

GEOLOGIC UNITS

QUATERNARY

- Qls** Recent Landslide Material.
- Qal** Recent Alluvium – Mostly sand, gravel, and cobbles; includes small exposures of bedrock.
- Qt1** Terrace Deposits – Mostly sand, gravel, and cobbles mantled by clayey soils. Lower topographic surface.
- Qt2** Terrace Deposits – Sandy silt and silty clay with some gravel. May include some colluvium. Higher topographic surface.
- Qrb** Red Bluff Formation – Red gravels with abundant sand, silt, and clay overlying Cretaceous formations.

CRETACEOUS – Great Valley Sequence

- KCVs** Cortina Formation – Sandstone with some Mudstone interbeds.
- KCVsm** Cortina Formation – Sandstone interbedded with Mudstone.
- KCVm** Cortina Formation – Mudstone with some Sandstone interbeds.
- KBm** Boxer Formation – Mudstone with some Sandstone interbeds.
- KBsm** Boxer Formation – Sandstone interbedded with Mudstone.

GEOLOGIC SYMBOLS

- Geologic Contact: dashed where approximately located, queried where inferred, dotted where concealed.
- Fault: dashed where approximately located, queried where inferred, dotted where concealed; arrows indicate direction of relative movement.
 - A** means relative fault movement is away from viewer.
 - T** means relative fault movement is towards viewer.
- Lineament, alignment of geomorphic features such as springs, saddles and truncated bedding.
- Zone of Weathered Bedrock (in cross sectional view), based on depth of weathering in borehole.
- Strike and Dip of Bedding.
- Strike and Dip of Joint.
- Strike of Vertical Joint.

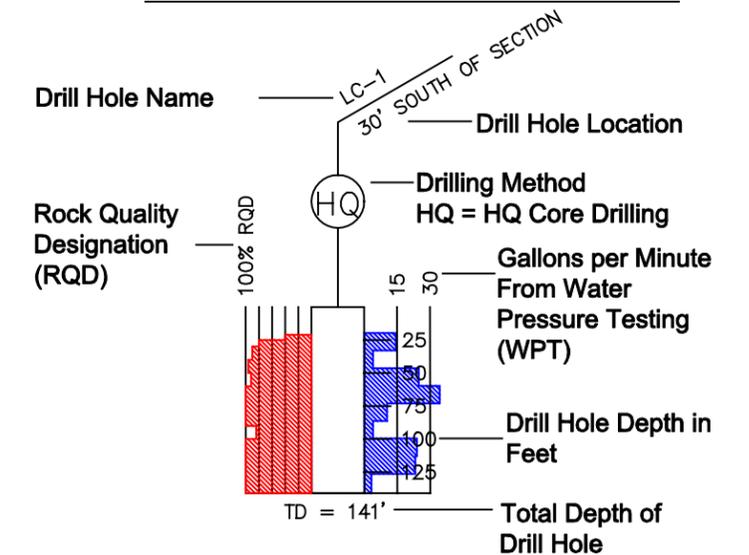
LANDSLIDE TERMINOLOGY

- Debris Slide.
- Earthflow (Creep).
- Rock Fall– Lines indicate source area and direction. Yellow area indicates deposit.

MAP SYMBOLS

- DH-303** USBR Angle Drill Hole Location, showing bearing and horizontal projection; angle is from horizontal.
- DH-302** USBR Vertical Drill Hole Location.
- RC-1** DWR Angle Drill Hole Location, showing bearing and horizontal projection; angle is from horizontal. Open if proposed, closed if completed.
- LA-1** DWR Vertical Drill Hole Location. Open if proposed, closed if completed.
- AUG-4** DWR Auger Hole Location. Open if proposed, closed if completed.
- SL-8** DWR Seismic refraction survey line.
- Location of geological cross section Line or profile.
- Location of spring.
- Road; solid if paved; dashed if non-paved.

DRILL HOLE LEGEND



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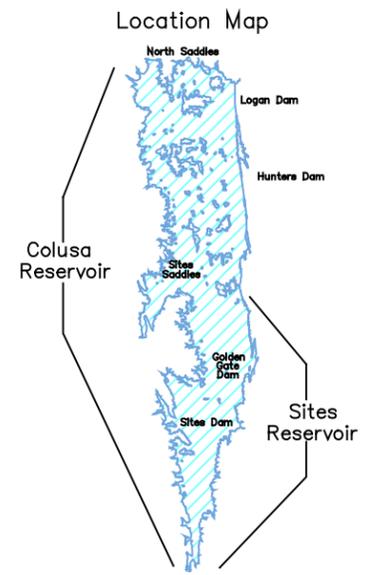
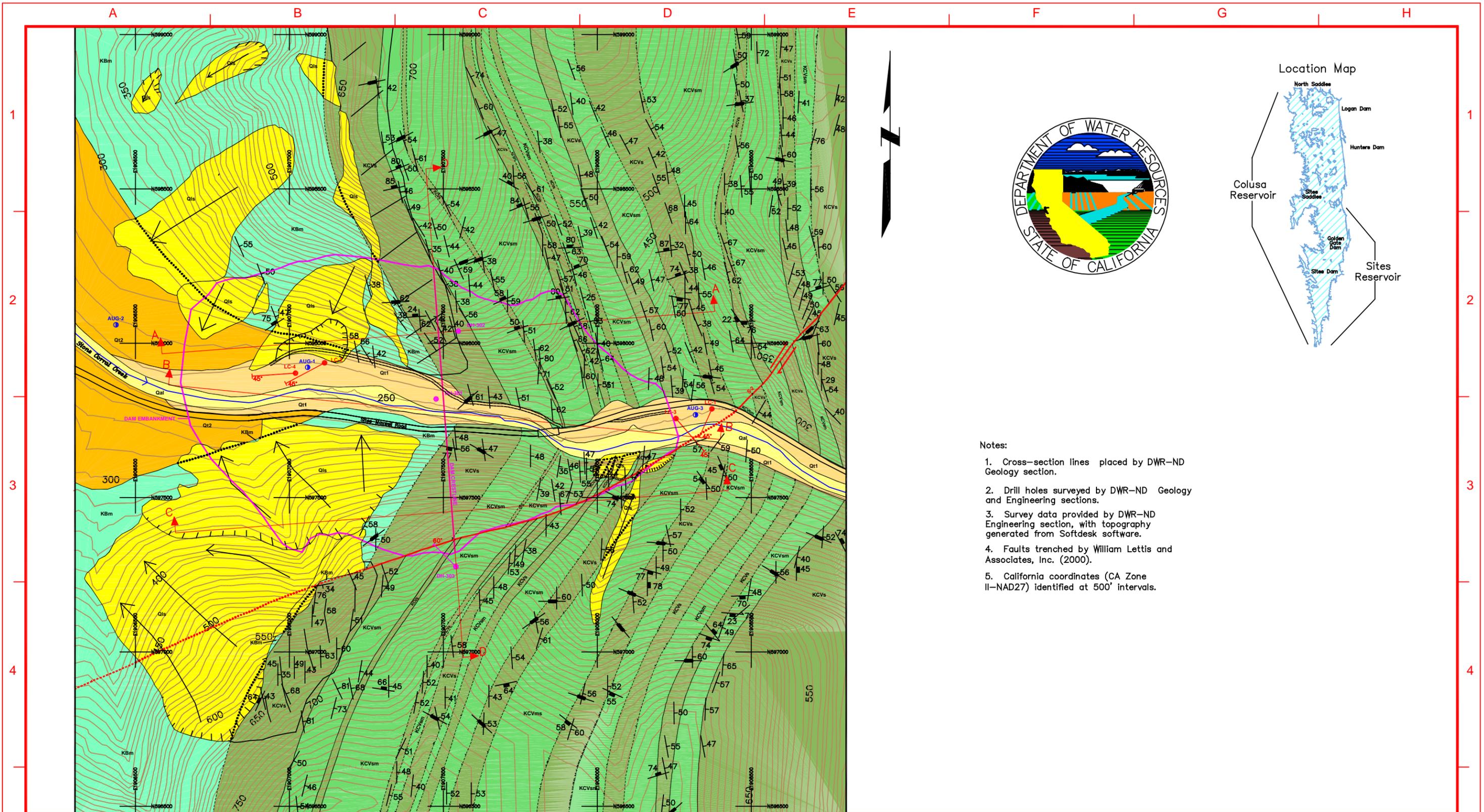
DRAWING SCALES

GEOLOGY REPORT No.	GEOLOGIC MAPPING AND/OR LOGGING BY:
CONSTRUCTION SPEC. No.	
GEOLOGY DRAWING No.	DRAWING PREPARED BY: DATE: JONATHAN MULDER 07/17/00

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF PLANNING & LOCAL ASSISTANCE
NORTHERN DISTRICT
GEOLOGY SECTION

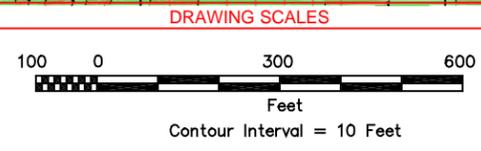
INTEGRATED STORAGE INVESTIGATION
ENGINEERING GEOLOGY OF THE
SITES--COLUSA RES. PROJECT
GEOLOGIC LEGEND

RELEASE DATE: 07/17/00
SHEET No. 1 of 1
PLATE 1



- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Drill holes surveyed by DWR-ND Geology and Engineering sections.
 3. Survey data provided by DWR-ND Engineering section, with topography generated from Softdesk software.
 4. Faults tranced by William Lettis and Associates, Inc. (2000).
 5. California coordinates (CA Zone II-NAD27) identified at 500' intervals.

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 GEOLOGIC MAPPING AND/OR LOGGING BY: ND -- D. FORWALTER
 CONSTRUCTION SPEC. No. _____
J. MULDER, K. STATON
DOE -- T. TODD
 GEOLOGY DRAWING No. _____
 DRAWING PREPARED BY: JONATHAN MULDER DATE: 07/17/00

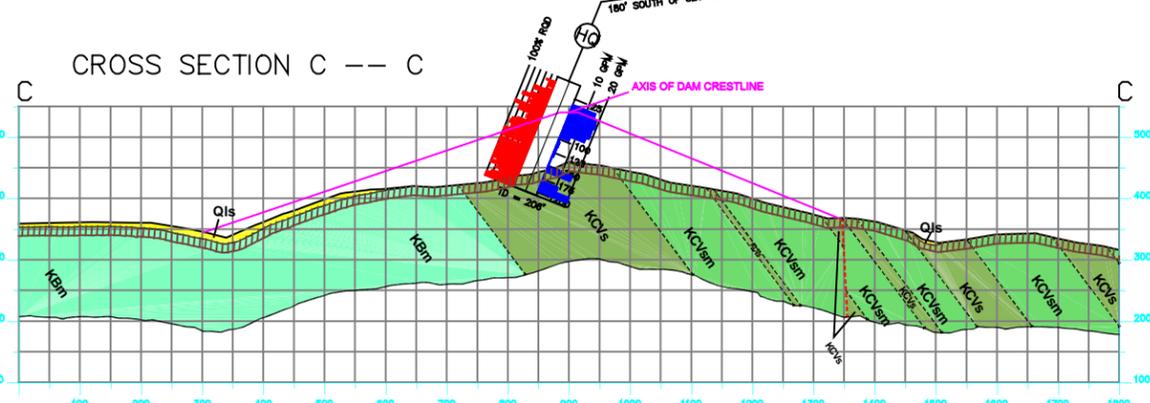
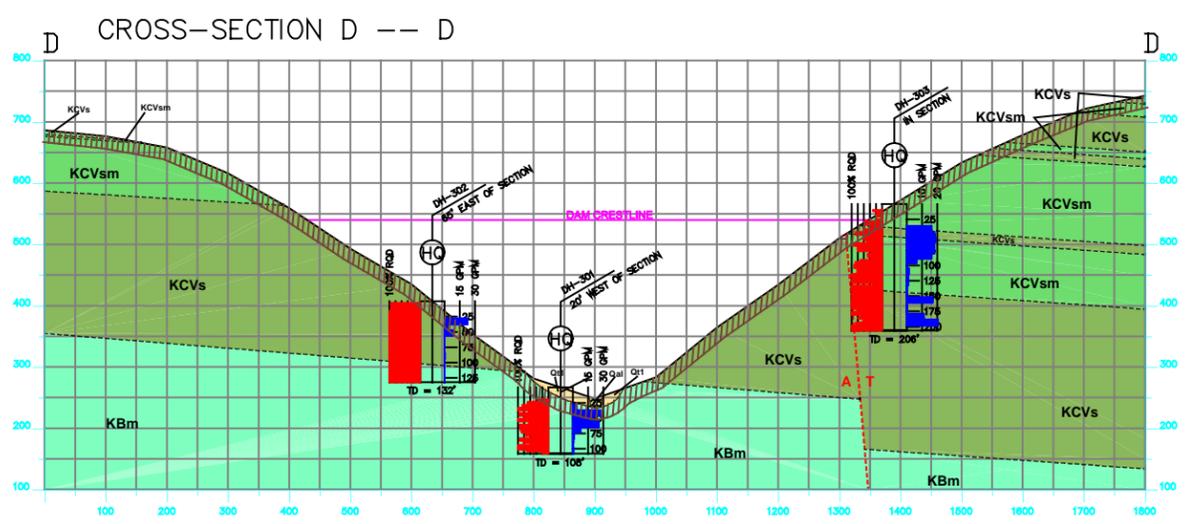
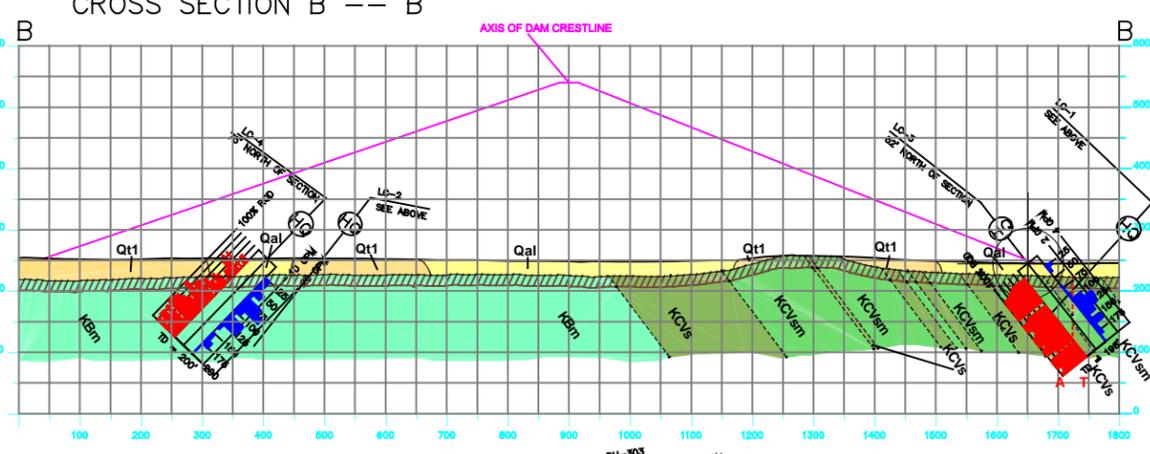
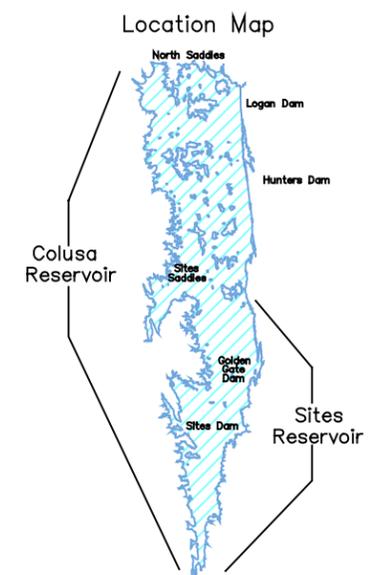
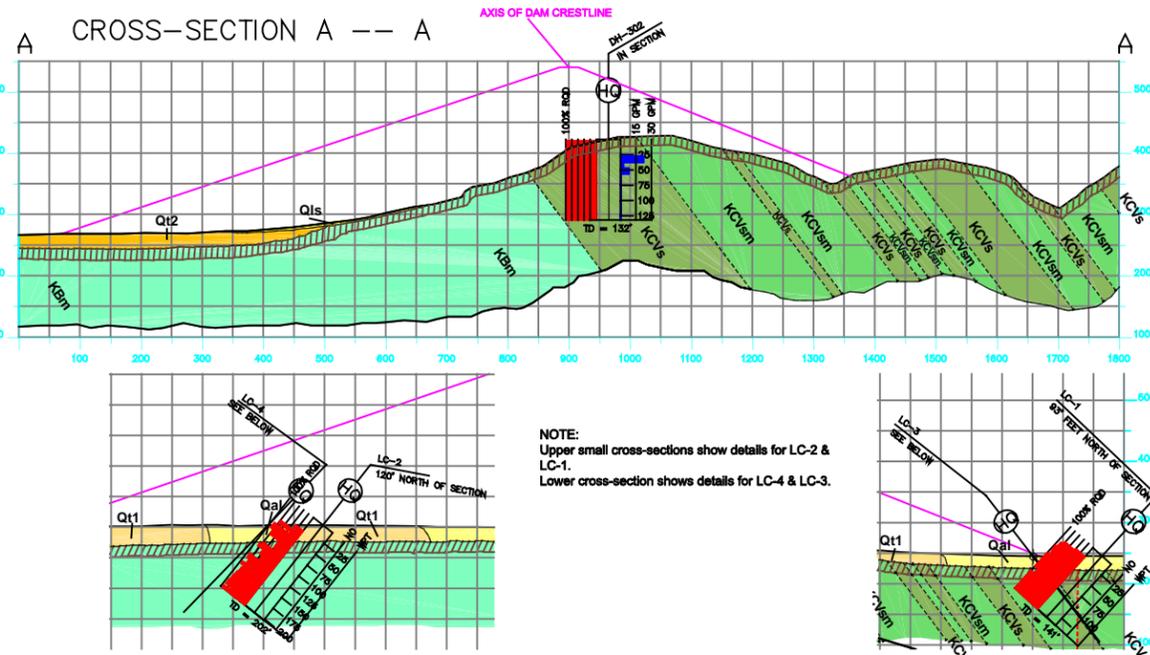
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INTEGRATED STORAGE INVESTIGATION
 SITES RESERVOIR PROJECT
 ENGINEERING GEOLOGY OF THE
 SITES DAM SITE

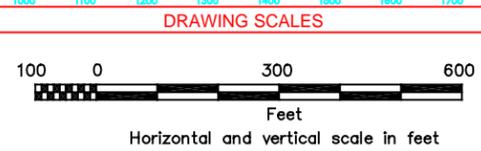
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 SHEET No.
1 OF 1
 PLATE
2

REV.	DATE	DESCRIPTION

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	JONATHAN MULDER 07/17/00

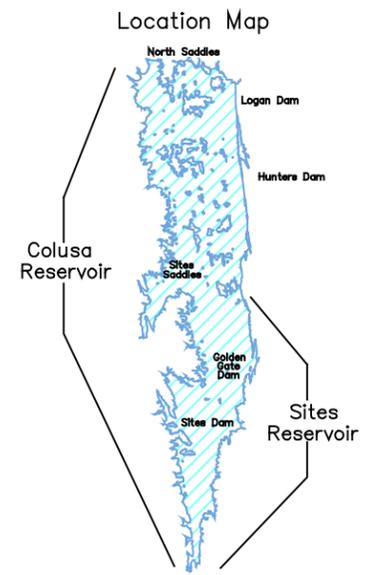
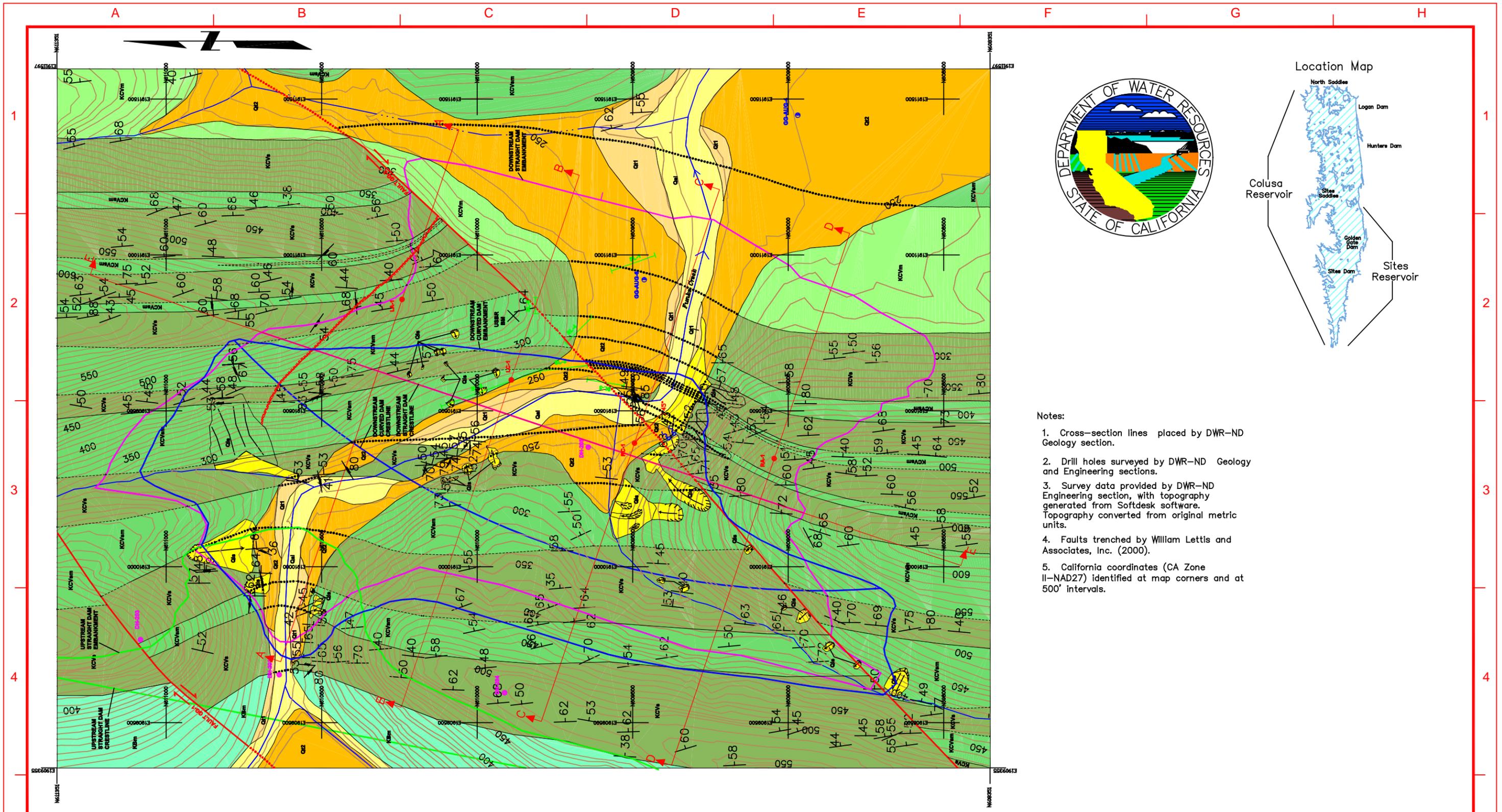
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INTEGRATED STORAGE INVESTIGATION
SITES RESERVOIR PROJECT
GEOLOGIC CROSS SECTIONS
OF THE SITES DAM SITE

RELEASE DATE:
07/17/00
SHEET No.
1 OF 1
PLATE
3

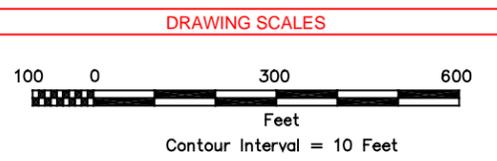
REV.	DATE	DESCRIPTION

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- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Drill holes surveyed by DWR-ND Geology and Engineering sections.
 3. Survey data provided by DWR-ND Engineering section, with topography generated from Softdesk software. Topography converted from original metric units.
 4. Faults tranced by William Lettis and Associates, Inc. (2000).
 5. California coordinates (CA Zone II-NAD27) identified at map corners and at 500' intervals.

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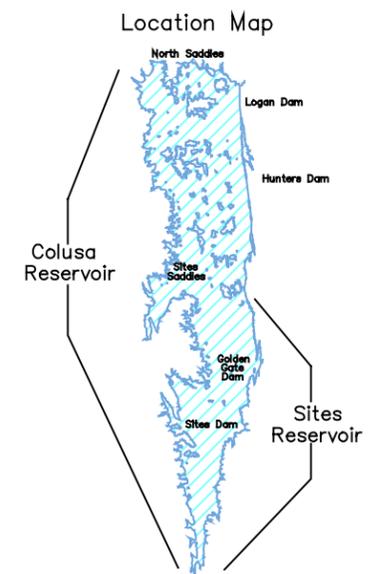
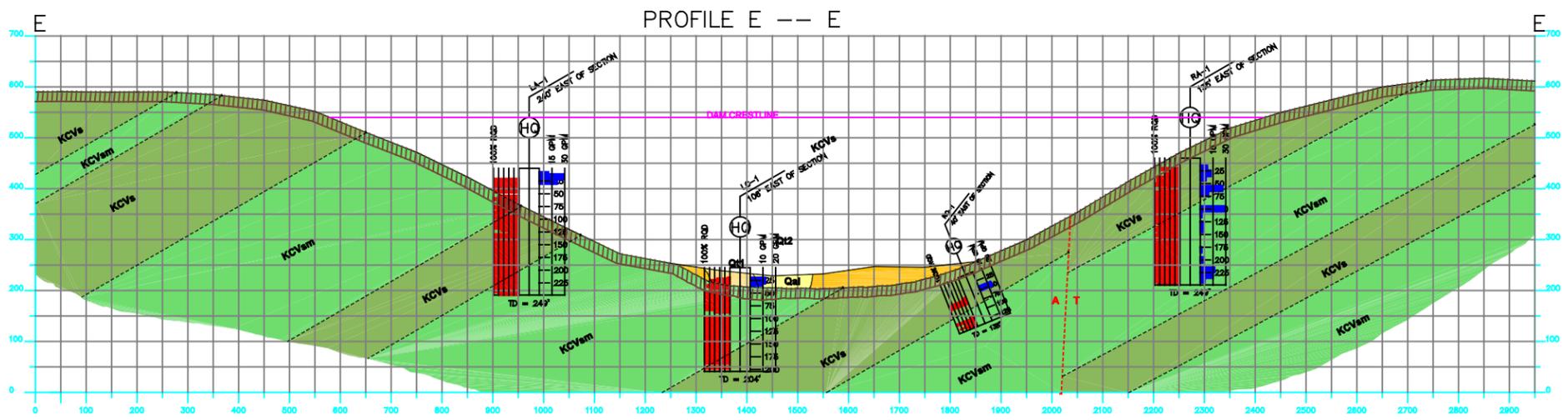
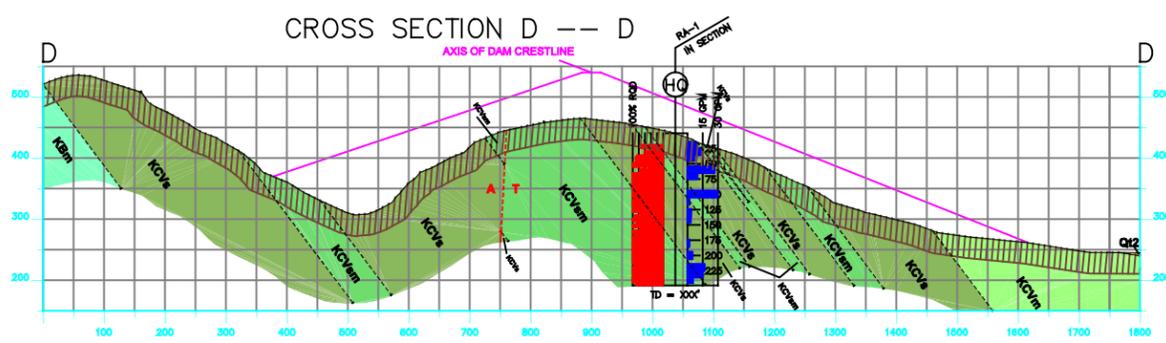
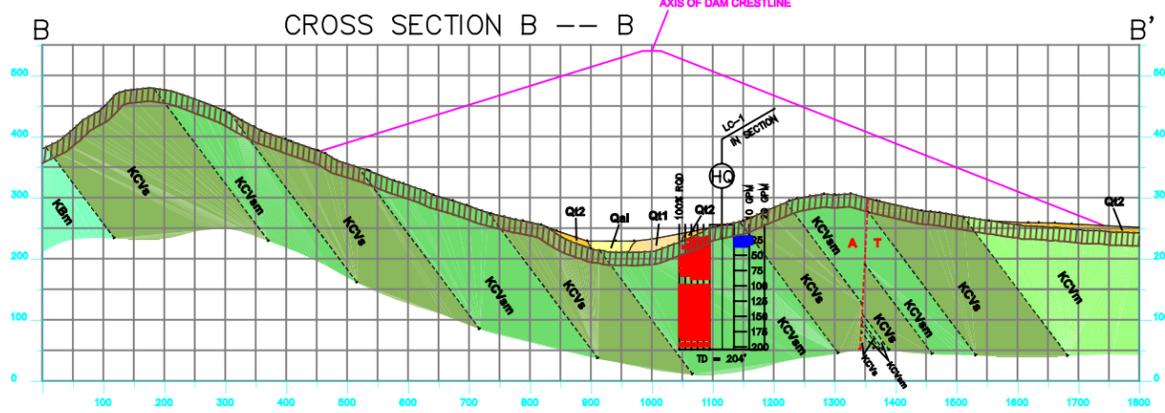
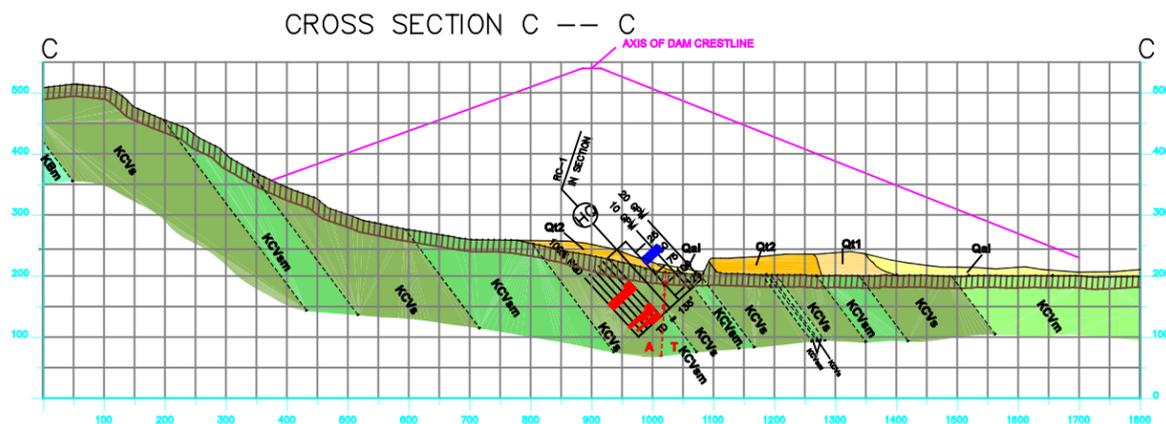
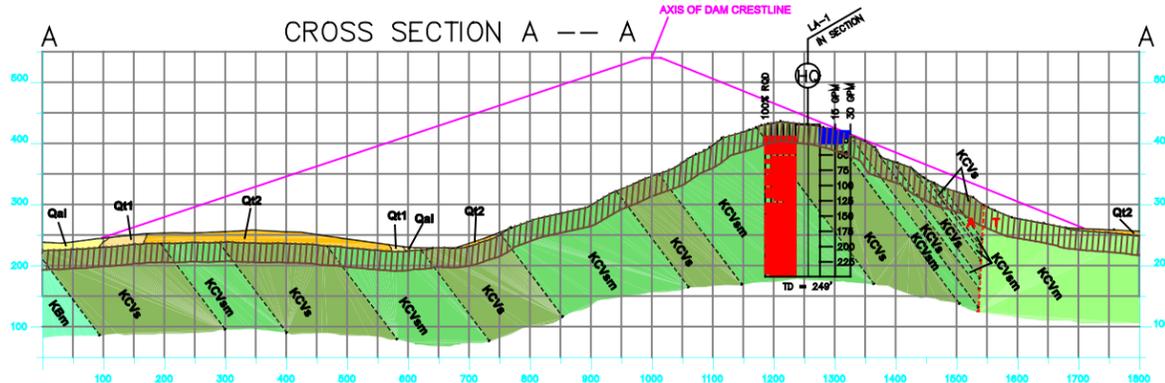


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CONSTRUCTION SPEC. No.	<u>J. MULDER, K. STATION</u>
GEOLOGY DRAWING No.	DRAWING PREPARED BY: <u>DOE - T. TODD</u> DATE: <u>07/17/00</u>

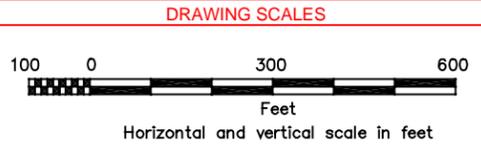
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GEOLOGY SECTION

**INTEGRATED STORAGE INVESTIGATION
SITES RESERVOIR PROJECT
ENGINEERING GEOLOGY OF THE
GOLDEN GATE DAM SITE**

RELEASE DATE:	07/17/00
SHEET No.	1 of 1
PLATE	4



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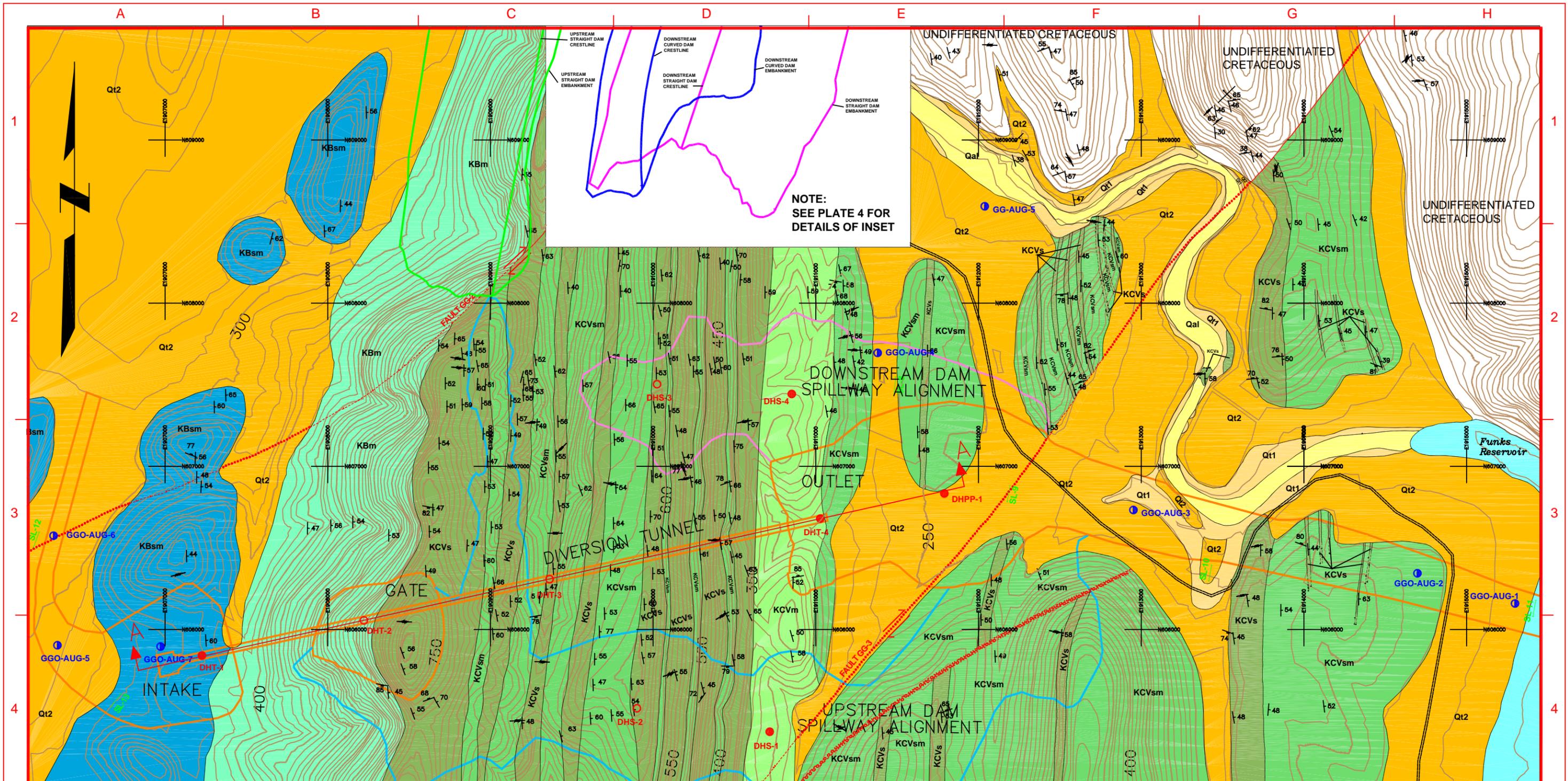
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CONSTRUCTION SPEC. No.		
GEOLOGY DRAWING No.	DRAWING PREPARED BY: JONATHAN MULDER	DATE: 07/17/00

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INTEGRATED STORAGE INVESTIGATION
SITES RESERVOIR PROJECT
GEOLOGIC CROSS SECTIONS OF
THE GOLDEN GATE DAM SITE

RELEASE DATE: 07/17/00
SHEET No. 1 of 1
PLATE 5

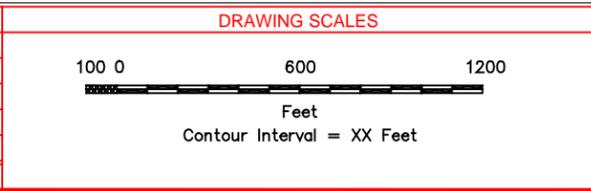
REV.	DATE	DESCRIPTION



NOTE:
SEE PLATE 4 FOR
DETAILS OF INSET

- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Drill holes surveyed by DWR-ND Geology and Engineering sections.
 3. Survey data provided by DWR-ND Engineering section, with topography generated from Softdesk software. Topography converted from original metric units.
 4. Proposed Diversion Alignments placed by DWR-Division of Engineering.
 5. Faults tranced by William Lettis and Associates, Inc. (2000).
 6. California coordinates (CA Zone II-NAD27) Identified at 1000' Intervals.

REV.	DATE	DESCRIPTION



GEOLOGY REPORT No. _____
CONSTRUCTION SPEC. No. _____
GEOLOGY DRAWING No. _____

GEOLOGIC MAPPING AND/OR LOGGING BY:
ND -- J. MULLER, K. STATION

DOE -- T. TODD

DRAWING PREPARED BY: _____ DATE: _____
JONATHAN MULLER 07/17/00

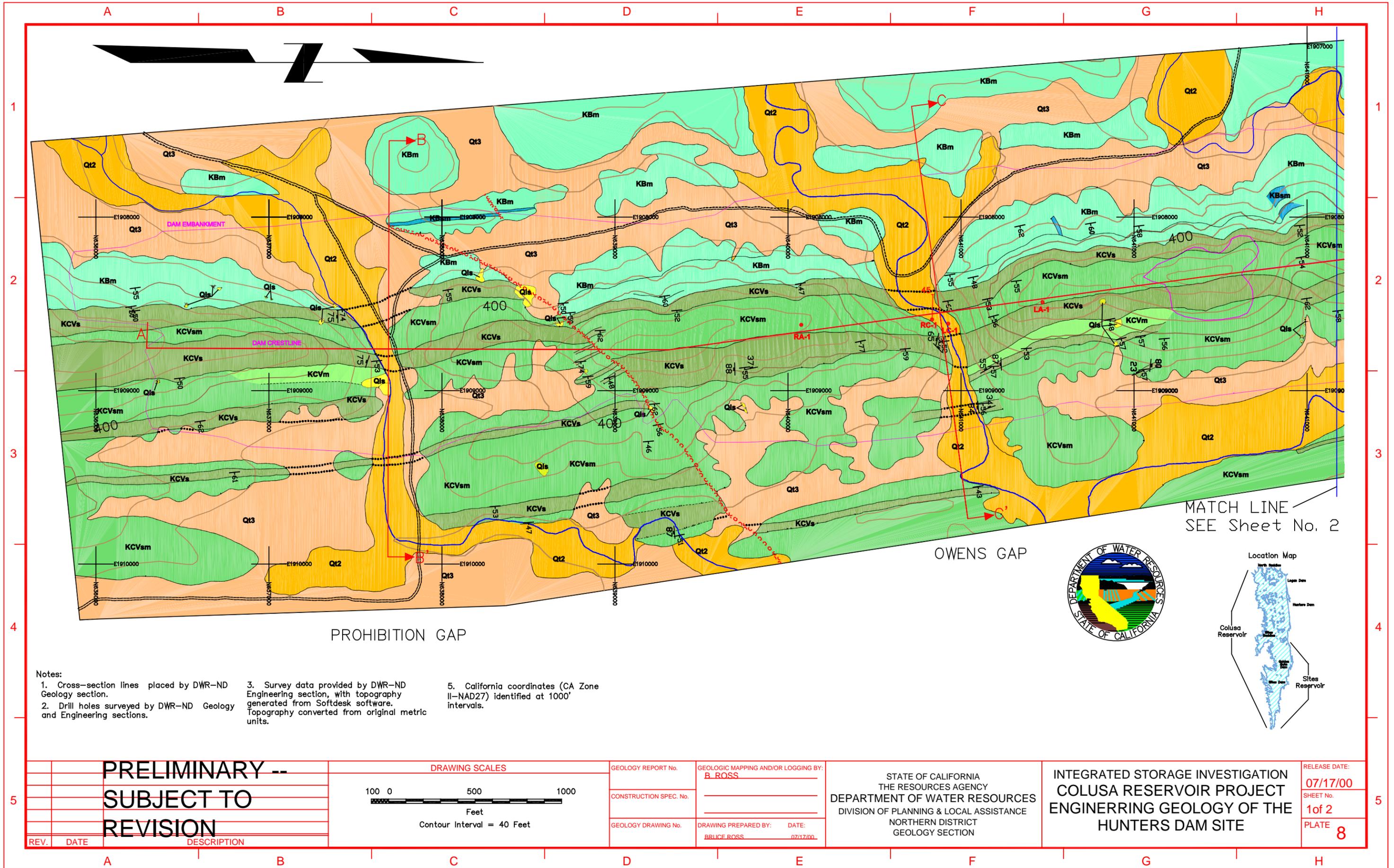
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GEOLOGY SECTION

**INTEGRATED STORAGE INVESTIGATION
SITES RESERVOIR PROJECT
ENGINEERING GEOLOGY OF THE
GOLDEN GATE OUTLET WORKS**

RELEASE DATE:
07/17/00

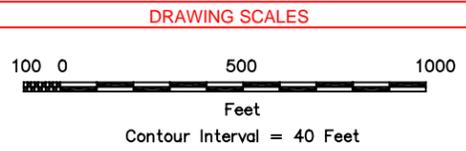
SHEET No.
1 of 1

PLATE
6



- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Drill holes surveyed by DWR-ND Geology and Engineering sections.
 3. Survey data provided by DWR-ND Engineering section, with topography generated from Softdesk software. Topography converted from original metric units.
 4. Contour lines generated from Softdesk software. Contour interval = 40 feet.
 5. California coordinates (CA Zone II-NAD27) identified at 1000' intervals.

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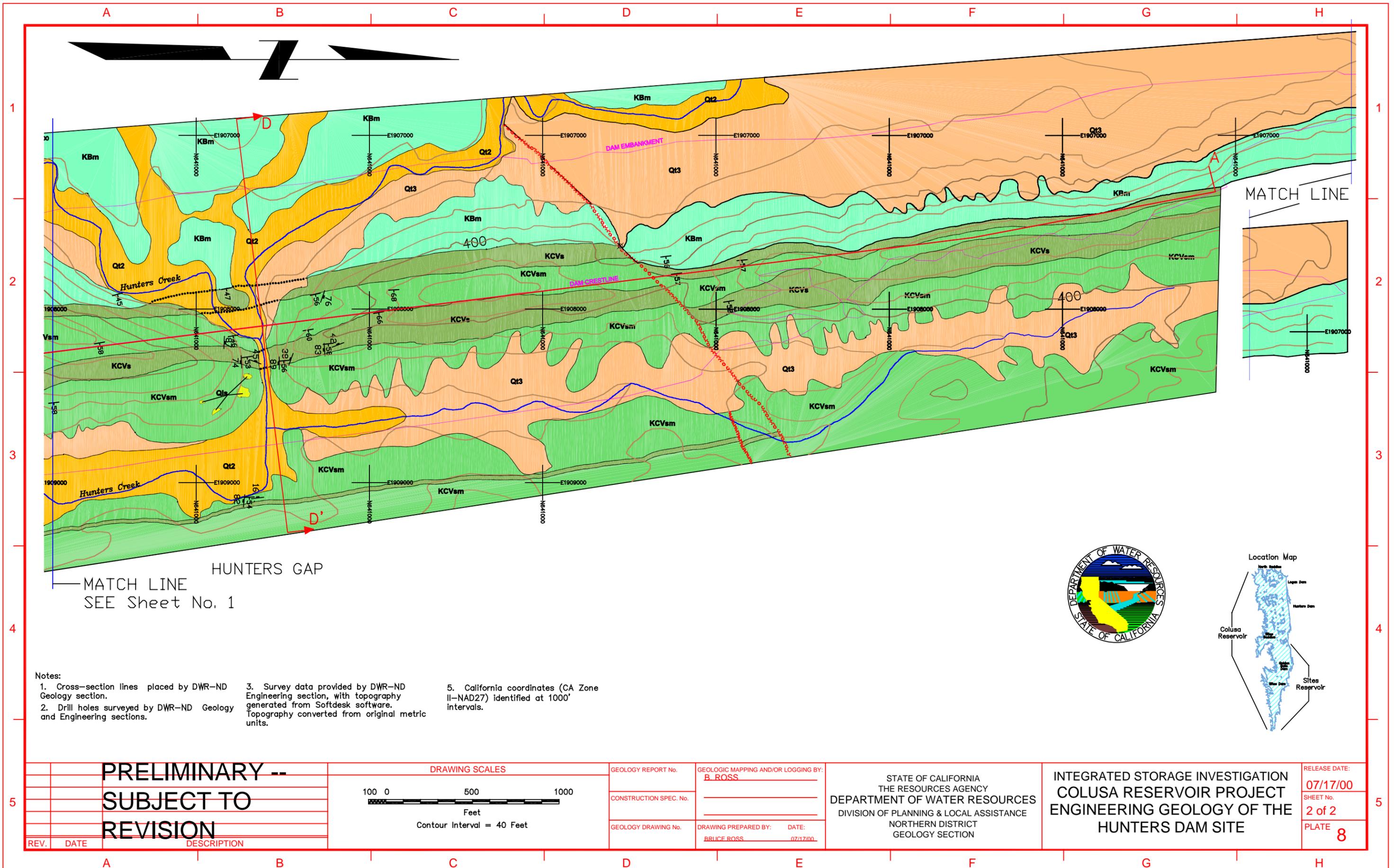


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CONSTRUCTION SPEC. No.	
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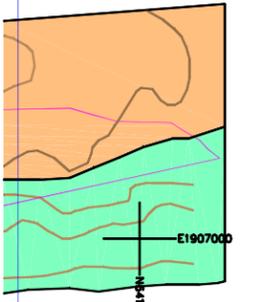
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INTEGRATED STORAGE INVESTIGATION
COLUSA RESERVOIR PROJECT
ENGINEERING GEOLOGY OF THE
HUNTERS DAM SITE

RELEASE DATE: 07/17/00
SHEET No. 1 of 2
PLATE 8



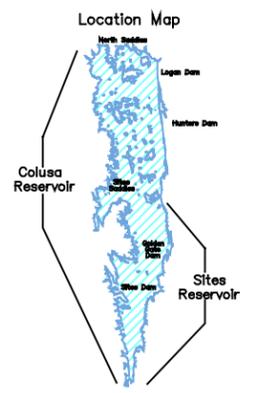
MATCH LINE



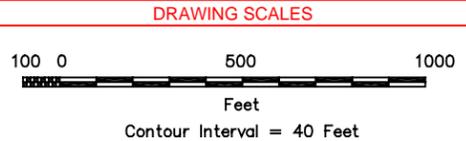
HUNTERS GAP

MATCH LINE
SEE Sheet No. 1

- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Drill holes surveyed by DWR-ND Geology and Engineering sections.
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 4. Contour interval = 40 feet.
 5. California coordinates (CA Zone II-NAD27) identified at 1000' intervals.



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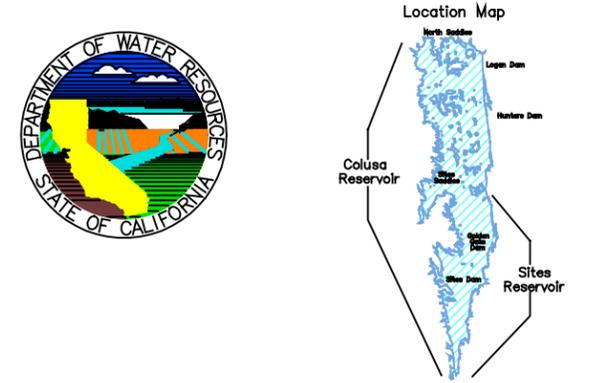
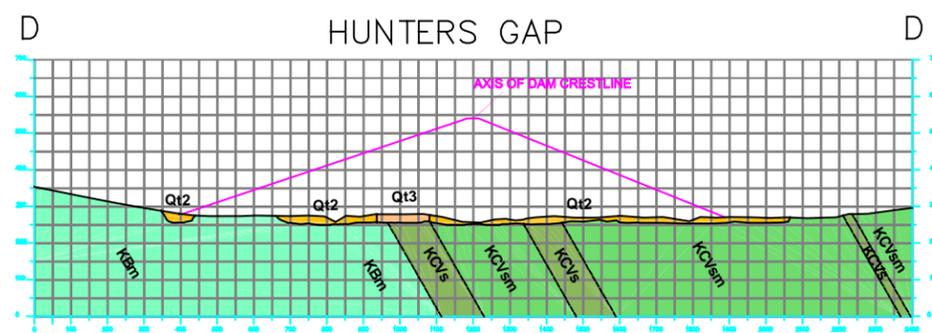
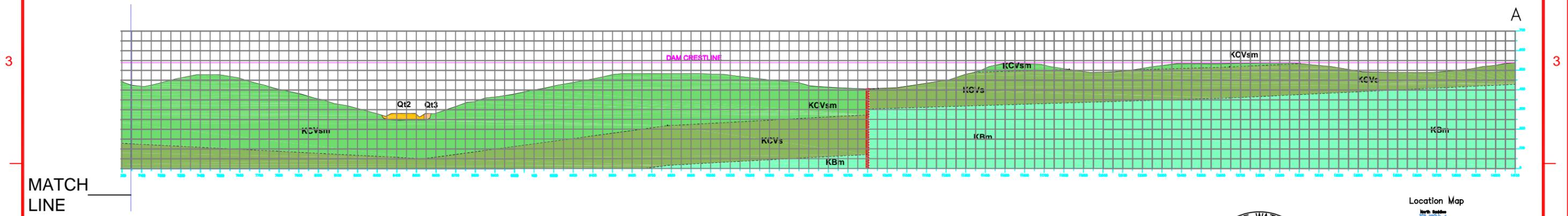
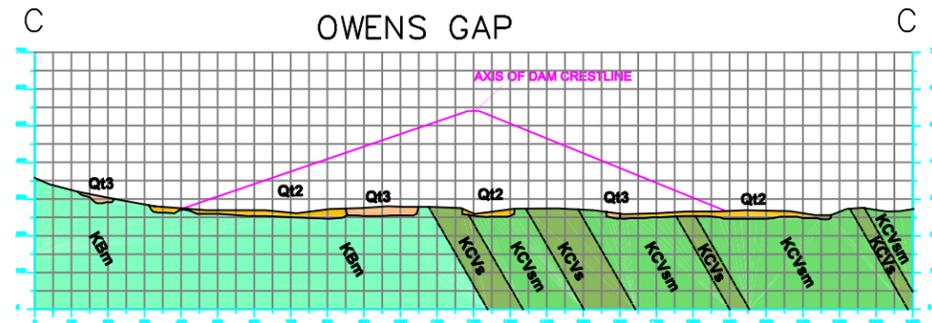
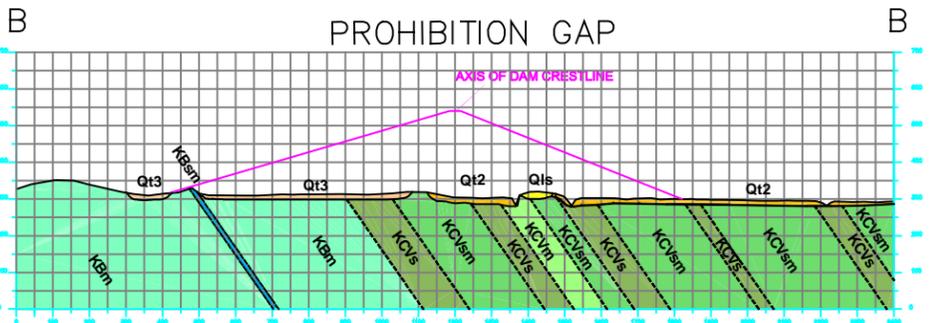
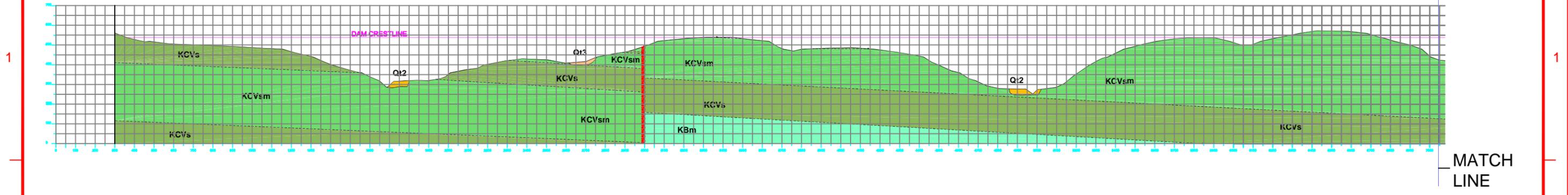
STATE OF CALIFORNIA
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DIVISION OF PLANNING & LOCAL ASSISTANCE
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GEOLOGY SECTION

INTEGRATED STORAGE INVESTIGATION
COLUSA RESERVOIR PROJECT
ENGINEERING GEOLOGY OF THE
HUNTERS DAM SITE

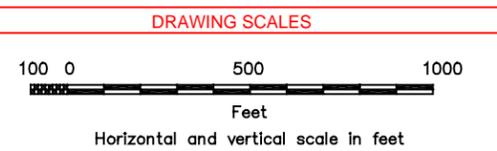
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SHEET No. 2 of 2
PLATE 8

A B C D E F G H

A NOTE: VIEW OF PROFILE A -- A IS LOOKING UPSTREAM.



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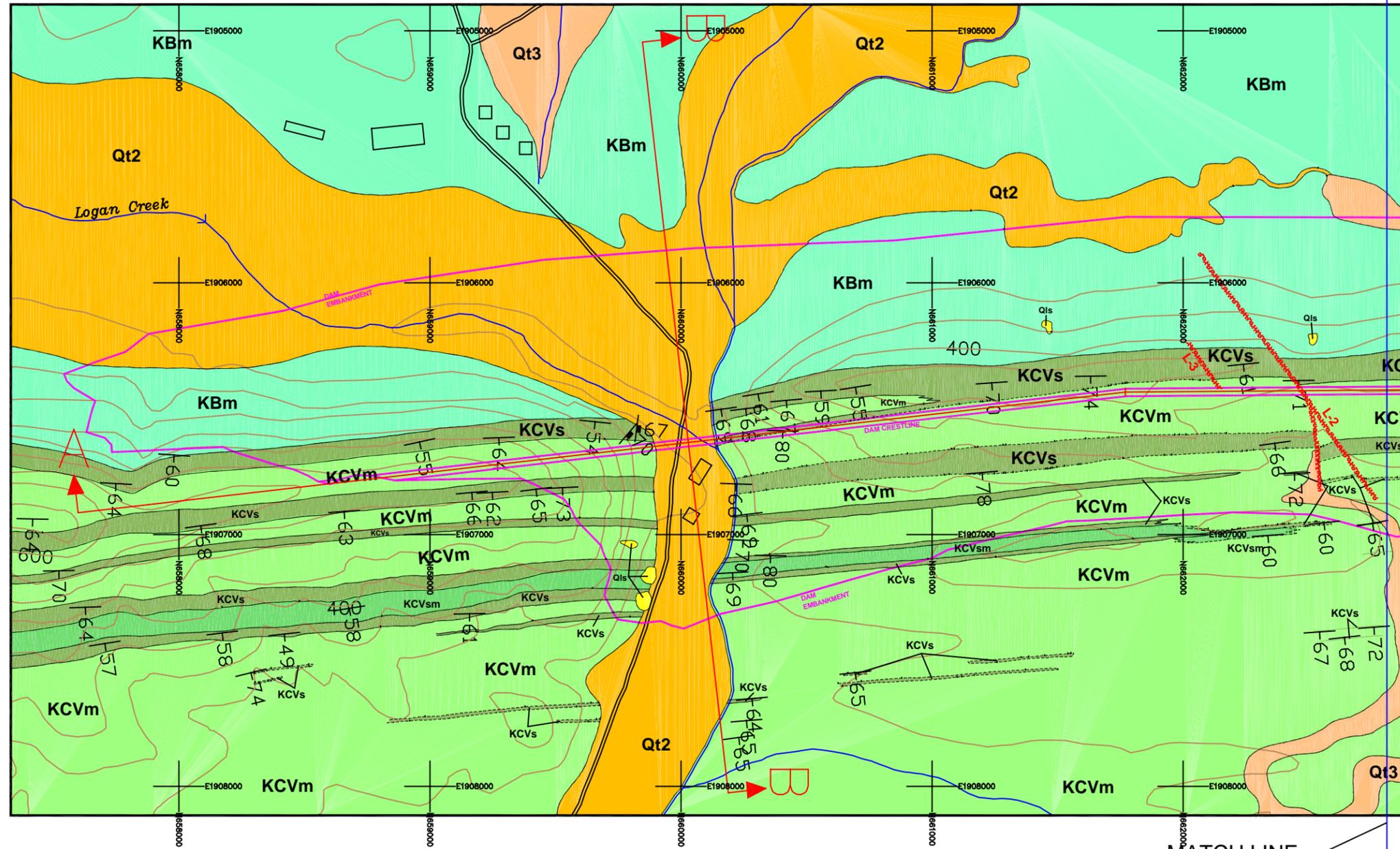
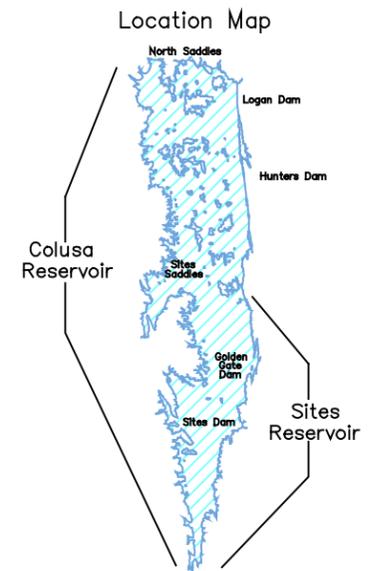
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GEOLOGY DRAWING No.	DRAWING PREPARED BY: DATE:
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INTEGRATED STORAGE INVESTIGATION
COLUSA RESERVOIR PROJECT
GEOLOGIC CROSS SECTIONS
OF THE HUNTERS DAM SITE

RELEASE DATE:
07/17/00
SHEET No.
1 of 1
PLATE
9

A B C D E F G H

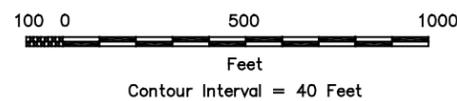


MATCH LINE
SEE Sheet No. 2

- Notes:
1. Cross-section lines placed by DWR-ND Geology section.
 2. Survey data provided by DWR-ND Engineering section, with topography generated from Softdesk software. Topography converted from original metric units.
 3. California coordinates (CA Zone II-NAD27) identified at 500' intervals.

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DRAWING SCALES



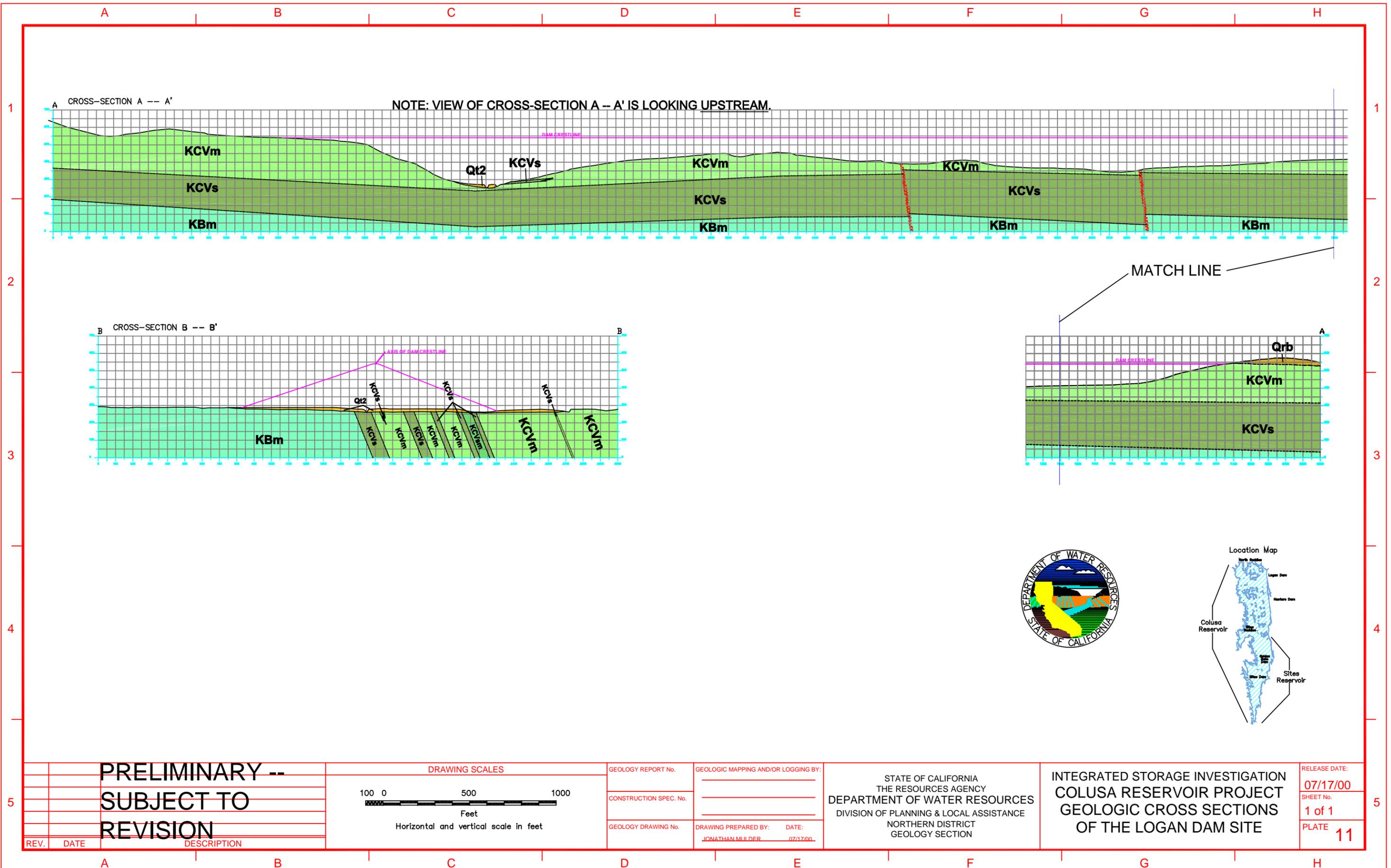
GEOLOGY REPORT No.	GEOLOGIC MAPPING AND/OR LOGGING BY: <u>J. MJULDER</u>	
CONSTRUCTION SPEC. No.		
GEOLOGY DRAWING No.	DRAWING PREPARED BY: <u>JONATHAN MJULDER</u>	DATE: <u>07/17/00</u>

STATE OF CALIFORNIA
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NORTHERN DISTRICT
GEOLOGY SECTION

**INTEGRATED STORAGE INVESTIGATION
COLUSA RESERVOIR PROJECT
ENGINEERING GEOLOGY OF THE
LOGAN DAM SITE**

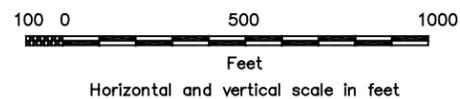
RELEASE DATE: 07/17/00
SHEET No. 1 of 2
PLATE 10

REV.	DATE	DESCRIPTION



**PRELIMINARY --
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DRAWING SCALES



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GEOLOGY DRAWING No.	DRAWING PREPARED BY:	DATE:
	JONATHAN MULDER	07/17/00

STATE OF CALIFORNIA
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INTEGRATED STORAGE INVESTIGATION
COLUSA RESERVOIR PROJECT
GEOLOGIC CROSS SECTIONS
OF THE LOGAN DAM SITE

RELEASE DATE:	07/17/00
SHEET No.	1 of 1
PLATE	11

State of California, Gray Davis, Governor
The Resources Agency, Mary D. Nichols, Secretary for Resources
Department of Water Resources, Thomas M. Hannigan, Director

Steve Macaulay, Chief Deputy Director
Jonas Minton, Deputy Director
L. Lucinda Chipponeri, Assistant Director for Legislation
Susan N. Weber, Chief Counsel

Naser J. Bateni, Chief, Division of Planning and Local Assistance

In coordination with CALFED

by

Charlie Brown, Department of Fish and Game
Brad Burkholder, Department of Fish and Game
Jenny Marr*, Department of Fish and Game
Frank Wernette, Department of Fish and Game

David J. Bogener, Department of Water Resources
Gerald Boles, Department of Water Resources
Koll Buer, Department of Water Resources
Doug Denton, Department of Water Resources
K. Glyn Echols, Department of Water Resources
Gary Hester, Department of Water Resources
Ralph Hinton, Department of Water Resources
Gail Kuenster, Department of Water Resources
Joyce Lacey-Rickert, Department of Water Resources
Glen Pearson, Department of Water Resources
Doug Rischbieter, Department of Water Resources
Dwight P. Russell, Department of Water Resources
Jim Wieking, Department of Water Resources
Waiman Yip, Department of Water Resources

Robert Orlins, Department of Parks and Recreation

assisted by

Nikki Blomquist, Department of Water Resources
Linton Brown, Department of Water Resources
Elle Burns, Department of Water Resources
Barbara Castro, Department of Water Resources
Julia Culp, Department of Water Resources
Jennifer Davis-Ferris, Department of Water Resources
Mark Dombrowski, Department of Water Resources
Lawrence Janeway, Department of Water Resources
Liz Kanter, Department of Water Resources
Sandy Merritt, Department of Water Resources
Shawn Pike, Department of Water Resources
Carole Rains, Department of Water Resources
April Scholzen, Department of Water Resources
Michael Serna, Department of Water Resources
Ward Tabor, Department of Water Resources
Marilee Talley, Department of Water Resources
Susan Tatayon, Department of Water Resources
Caroline Warren, Department of Water Resources

Special thanks to DWR's Northern District staff,
who drafted many chapters of this progress report and conducted many of the studies that form its core.

**formerly with Department of Water Resources*