NOTES:
1. CONCEPTUAL DRAWINGS INCLUDED IN THIS VOLUME DO NOT REPRESENT A DETAILED PRELIMINARY ENGINEERING DESIGN EFFORT. INFORMATION SHOWN ON THE CONCEPTUAL ENGINEERING REPORT IS FOR ENGINEERING DESIGN INTENT, FACILITY LOCATIONS AND INDICATED DIMENSIONS. SHOWN DIMENSIONS 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 COORDINATES ARE CALIFORNIA STATE PLANE, 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. TOPOGRAPHIC DATA IS BASED ON USGS NATIONAL DATASET (NED) DATA IS FOR PRELIMINARY USE ONLY.
NOTES:
1. CROSS SECTIONS ARE BASED ON PRELIMINARY REPORT:
   DATE: AUGUST 2013
   DWR NO. 26.25209.8
   EA: ES.05.103
2. OVER EXCAVATION OF UNSUITABLE FOUNDATION MATERIAL WILL VARY, AN AVERAGE OF 6' IS ASSUMED. VERIFY DURING PRELIMINARY ENGINEERING.
3. SLOPE INCLINATION STEEPER THAN 1:1 WILL BE DESIGNED WITH FACE PROTECTION AND/OR SOIL REINFORCEMENT DURING OPTIMIZATION OF THE BOX CULVERT CONFIGURATION DURING PRELIMINARY DESIGN PHASE.
4. FOR BOTTOM ELEVATION OF SEDIMENTATION BASINS, SEE ELEVATION SCHEDULE ON SHEET CCO-M-018T.

STATE ROUTE 160 REALIGNMENT - TYPICAL CROSS SECTION

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

FINISHED ELEVATIONS AT INTAKES
INTAKE NO. 5 = EL. 32.2
INTAKE NO. 3 = EL. 33.4
INTAKE NO. 2 = EL. 34.4
FINISHED ELEVATIONS AT INTAKES
INTAKE NO. 3 = EL. 33.4
INTAKE NO. 2 = EL. 34.4
FINISHED ELEVATIONS AT INTAKES
INTAKE NO. 5 = EL. 32.2
INTAKE NO. 3 = EL. 33.4
INTAKE NO. 2 = EL. 34.4
FINISHED ELEVATIONS AT INTAKES
INTAKE NO. 3 = EL. 33.4
INTAKE NO. 2 = EL. 34.4
OVER EXCAVATE EXISTING GRADE. SEE NOTE 2
SIDE SLOPES, TYP. SLOPE INCLINATION STEEPER THAN 1:1.
SEE NOTE 3
FOR BOTTOM ELEVATION OF SEDIMENTATION BASINS, SEE ELEVATION SCHEDULE ON SHEET CCO-M-018T.

SEDIMENTATION BASINS - TYPICAL CROSS SECTION

SECTION

DATE: APRIL 1, 2015

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

CONCEPTUAL ENGINEERING REPORT
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT
STATE ROUTE 160 REALIGNMENT AND SED. BASINS
TYPICAL CROSS SECTIONS

pw:USMWD224.mwd.h2o:MWD_Projects\Documents\Projects\Active Projects\601053 (DWR) Delta Habitat & Conservation & Conveyance Program :Study (CER Conceptual Engineering Report):CER_CCO FINAL DRAFT - April 1, 2015\Drawings Civil\CCO-C-014-240010
A DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

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

NOTES:
2. 18' X 18' GATE OPENINGS TOTAL OF 8 PLACES
3. 2' X 3' VENT OPENINGS TOTAL OF 6 PLACES

TYPICAL SECTION

FOR CONTINUATION SEE CCO-M-3017TT

ELEVATION SCHEDULE

<table>
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<tr>
<th>INTAKE NO.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>DESIGN WSE</th>
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<tbody>
<tr>
<td>2</td>
<td>-29</td>
<td>-11'</td>
<td>34.4</td>
<td>-199</td>
<td>-39</td>
<td>31.4</td>
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<tr>
<td>3</td>
<td>-29</td>
<td>-37</td>
<td>33.4</td>
<td></td>
<td>-39</td>
<td>31.4</td>
</tr>
<tr>
<td>6</td>
<td>-24</td>
<td>-17'</td>
<td>32.7</td>
<td></td>
<td>-39</td>
<td>28.4</td>
</tr>
</tbody>
</table>

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

FINAL DRAFT
DATE: APRIL 1, 2015

NOTE
1. TOTAL OF 8 PLACES GATE OPENINGS
2. TOTAL OF 6 PLACES VENT OPENINGS

Sedimentation Basin
Typical Section

Security Fence
Sedimentation Basin
TRASH RACK (REF)
Outlet Tower
SECURITY FENCE
Sedimentation Basin
TYPICAL SECTION

NOTE 1
1. DUAL CONVEYANCE FACILITY
2. CONCEPTUAL ENGINEERING REPORT
3. MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

FOR CONTINUATION SEE CCO-M-3017TT
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

TYPICAL CONCRETE BOX CONDUIT

INTAKE STRUCTURE

LOG BOOM PILES

LOG BOOM

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

STEEL CASING DRILLED PER W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

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

FINAL DRAFT
DATE: APRIL 1, 2015

DUAL CONVEYANCE FACILITY

TYPICAL CONCRETE BOX CONDUIT
ISOMETRIC

Edited By: Mendez, Martin
Printed By: Mendez, Martin

Mendez, Martin
CCO - M - 4019IT
240010

TYP OF 12

8' X 8' CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

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GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

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GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

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GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

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GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

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

FINAL DRAFT
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GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.

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

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INTAKE STRUCTURE

FISH SCREEN PANEL

COFFER DAM FRONT WALL

BOX CONDUIT 12' X 12' CONCRETE

R X R DROP GATES / LOGS

SEDIMENT / JETTING PLUMPS (TYP OF 6)

R X R CONTROL GATES (TYP OF 12)

STEEL CASING DRILLED PER W/ REINFORCED CONC.

GATES / LOGS 8' X 8' DROP W/ REINFORCED CONC.
NOTES:
1. ORIgINAL DIMENSIONS OF ALL PANELS SHALL BE EQUAL.
   ALLOWABLE TOLERANCE IS +/- 1/8".
2. PROVIDE 3 SPARE FISH SCREEN PANELS PER INTAKE.

DATE: APRIL 1, 2015
F I N A L D R A F T
OUTLET SHAFT @ INTAKE NO. 3

FINAL DRAFT
DATE: APRIL 1, 2015

ELEVATION SCHEDULE

<table>
<thead>
<tr>
<th>INTAKE NO.</th>
<th>A</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-7'</td>
<td>34.4'</td>
</tr>
<tr>
<td>3</td>
<td>-7'</td>
<td>34.4'</td>
</tr>
<tr>
<td>5</td>
<td>-7'</td>
<td>30.3'</td>
</tr>
</tbody>
</table>

TYPICAL FOR INTAKE No. 2, 3 & 5

SECTION

OUTLET SHAFT @ INTAKE NO. 3

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

Conceptual Engineering Report
Modifed Pipeline / Tunnel Option - Clifton Court Forebay Pumping Plant

OUTLET SHAFT

TOP OF DECK EL. B

SEGMENATION BASIN No. 2

SEGMENATION BASIN No. 1

BASIN No. 2
SEDIMENTATION

BASIN No. 1
SEDIMENTATION

OUTLET SHAFT

1/16" = 1'-0"

3/32" = 1'-0"

690' NORTH TUNNEL FROM OUTLET SHAFT INTAKE No. 2

40' ID NORTH TUNNEL TO INTERMEDIATE FOREBAY

12' X 12' GATES (TOP OF A)

12' X 12' GATES (TOP OF A)

OUTLET SHAFT @ INTAKE NO. 3

TOP OF DECK EL. B

SEGMENATION BASIN No. 2

SEGMENATION BASIN No. 1

BASIN No. 2
SEDIMENTATION

BASIN No. 1
SEDIMENTATION

OUTLET SHAFT

1/16" = 1'-0"

3/32" = 1'-0"

690' NORTH TUNNEL FROM OUTLET SHAFT INTAKE No. 2

40' ID NORTH TUNNEL TO INTERMEDIATE FOREBAY

12' X 12' GATES (TOP OF A)

12' X 12' GATES (TOP OF A)

OUTLET SHAFT @ INTAKE NO. 3

TOP OF DECK EL. B

SEGMENATION BASIN No. 2

SEGMENATION BASIN No. 1

BASIN No. 2
SEDIMENTATION

BASIN No. 1
SEDIMENTATION

OUTLET SHAFT

1/16" = 1'-0"

3/32" = 1'-0"

690' NORTH TUNNEL FROM OUTLET SHAFT INTAKE No. 2

40' ID NORTH TUNNEL TO INTERMEDIATE FOREBAY

12' X 12' GATES (TOP OF A)

12' X 12' GATES (TOP OF A)
OUTLET SHAFT @ INTAKE NO. 5

PLAN AND SECTION

INTAKE No. 5

1/16" = 1'-0"

12' X 12' GATES (Typ. of 6)

SEDIMENTATION BASIN No. 2

SEE STRUCTURAL DRAWING

OUTLET SHAFT

FINAL DRAFT

DATE: APRIL 1, 2015

OUTLET SHAFT @ INTAKE NO. 5

PLAN AND SECTION

INTAKE No. 5

1/16" = 1'-0"

12' X 12' GATES (Typ. of 6)

SEDIMENTATION BASIN No. 2

SEE STRUCTURAL DRAWING

OUTLET SHAFT

FINAL DRAFT

DATE: APRIL 1, 2015
NOTES:

A. SECTION

B. SECTION

C. SECTION

EXISTING GROUND

Sedimentation Drying Lagoon No. 1

Sedimentation Drying Lagoon No. 2

Sedimentation Drying Lagoon No. 3

Hollow Compact Concrete

Underdrain

Roller Compacted Concrete

Ground Existing

Ground Existing

Ground Existing

ELEVATIONS (FT)

ELEVATIONS (FT)

ELEVATIONS (FT)

REV SEQUENCE NO.

APPROVAL BY

APPROVAL RECOMMENDED

DESIGNED

DRAWN

CHECKED

APPD

SUB.

DESCRIPTION

DATE

REVISION

NOTE:

1. SOLID LAGOON SECTIONS ARE REPRESENTATIVE OF INTAKES NO. 3, INTAKES NO. 4, AND INTAKES NO. 5. INTAKES NO. 3 AND 5 ARE SIMILAR IN SIZE AND DEPTH, REPRESENTATIVE OF INTAKE NO. 2. INTAKES SOLIDS LAGOON SECTIONS ARE 1.

ELEVATIONS VARY.

LAND-65

DATE: APRIL 1, 2015

FINAL DRAFT

Elevations vary.
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

DUAL CONVEYANCE FACILITY

MANUAL ISOLATION DROP GATE
12 FT X 12 FT (TYP OF 4)

MANUAL ISOLATION DROP GATE
12 FT X 12 FT (TYP OF 4)

12 FT X 12 FT BOX CONDUIT

MANUAL DROP SLIDE GATE
8 FT X 8 FT (TYP 12)

ACOUSTIC FLOW METER
(TYP 12)

MOTORIZED SLIDE GATE
8 FT X 8 FT (TYP 12)

MANUAL DROP SLIDE GATE
8 FT X 8 FT (TYP 12)

FISH SCREEN STRUCTURE

INTAKE STRUCTURE (TYP 3)

TO DISTRIBUTION TUNNEL

INTAKE PROCESS FLOW DIAGRAM
INTAKE NO. 3 SINGLE LINE DIAGRAM

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

NOTE:
1. SWITCHGEAR SHALL BE LOCATED WITHIN ELECTRICAL ROOM.

GENERAL NOTE:
2. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200 YEAR FLOODPLAIN.

DATE: APRIL 1, 2015

DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT
California Department of Water Resources
Delta Habitat Conservation & Conveyance Program

MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

MAIN TUNNELS
PLAN AND PROFILE - SHEET 1 OF 4

VERIFICATION SCALE
1000 FEET  PER INCH

DATE: APRIL 1, 2015
FINAL DRAFT

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

NOTE:
DRAWN
CHECKED
APPROVED
APPROVAL BY
APPROVAL RECOMMENDED
DESIGNED
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California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program

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

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

PLANNED TUNNELS

PROFILE

VERTICAL EXAGGERATION = 1:5

STATIONS

ELEVATION (FT)

PROFILE

MAXIMUM DEPTH OF PROPOSED TUNNEL PROFILE (SOFFIT)

MINIMUM DEPTH OF PROPOSED TUNNEL PROFILE (SOFFIT)

EXISTING GROUND

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

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

DATE: APRIL 1, 2015
FINAL DRAFT

Bautista,Jav

DRAWN

CHECKED

APPROVED

SUB.

DESCRIPTION

DATE

REV

SEQUENCE NO.

APPROVAL BY

APPROVAL RECOMMENDED

REV

SHEET NO.

PROJECT NO.

3.83 MILES  (20,239 FEET)

9.17 MILES  (48,437 FEET)

8.86 MILES  (46,792 FEET)

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

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USGS NATIONAL ELEVATION DATASET (NED).
TOPOGRAPHY DATA IS BASED ON 1.
California Department of Water Resources
Modifying the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program
Conceptual Engineering Report

28' DIA. NORTH TUNNELS
LINING DETAILS

NOTE:
1. HOOP BAR STEEL, fy = 60 ksi.
2. REBAR REINFORCING STEEL IS FOR fy = 50 ksi.
THE BAR SIZE MAY BE REDUCED TO D18 BAR IF fy = 80 ksi.
3. BOLTS SHALL CONFORM TO ASTM A325 or ASTM A449.
4. CONCRETE 28-DAY STRENGTH: 7000 psi.

LAND-65

A B C D E F G H

SECTION

ELEVATION

PLAN OF SEGMENTAL CONCRETE LINING

DEVELOPED INSIDE TUNNEL

SECTION

NOTES:
- VERIFY SCALE ON ORIGINAL DRAWING.
- SCHEDULE 1
- SEE SCHEDULE 1 FOR HOOP BAR DIA.
- SEE SCHEDULE 1 FOR BOLT DIA.
- SEE SCHEDULE 1 FOR HYDRAULIC HEAD (FT)
- SEE SCHEDULE 1 FOR INTERNAL DIA (FT)

FINAL DRAFT: APRIL 1, 2015
RECEPTION SHAFT
SEE SHEET CCO-C-1069TS FOR SIMILAR WORK AREA PLAN,
RANDALL ISLAND
S A C R A M E N T O  R IV E R
HOOD, CA.
TO INTERMEDIATE FOREBAY
28' ID NORTH TUNNEL
HIGHWAY 160 RELAIGNMENT
INTERMEDIATE FOREBAY
FROM INTAKE NO. 3 TO
40' ID NORTH TUNNEL

RECEPTION SHAFT
THIS IS SIMILAR WORK AREA PLAN
SEE SHEET NO. 5 FOR VISUAL

CONCEPTUAL ENGINEERING REPORT
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT
1"=600'

EDITED BY:  
PRINTED BY:  
DATE: APRIL 1, 2015  
FINAL DRAFT

APPROVAL BY
APPROVAL RECOMMENDED
DESIGNED
DRAWN
CHECKED
APPD
SUB.
DESCRIPTION
DATE
REV
SHEET NO.
PROJECT NO.

WORK STAGING AREA
CONSTRUCTION ACCESS AREA
CONTRACTOR'S NORTH TUNNELS
LAND-65
RECEPTION SHAFTS

STAITE ISLAND

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

2-40' ID MAIN TUNNELS

SAVE HAVEN ACCESS AREA

CONTRACTOR'S MAIN TUNNELS

CONTRACTOR'S ACCESS ROAD

NORTH STATEN ISLAND RD.

NORTH STATEN ISLAND RD.

TYLER ISLAND

RECEPTION SHAFTS - SITE PLAN

PLAN 1"=400'

BAR IS ONE INCH ON ORIGINAL DRAWING.

0 VERIFY SCALE

Edited By: Printed By: DATE: APRIL 1, 2015 FINAL DRAFT

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

MAIN TUNNELS - STATEN ISLAND
RECEPTION SHAFTS - SITE PLAN
California Department of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program

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

MAIN TUNNELS - CLIFTON COURT FOREBAY
DRIVE SHAFTS - SITE PLAN

DATE: APRIL 1, 2015
FINAL DRAFT

EDITED BY: Bautista, Jav
PRINTED BY: Bautista, Jav

REV
SEQUENCE NO.
APPD
SUB.
DESCRIPTION
DATE
APPROVAL BY
APPROVAL RECOMMENDED
DESIGNED
DRAWN
CHECKED
SCARIFY AND RECOMPACT 6"
SLURRY TRENCH CUTOFF EL -50.0
NOTE 2 TOE DRAIN MATERIAL
EMBANKMENT COMPACTED EL 32.2
CREST CL
NOTE 3 PROTECTION, RIPRAP SLOPE 4
4 1 4
NOTE 2

NOTES:
A SECTION CCO-C-1056IF UNDER EMBANKMENT, NOTE 1
EXCAVATE OVER 6' BELOW EXISTING GRADE
EXISTING GRADE, EL 0 +/- WHICHEVER IS GREATER.
LEVEE/EMBANKMENT OR PROPERTY LINE, BACK 100 FEET FROM TOE OF EXISTING
TOE OF EMBANKMENT SHALL BE SET
PLACE RIPRAP OVER FILTER LAYER.
WITH FILTER LAYERS.
2.5' OF PROCESSED DRAIN MATERIAL
ENGINEERING.
IS ASSUMED. VERIFY DURING PRELIMINARY
MATERIAL WILL VARY. AN AVERAGE OF 6'
EXCAVATION OF UNSUITABLE FOUNDATION
4.
3.
2.
1.

INTERMEDIATE FOREBAY
BOTTOM EL -20.0
INTERMEDIATE FOREBAY WS EL 0.0
AT RIVER EL +10.0
AT RIVER EL +1.0
2.5' SHOULDER, TYP
4' SHOULDER, TYP
1" = 15'

EDITED BY:
PRINTED BY:
DATE: APRIL 1, 2015
FINAL DRAFT
**NOTE 1**

1. GROUND IMPROVEMENT TO EL -50.0, SEE PLAN FOR HORIZONTAL LIMITS.
TYPICAL GENERAL ARRANGEMENT
FILL AND DRAIN PIPING UPPER LEVEL - PLAN
DUAL CONVEYANCE FACILITY
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT
FILL AND DRAIN PIPING
UPPER LEVEL - SECTION

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

CONCEPTUAL ENGINEERING REPORT
PROJECT NO.
MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT
FILL AND DRAIN PIPING
UPPER LEVEL - SECTION

SECTION

FINAL DRAFT
DATE: APRIL 1, 2015

Edited By: Martin
Printed By: Martin
DETAIL PLAN AND SECTION

FILL AND DRAIN PIPING

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

FINAL DRAFT
DATE: APRIL 1, 2015

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

FILL AND DRAIN PIPING

DETAIL PLAN AND SECTION

DECK

60" TUNNEL FULL LINE

2 ½" CHECK VALVE (TYP)

20" CHECK VALVE

DECK

60" TUNNEL FULL LINE

20" DRAINING PUMP DISCHARGE CONNECTION

32" AIR RELEASE VALVE

VALVE 2 STRUCTURE

FILL AND DRAIN PIPING

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALUE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE

20" CHECK VALVE

VALVE

AIR RELEASE VALVE

CIRCULATION INLET

TO FOREBAY

48" DISCHARGE
NOTE:

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

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

GENERAL NOTE:

1. THE 200 YEAR FLOODPLAIN.
NOTES

1. WORK AREA PLAN SHOWN HERON IS TYPICAL FOR THE DRIVE SHAFTS FOR THE 40'-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'-ID MAIN TUNNELS WILL HAVE SIMILAR, BUT SMALLER CONFIGURATIONS.

2. WORK AREAS FOR DRIVE OR RECEPTION SHATS FOR THE NORTH TUNNELS WILL ONLY REQUIRE ONE SHAFT AND WILL HAVE SIMILAR, BUT SMALLER CONFGURATIONS.

3. DRIVE SHAFT SEPARATION FOR THE MAIN TUNNELS IS BASED ON A MINIMUM TWO-SHAFT OUTSIDE DIAMETER CENTER-TO-CENTER SPACING (240 FEET) TO ACCOMMODATEBACKSEETTAGE AND PROVIDE SPACE FOR WORK AREAS AND MATERIAL HANDLING.

4. THE SOUCON ISLAND WILL BE USED AS DRIVE SHAFTS FOR THE ADJACENT TUNNEL SECTIONS. THE CONTRACTORS SHALL COORDINATE THE USE OF THESE SHAFTS FOR LAUNCHING TUNNELING EQUIPMENT AND MATERIALS.

5. THE STATEN ISLAND AND BACON ISLAND SHATS WILL ONLY BE USED AS RECEPTION SHATS FOR THE ADJACENT TUNNEL SECTIONS. THE CONTRACTORS SHALL COORDINATE THE USE OF THESE SHAFTS FOR RETRIEVING TUNNELING EQUIPMENT AND MATERIALS.

6. WORK AREA LAYOUT SHOWN HEREIN IS FOR CONCEPTUAL STUDY ONLY. FINAL TUNNEL DRIVE WORK AREA CONFIGURATIONS WILL BE DETERMINED BY THE CONTRACTOR'S MEANS AND METHODS.

7. BOX IN SLOTS OF CONSTRUCTION SHAFT PASSAGES ARE 24' IN T.C.T. - 41. SLOPE INLY CLINCHING WILL BE LAUNCHING CAVITIES PREVIOUSLY DESIGNED ONCE GEOTECHNICAL AND ENGINEERING DATA IS AVAILABLE.

8. TUNNEL DRIVE SELECTION IS CONTRACTORS' RESPONSIBILITY. SEE STRUCTURAL DRAWINGS CC0-S-6977TS AND CC0-S-6977TS.
NOTES

1. SHOWN HEREIN IS THE TYPICAL CONFIGURATION OF A FINISHED 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 DESIGNATION. SEE INTERMEDIATE SITE PLANS AND THE INTERIM 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 HEREIN IS BASED ON THE MINIMUM MAIN TUNNELS SHAFT SEPARATION.

5. FINISHED TUNNEL SHAFT SITE PLAN LAYOUT SHOWN HEREIN IS FOR CONCEPTUAL STUDY ONLY. FINAL FINISHED TUNNELS SHAFT SITE CONFIGURATIONS WILL BE DETERMINED BY THE CONTRACTOR'S WORK AREA CONFIGURATION AND THE SPACE REQUIREMENTS NEEDED FOR FACTORY OPERATIONS AND MAINTENANCE.

FINAL DRAFT
DATE: APRIL 1, 2015
1. The configuration shown herein for the drive and reception shafts is applicable for the main tunnels and north tunnels.
2. The dimensions shown herein 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 diameters of the shafts are measured from the inside face of the slurry wall. The anticipated inside diameters of drive and reception shafts are as follows:

<table>
<thead>
<tr>
<th>Shaft Type/Description</th>
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<th>Shaft Inside Diameter (Feet)</th>
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<tbody>
<tr>
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<td>Intake No. 3 &amp; Junction Structure Intake No. 3 &amp; Junction Structure</td>
<td>113</td>
</tr>
<tr>
<td>Reception Shaft at Drive Shaft at Intake No. 4</td>
<td>Intake No. 5</td>
<td>113</td>
</tr>
<tr>
<td>Reception Shaft at Drive Shaft at Intake No. 5</td>
<td>Intake No. 5</td>
<td>113</td>
</tr>
<tr>
<td>Drive Shaft at Intake No. 3</td>
<td>Intake No. 3 &amp; Junction Structure Intake No. 3 &amp; Junction Structure</td>
<td>113</td>
</tr>
<tr>
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<td>113</td>
</tr>
<tr>
<td>Drive Shaft at Intake No. 5</td>
<td>Intake No. 5</td>
<td>113</td>
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</table>

4. Refer to engineering reports for final drive and reception shaft configurations.
5. Refer to CCO-M-3005IT for final junction structure shaft configuration.
6. High groundwater levels is consistent with existing ground surface.
7. Refer to mechanical drawings for finished shaft diameter at facilities.

Notes:
- 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:
- 113 feet.
- Adjustments to these dimensions should be made for smaller inside diameters.

The configuration shown herein for the drive and reception shafts is applicable for main and north tunnels.

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<td>Reception Shaft at Drive Shaft at Intake No. 5</td>
<td>Intake No. 5</td>
<td>113</td>
</tr>
<tr>
<td>Drive Shaft at Intake No. 3</td>
<td>Intake No. 3 &amp; Junction Structure Intake No. 3 &amp; Junction Structure</td>
<td>113</td>
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Notes:
- 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:
- 113 feet.
- Adjustments to these dimensions should be made for smaller inside diameters.
NOTE 1: THE CONFIGURATION SHOWN HEREON FOR THE VENT SHAFTS IS APPROPRIATE FOR THE MAIN TUNNELS AND NORTH TUNNELS.

NOTE 2: THE DIMENSIONS SHOWN HEREON ARE APPLICABLE FOR VENT SHATCHES WITH A 59.0 INCH DIAMETER OR LESS. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.

NOTE 3: THE INSIDE DIAMETER OF THE SHAFTS IS MEASURED FROM THE INSIDE FACE OF THE SLURRY WALL. THE INSIDE DIAMETER DIMENSIONS OF VENT SHAFTS ARE AS FOLLOWS:

<table>
<thead>
<tr>
<th>TUNNEL</th>
<th>DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>60</td>
</tr>
<tr>
<td>NORTH</td>
<td>40</td>
</tr>
<tr>
<td>SOUTH</td>
<td>30</td>
</tr>
</tbody>
</table>

NOTE 4: REFERENCE TO CCO-S-5003TS FOR FINAL VENT SHAFT CONFIGURATIONS.

NOTE 5: INSIDE DIAMETER OF THE SHAFTS IS MEASUREMENT FROM INSIDE FACE OF THE SLURRY WALL.

NOTE 6: INSIDE DIAMETER IS THE INSIDE DIAMETER OF THE SHAFTS. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.

NOTE 7: THE DIMENSIONS SHOWN HEREON ARE APPLICABLE FOR VENT SHAFTS WITH A 59.0 INCH DIAMETER OR LESS. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.

NOTE 8: THE CONFIGURATION SHOWN HEREON FOR THE VENT SHAFTS IS APPLICABLE FOR THE MAIN TUNNELS AND NORTH TUNNELS.

NOTE 9: INSIDE SHAFT DIAMETER IS THE INSIDE DIAMETER OF THE SHAFTS. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.

NOTE 10: INSIDE DIAMETER OF THE SHAFTS IS MEASUREMENT FROM INSIDE FACE OF THE SLURRY WALL.

NOTE 11: INSIDE DIAMETER IS THE INSIDE DIAMETER OF THE SHAFTS. ADJUSTMENTS TO THESE DIMENSIONS SHOULD BE MADE FOR SMALLER INSIDE DIAMETERS.
NOTES:
1. DIMENSIONS SHOWN HERE ARE TYPICAL UNLESS NOTE OTHERWISE.
2. HIGH GROUNDWATER LEVEL, COINCIDENT WITH ORIGINAL GRADE.

NORTH TUNNELS
SECTION

MAIN TUNNELS
SECTION

DATE: APRIL 1, 2015

NORTH AND MAIN TUNNELS TYPICAL
FINAL SHAFT CONFIGURATION - SECTIONS
The preparation of the final design report shall be addressed during the structural configuration of the pump suction inlet compartment, as described in note 1. The dual conveyance facility includes the upper plan and the lower plan, with key components such as the splash basin, surge channel, and various piping configurations. The final draft date is April 1, 2015.
1. Large-scale excavation, as required.

Note: See Structural Drawing.

Title: Conceptual Engineering Report

Date: April 1, 2015

Final Draft

Page 6 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.
NOTE:
1. MCC AND SWITCHBOARD SHALL BE LOCATED ABOVE ELECTRICAL ROOM.

GENERAL NOTE:
2. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 200-FLOODPLAIN.
APPROACH TO BANKS PUMPING PLANT

APPROACH TO JONES PUMPING PLANT

FINAL DRAFT
DATE: APRIL 1, 2015

SOUTH CLIFTON COURT FOREBAY
SOUTH CLIFTON COURT FOREBAY

CHANNEL APPROACHES TO PUMPING PLANTS
SITE PLANS
NOTES:
1. EXCAVATION OF EXISTING FOUNDATION MATERIAL.
2. PLACE wipe OVER FILTER LAYER.
3. EMBANKMENT FILLED WITH SAND CONTINUOUSLY.
4. CONSTRUCT DRAINAGE TRENCHES AT EXISTING MID-LEVEL FROM EL -30 FT.
5. CONSTRUCT DRAINAGE TRENCHES AT EL -15 FT.
6. SEE WATER SURFACE ELEVATION TABLE ON DWR-086 FM FOR WATER LEVEL INDICATING.
NOTES:
1. EXCAVATION OF UNLATERAL FOUNDATION MATERIAL. 
   RESISTANCE TO A VERTICAL FORCE OF 6 FEET IS ASSUMED.
2. PLACE RIPRAP OVER FILTER LAYER.
3. FOREBAY FILM CONSTRUCTED FROM COMPACTED EMBANKMENT MATERIAL.
4. REPLACE SLOPE WITH TEARAN CONCRETE GROUND IS CUSHTED TO 
   INCLUDE THE 6 FEET OF MATERIAL FROM EMBANK AND 
   EXTENDS TO DECK OF 8 FT.W.
5. CONSTRUCT SLUARY BREAKOUT TO 10.0 FEET.
6. SEE WATER SURFACE ELEVATION TABLE ON 
   COC-C-3082FB FOR WSE OPERATING LEVEL.

EMBANKMENT CREST
EL 25.0

SEE NOTE 2
RIPRAP, EL. -5.0

SCALE AS SHOWN 
CCO-C-3082FB

**California Department of Water Resources**

**DUAL CONVEYANCE FACILITY**

**MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT**

**CHANNEL CONTROL STRUCTURES**

**PLANS, SECTION, AND DETAIL**

**LAND-65**

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**PLAN**

- **JONES APPROACH CHANNEL**
- **CHANNEL FROM NCCF TO JONES APPROACH CHANNEL**
- **BANKS APPROACH CHANNEL**
- **CHANNEL FROM NCCF TO BANKS APPROACH CHANNEL**

**SECTION**

- **DETAIL**

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**NOTES**

- **DRAWN**
- **CHECKED**
- **APPD**
- **SUB.**
- **DATE**
- **REV**
- **SHEET NO.**
- **PROJECT NO.**
- **APPROVAL BY**
- **APPROVAL RECOMMENDED**

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**DATE:** APRIL 1, 2015

**FINAL DRAFT**

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**EDITED BY:** Baghdassarian, Albert

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

## Channel Control Structures

### Plan and Sections

### Table of Contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Number</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Notes

- **Scale:** 1/16"=1'-0"
- **Verification:**
  - **Scale:** 1/16"=1'-0"
  - **Bar:** 1" represents 1 foot on original drawing.

### Design Information

- **Edited by:** Baghdassarians, Albert
- **Printed by:**

**Final Draft Date:** April 1, 2015

**California Department of Water Resources**

**Conceptual Engineering Report**

**Modified Pipeline / Tunnel Option - Clifton Court Forebay Pumping Plant**

**Channel Control Structures**

**Plan and Sections**
LABYRINTH WEIR

APRON

STILLING BASIN

UPSTREAM APRON

LIMITS OF GROUND IMPROVEMENT

TO OLD RIVER

CL EMBANKMENT

C

D

B

A

STEPS

PLAN

1/16"=1'-0"

FLOW

EL -1.0

EL 10.0

EL 11.0

EL -5.0

TO OLD RIVER

240'

15'

15'

10'

58'

12'

1'

3'

2' R ISER

T YP

32'

25'

LIMITS OF GROUND IMPROVEMENT

419'

20.5'


NORTH CLIFTON FOREBAY

SPILLWAY PLAN

FINAL DRAFT

DATE: APRIL 1, 2015
MODIFIED CLIFTON COURT FOREBAY SEDIMENT AREA PLAN AND SECTION

NORTH CLIFTON COURT FOREBAY

MODIFIED CLIFTON COURT FOREBAY SEDIMENT AREA

PERIMETER SETM

VERIFY SCALE
1"=10'

VERIFY DURING PRELIMINARY ENGINEERING
APPROXIMATE OVEREXCAVATION LIMITS

MATERIAL
EMBANKMENT
COMPACTED

MATERIAL
SEDIMENT

PROJECT NO.
NORTH CLIFTON COURT FOREBAY

MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

DATE: APRIL 1, 2015

FINAL DRAFT

CALIFORNIA DEPARTMENT OF WATER RESOURCES

DUAL CONVEYANCE FACILITY

ADVANCING THE BAY DELTA CONSERVATION PLAN

DELTA HABITAT CONSERVATION & CONVEYANCE PROGRAM/KSB Study/CER Conceptual Engineering Report/CER CER/ F/ DRAFT - April 1, 2015/Drawn: G2 Printed: B/L/ ED. 6/ 24/03/70}

REVIEWED

APPROVED

REVISED

FOR PRINT
1. Fiber optic cable system (in tunnel or surface) installed, including and leased telecommunication lines and alternatives that will be studied further in preliminary engineering.

2. Fiber optic cable in conduit around intermediate forebay.

NOTES:

- Existing telecommunication cables, conduits, and shafts.
- Fiber optic cables.
- Microwave, fiber, or leased line options.

Legend:
- Modified pipeline/tunnel
- Intake
- Canal
- Main construction shaft
- Ventilation/access shaft
- Tunnel
- Communications
  - Fiber optic cables
  - Microwave, fiber, or leased line
Plan Sheet 1

Legend Features
- 230 kV Utility Interconnection Substation
- Substation
- Potential 230 kV or 115 kV Transmission Line
- 69 kV Temporary Subtransmission Line
- 34.5 kV Temporary Subtransmission Line
- Existing Transmission Line

Alignment Features
- Intake
- Tunnel Shaft
- Transmission
- Forebay

Intake No. 3
Intake No. 2
Intake No. 5

Legend

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MODIFIED PIPELINE / TUNNEL OPTION - CLIFTON COURT FOREBAY PUMPING PLANT

POWER SUPPLY AND GRID CONNECTIONS
VICINITY MAP

DATE: APRIL 1, 2015
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