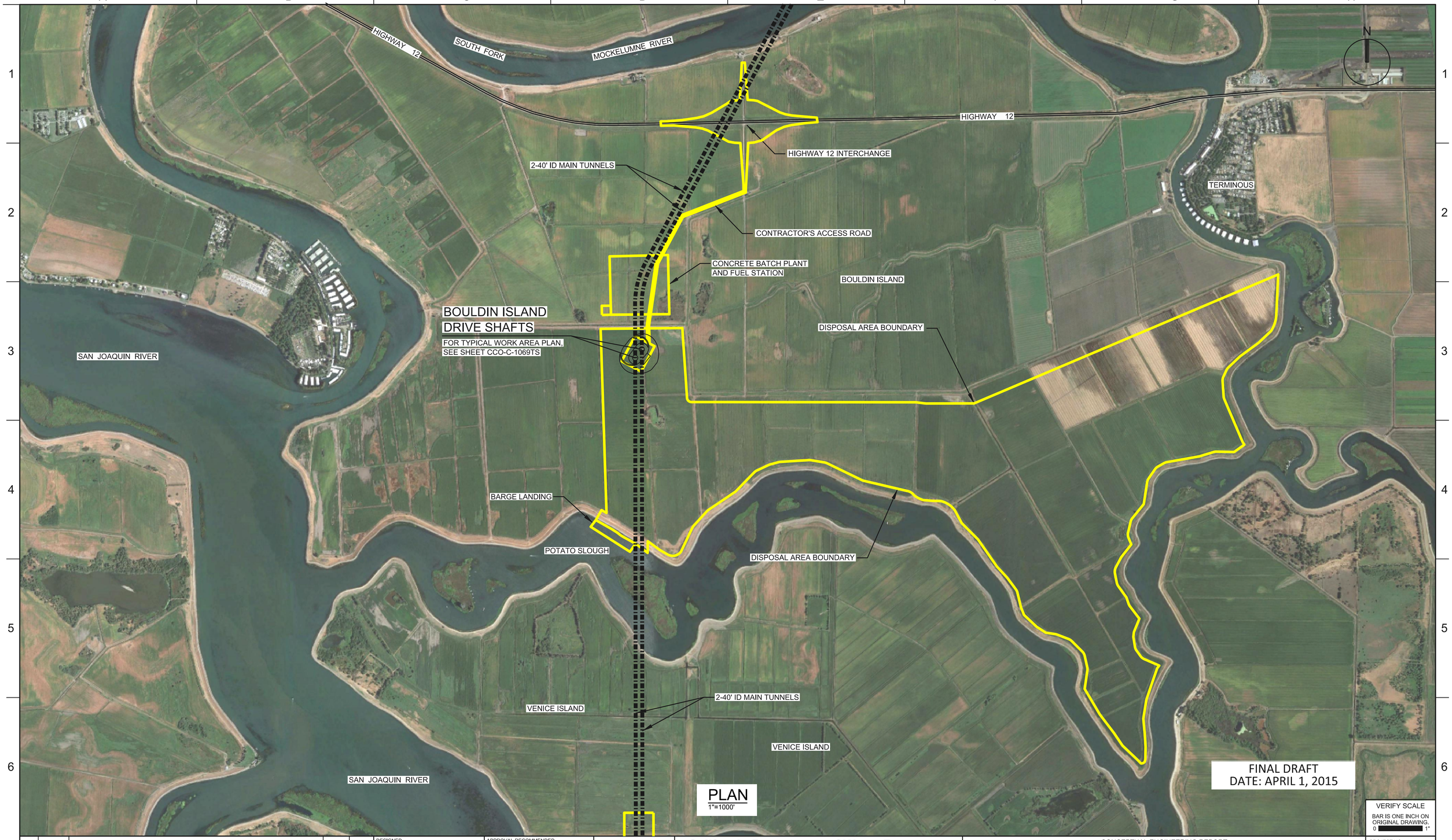
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - STATEN ISLAND RECEPTION SHAFTS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1049TN
REV 0
SEQUENCE NO. 49 OF 96

DWR-808



PLAN
1"=1000'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - BOULDIN ISLAND DRIVE SHAFTS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1050TN
REV 0
SEQUENCE NO. 50 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-050-240010

Edited By: Bautista,Jav

Printed By: Bautista,Jav

PLAN
1"=500'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

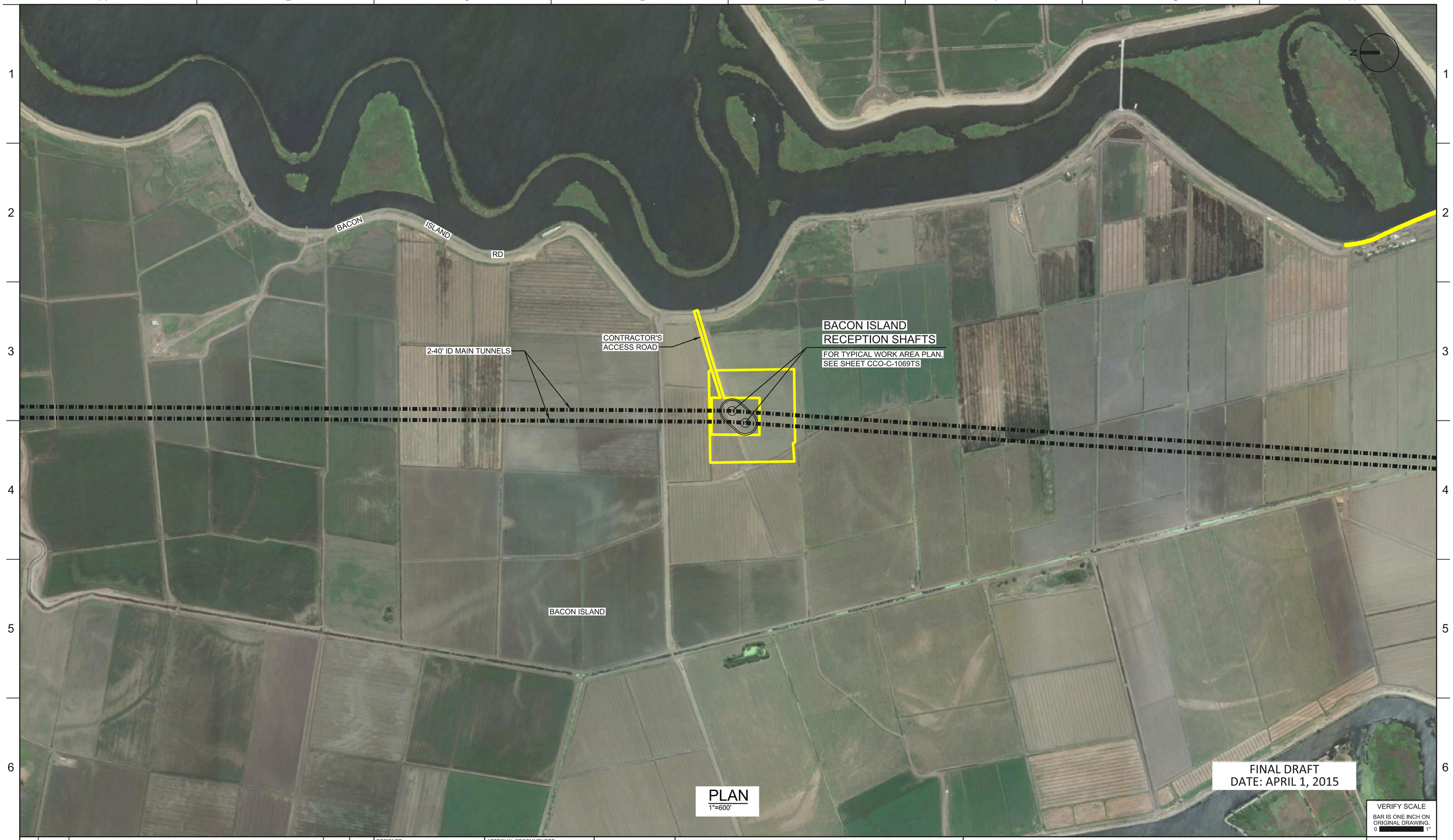
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - MANDEVILLE ISLAND CONSTRUCTION ACCESS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1051TN
REV 0
SEQUENCE NO. 51 OF 96

DWR-808



PLAN
1"=600'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

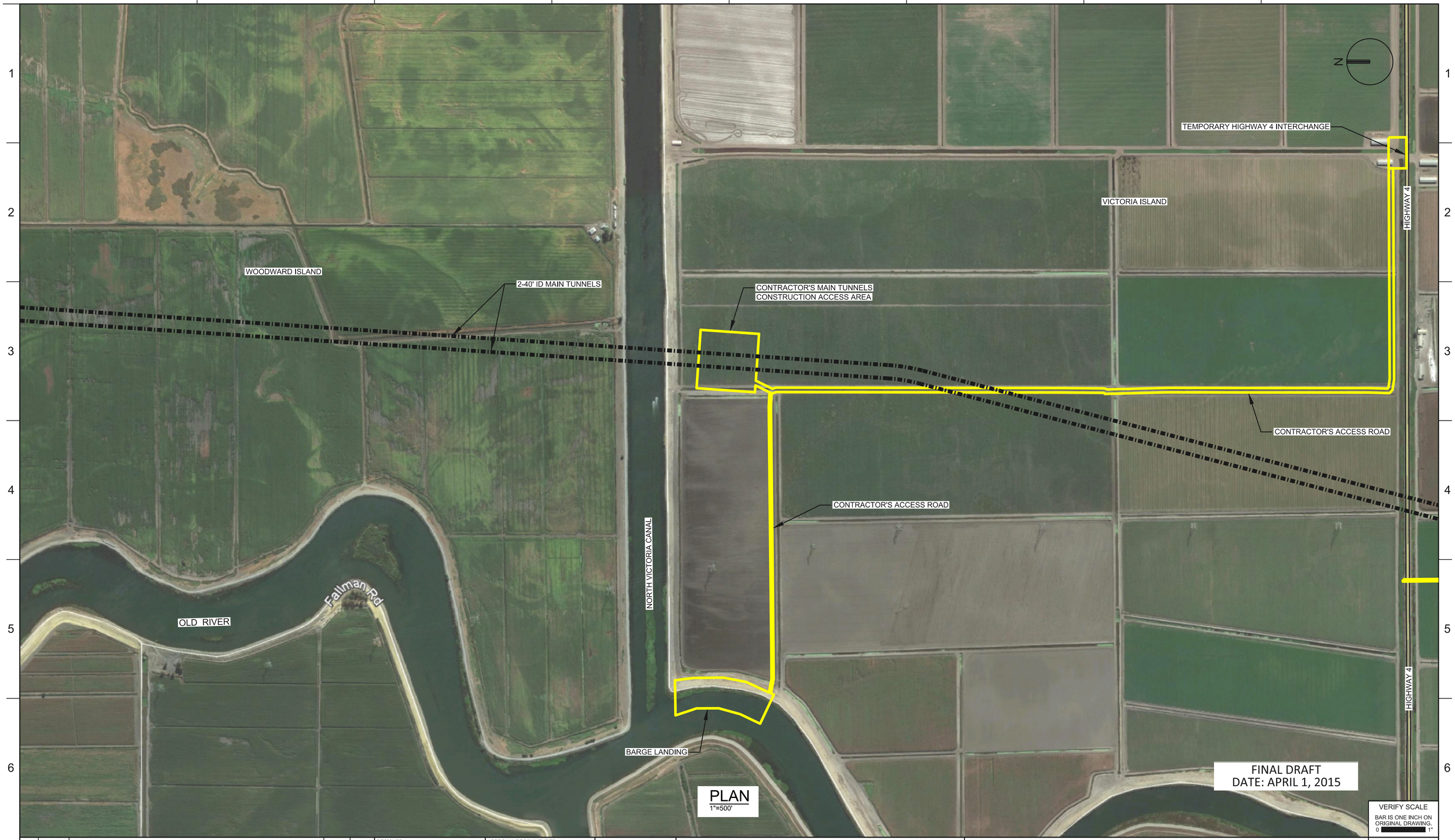
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - BACON ISLAND RECEPTION SHAFTS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1052TN
REV 0 | SEQUENCE NO. 52 OF 96

DWR-808



PLAN
1"=500'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - VICTORIA ISLAND CONSTRUCTION ACCESS - SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1053TN
REV 0
SEQUENCE NO. 53 OF 96

DWR-808

CONTRACTOR'S MAIN TUNNELS
SAVE HAVEN ACCESS AREA

2-40' ID MAIN TUNNELS

PUMPING PLANT

OLD RIVER

BARGE LANDING

CONEY ISLAND

CLIFTON COURT FOREBAY
DRIVE SHAFTS

FOR TYPICAL WORK AREA PLAN,
SEE SHEET CCO-C-1069TS

CLIFTON COURT FOREBAY

BYRON BETHANY HIGHWAY

OLD RIVER

JONES
PUMPING PLANT

ITALIAN SLOUGH

DISPOSAL AREA BOUNDARY

SKINNER
FACILITY

BANKS
PUMPING PLANT

BYRON HIGHWAY

DISPOSAL AREA BOUNDARY

PLAN
1"=1200'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS - CLIFTON COURT FOREBAY DRIVE SHAFTS - SITE PLAN

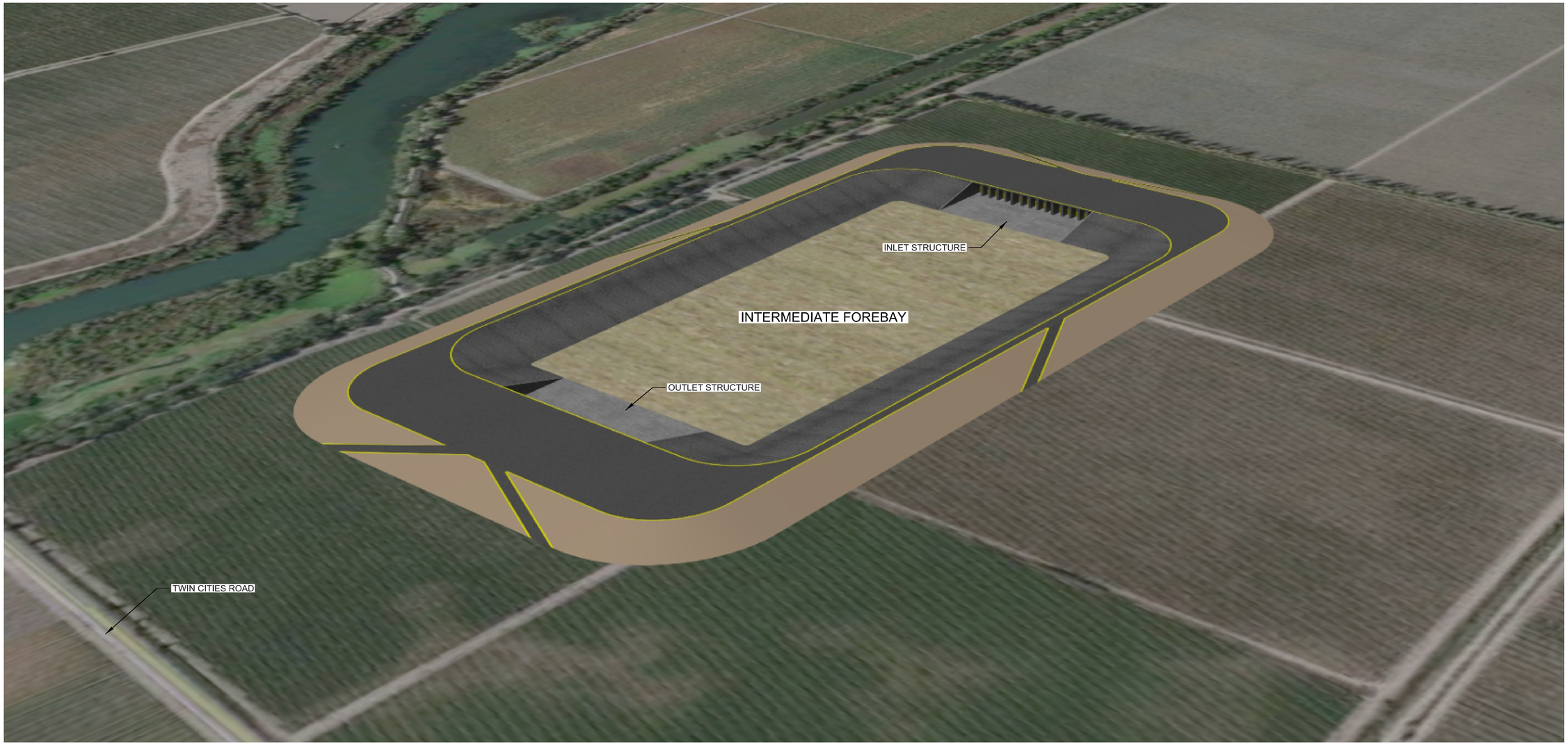
PROJECT NO.	
240010	
SHEET NO.	
CCO - C - 1054TN	
REV	SEQUENCE NO.
0	54 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-054-240010

Edited By: Bautista,Jav

Printed By: Bautista,Jav

DWR-808



FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY RENDERING

PROJECT NO. 240010
SHEET NO. CCO - G - 9055IF
REV 0
SEQUENCE NO. 55 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-055-240010

Edited By: Bautista,Jav
Printed By: Bautista,Jav

PLAN
1"=250'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

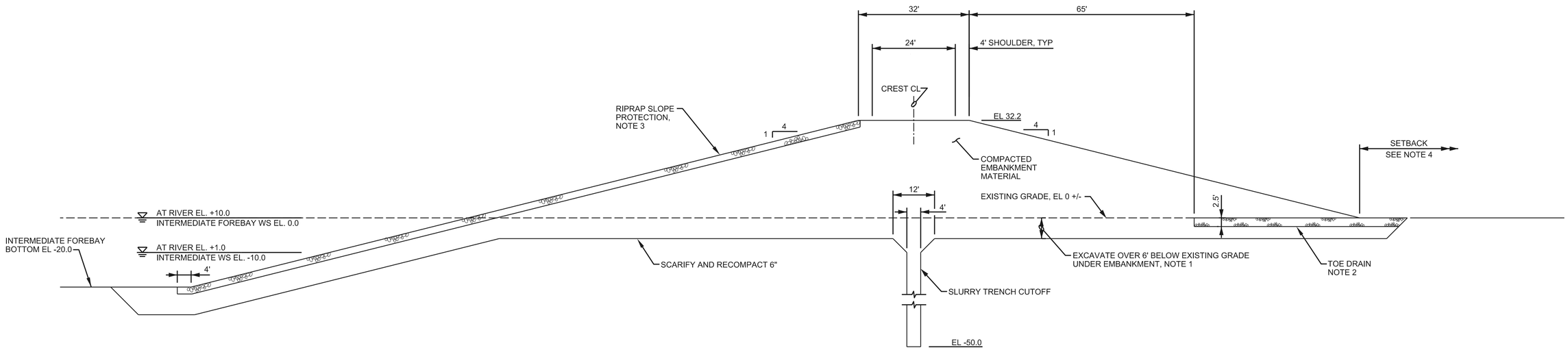
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1056IF
REV 0
SEQUENCE NO. 56 OF 96

NOTES:

1. EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY. AN AVERAGE OF 6' IS ASSUMED. VERIFY DURING PRELIMINARY ENGINEERING.
2. 2.5' OF PROCESSED DRAIN MATERIAL WITH FILTER LAYERS.
3. PLACE RIPRAP OVER FILTER LAYER.
4. TOE OF EMBANKMENT SHALL BE SET BACK 100 FEET FROM TOE OF EXISTING LEVEE/EMBANKMENT OR PROPERTY LINE, WHICHEVER IS GREATER.



A SECTION
1" = 15'
CCO-C-1056IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

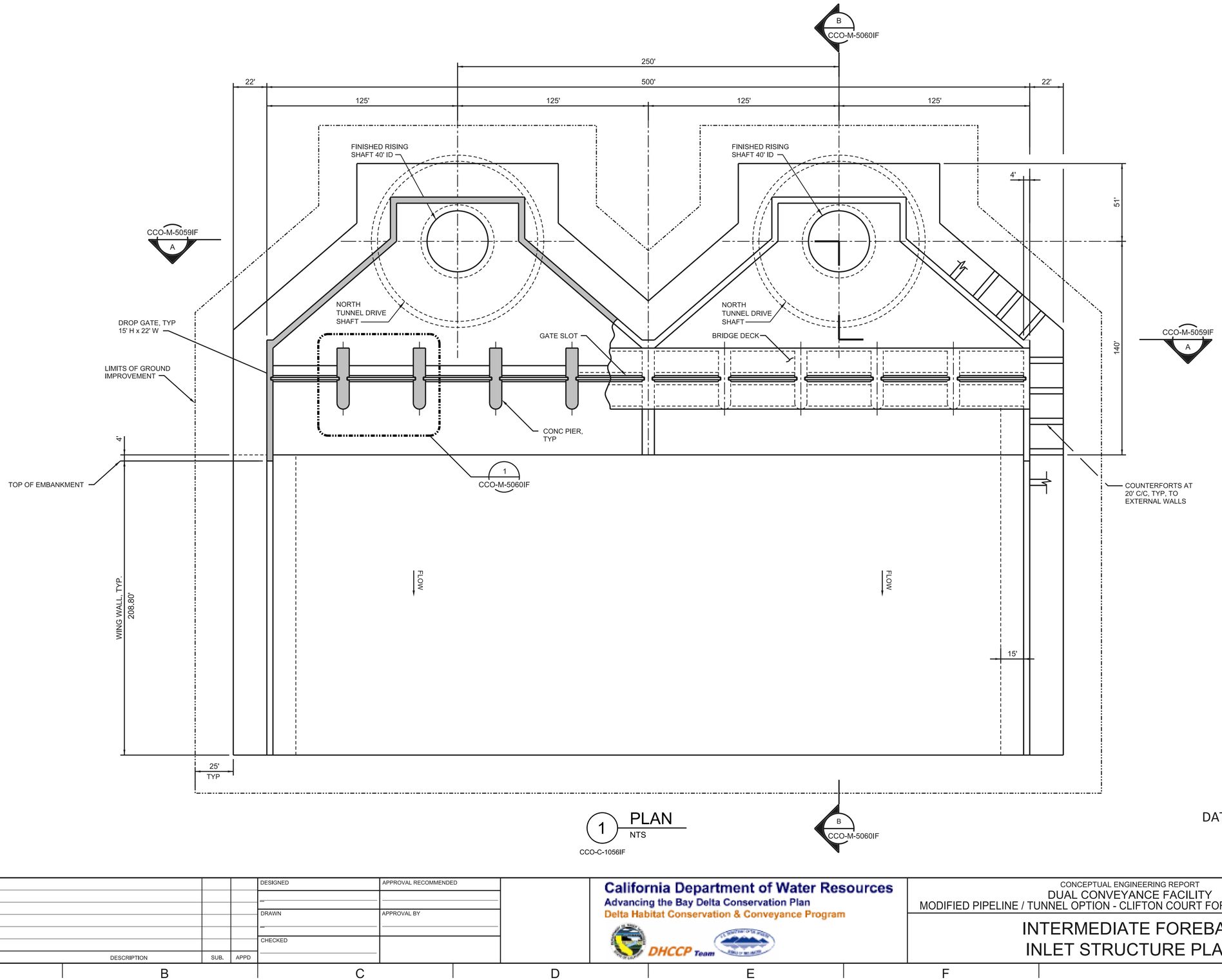
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY SECTION

PROJECT NO. 240010
SHEET NO. CCO - C - 3057IF
REV 0
SEQUENCE NO. 57 OF 96



1 PLAN
NTS
CCO-C-1056IF

B
CCO-M-5060IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

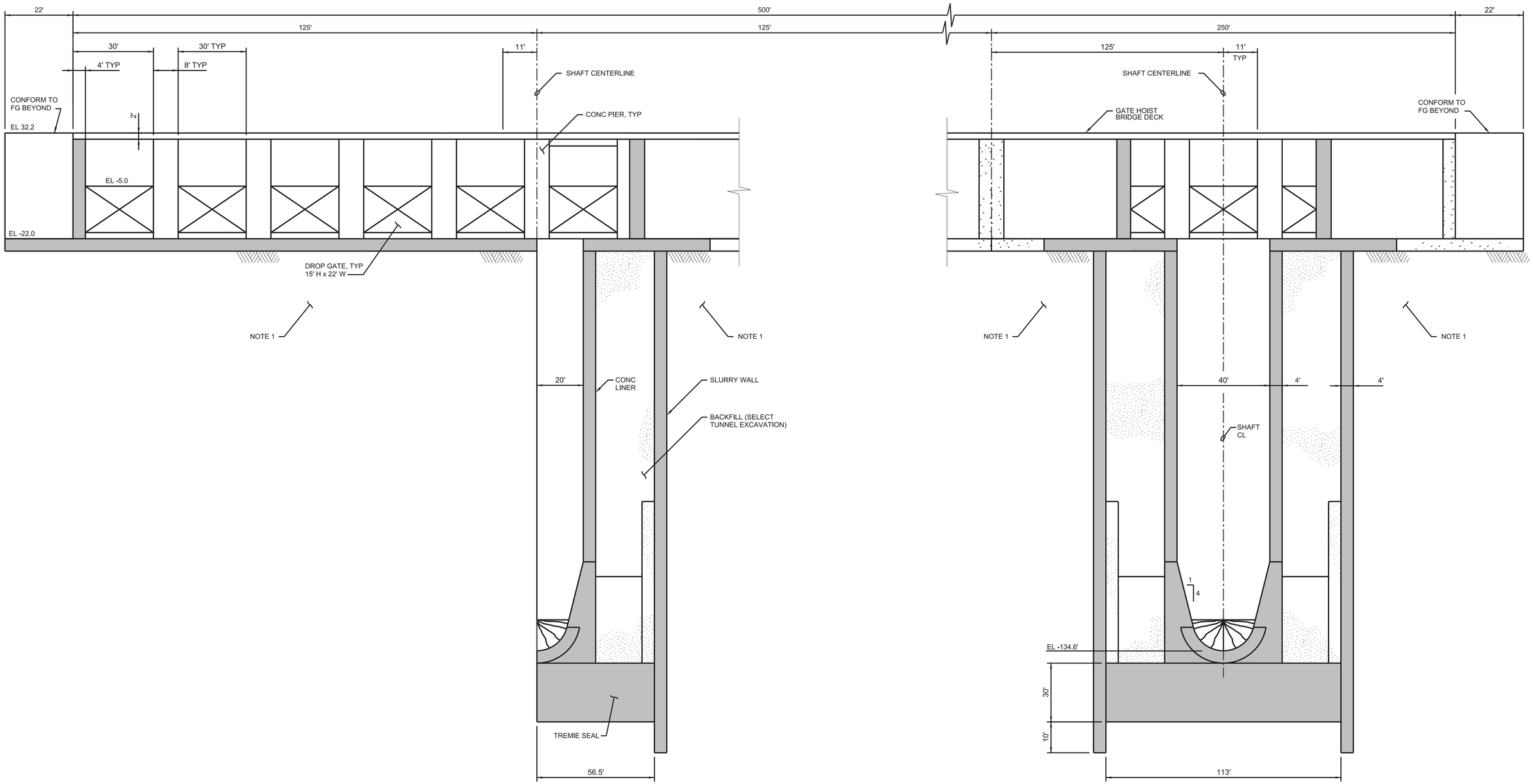
DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY INLET STRUCTURE PLAN

PROJECT NO. 240010
SHEET NO. CCO - M - 4058IF
REV 0
SEQUENCE NO. 58 OF 96



NOTE:

1. GROUND IMPROVEMENT TO EL -50.0, SEE PLAN FOR HORIZONTAL LIMITS.

A SECTION
NTS
CCO-M-4058IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

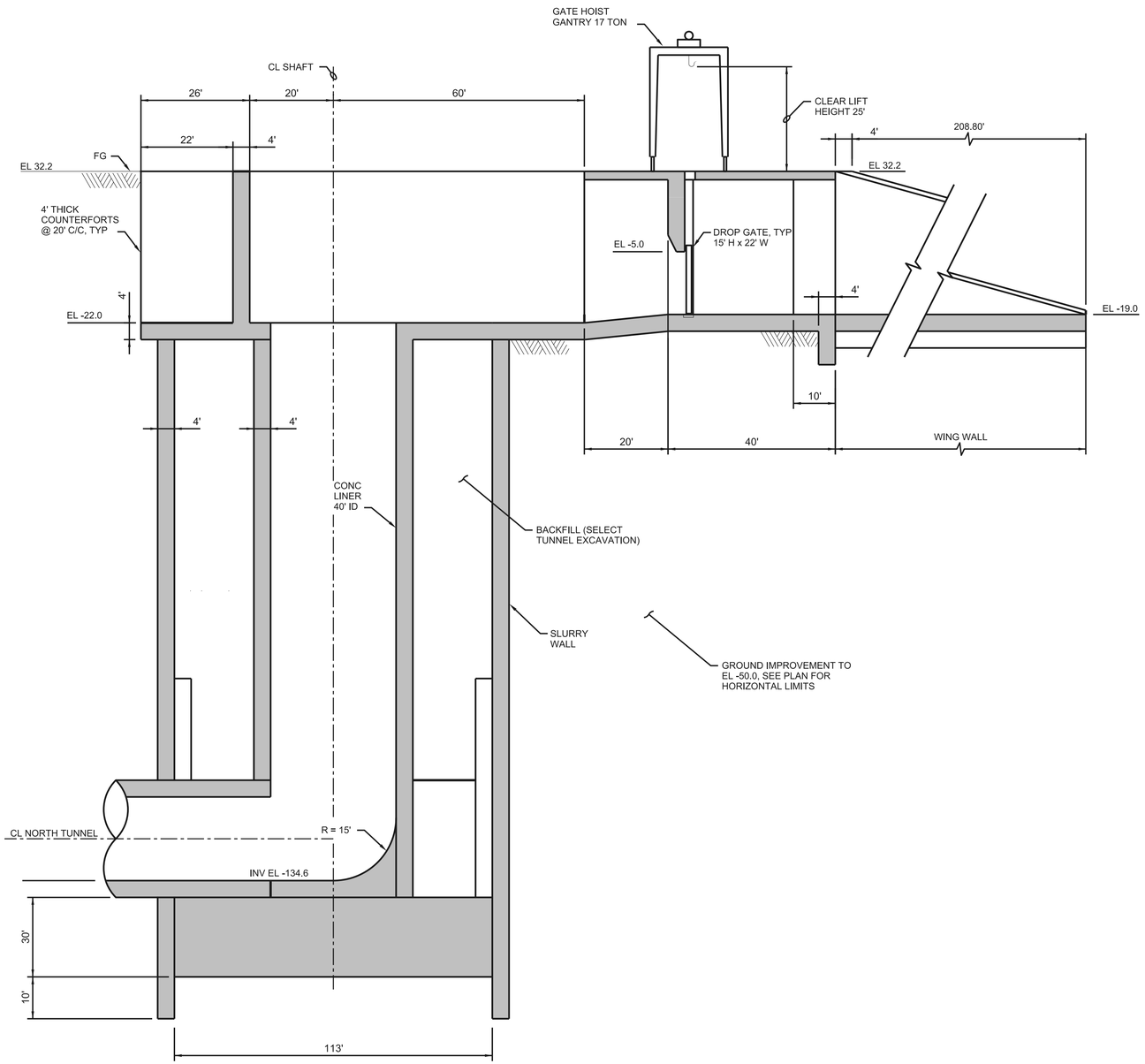
DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

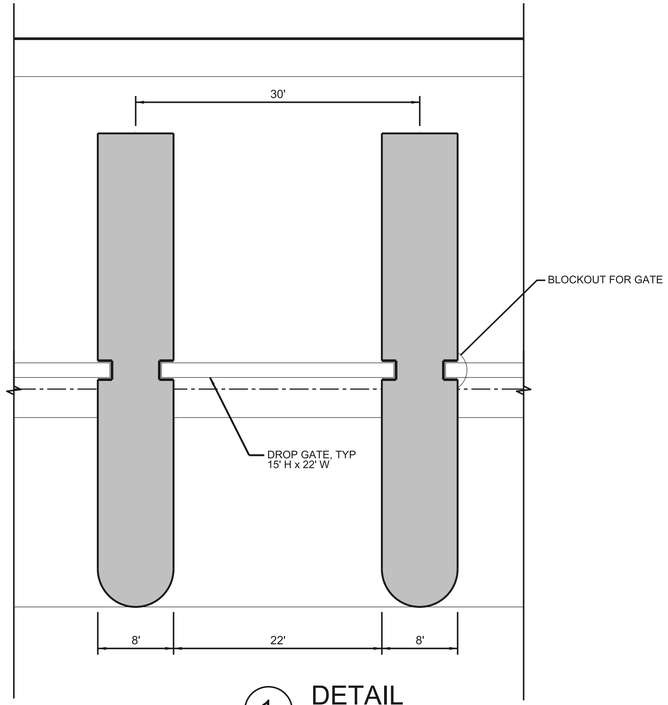
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY INLET STRUCTURE LONGITUDINAL SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 3059IF
REV 0
SEQUENCE NO. 59 OF 96



B SECTION
NTS
CCO-M-4058IF



1 DETAIL
NTS
CCO-M-4058IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

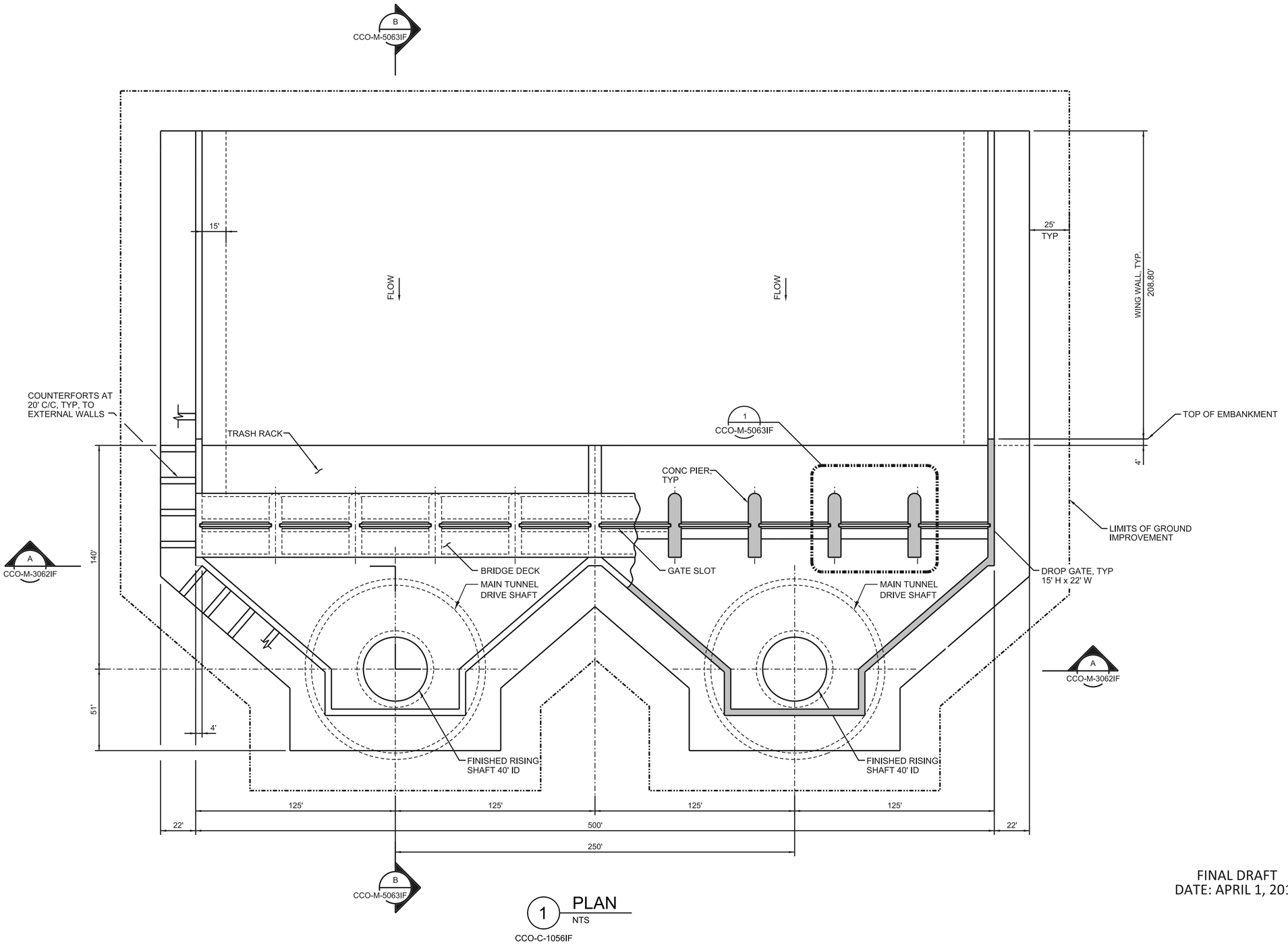
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY INLET STRUCTURE SECTION AND DETAILS

PROJECT NO. 240010
SHEET NO. CCO - M - 5060IF
REV 0
SEQUENCE NO. 60 OF 96



1 PLAN
NTS
CCO-C-1056IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

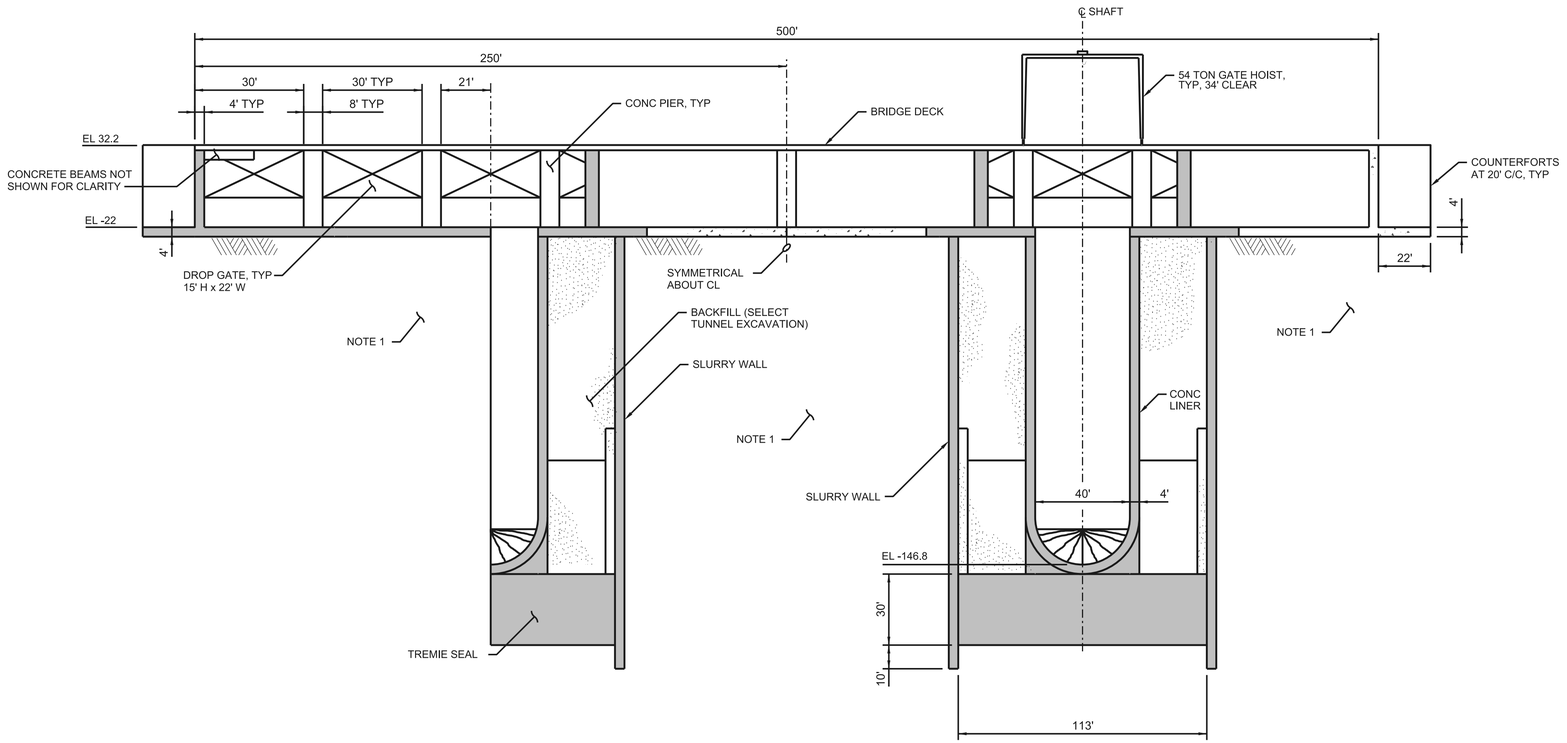
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY OUTLET STRUCTURE PLAN

PROJECT NO. 240010
SHEET NO. CCO - M - 4061IF
REV 0
SEQUENCE NO. 61 OF 96



A SECTION
1/32"=1'-0"
CCO-M-4061IF

NOTE:

1. GROUND IMPROVEMENT TO EL -50.0. SEE PLAN FOR HORIZONTAL LIMITS.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

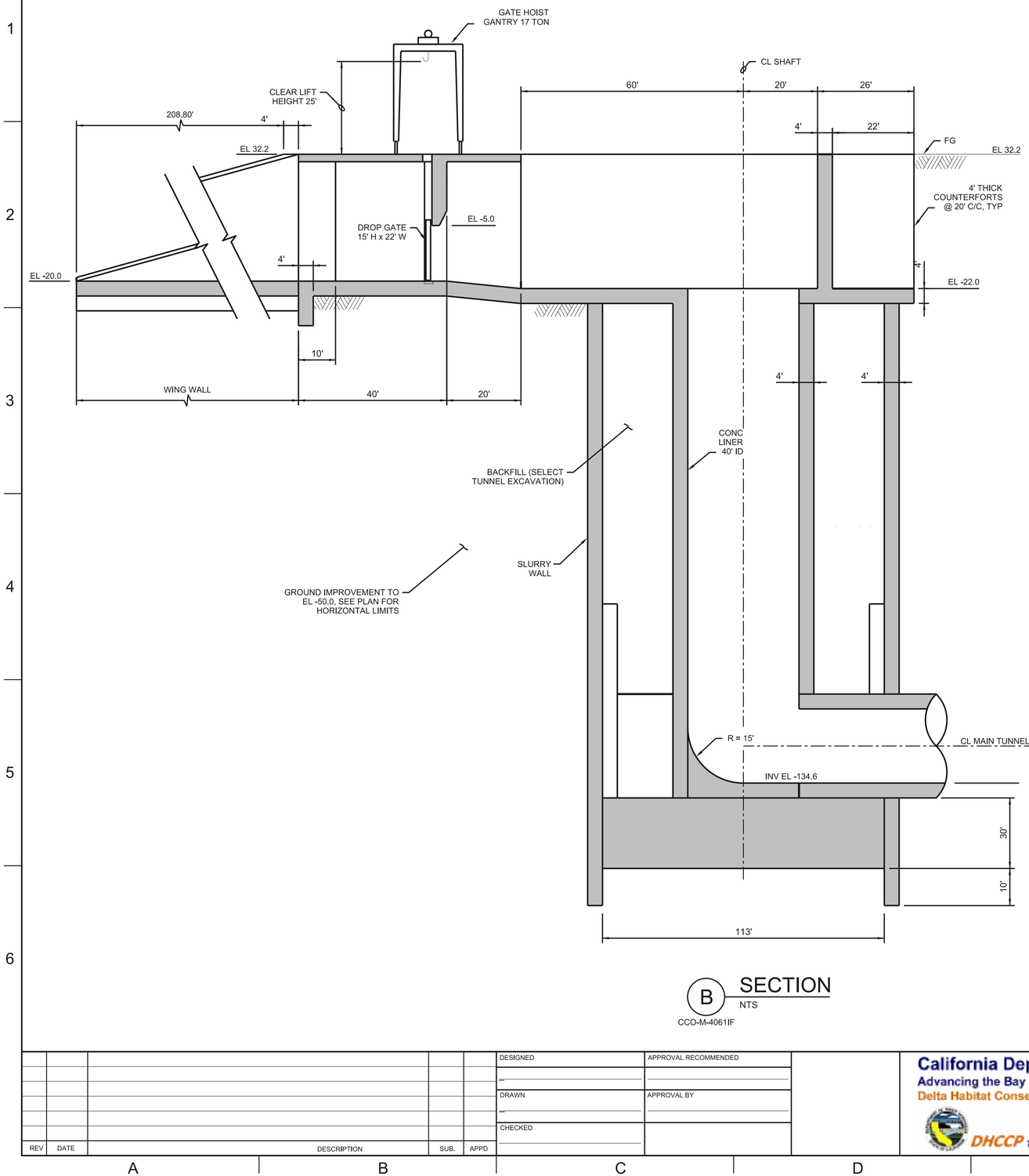
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

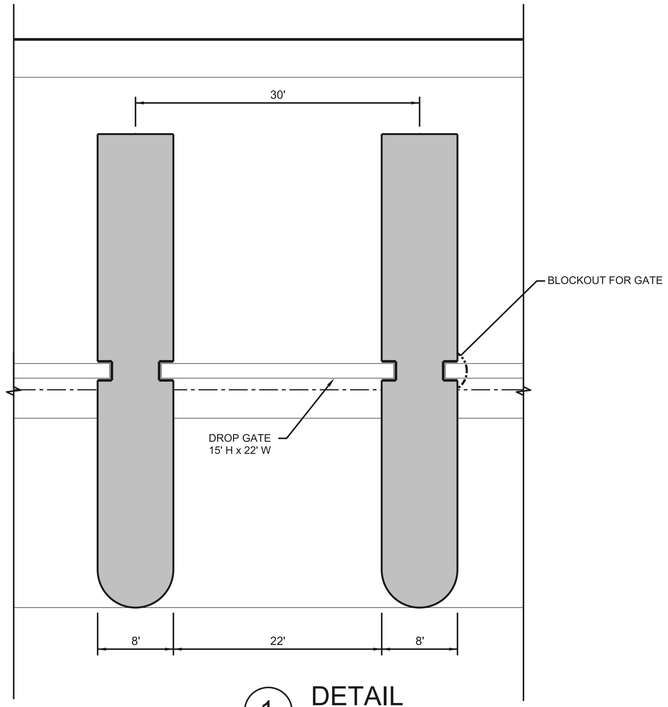
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY OUTLET STRUCTURE LONGITUDINAL SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 3062IF
REV 0
SEQUENCE NO. 62 OF 96



B SECTION
NTS
CCO-M-4061IF



1 DETAIL
NTS
CCO-M-4061IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

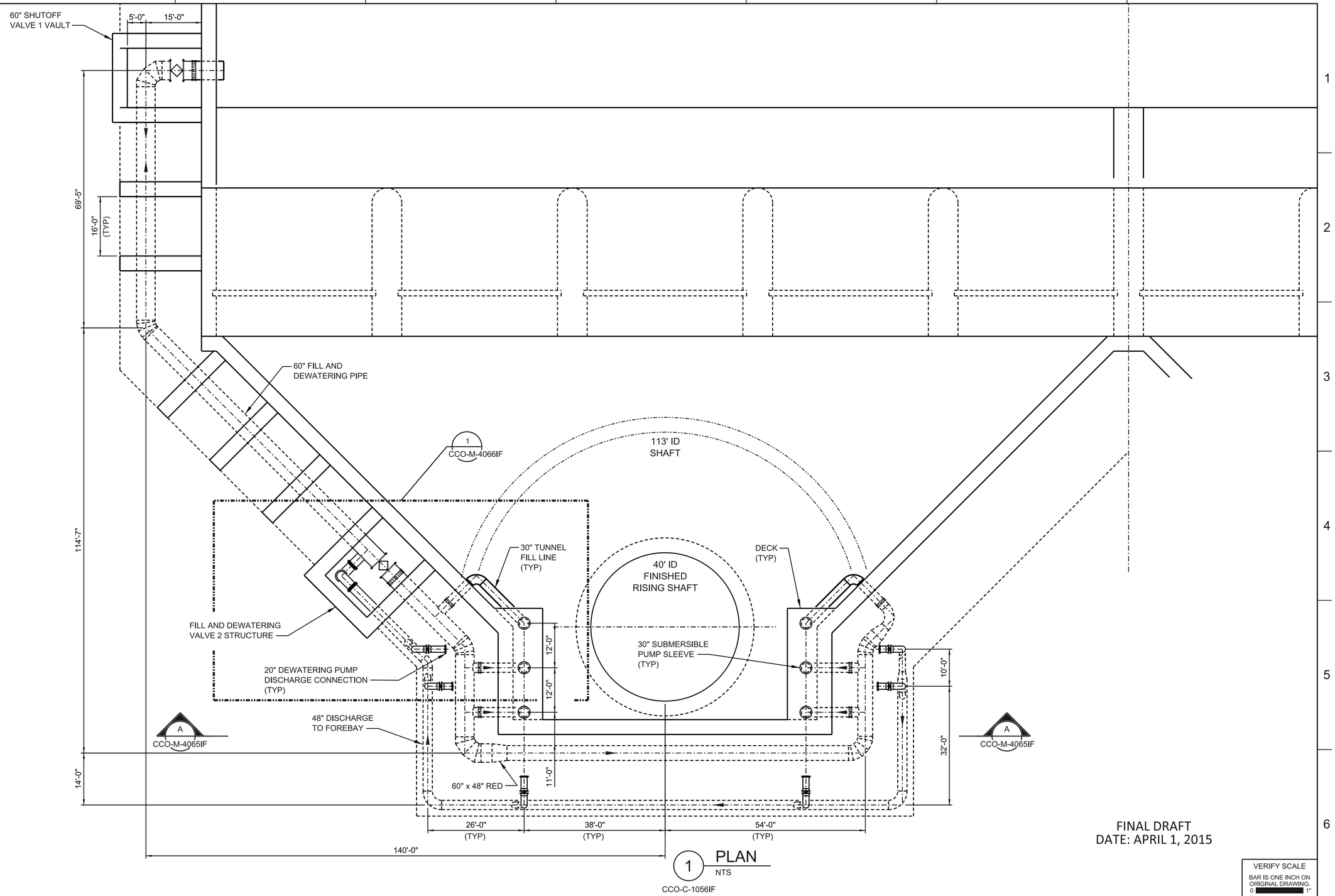
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY OUTLET STRUCTURE SECTION AND DETAILS

PROJECT NO. 240010
SHEET NO. CCO - M - 5063IF
REV 0
SEQUENCE NO. 63 OF 96



1 PLAN
NTS
CCO-C-1056IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

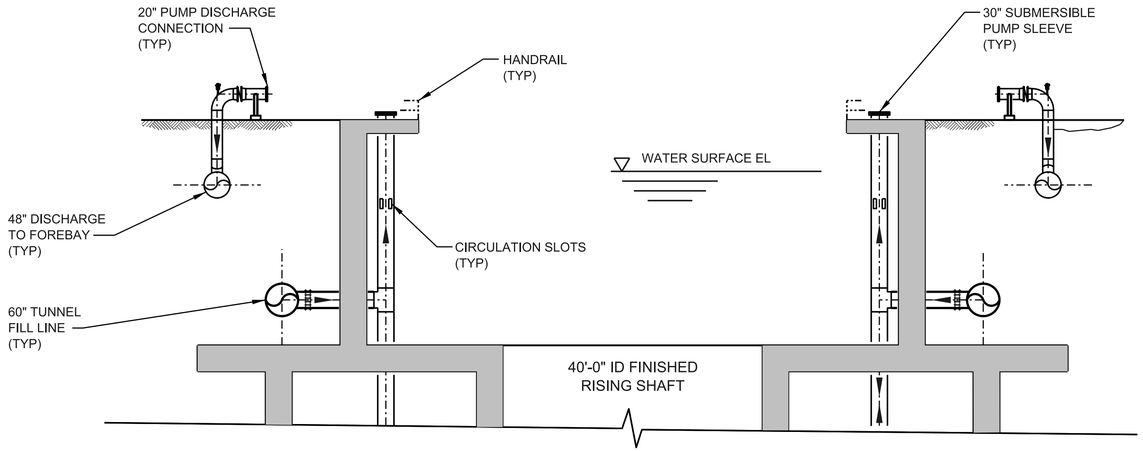
DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL GENERAL ARRANGEMENT
FILL AND DRAIN PIPING UPPER LEVEL - PLAN

PROJECT NO.	
240010	
SHEET NO.	
CCO - M - 4064IF	
REV	SEQUENCE NO.
0	64 OF 96



A SECTION
NTS

CCO-M-4064IF

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

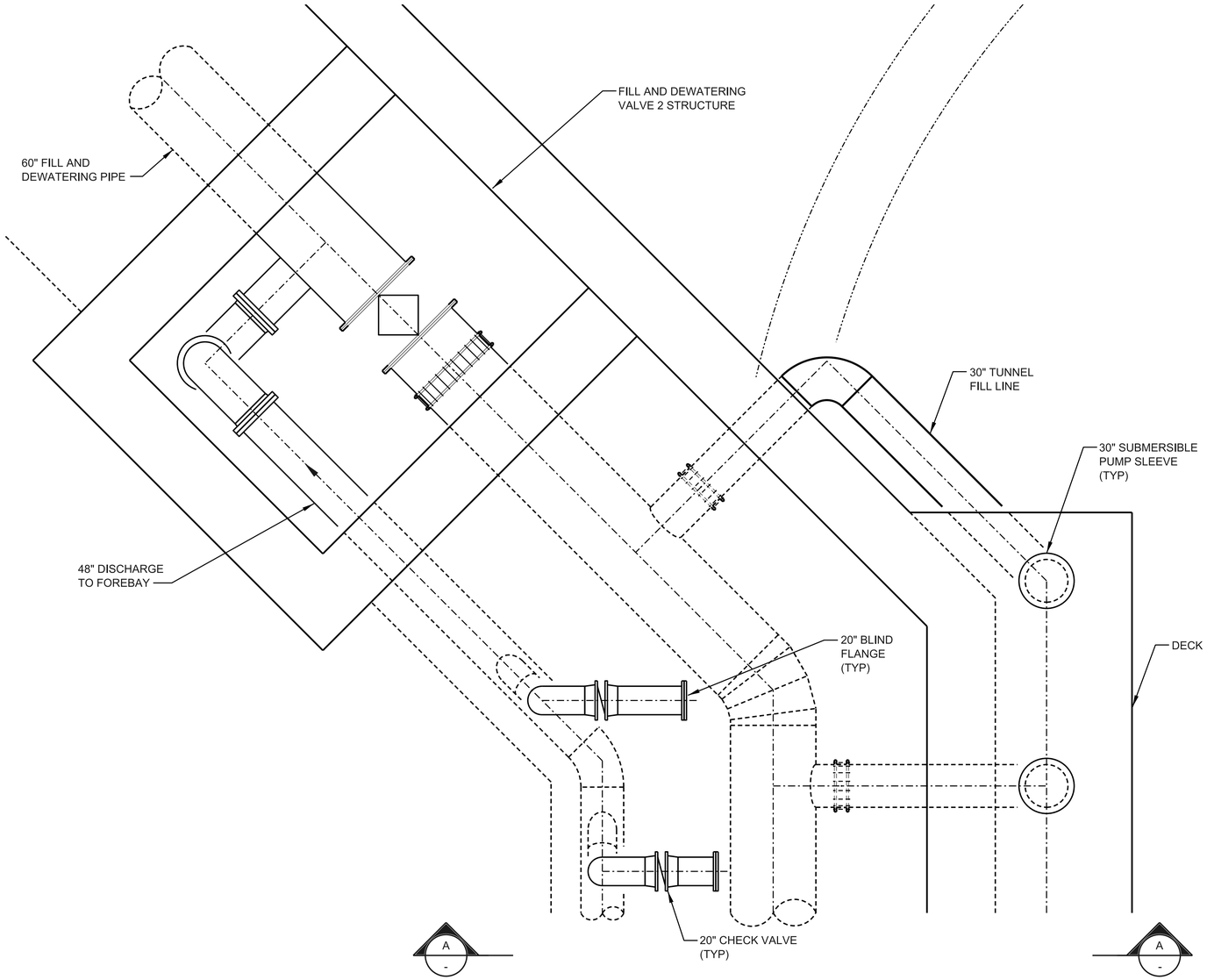
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

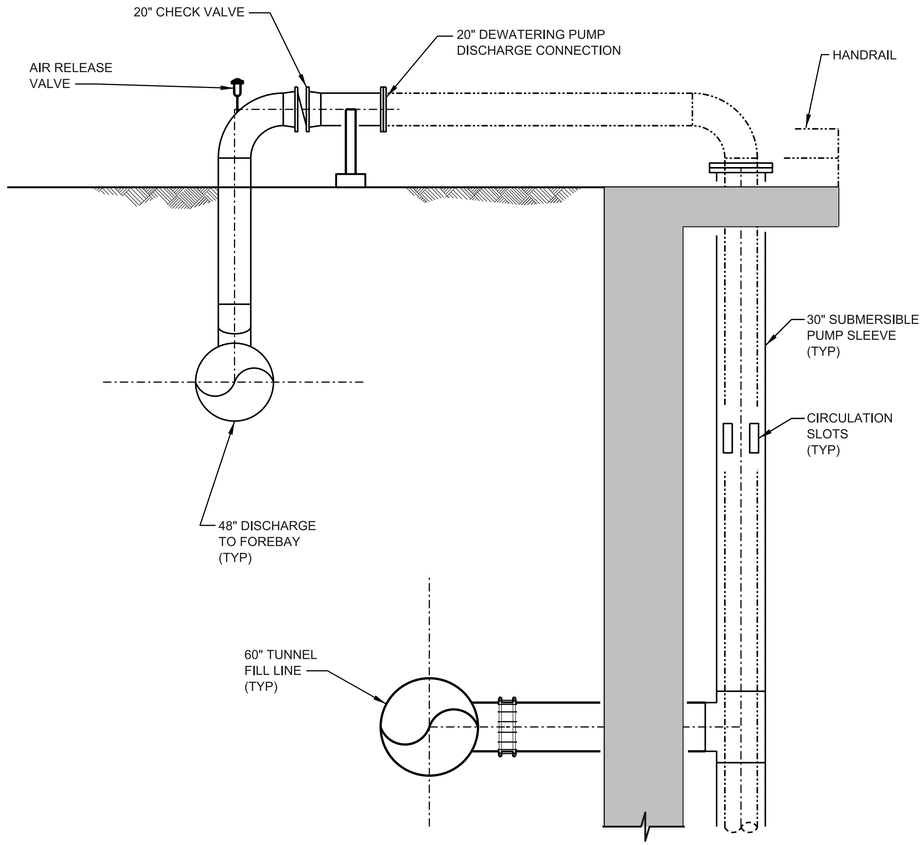
FILL AND DRAIN PIPING
UPPER LEVEL - SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4065IF
REV 0
SEQUENCE NO. 65 OF 96



1 DETAIL
NTS

CCO-M-4064IF



A SECTION
NTS

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

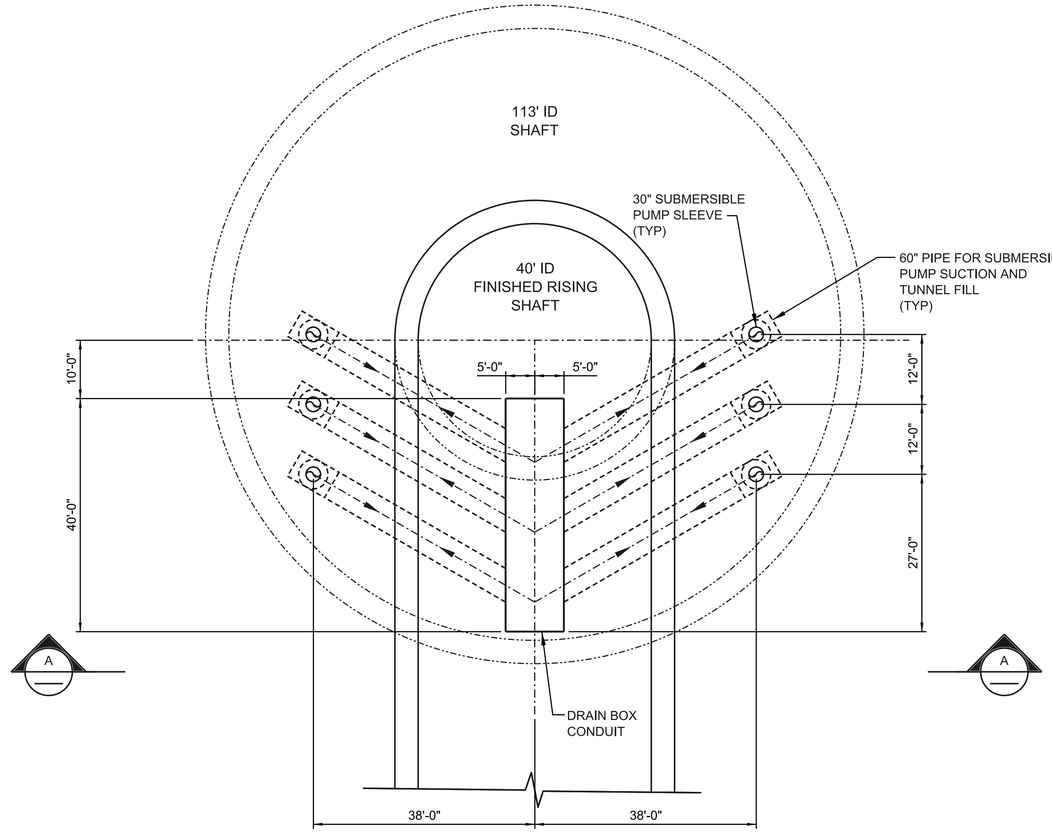
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

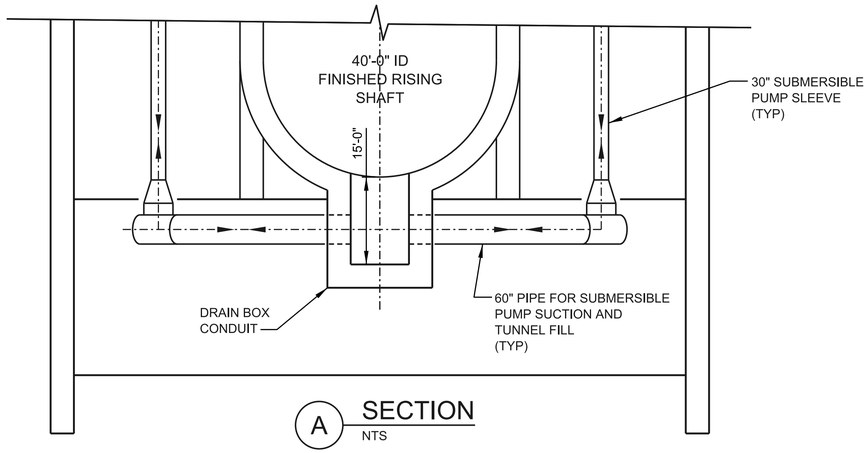
FILL AND DRAIN PIPING DETAIL PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4066IF
REV 0
SEQUENCE NO. 66 OF 96



1 PLAN
NTS

CCO-M-4064IF



A SECTION
NTS

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

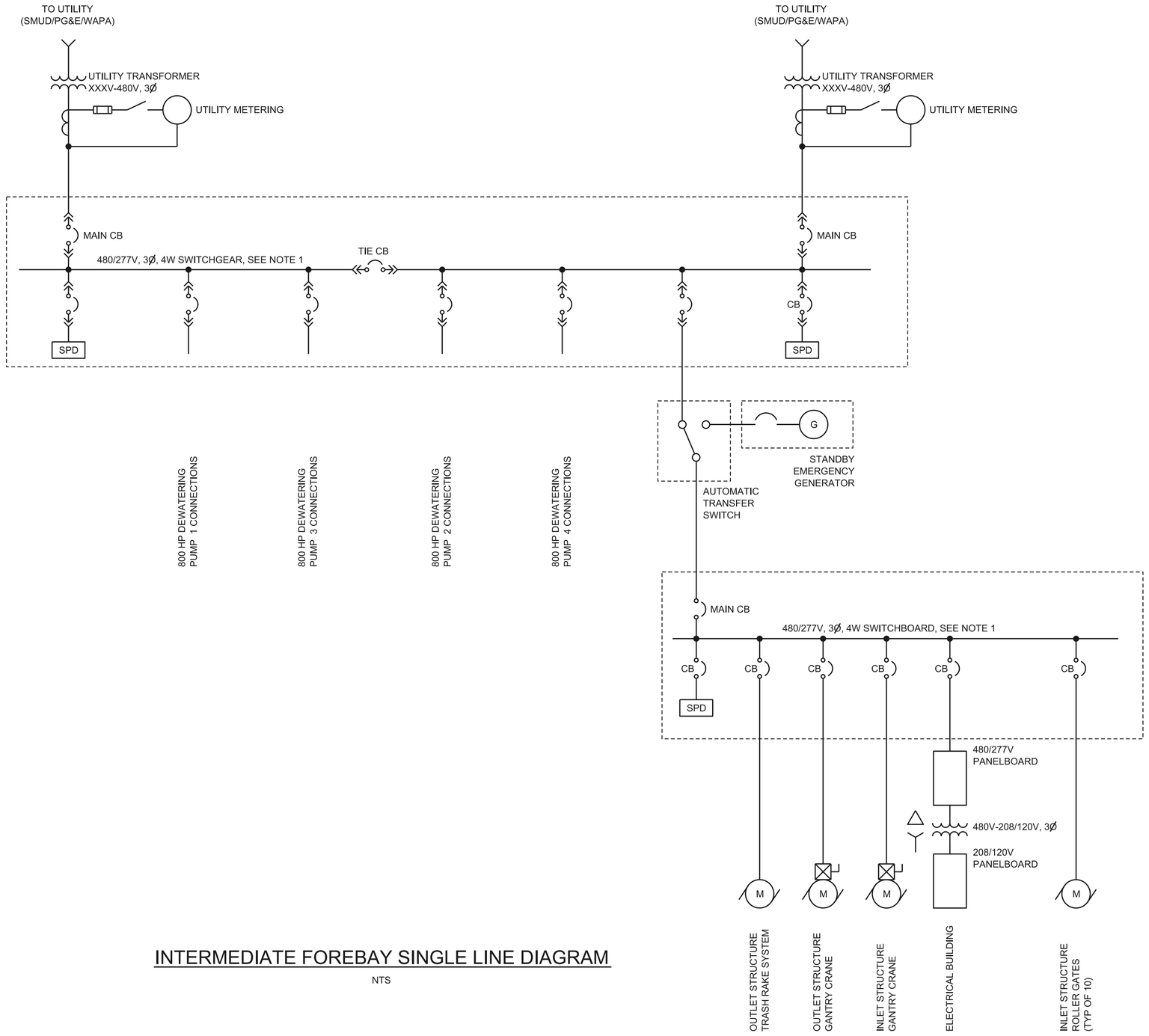
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL FOREBAY DRAIN/FILL PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - M - 4067IF
REV 0
SEQUENCE NO. 67 OF 96



INTERMEDIATE FOREBAY SINGLE LINE DIAGRAM

NTS

NOTE:

1. SWITCHGEAR AND SWITCHBOARD SHALL BE LOCATED WITHIN ELECTRICAL ROOM.

GENERAL NOTE:

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200 YEAR FLOODPLAIN.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

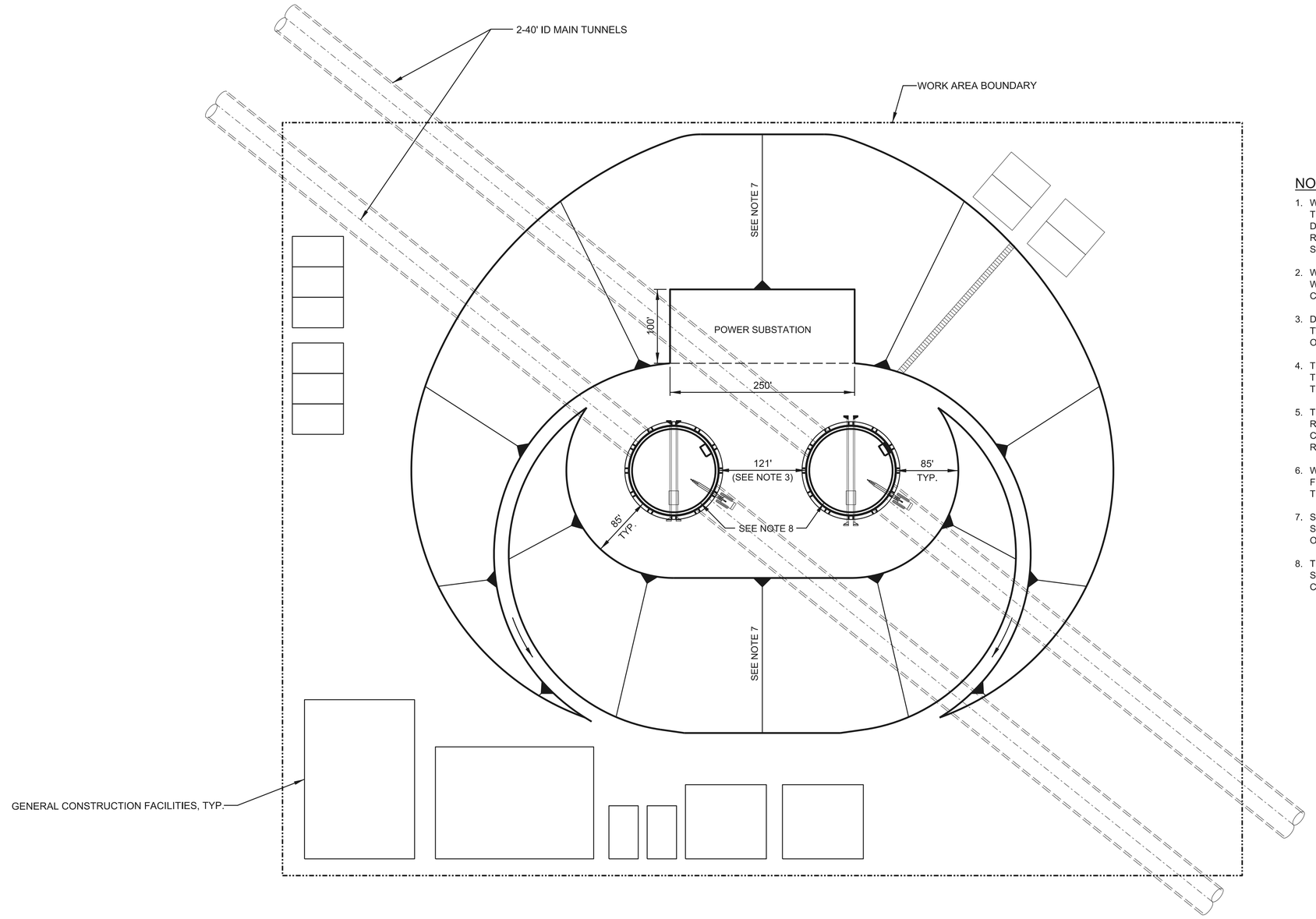
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

INTERMEDIATE FOREBAY
SINGLE LINE DIAGRAM

PROJECT NO. 240010
SHEET NO. CCO - E - 6068IF
REV 0
SEQUENCE NO. 68 OF 96



NOTES

1. WORK AREA PLAN SHOWN HEREON IS TYPICAL FOR THE DRIVE SHAFTS FOR THE 40-FOOT ID MAIN TUNNELS. TWO SHAFTS WILL BE LOCATED AT EACH DRIVE SHAFT WORK AREA, ONE FOR EACH TUNNEL. WORK AREA PLANS FOR RECEPTION ONLY SHAFTS FOR THE 40-FOOT ID MAIN TUNNELS WILL HAVE SIMILAR, BUT SMALLER CONFIGURATIONS.
2. WORK AREAS FOR DRIVE OR RECEPTION SHAFTS FOR THE NORTH TUNNELS WILL ONLY REQUIRE ONE SHAFT AND WILL HAVE SIMILAR, BUT SMALLER CONFIGURATIONS.
3. DRIVE SHAFT SEPARATION FOR THE MAIN TUNNELS IS BASED ON A MINIMUM TWO SHAFT OUTSIDE DIAMETER CENTER-TO-CENTER SPACING (121 FEET OUTSIDE DIAMETER OF SLURRY WALL).
4. THE BOULDIN ISLAND WILL BE USED AS DRIVE SHAFTS FOR THE ADJACENT TUNNEL REACHES. THE CONTRACTORS SHALL COORDINATE THE USE OF THESE SHAFTS FOR LAUNCHING TUNNELING EQUIPMENT AND MATERIALS.
5. THE STATEN ISLAND AND BACON ISLAND SHAFTS WILL ONLY BE USED AS RECEPTION SHAFTS FOR THE ADJACENT TUNNEL REACHES. THE CONTRACTORS SHALL COORDINATE THE USE OF THESE SHAFTS FOR RETRIEVING TUNNELING EQUIPMENT AND MATERIALS.
6. WORK AREA LAYOUT SHOWN HEREON IS FOR CONCEPTUAL STUDY ONLY. FINAL TUNNEL SHAFT WORK AREA CONFIGURATIONS WILL BE DETERMINED BY THE CONTRACTOR'S MEANS AND METHODS.
7. SIDE SLOPES OF CONSTRUCTION SHAFT PAD ARE BETWEEN 3:1 - 5:1. SLOPE INCLINATIONS WILL BE DETERMINED DURING PRELIMINARY DESIGN ONCE GEOTECHNICAL AND ENGINEERING DATA IS AVAILABLE.
8. TUNNEL DRIVE, RECEPTION OR CONTRACTOR'S VENTILATION SHAFTS. SEE STRUCTURAL DRAWINGS CCO-S-5071TS AND CCO-S-5072TS .

PLAN
1"=80'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

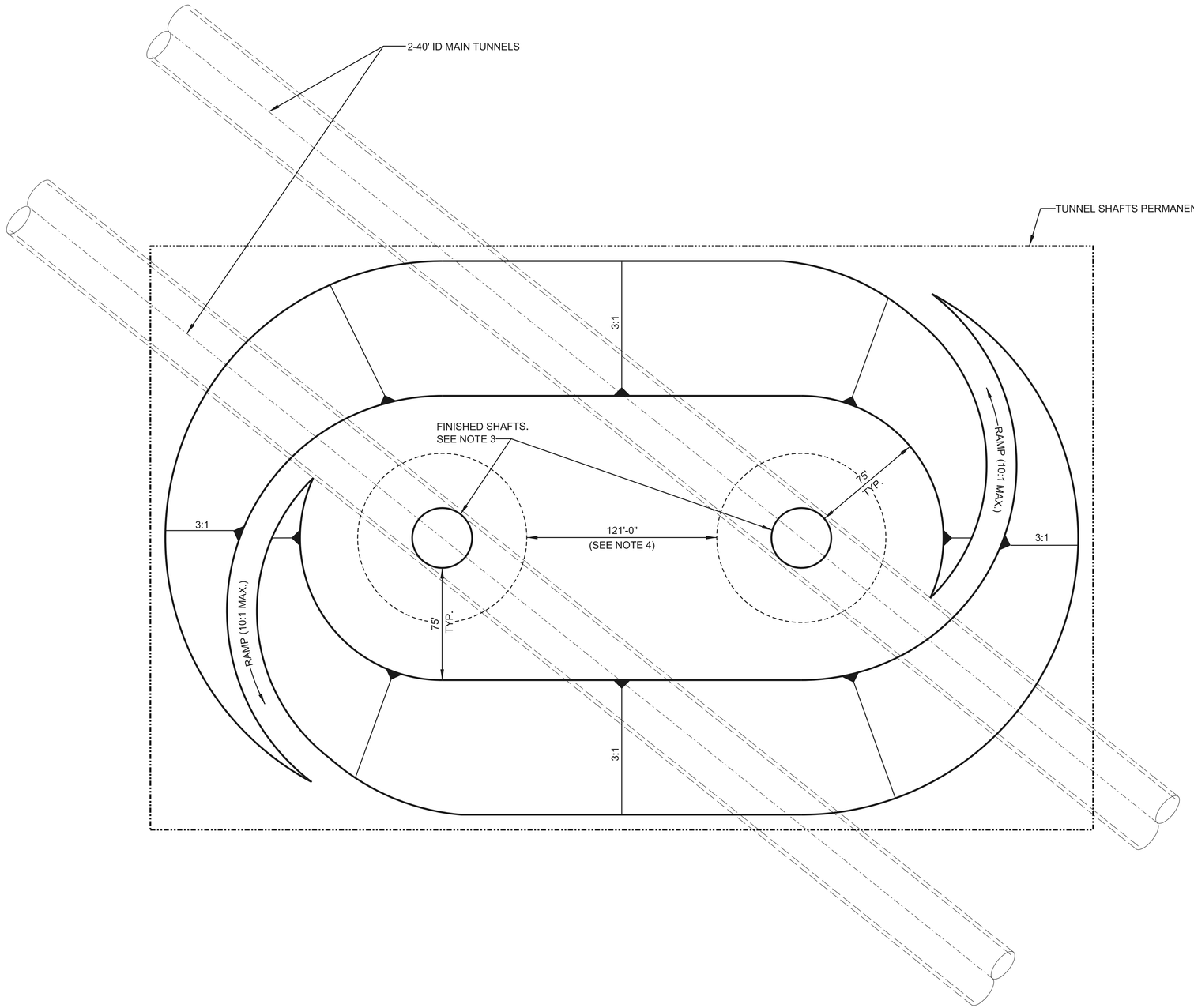
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL TUNNEL SHAFTS WORK AREA PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1069TS
REV 0
SEQUENCE NO. 69 OF 96



PLAN
1"=40'

NOTES

1. SHOWN HEREON IS THE TYPICAL CONFIGURATION OF A FINSIHED 40-FOOT ID MAIN TUNNEL DRIVE SHAFT SITE. TWO FINISHED SHAFTS WILL BE LOCATED AT EACH FINISHED PAD SITE, ONE FOR EACH TUNNEL.
2. NORTH TUNNELS FINISHED DRIVE AND RECEPTION SHAFT PAD SITES ONLY HAVE ONE SHAFT. FINISH DESIGN LAYOUTS VARY. SEE INTAKES SITE PLANS AND THE INTERMEDIATE FOREBAY PLAN FOR CONFIGURATION.
3. FINISHED SHAFT ID'S WILL VARY FROM 20' TO 40'. SEE STRUCTURAL DRAWING CCO-S-5073TS.
4. FINISHED SHAFT SEPARATIONS WILL DEPEND UPON THE ACTUAL CONSTRUCTION SHAFT SEPARATION SELECTED BY THE CONTRACTOR. FINISHED SHAFT SPACING SHOWN HEREON IS BASED ON THE MINIMUM MAIN TUNNELS SHAFT SEPARATION.
5. FINISHED TUNNEL SHAFT SITE PLAN LAYOUT SHOWN HEREON IS FOR CONCEPTUAL STUDY ONLY. FINAL FINISHED TUNNEL SHAFT SITE CONFIGUATIONS WILL BE DETERMINED BY THE CONTRACTOR'S WORK AREA CONFIGURATION AND THE SPACE REQUIREMENTS NEEDED FOR FACILITY OPERATON AND MAINTENANCE.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

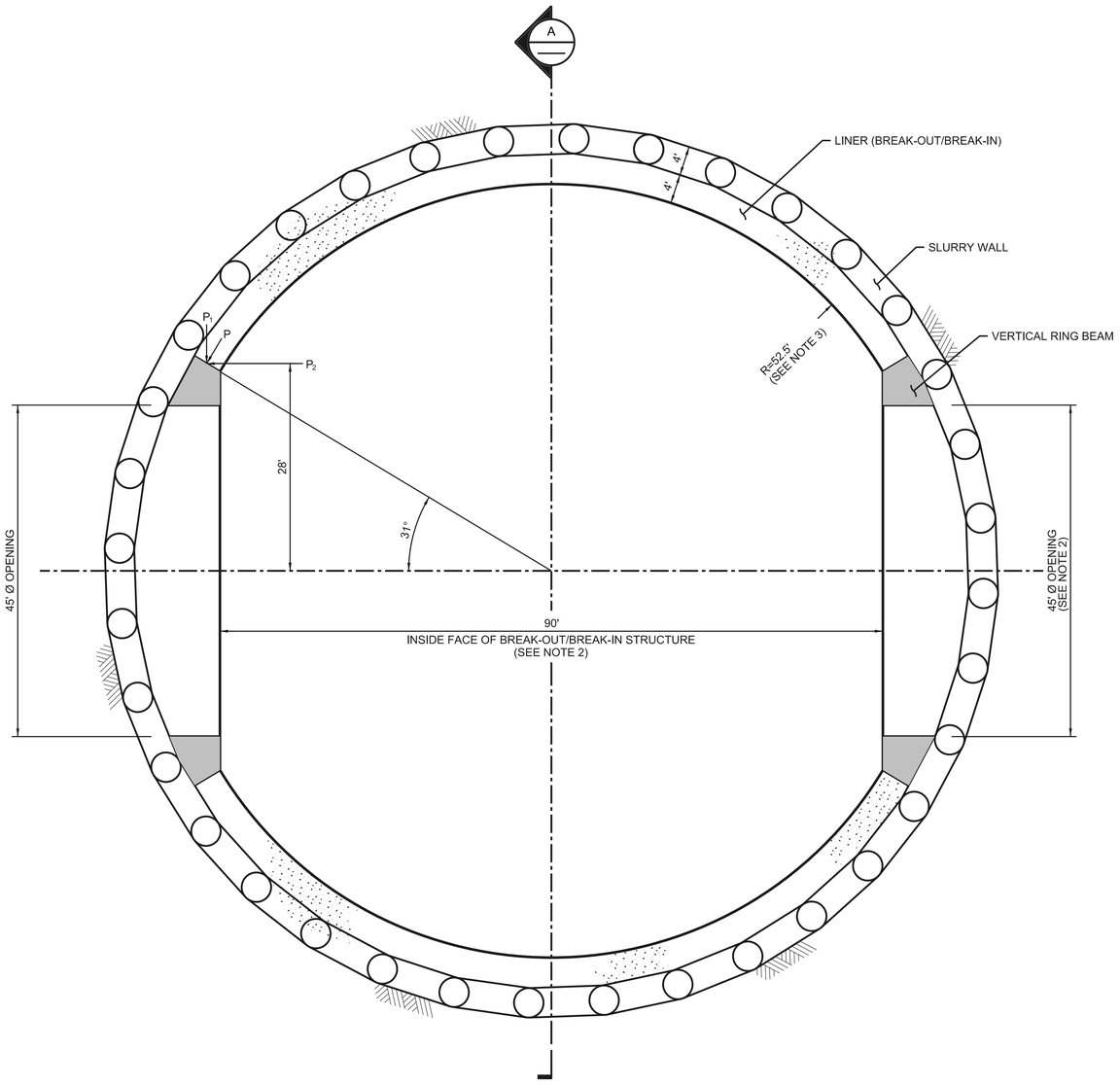
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

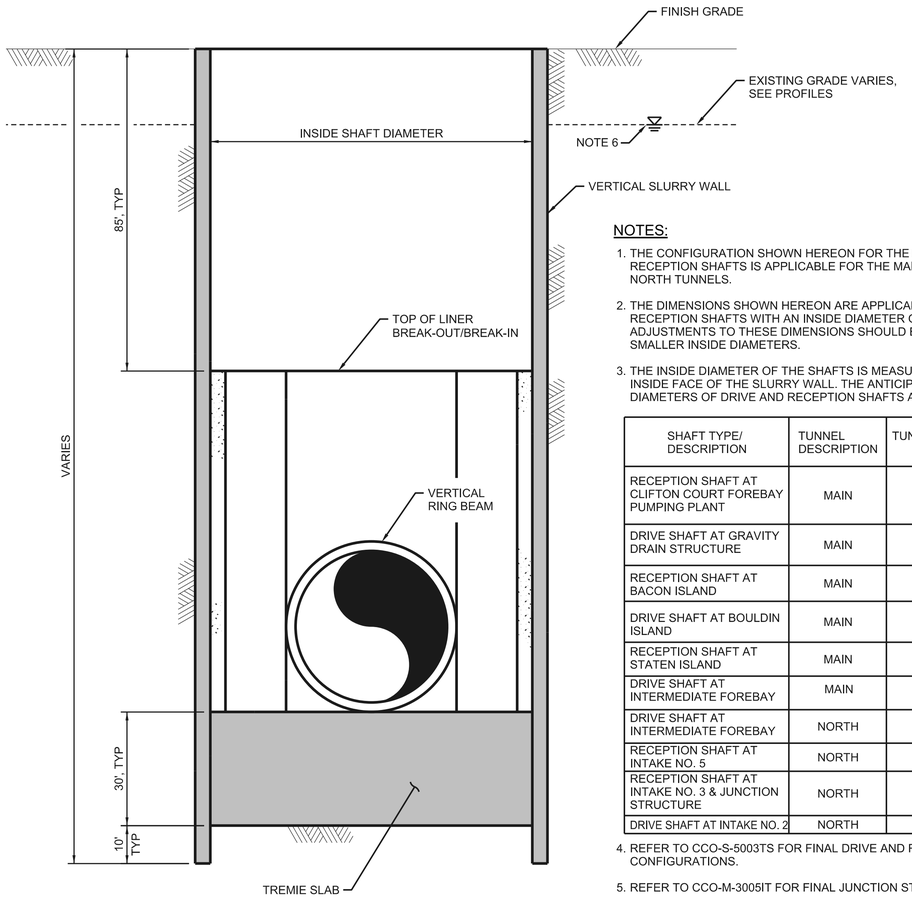
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL TUNNEL SHAFTS FINISHED PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1070TS
REV 0
SEQUENCE NO. 70 OF 96



PLAN
1"=20'



A SECTION
1"=20"

NOTES:

1. THE CONFIGURATION SHOWN HEREON FOR THE DRIVE AND RECEPTION SHAFTS IS APPLICABLE FOR THE MAIN TUNNELS AND NORTH TUNNELS.
2. THE DIMENSIONS SHOWN HEREON ARE APPLICABLE FOR DRIVE AND RECEPTION SHAFTS WITH AN INSIDE DIAMETER OF 113 FEET. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.
3. THE INSIDE DIAMETER OF THE SHAFTS IS MEASURED FROM THE INSIDE FACE OF THE SLURRY WALL. THE ANTICIPATED INSIDE DIAMETERS OF DRIVE AND RECEPTION SHAFTS ARE AS FOLLOWS:

SHAFT TYPE/ DESCRIPTION	TUNNEL DESCRIPTION	TUNNEL DIAMETER (FEET)	SHAFT INSIDE DIAMETER (FEET) (✱ = SEE NOTE 7)
RECEPTION SHAFT AT CLIFTON COURT FOREBAY PUMPING PLANT	MAIN	40	✱ 150
DRIVE SHAFT AT GRAVITY DRAIN STRUCTURE	MAIN	40	113
RECEPTION SHAFT AT BACON ISLAND	MAIN	40	100
DRIVE SHAFT AT BOULDIN ISLAND	MAIN	40	113
RECEPTION SHAFT AT STATEN ISLAND	MAIN	40	100
DRIVE SHAFT AT INTERMEDIATE FOREBAY	MAIN	40	✱ 113
DRIVE SHAFT AT INTERMEDIATE FOREBAY	NORTH	40	✱ 113
RECEPTION SHAFT AT INTAKE NO. 5	NORTH	28	100
RECEPTION SHAFT AT INTAKE NO. 3 & JUNCTION STRUCTURE	NORTH	28 AND 40	✱ 113
DRIVE SHAFT AT INTAKE NO. 2	NORTH	28	100

4. REFER TO CCO-S-5003TS FOR FINAL DRIVE AND RECEPTION SHAFT CONFIGURATIONS.
5. REFER TO CCO-M-3005IT FOR FINAL JUNCTION STRUCTURE SHAFT CONFIGURATION.
6. HIGH GROUNDWATER LEVEL IS COINCIDENT WITH EXISTING GROUND SURFACE.
7. REFER TO MECHANICAL DRAWINGS FOR FINISHED SHAFT DIAMETER AT FACILITIES.

FINAL DRAFT
DATE: APRIL 1, 2015

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

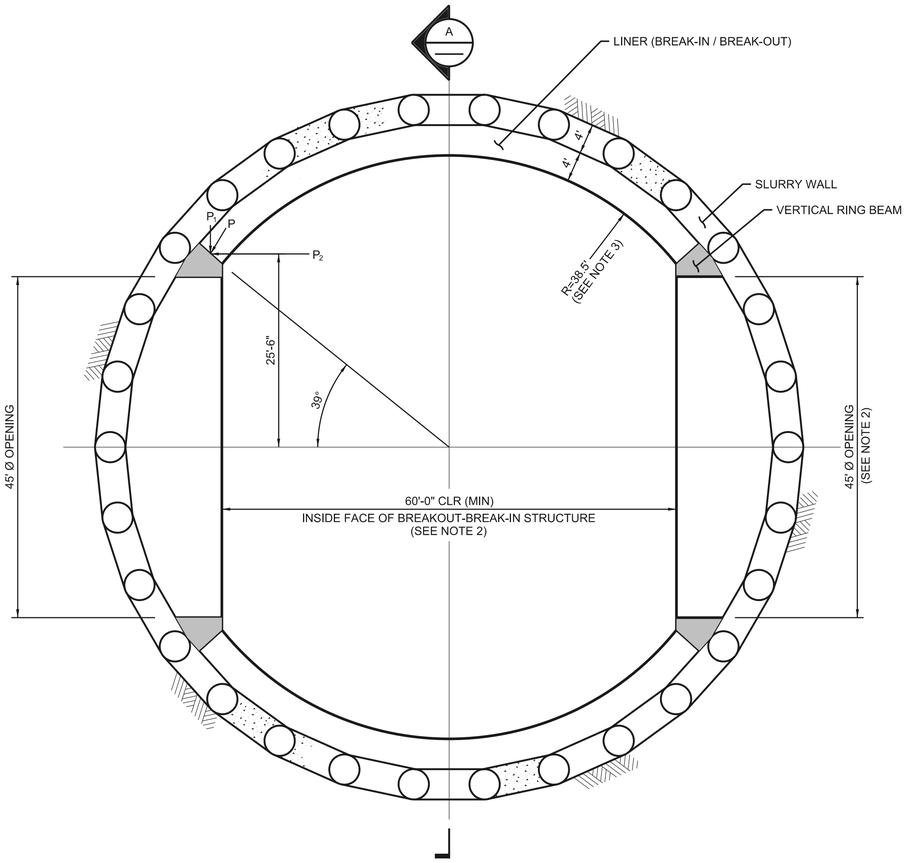
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY-MODIFIED PIPELINE / TUNNEL OPTION

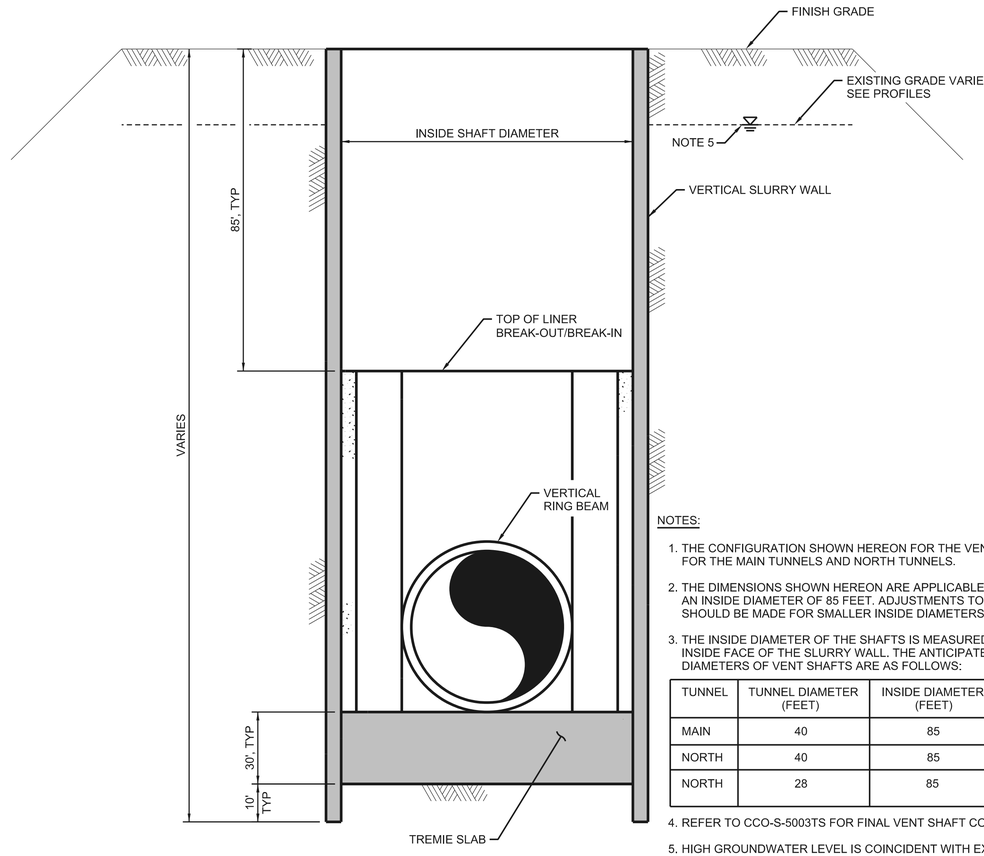
NORTH AND MAIN TUNNELS TYPICAL
DRIVE AND RECEPTION SHAFT - PLAN AND SECTION

PROJECT NO.	
240010	
SHEET NO.	
CCO - S - 5071TS	
REV	SEQUENCE NO.
0	71 OF 96

Edited By:
Printed By:



PLAN
1"=10"



NOTES:

1. THE CONFIGURATION SHOWN HEREON FOR THE VENT SHAFTS IS APPLICABLE FOR THE MAIN TUNNELS AND NORTH TUNNELS.
2. THE DIMENSIONS SHOWN HEREON ARE APPLICABLE FOR VENT SHAFTS WITH AN INSIDE DIAMETER OF 85 FEET. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.
3. THE INSIDE DIAMETER OF THE SHAFTS IS MEASURED FROM THE INSIDE FACE OF THE SLURRY WALL. THE ANTICIPATED INSIDE DIAMETERS OF VENT SHAFTS ARE AS FOLLOWS:

TUNNEL	TUNNEL DIAMETER (FEET)	INSIDE DIAMETER (FEET)
MAIN	40	85
NORTH	40	85
NORTH	28	85

4. REFER TO CCO-S-5003TS FOR FINAL VENT SHAFT CONFIGURATIONS.
5. HIGH GROUNDWATER LEVEL IS COINCIDENT WITH EXISTING GROUND SURFACE.

A SECTION
1"=20"

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

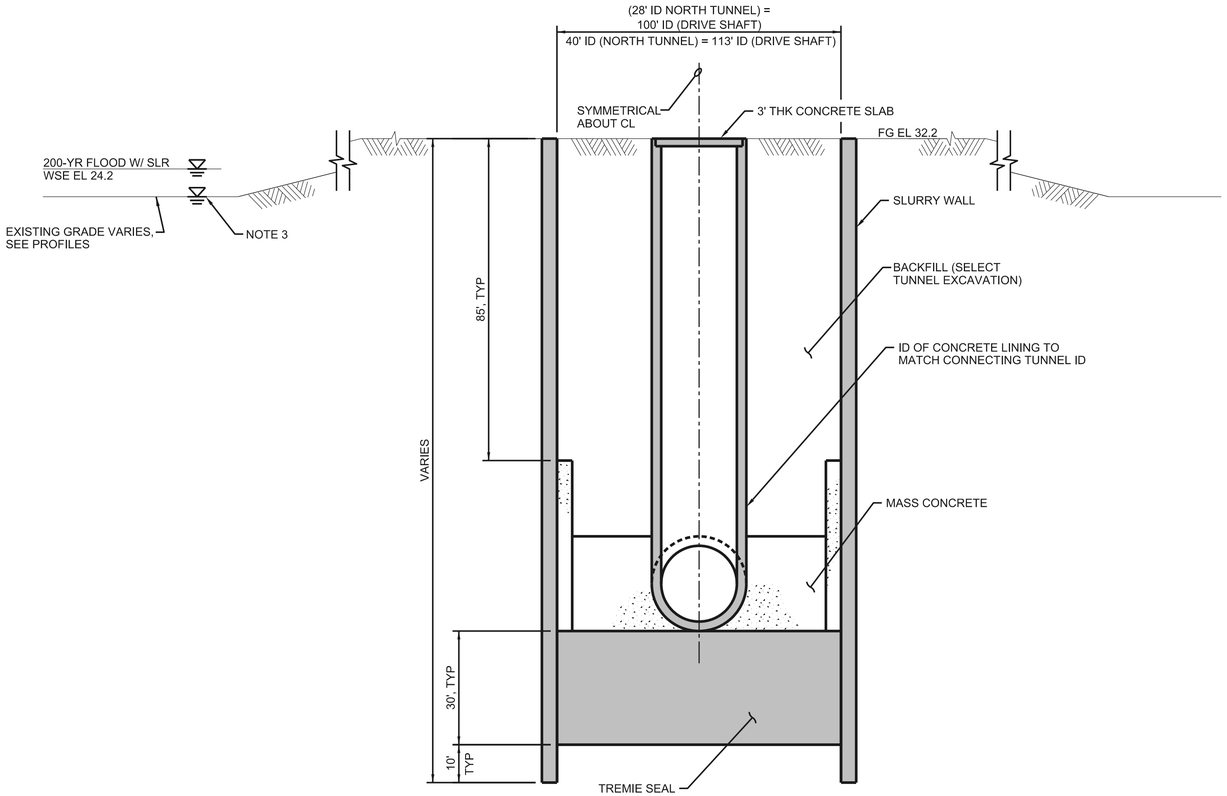
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY-MODIFIED PIPELINE / TUNNEL OPTION

NORTH AND MAIN TUNNELS TYPICAL VENT SHAFT - PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - S - 5072TS
REV 0
SEQUENCE NO. 72 OF 96

Edited By:
Printed By:

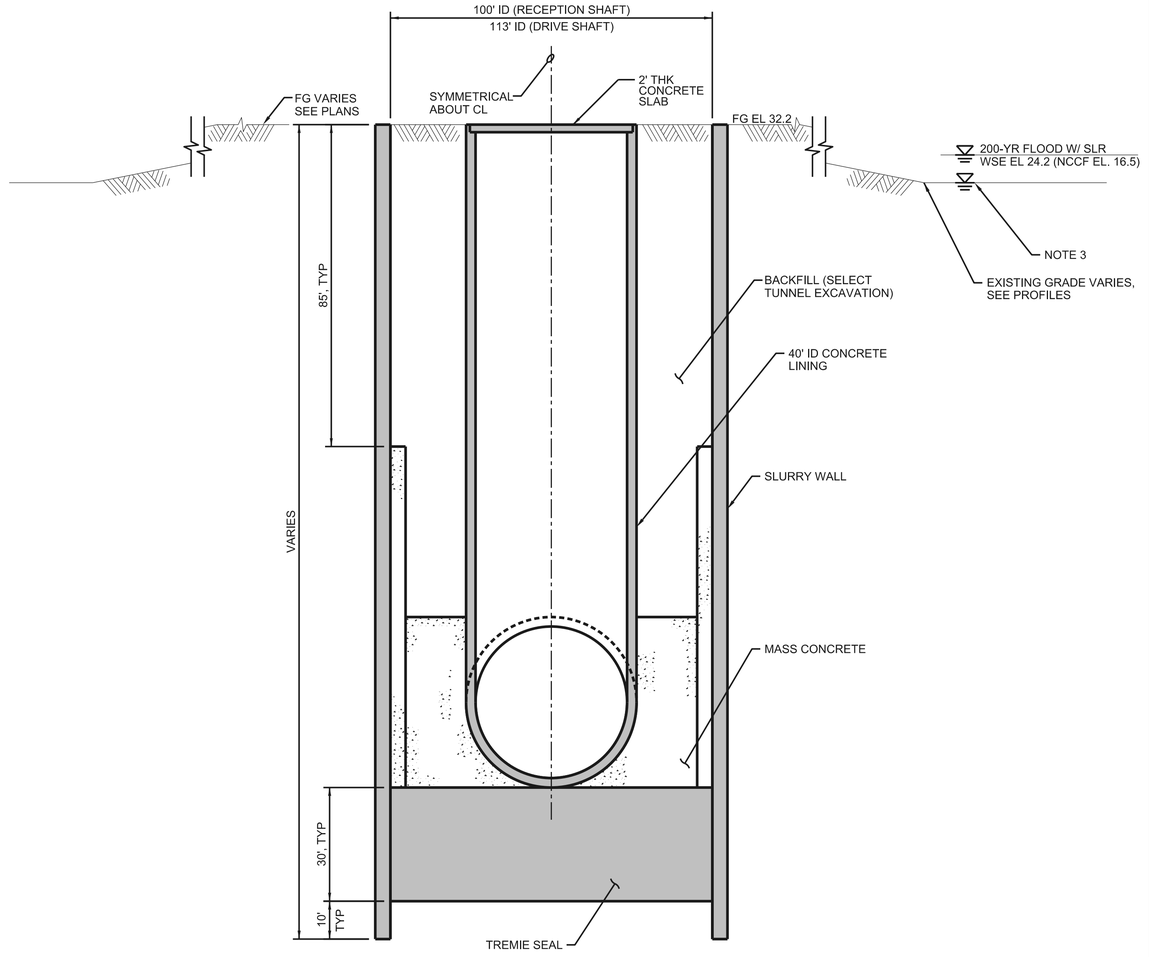


NOTES:

1. DIMENSIONS SHOWN HERE ARE TYPICAL UNLESS NOTE OTHERWISE ON SHEET CCO-S-5071TS.
2. HIGH GROUNDWATER LEVEL COINCIDENT WITH ORIGINAL GRADE.

NORTH TUNNELS

SECTION
1"=20'



NOTES:

1. DIMENSIONS SHOWN HERE ARE TYPICAL UNLESS NOTED OTHERWISE ON SHEET CCO-S-5071TS.
2. HIGH GROUNDWATER LEVEL COINCIDENT WITH EXISTING GRADE.

MAIN TUNNELS

SECTION
1"=20'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH AND MAIN TUNNELS TYPICAL FINAL SHAFT CONFIRGURATION - SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - S - 5073TS
REV 0
SEQUENCE NO. 73 OF 96

DWR-808

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED —
DRAWN —
CHECKED

APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT RENDERING

PROJECT NO. 240010
SHEET NO. CCO - G - 9074PP
REV 0
SEQUENCE NO. 74 OF 96

NOTE:

1. FOR PUMPING PLANT PLAN, SEE SHEET CCO-M-1076PP.

FINAL DRAFT
DATE: APRIL 1, 2015

PLAN
1"=200'

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED
DRAWN
CHECKED
APPROVAL RECOMMENDED
APPROVAL BY

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1075PP
REV 0
SEQUENCE NO. 75 OF 96

2 DETAIL
1"=80'

CCO-C-1075PP

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

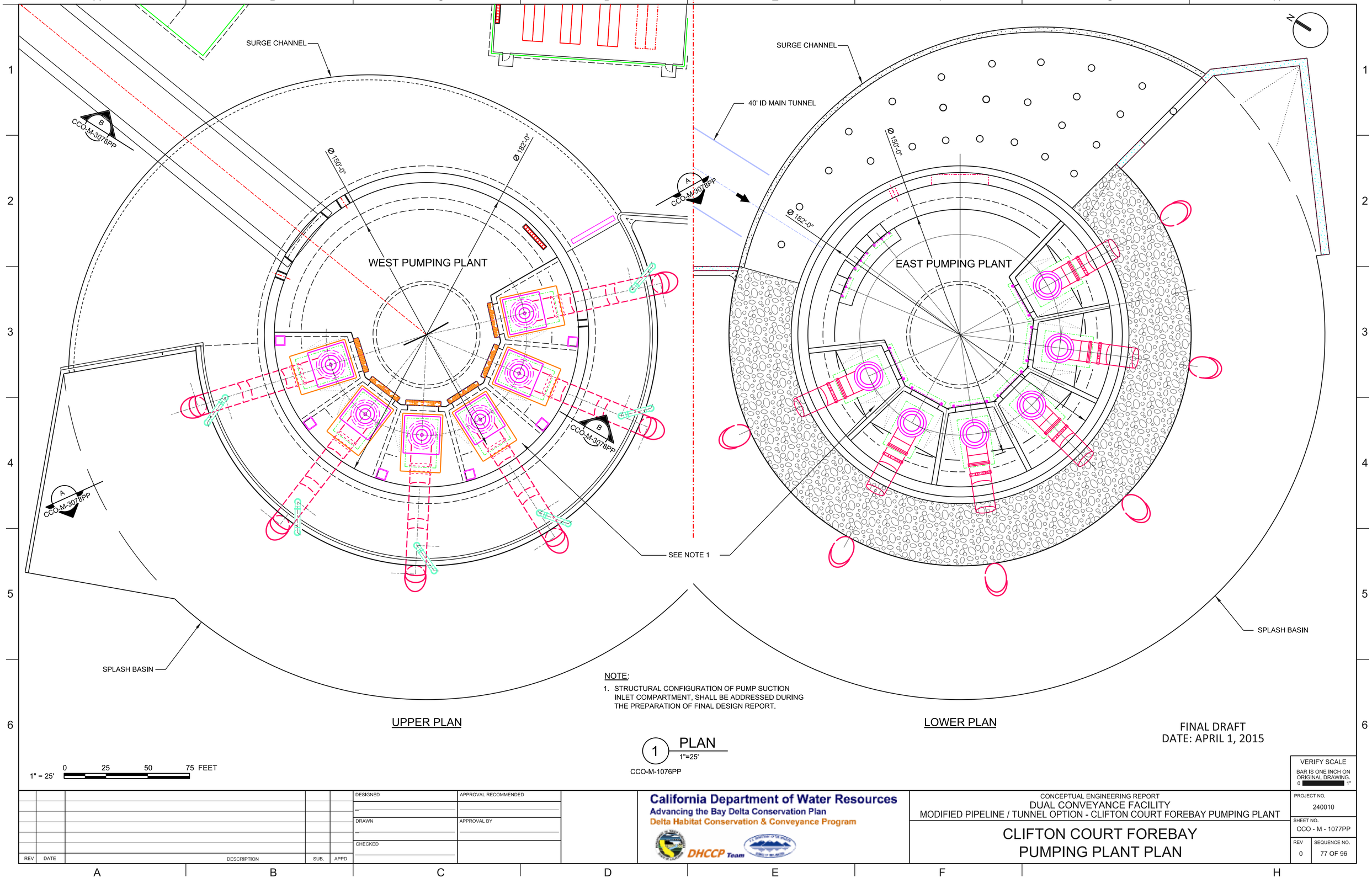
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT PLAN

PROJECT NO. 240010
SHEET NO. CCO - M - 1076PP
REV 0
SEQUENCE NO. 76 OF 96



NOTE:

1. STRUCTURAL CONFIGURATION OF PUMP SUCTION INLET COMPARTMENT, SHALL BE ADDRESSED DURING THE PREPARATION OF FINAL DESIGN REPORT.

UPPER PLAN

LOWER PLAN

1 PLAN
1"=25'
CCO-M-1076PP

1" = 25' 0 25 50 75 FEET

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

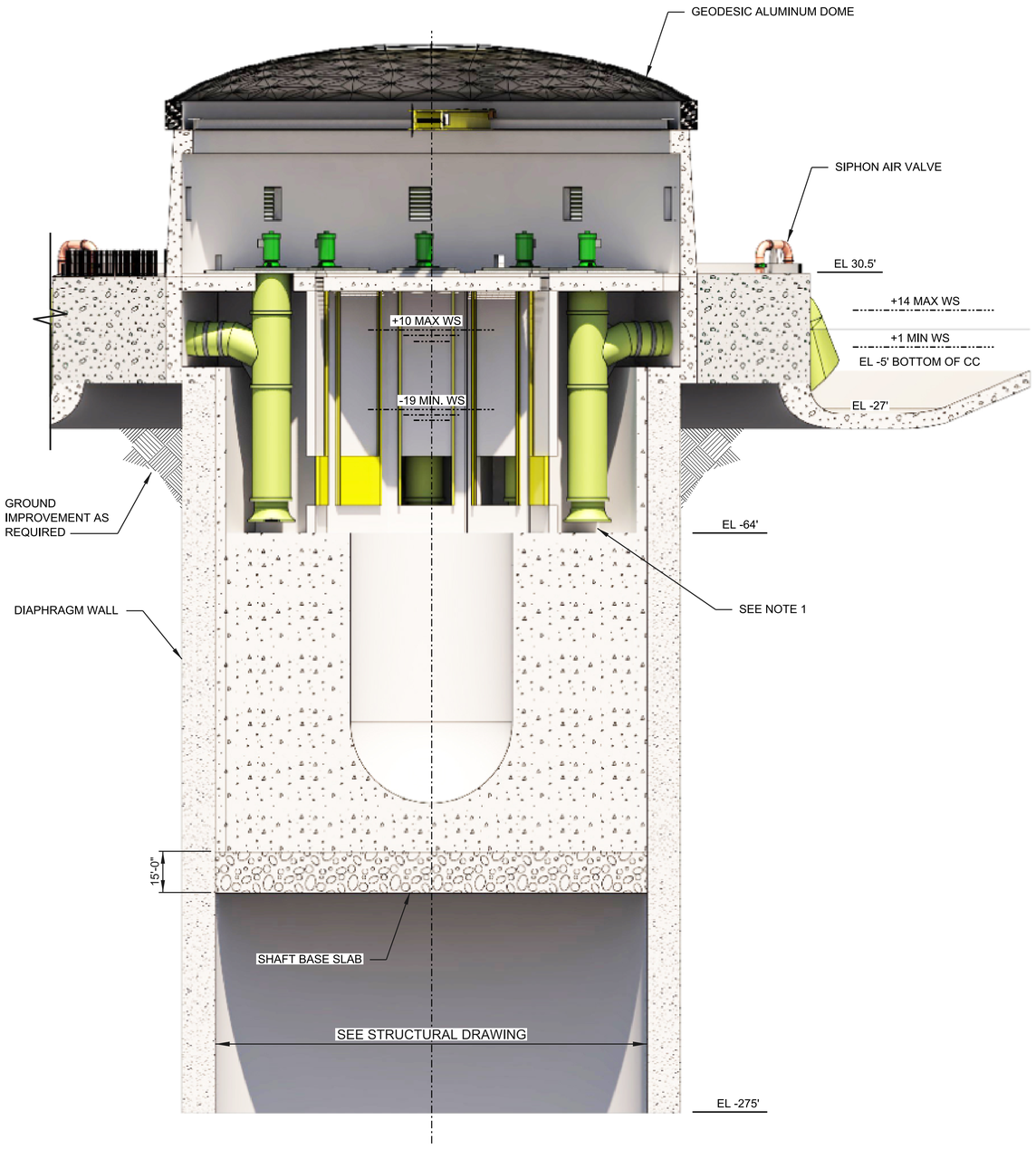
DESIGNED — APPROVAL RECOMMENDED
DRAWN — APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

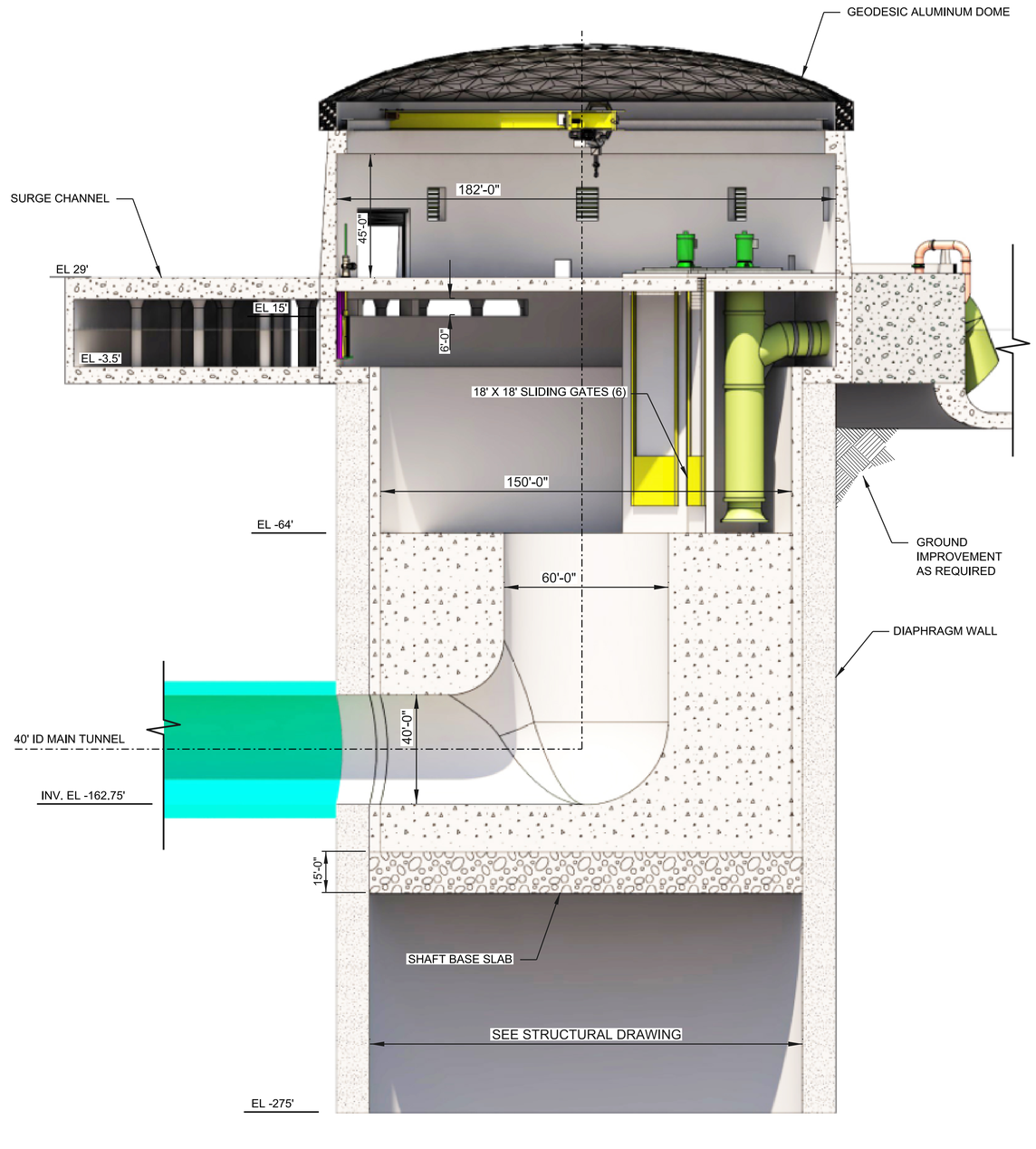
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT PLAN

PROJECT NO. 240010
SHEET NO. CCO - M - 1077PP
REV 0
SEQUENCE NO. 77 OF 96



A TYPICAL SECTION
1"=25'
CCO-M-1077PP



B TYPICAL SECTION
1"=25'
CCO-M-1077PP

NOTE:

1. STRUCTURAL CONFIGURATION OF PUMP SUCTION INLET COMPARTMENT, SHALL BE ADDRESSED DURING THE PREPARATION OF FINAL DESIGN REPORT.

FINAL DRAFT
DATE: APRIL 1, 2015

1" = 25' 0 25 50 75 FEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

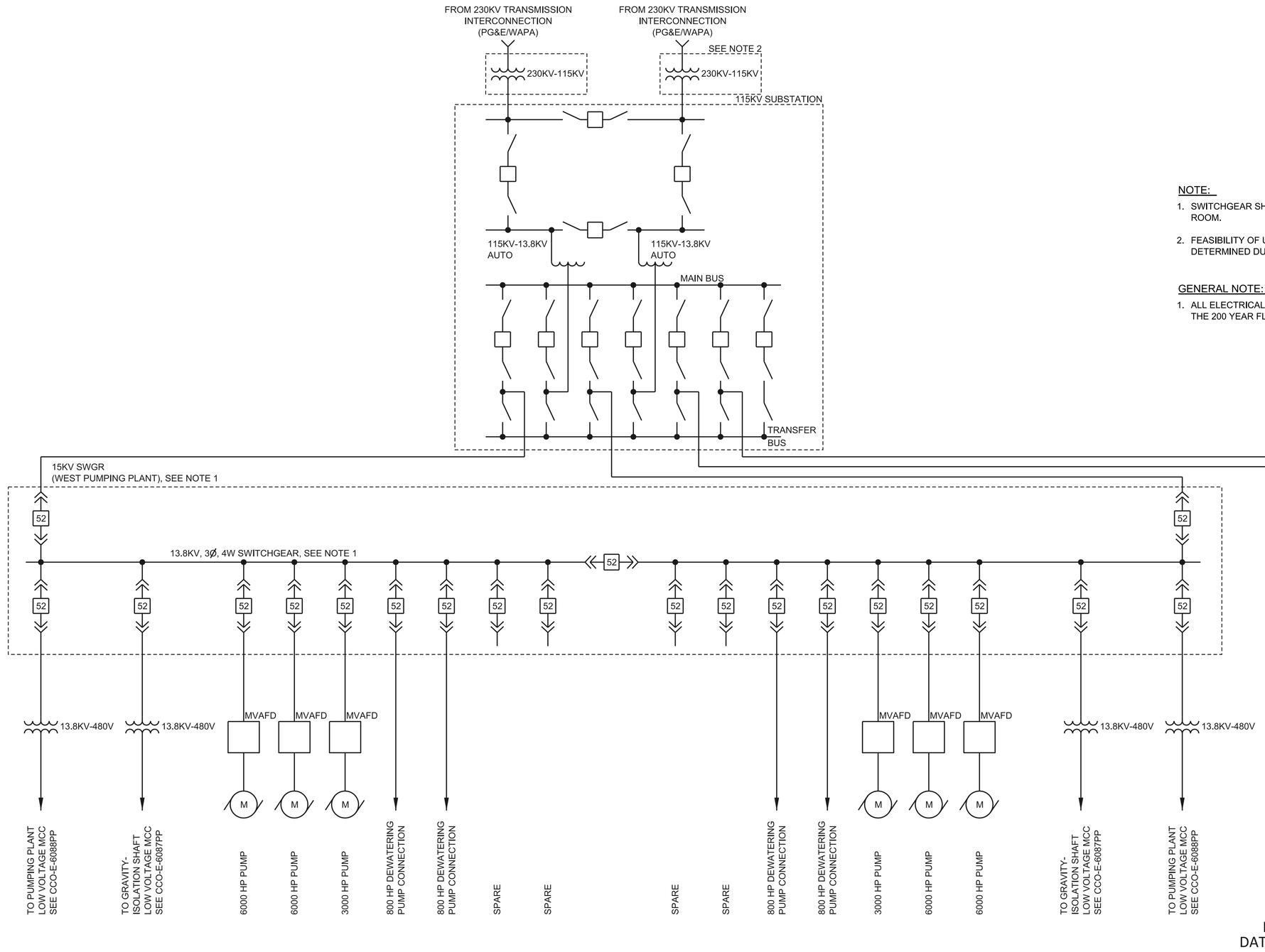
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - M - 3078PP
REV 0
SEQUENCE NO. 78 OF 96



NOTE:

1. SWITCHGEAR SHALL BE LOCATED WITHIN ELECTRICAL ROOM.
2. FEASIBILITY OF UTILITY BACKUP SOURCE TO BE DETERMINED DURING PRELIMINARY DESIGN.

GENERAL NOTE:

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200 YEAR FLOODPLAIN.

FINAL DRAFT
DATE: APRIL 1, 2015

PUMPING PLANT MEDIUM VOLTAGE POWER DISTRIBUTION SINGLE LINE DIAGRAM (TYPICAL OF 2)

NTS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

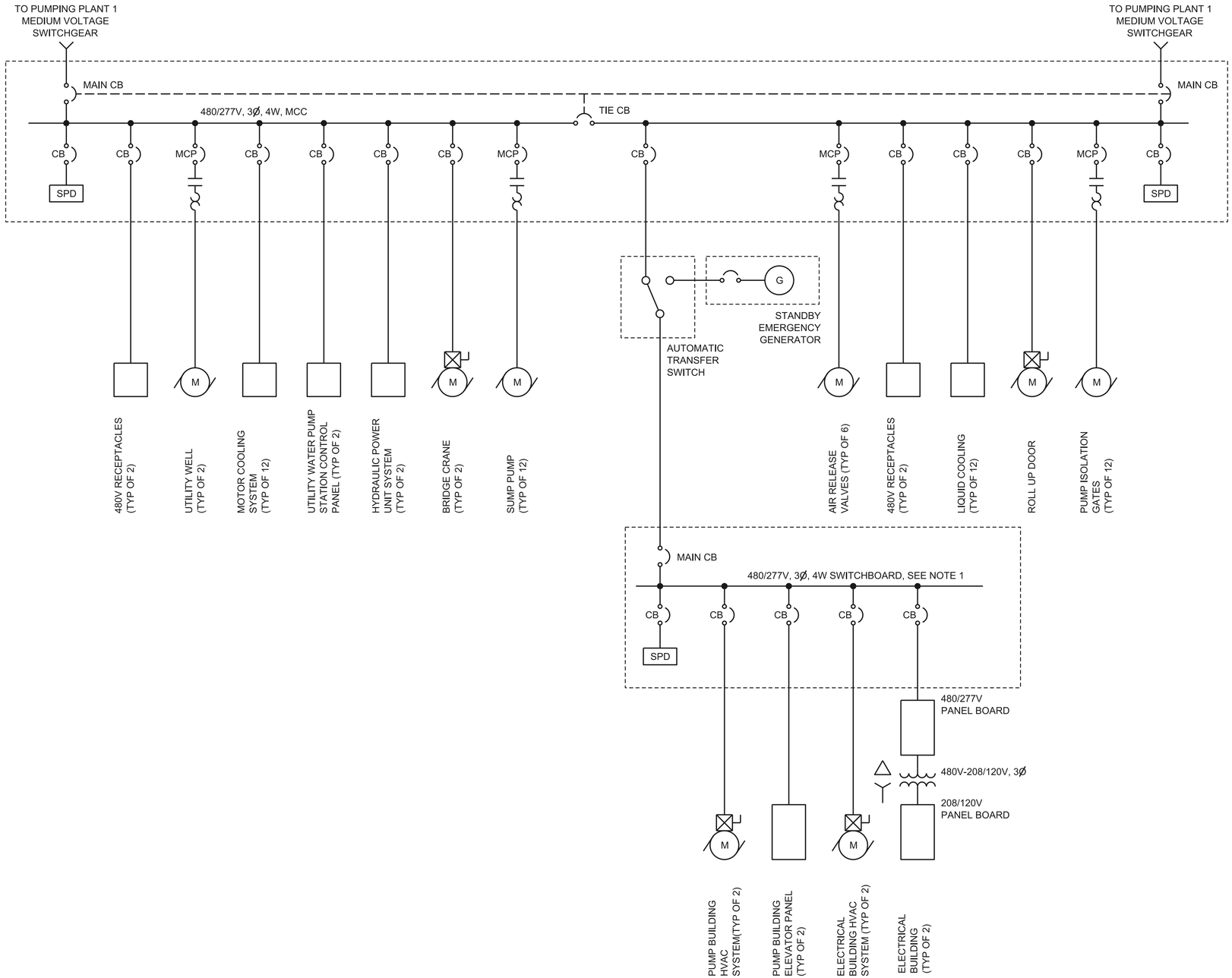
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT OVERALL SINGLE LINE DIAGRAM

PROJECT NO. 240010
SHEET NO. CCO - E - 6079PP
REV 0
SEQUENCE NO. 79 OF 96



NOTE:

1. MCC AND SWITCHBOARD SHALL BE LOCATED WITHIN ELECTRICAL ROOM.

GENERAL NOTE:

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200 YEAR FLOODPLAIN.

FINAL DRAFT
DATE: APRIL 1, 2015

PUMPING PLANT MCC SINGLE LINE DIAGRAM (TYPICAL OF 2)

NTS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

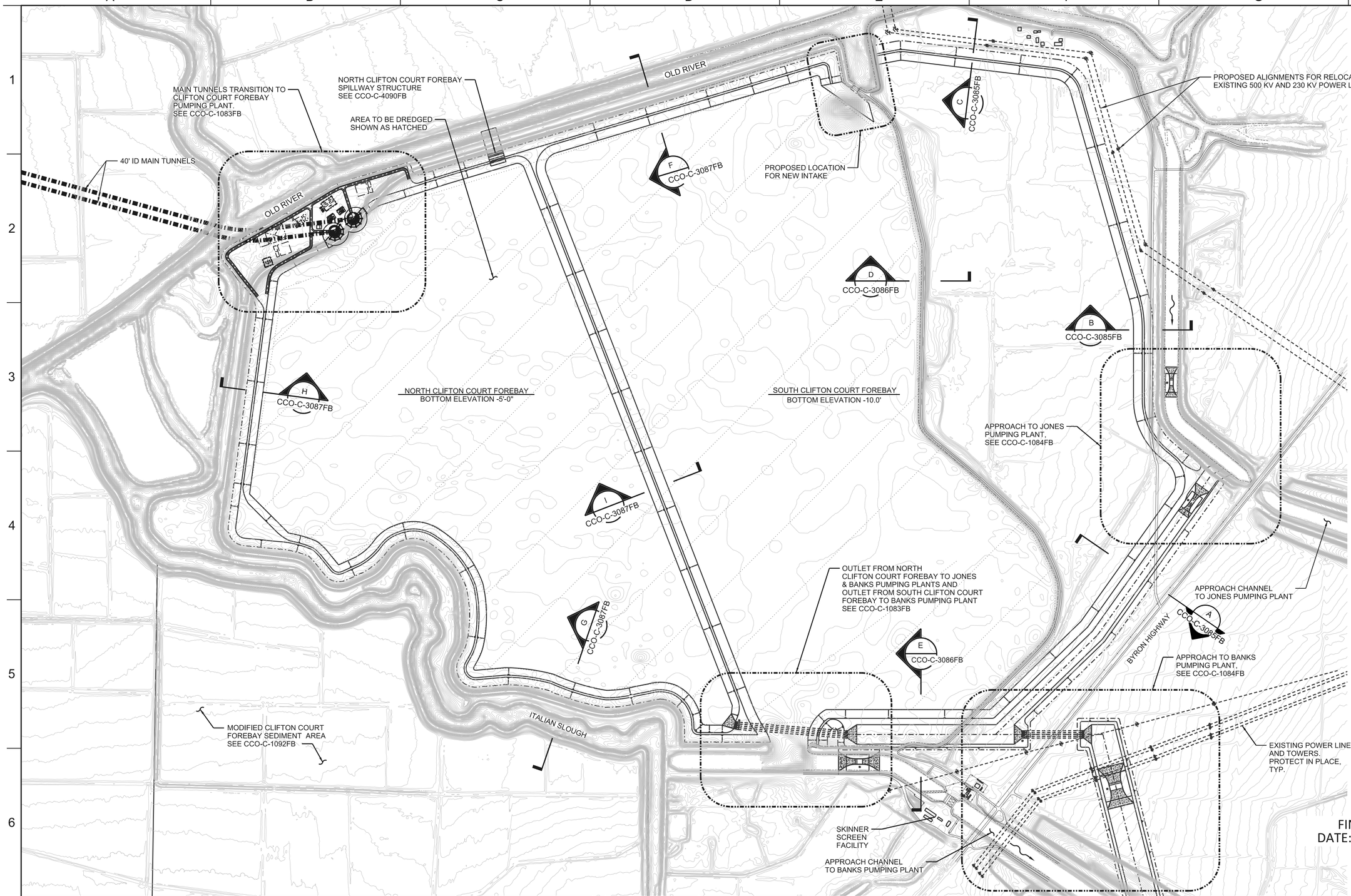
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CLIFTON COURT FOREBAY PUMPING PLANT
SINGLE LINE DIAGRAM

PROJECT NO. 240010
SHEET NO. CCO - E - 6080PP
REV 0
SEQUENCE NO. 80 OF 96



SITE PLAN

1" = 750'

N

0 750 1500 2250

Scale In Feet

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

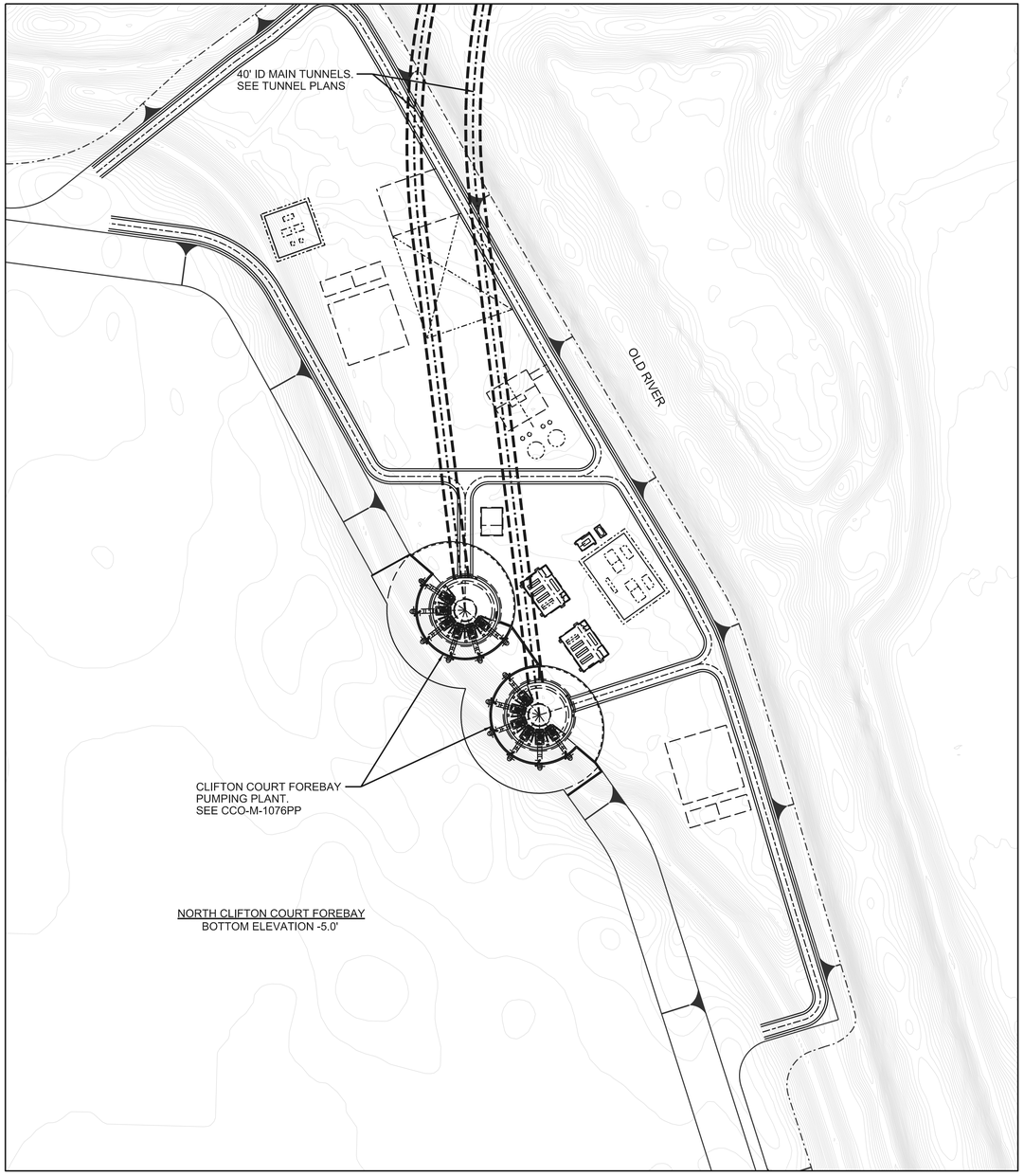
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY OVERALL SITE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1082FB
REV 0
SEQUENCE NO. 82 OF 96

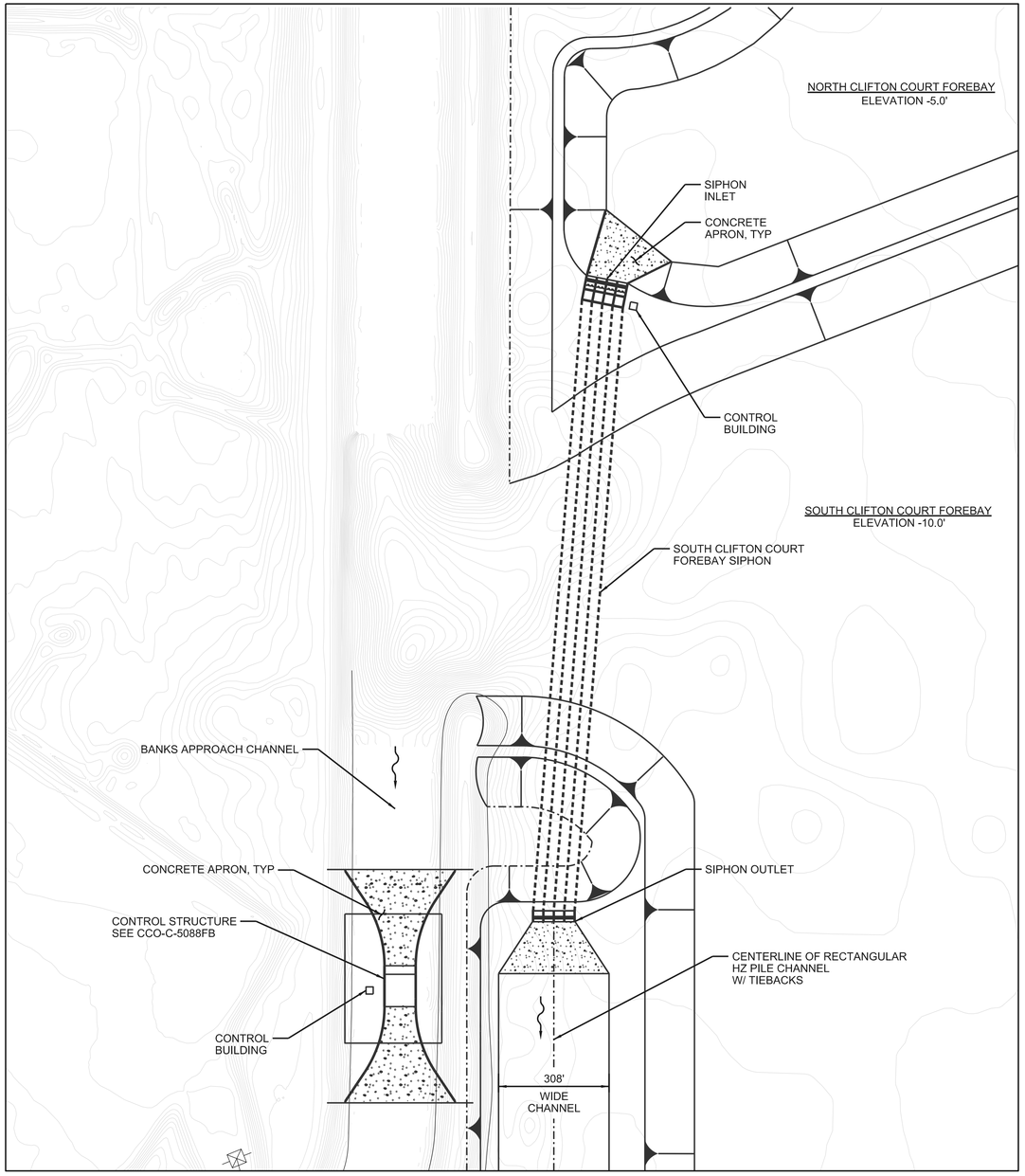


TUNNEL TRANSITION TO CLIFTON COURT FOREBAY PUMPING STATION

PARTIAL PLAN
1"=200'

N

0 200 400 600
Scale In Feet



OUTLETS FROM NORTH & SOUTH CLIFTON COURT FOREBAYS TO BANKS & JONES PUMPING PLANTS

PARTIAL PLAN
1"=200'

N

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

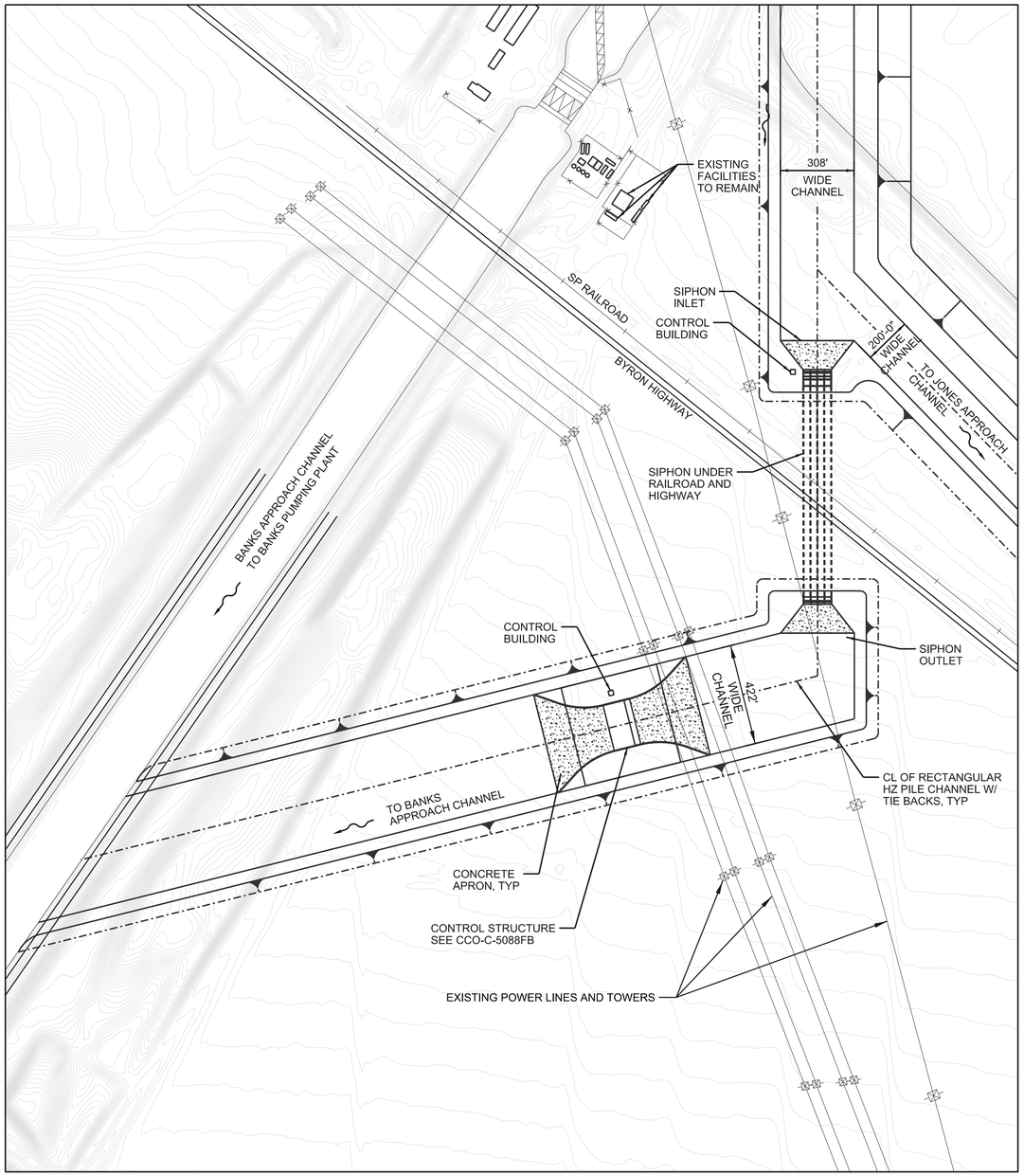
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

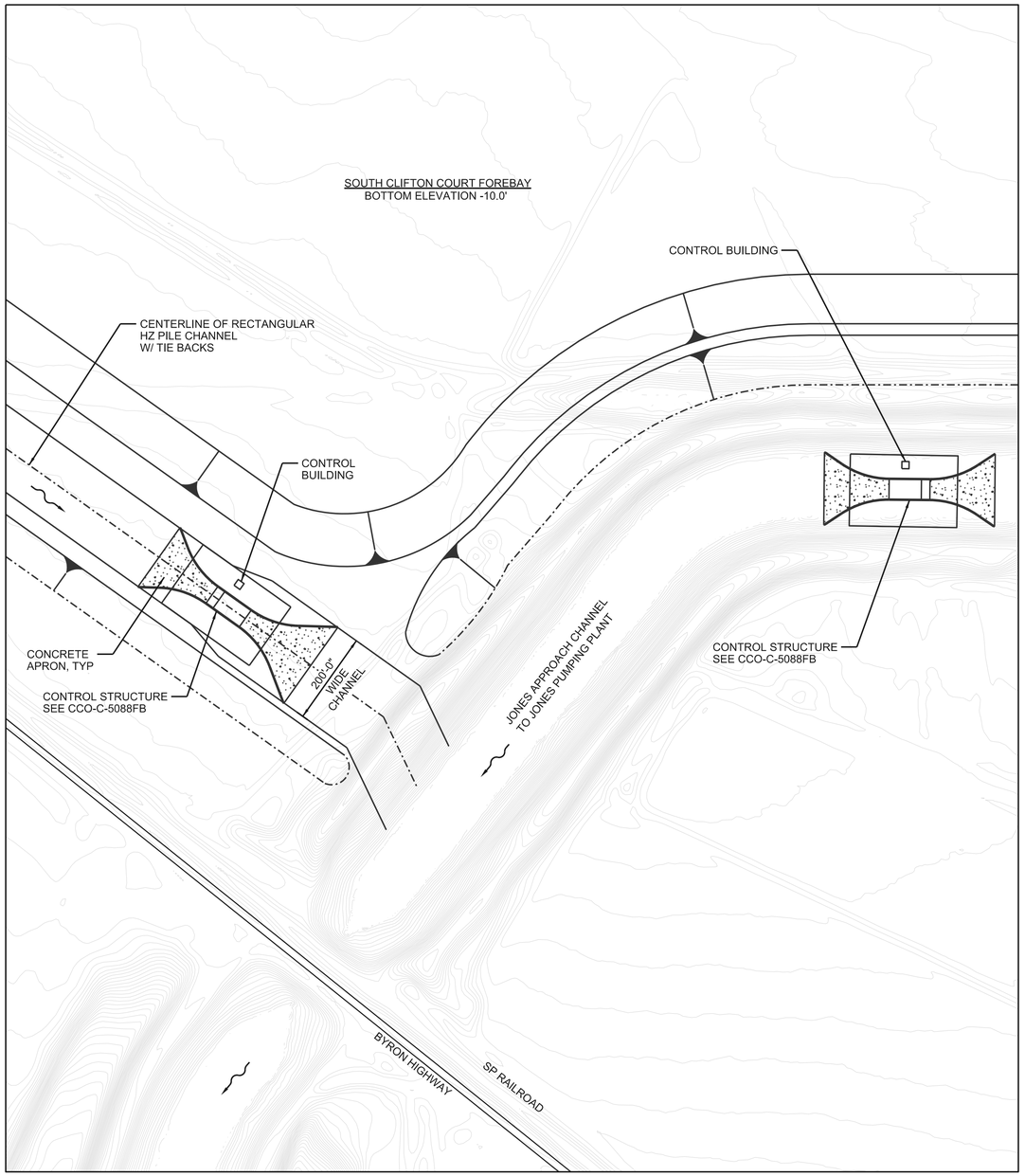
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY INLET AND OUTLETS - SITE PLANS

PROJECT NO. 240010
SHEET NO. CCO - C - 1083FB
REV 0
SEQUENCE NO. 83 OF 96





APPROACH TO BANKS PUMPING PLANT

PARTIAL PLAN
1"=300'

N

APPROACH TO JONES PUMPING PLANT

PARTIAL PLAN
1"=200'

N

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

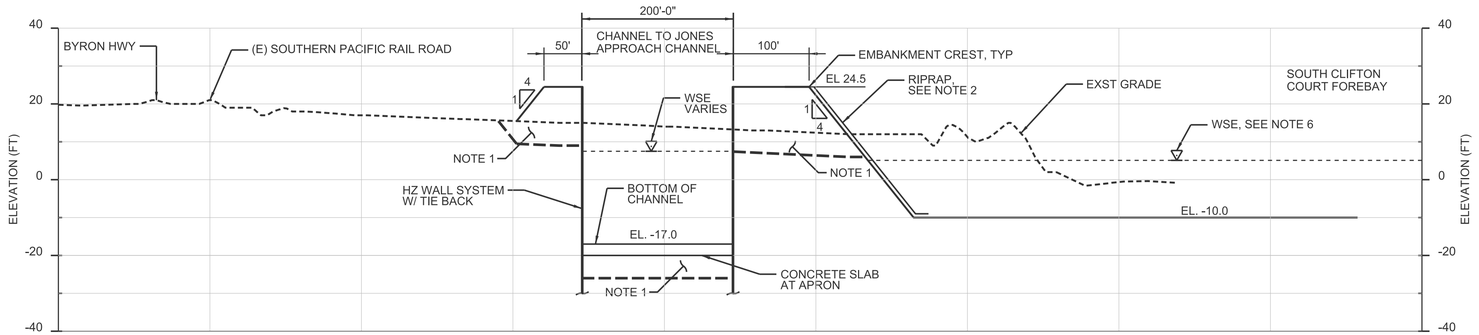
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

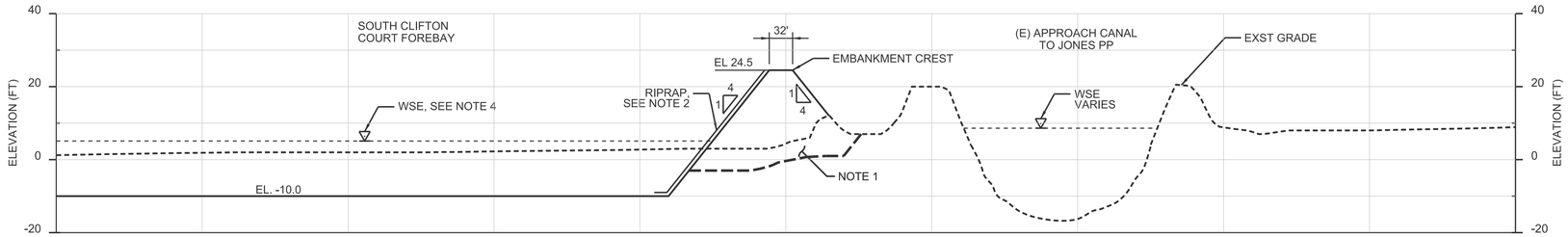
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CHANNEL APPROACHES TO PUMPING PLANTS SITE PLANS

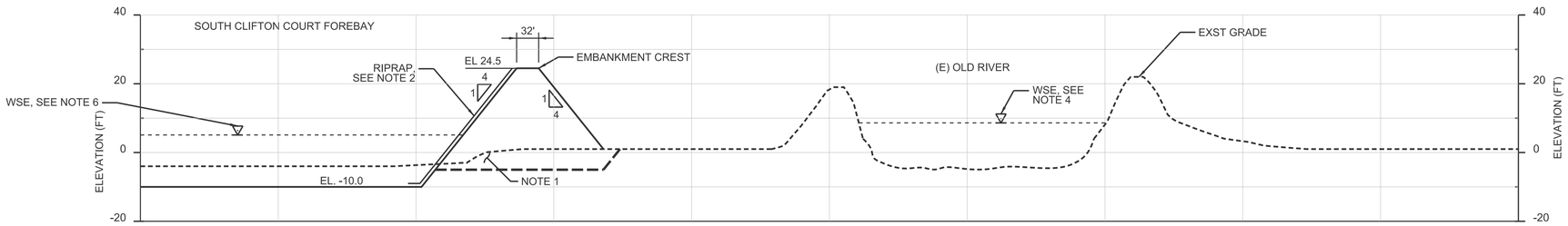
PROJECT NO. 240010
SHEET NO. CCO - C - 1084FB
REV 0
SEQUENCE NO. 84 OF 96



A SECTION
SCALE AS SHOWN
CCO-C-1089FB



B SECTION
SCALE AS SHOWN
CCO-C-1089FB



C SECTION
SCALE AS SHOWN
CCO-C-1089FB

OPERATION SCENARIO	OPERATED FOREBAY	WATER SURFACE ELEVATIONS												
		SWP						CVP			SWP & CVP			
		HISTORICAL MINIMUM WSE	HISTORICAL MAXIMUM WSE	TYPICAL MINIMUM OPERATING WSE	TYPICAL MAXIMUM OPERATING WSE	NORMAL MAXIMUM OPERATING WSE	ABSOLUTE MAXIMUM OPERATING WSE	DESIGN MINIMUM OPERATING WSE	DESIGN MAXIMUM OPERATING WSE	LOWEST WSE FOR PUMP OPERATION	MINIMUM WSE	MAXIMUM WSE	PREFERRED MINIMUM OPERATING WSE	PREFERRED MAXIMUM OPERATING WSE
ISOLATED SOUTH DELTA OPERATION	SOUTH CCF	1.1	12.6	1.1	3.1	8.1	9.1	-1.43	9.57	-2.43	-	-	-	-
ISOLATED NORTH DELTA OPERATION	NORTH CCF	-	-	-	-	-	-	-	-	-	1.1	11.07	3.1	7.07
DUAL OPERATON	NORTH CCF	-	-	-	-	-	-	-	-	-	5.6	14.7	-	-
	SOUTH CCF	1.1	12.6	1.1	3.1	5.1	-	-	-	-	-	-	-	-
	OLD RIVER	-	-	-	-	-	-	-1.43	5.1	-2.43	-	-	-	-

NOTES:

1. EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY. AN AVERAGE OF 6 FEET IS ASSUMED.
2. PLACE RIPRAP OVER FILTER LAYER.
3. FOREBAY FILLS CONSTRUCTED FROM COMPACTED EMBANKMENT MATERIAL.
4. OUTSIDE SLOPE AT ORIGINAL GROUND ELEVATION TO INCLUDE TOE DRAIN STARTING 38' FROM CREST AND EXTENDING TO TOE OF SLOPE.
5. CONSTRUCT SLURRY TRENCH CUTOFF TO EL. -50.0
6. SEE WATER SURFACE ELEVATION TABLE FOR OPERATING WSE LEVELS

0 100 200 300
HORIZ 1"-100'

0 20 40 60
VERT 1"=20'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

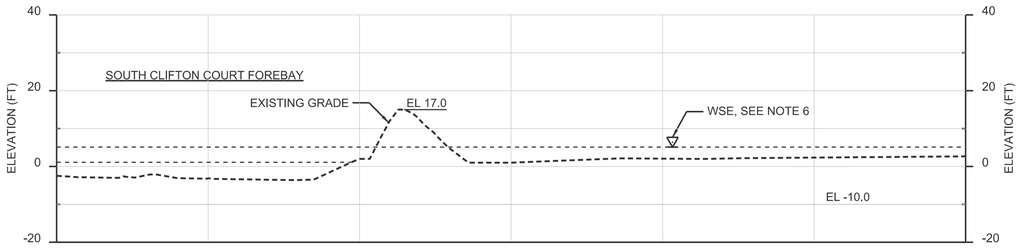
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS I

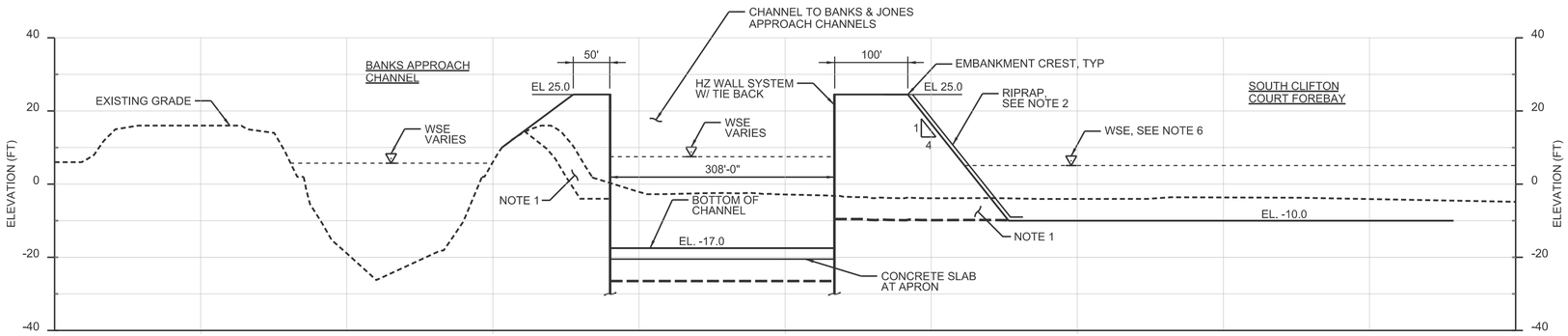
PROJECT NO. 240010
SHEET NO. CCO - C - 3085FB
REV 0
SEQUENCE NO. 85 OF 96



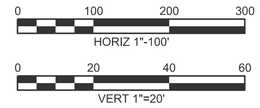
D SECTION
SCALE AS SHOWN
CCO-C-1082FB

NOTES:

1. EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY. AN AVERAGE OF 6 FEET IS ASSUMED.
2. PLACE RIPRAP OVER FILTER LAYER.
3. FOREBAY FILLS CONSTRUCTED FROM COMPACTED EMBANKMENT MATERIAL.
4. OUTSIDE SLOPE AT ORIGINAL GROUND ELEVATION TO INCLUDE TOE DRAIN STARTING 38' FROM CREST AND EXTENDING TO TOE OF SLOPE.
5. CONSTRUCT SLURRY TRENCH CUTOFF TO EL -50.0.
6. SEE WATER SURFACE ELEVATION TABLE ON CCO-C-3085FB FOR WSE OPERATING LEVELS.



E SECTION
SCALE AS SHOWN
CCO-C-1082FB



FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS II

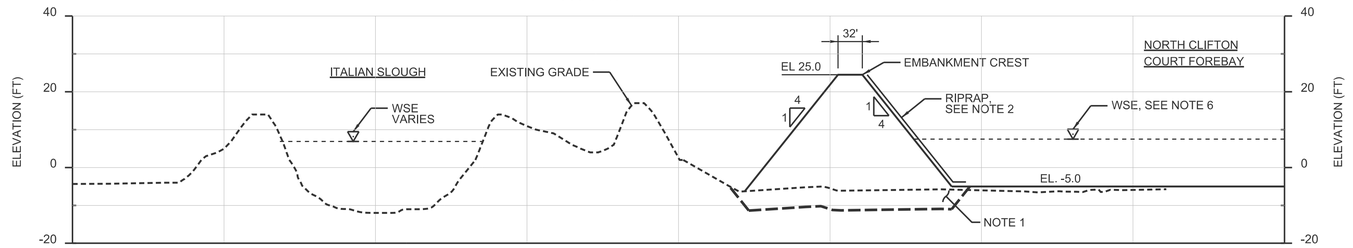
PROJECT NO.	
240010	
SHEET NO.	
CCO - C - 3086FB	
REV	SEQUENCE NO.
0	86 OF 96

pw:\\USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program\02 Study (CER-Conceptual Engineering Report)\07-CER-CCO FINAL DRAFT - April 1, 2015\Drawings\02 Civil\CCO-C-086-240010

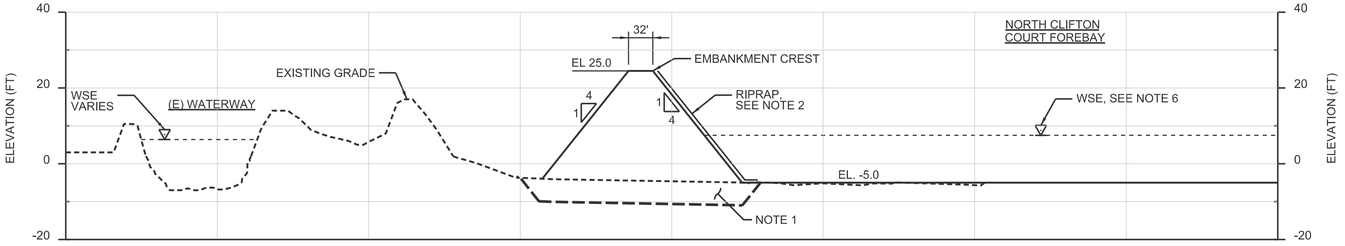
Edited By: Baghdassarians,Albert

Printed By: Bautista,Jav

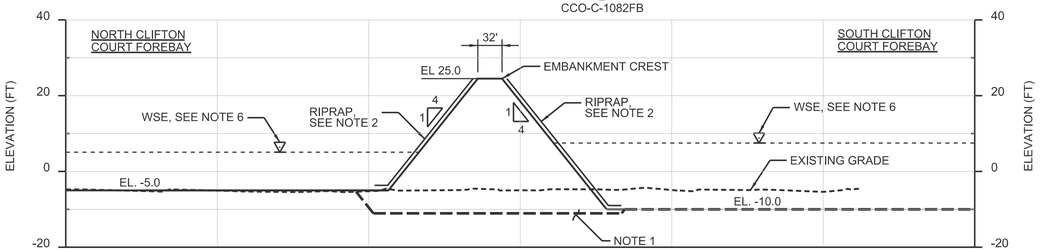
F SECTION
SCALE AS SHOWN
CCO-C-1082FB



G SECTION
SCALE AS SHOWN
CCO-C-1082FB



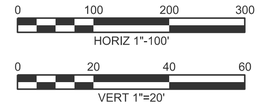
H SECTION
SCALE AS SHOWN
CCO-C-1082FB



I SECTION
SCALE AS SHOWN
CCO-C-1082FB

NOTES:

1. EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY. AN AVERAGE OF 6 FEET IS ASSUMED.
2. PLACE RIPRAP OVER FILTER LAYER.
3. FOREBAY FILLS CONSTRUCTED FROM COMPACTED EMBANKMENT MATERIAL.
4. OUTSIDE SLOPE AT ORIGINAL GROUND ELEVATION TO INCLUDE TOE DRAIN STARTING 38' FROM CREST AND EXTENDING TO TOE OF SLOPE.
5. CONSTRUCT SLURRY TRENCH CUTOFF TO EL -50.0.
6. SEE WATER SURFACE ELEVATION TABLE ON CCO-C-3085FB FOR WSE OPERATING LEVELS.



FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

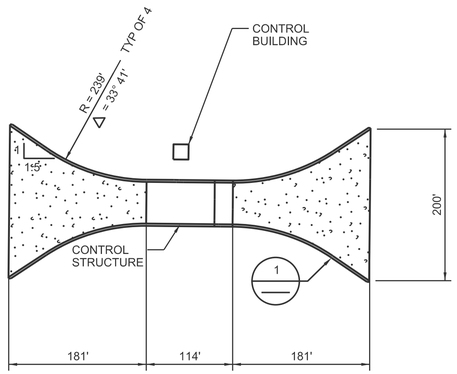
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY EMBANKMENT SECTIONS III

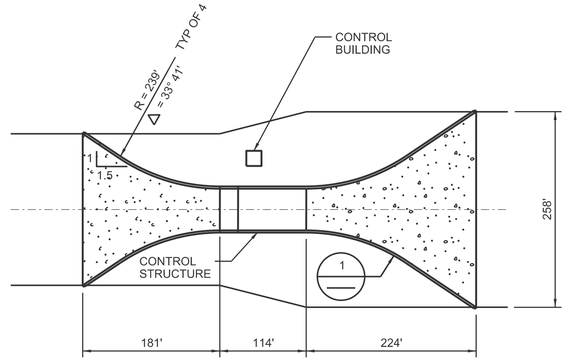
PROJECT NO. 240010
SHEET NO. CCO - C - 3087FB
REV 0
SEQUENCE NO. 87 OF 96



@ JONES APPROACH CHANNEL

N

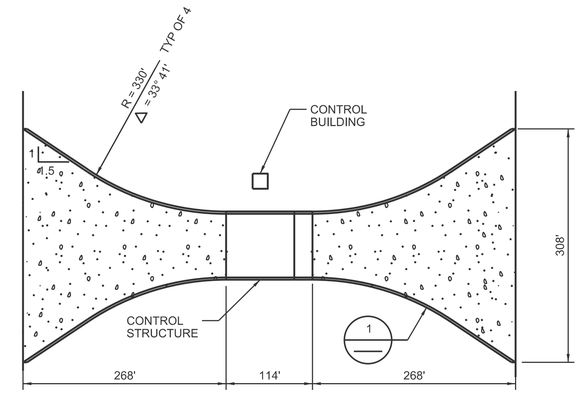
PLAN
NTS



@ CHANNEL FROM NCCF TO JONES APPROACH CHANNEL

N

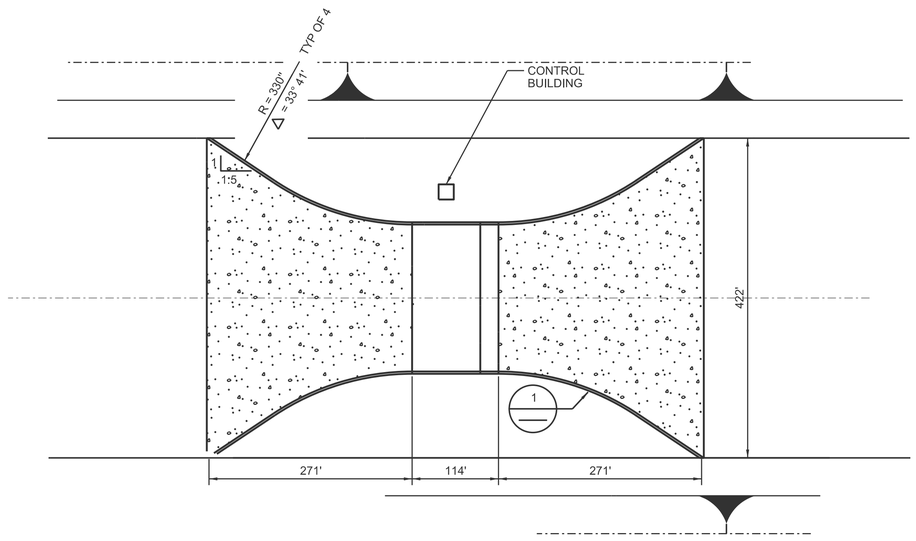
PLAN
NTS



@ BANKS APPROACH CHANNEL

N

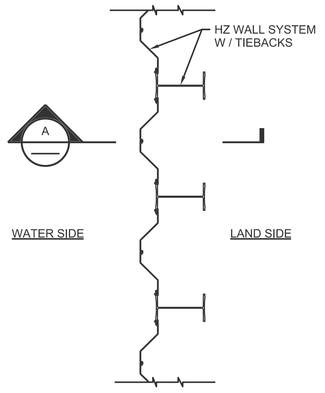
PLAN
NTS



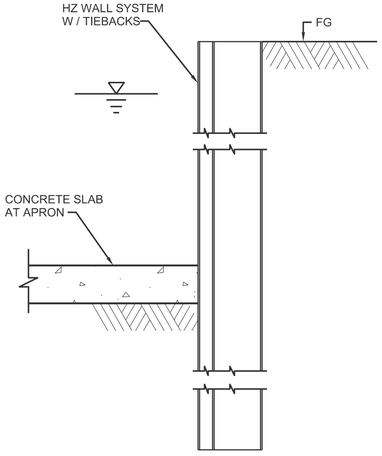
@ CHANNEL FROM NCCF TO BANKS APPROACH CHANNEL

N

PLAN
NTS



1 DETAIL
1/4"=1'-0"



A SECTION
1/4"=1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

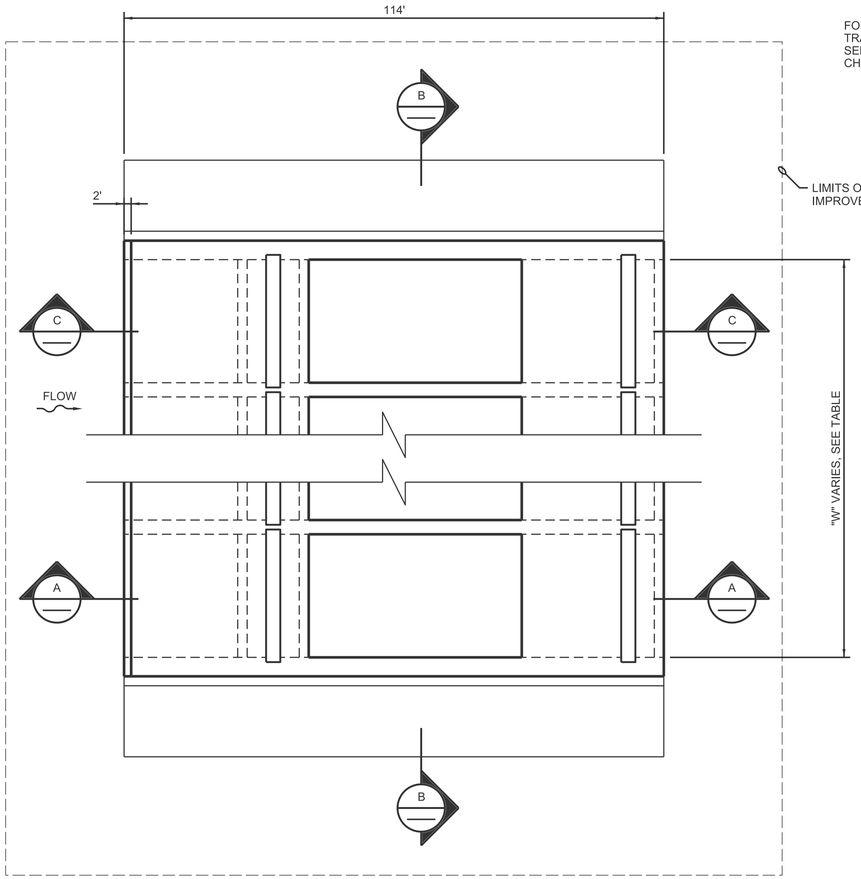
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

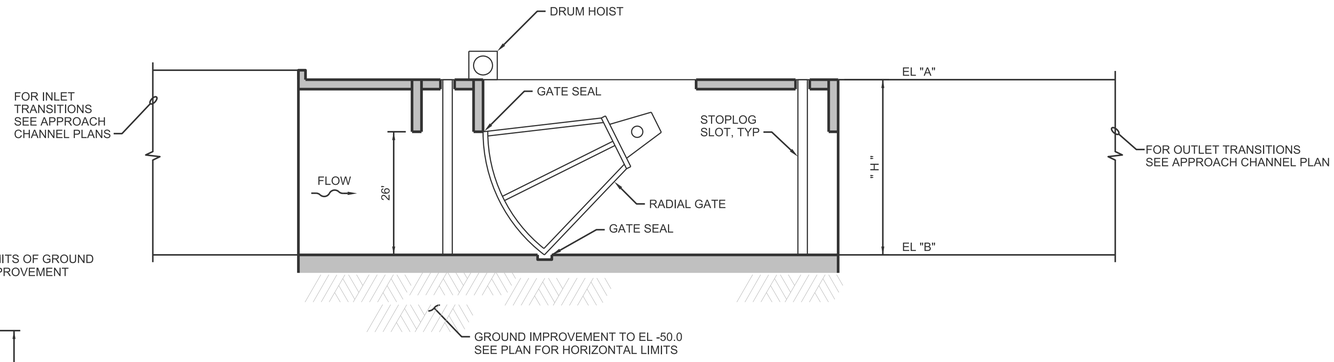
CHANNEL CONTROL STRUCTURES PLANS, SECTION, AND DETAIL

PROJECT NO. 240010
SHEET NO. CCO - C - 4088FB
REV 0
SEQUENCE NO. 88 OF 96

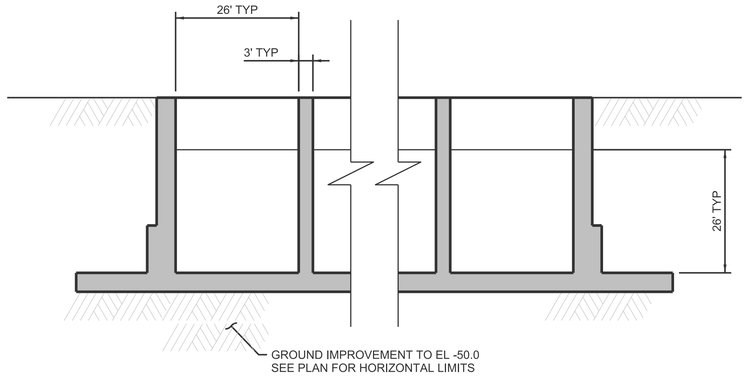


PLAN
1/16"=1'-0"

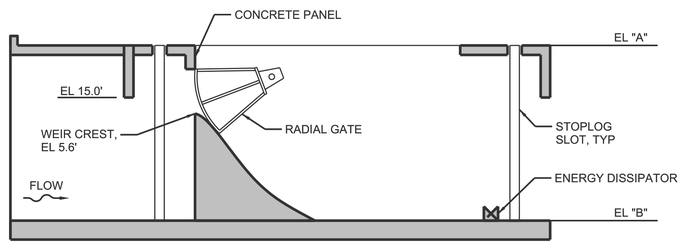
ITEM	BANKS APPROACH CHANNEL	NCCF TO BANKS APPROACH CHANNEL	JONES APPROACH CHANNEL	NCCF TO JONES APPROACH CHANNEL
Q (CFS)	10,600	10,600	4,600	4,600
NUMBER OF GATES	3	3	2	2
EL "A"	20.0	20.0	20.0	20.0
EL "B"	-27.9	-27.9	-17.0	-17.0
"H"	47.9	47.9	37.0	37.0
"W"	84.0	200.0	55.0	113.0



A SECTION
1/16"=1'-0"



B SECTION
1/16"=1'-0"



C SECTION
1/16"=1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

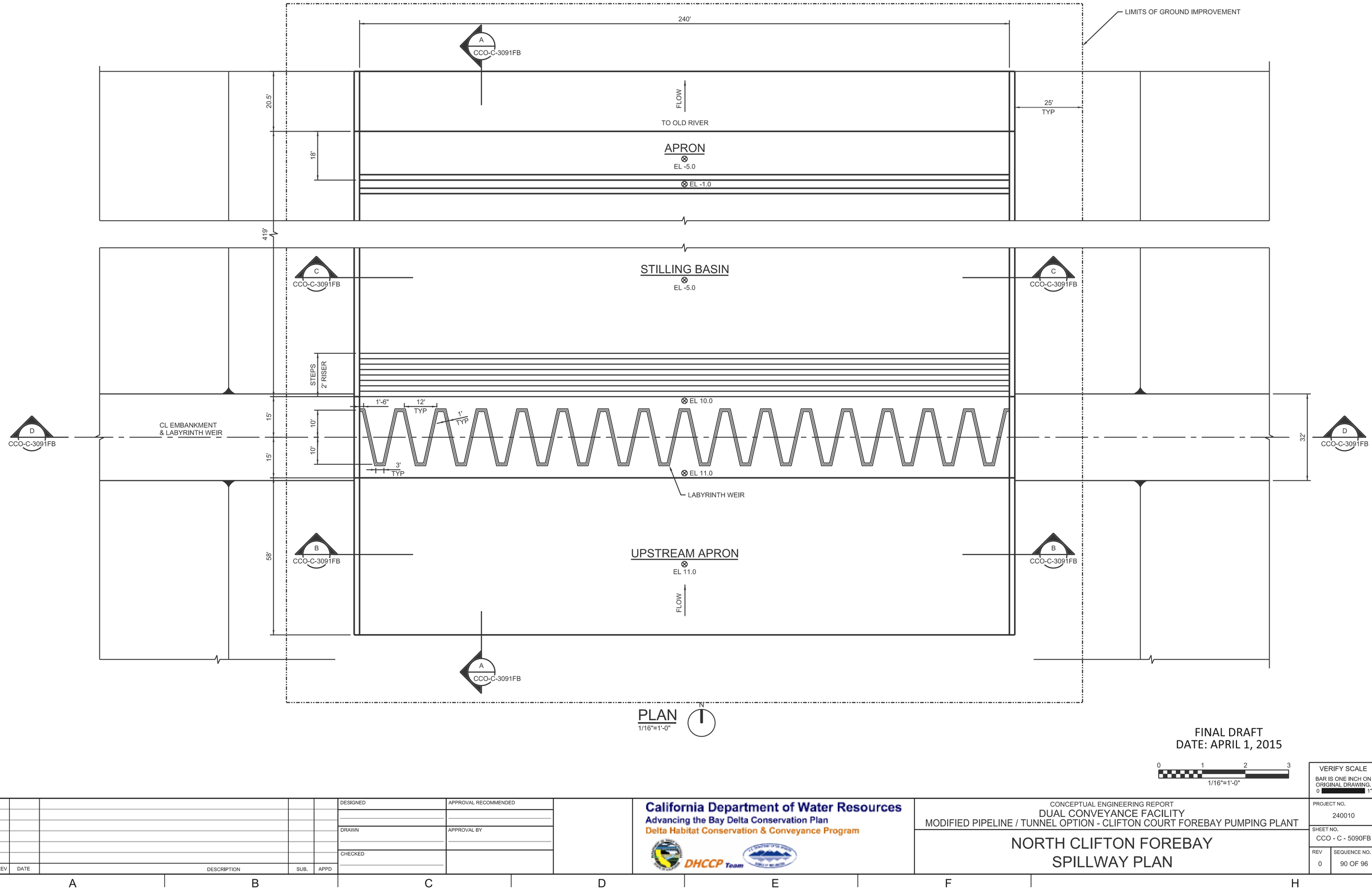
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CHANNEL CONTROL STRUCTURES PLAN AND SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - C - 5089FB
REV 0
SEQUENCE NO. 89 OF 96



PLAN
1/16"=1'-0"

FINAL DRAFT
DATE: APRIL 1, 2015

0 1 2 3
1/16"=1'-0"

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

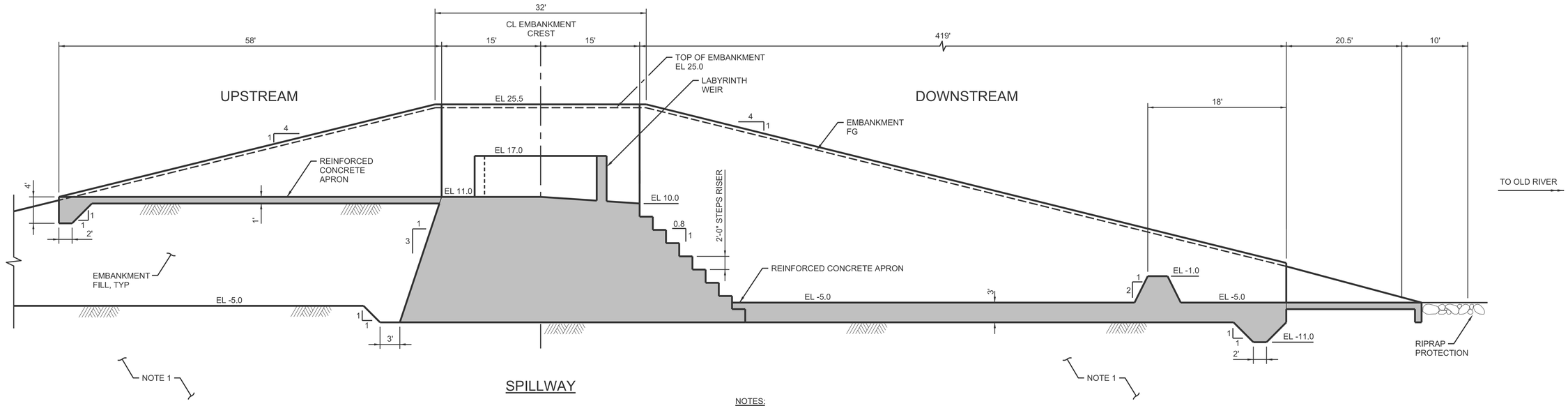
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH CLIFTON FOREBAY SPILLWAY PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 5090FB
REV 0
SEQUENCE NO. 90 OF 96

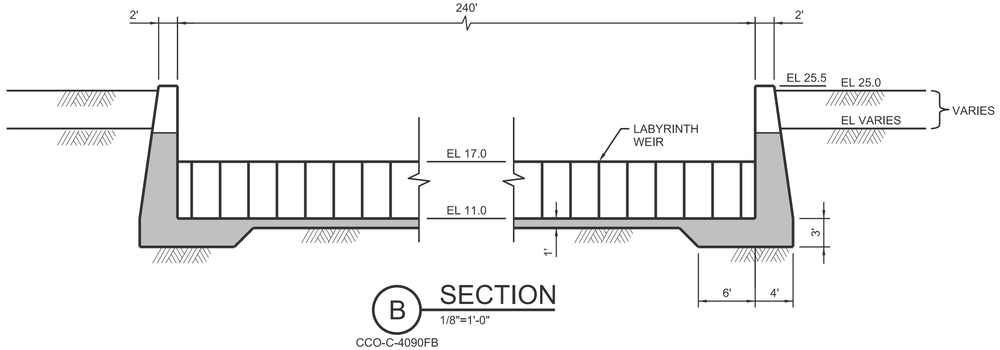


SPILLWAY

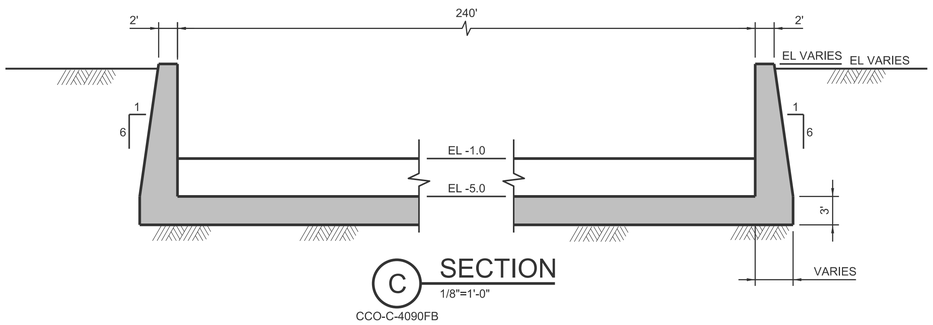
A SECTION
1/8"=1'-0"
CCO-C-4090FB

NOTES:

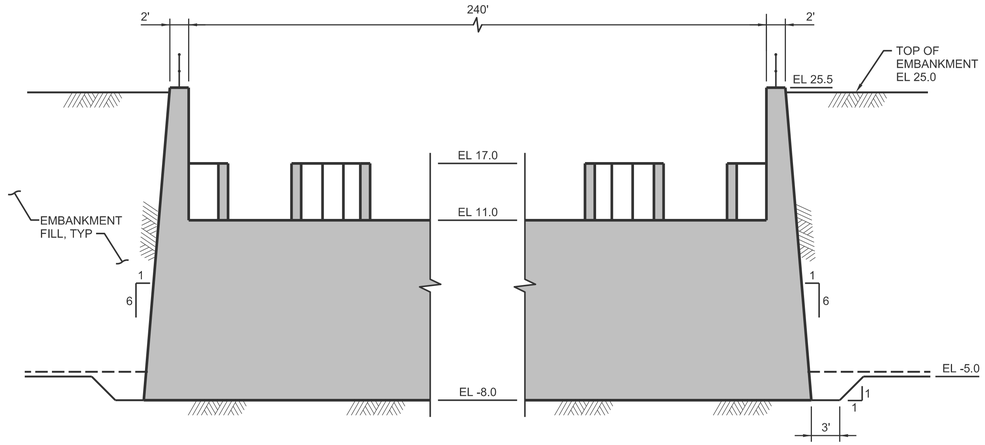
1. GROUND IMPROVEMENTS TO EL -50.0, SEE PLAN FOR HORIZONTAL LIMIT.
2. CONSIDER REINFORCED CONCRETE SPILLWAY DURING PRELIMINARY ENGINEERING.



B SECTION
1/8"=1'-0"
CCO-C-4090FB



C SECTION
1/8"=1'-0"
CCO-C-4090FB



D SECTION
1/8"=1'-0"
CCO-C-4090FB

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

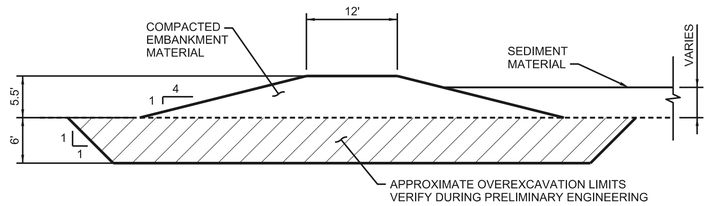
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

NORTH CLIFTON COURT FOREBAY SPILLWAY SECTIONS

PROJECT NO. 240010
SHEET NO. CCO - C - 3091FB
REV 0
SEQUENCE NO. 91 OF 96

1 PLAN
1"=500'
CCO-C-1082FB



A SECTION
1"=10'

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MODIFIED CLIFTON COURT FOREBAY SEDIMENT AREA PLAN AND SECTION

PROJECT NO. 240010
SHEET NO. CCO - C - 1092FB
REV 0
SEQUENCE NO. 92 OF 96

Legend
Modified Pipeline/Tunnel
- Intake
- Main Construction Shaft
- Ventilation/Access Shaft
- Tunnel

Communications
- Existing Telecommunications
- Fiber Optic-Cable
- Microwave, Fiber, or Leased Line

N

STOCKTON

EXISTING J.O.C.

EXISTING TELECOMMUNICATIONS

SACRAMENTO

DWR HEADQUARTERS

MICROWAVE, FIRBER OPTIC CABLE, OR LEASED TELECOMMUNICATION LINES

FIBER OPTIC CABLE IN CONDUIT IN TUNNEL, TYPICAL ALL INTAKES TO INTERMEDIATE FOREBAY (NOTE 1)

INTERMEDIATE FOREBAY (NOTE 2)

INTAKE NO. 2

INTAKE NO. 3

INTAKE NO. 5

FIBER OPTIC CABLE IN CONDUIT IN MAIN TUNNELS (NOTE 1)

CVP CONTROL STRUCTURE

ITALIAN SLOUGH SIPHON

JONES APPROACH CHANNEL

NORTH CLIFTON COURT SUPPLY CANAL

FIBER OPTIC CABLE IN CONDUIT (NOTE 1)

SIPHON

SOUTH CCF CONTROL STRUCTURE TO BANKS PP

FIBER OPTIC CABLE IN CONDUIT ALONG EXISTING CANAL (NOTE 1)

SIPHON BELOW RR AND HWY

NORTH CCF CONTROL STRUCTURE TO BANKS PP

BANKS APPROACH CHANNEL

NOTES:

1. FIBER OPTIC CABLE SYSTEM (IN-TUNNEL OR SURFACE INSTALLED), MICROWAVE, AND LEASED TELECOMMUNICATION LINES ARE ALTERNATIVES THAT WILL BE STUDIED FURTHER IN PRELIMINARY ENGINEERING.
2. FIBER OPTIC CABLE IN CONDUIT AROUND INTERMEDIATE FOREBAY.

PLAN
1"=2 MILES

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

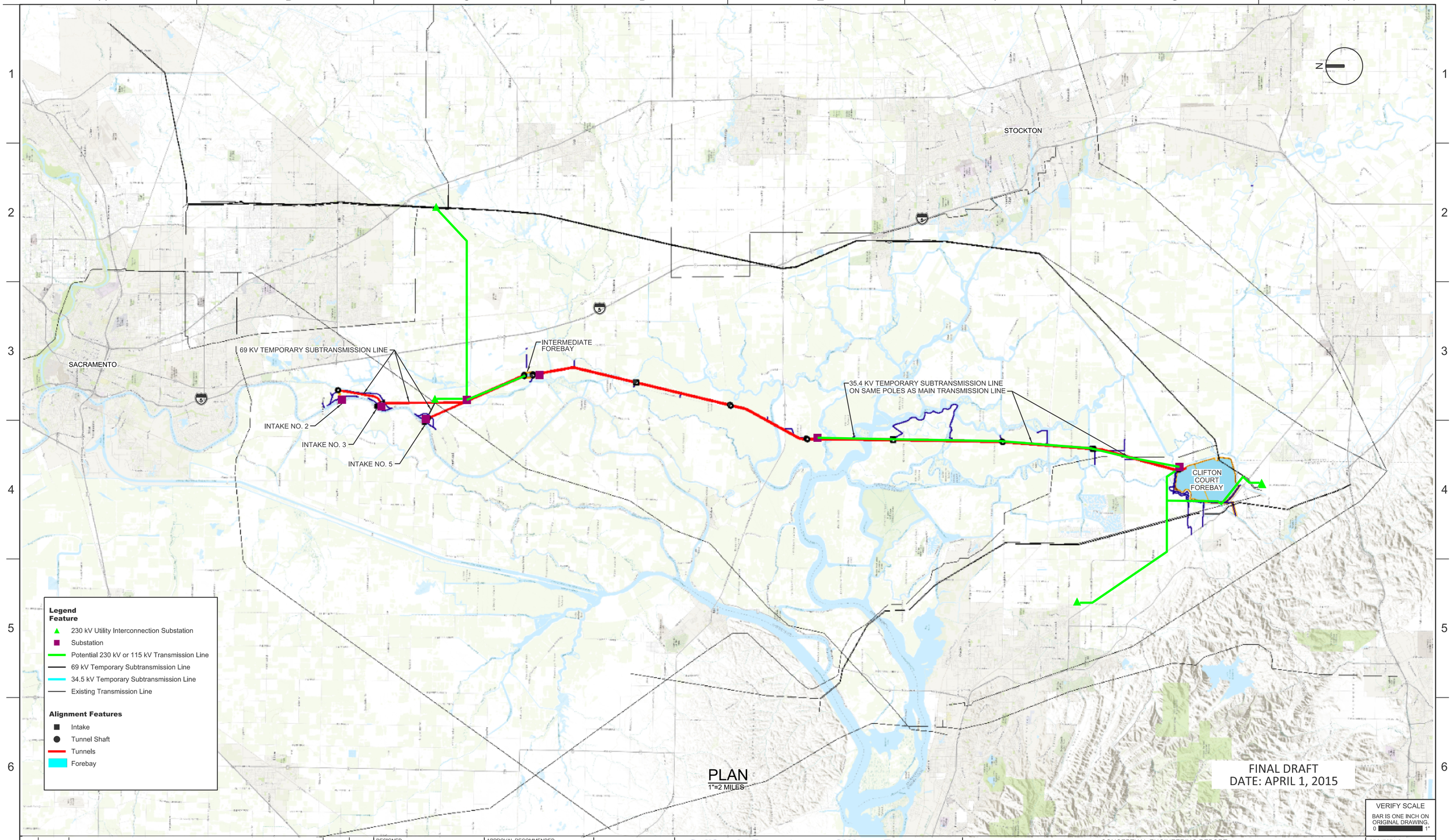
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

CONTROL AND COMMUNICATIONS OVERVIEW

PROJECT NO. 240010
SHEET NO. CCO - E - 1093GN
REV 0
SEQUENCE NO. 93 OF 96

Edited By: Bautista,Jav
Printed By: Mendez,Martin

DWR-808



PLAN
1"=2 MILES

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED	APPROVAL RECOMMENDED
DRAWN	APPROVAL BY
CHECKED	

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

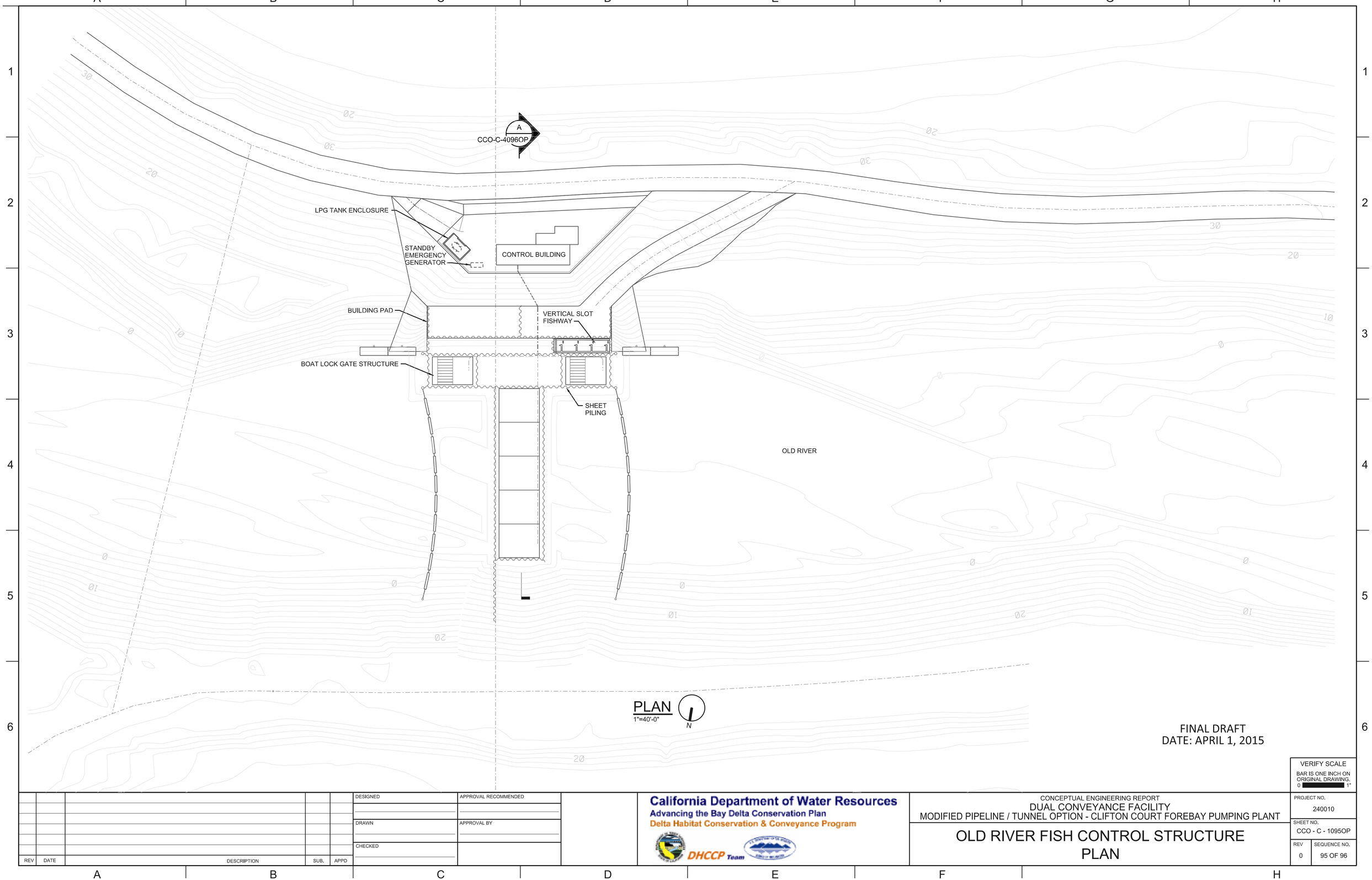
CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

POWER SUPPLY AND GRID CONNECTIONS VICINITY MAP

PROJECT NO.	
240010	
SHEET NO.	
CCO - E - 1094GN	
REV	SEQUENCE NO.
0	94 OF 96

Edited By: Bautista,Jav

Printed By: Bautista,Jav



FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

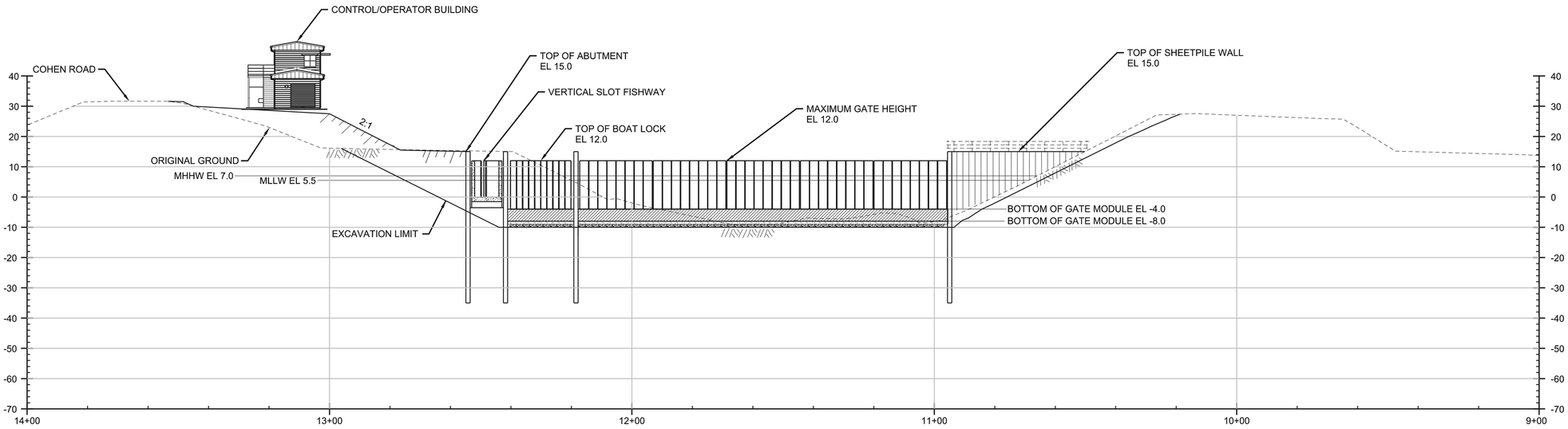
DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OLD RIVER FISH CONTROL STRUCTURE PLAN

PROJECT NO. 240010
SHEET NO. CCO - C - 1095OP
REV 0
SEQUENCE NO. 95 OF 96



A STRUCTURE PROFILE
1"=20'-0"
CCO-C-1095OP

NOTES:

1. VERTICAL DATUM - 1988 NAVD
2. SHEETPILE NOT SHOWN FOR CLARITY.

FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
DHCCP Team

CONCEPTUAL ENGINEERING REPORT
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

OLD RIVER FISH CONTROL STRUCTURE PROFILE

PROJECT NO. 240010
SHEET NO. CCO - C - 4096OP
REV 0
SEQUENCE NO. 96 OF 96