DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	New			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Hany M. Haroun — No. 63105 — Exp. 6-30-06 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

COUNTY OF RIVERSIDE
4080 LEMON STREET
RIVERSIDE, CA 92502

CH2MHILL
3 HUTTON CENTRE DRIVE, SUITE 200
SANTA ANA, CALIFORNIA 92707

LEGEND

1. Paint "Warm Springs Creek Bridge"
2. Paint bridge number and year constructed
3. Structure Approach Type N(30S)
4. Concrete Barrier Type 60, see "Road Plans"
5. MBGR, see "Road Plans"

Electrolier, see Road Plans.

ABBREVIATION

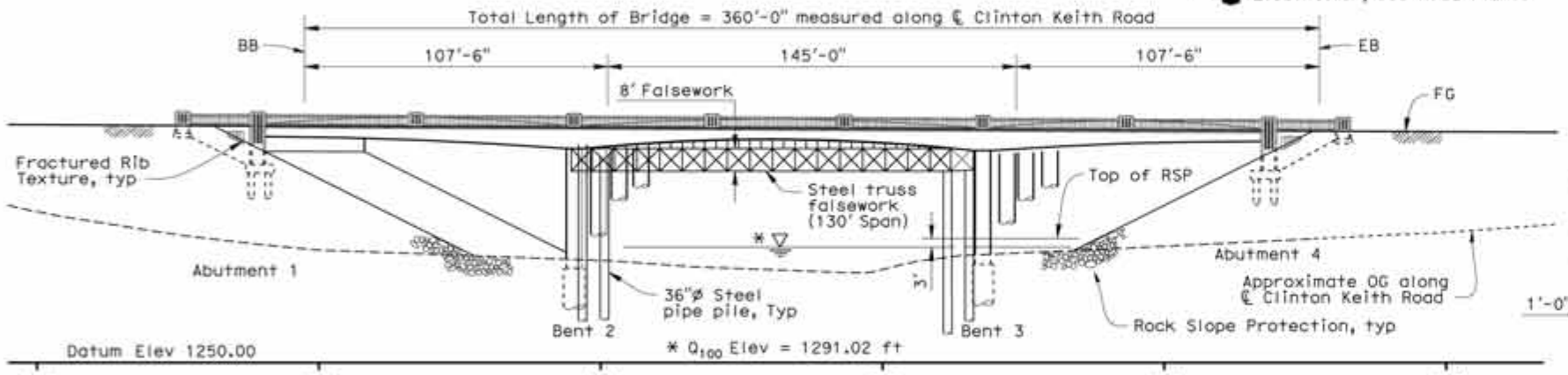
USACE	United States Army Corps of Engineers
CDFG	California Department of Fish and Game
RSP	Rock Slope Protection

-0.50%

Sta 297+00.00 EVC
Elev 1335.50

Sta 304+75.00 BVC
Elev 1331.63

PROFILE
No Scale



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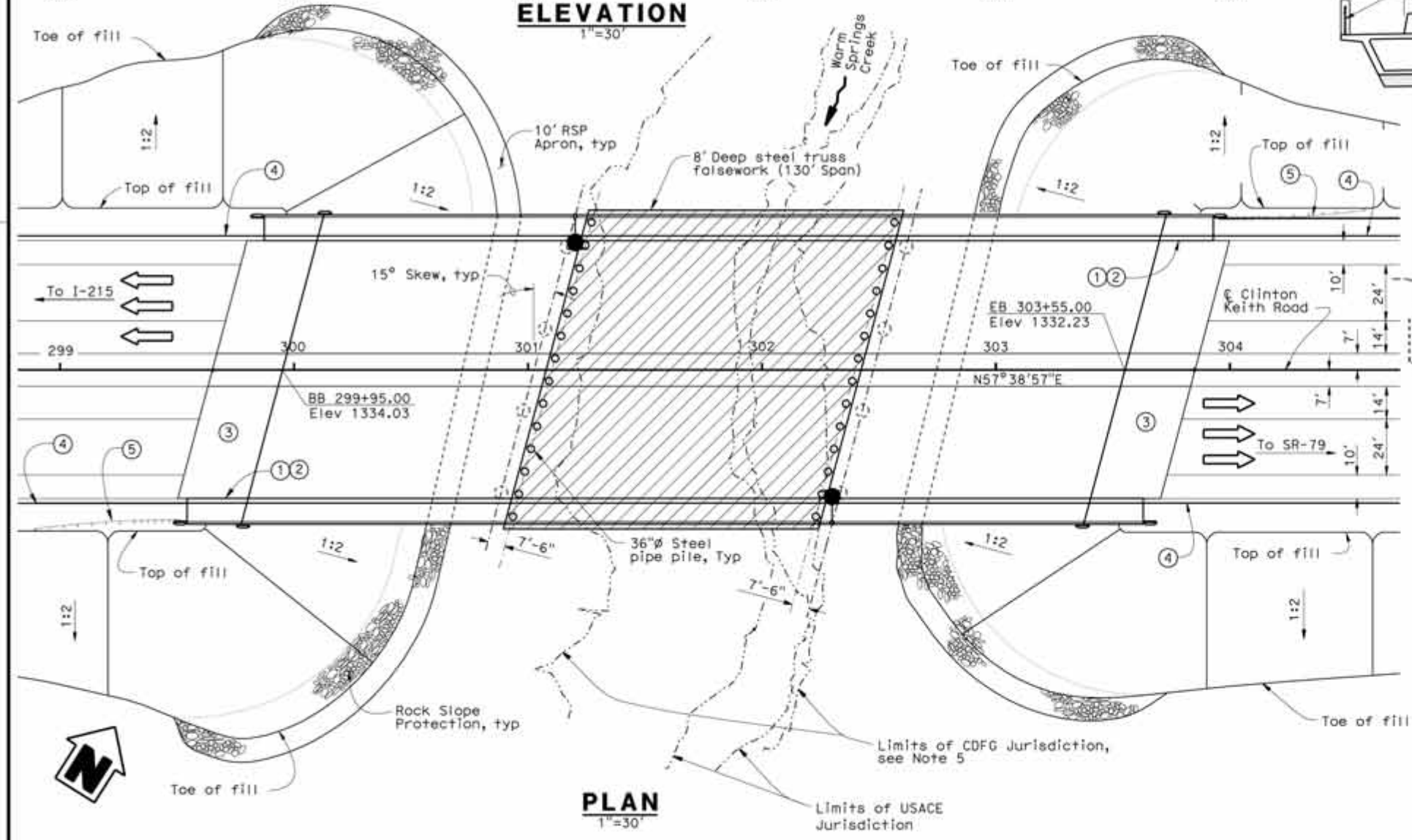
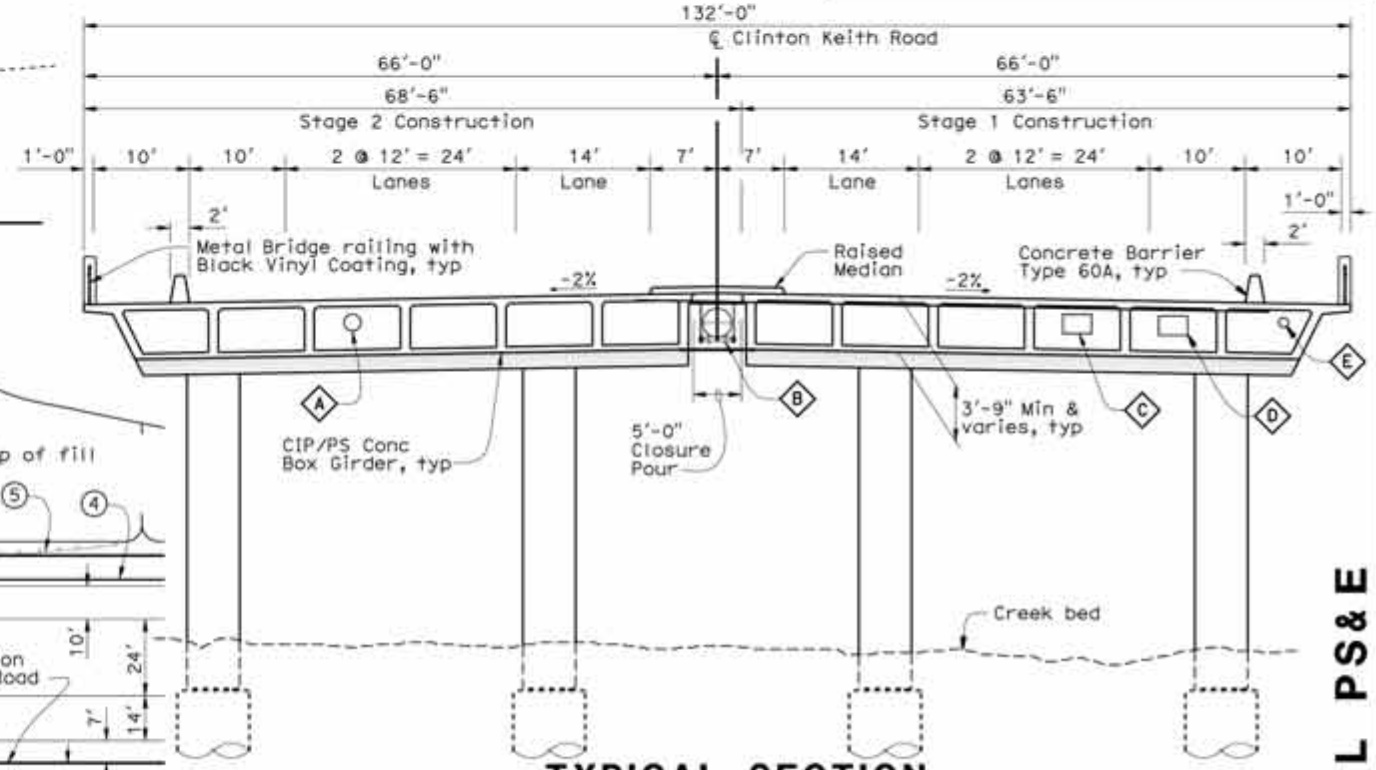


PLAN
1"=30'



TYPICAL SECTION
1"=10'

NOTES:

1. For "General Notes", "Standard Plans", "Index to Plans", "Concrete Strength and Type Limits", and "Quantities", see "General Notes and Quantities" sheet.
2. For "Pile Data Table", see "Foundation Plan" sheet.
3. For utilities information, see "Typical Section Details" sheet.
4. For railing details, see "Architectural Details No. 1" sheet.
5. Contractor shall use falsework towers within the limits of USACE and CDFG jurisdictions to keep the impacted temporary and permanent area during construction below the allowable limits accepted by USACE (0.5 acre). See special provisions for details.

UTILITIES

- (A) 14" ø Eastern Municipal Water District recycled water line
- (B) 1-36" ø County of Riverside storm drain line
- (C) Future utility opening for 14" ø Eastern Municipal Water District water line
- (D) Future utility opening
- (E) 1-8" ø gas line for The Gas Company

INITIAL PS&E

FIGURE 5: WARM SPRINGS CREEK BRIDGE

DESIGN OVERSIGHT	DESIGN	BY H. Haroun	CHECKED D. Sun	LOAD FACTOR DESIGN	LIVE LOADING HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD		PREPARED FOR THE COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT	Ayman Salama PROJECT ENGINEER	BRIDGE NO. M8415
	DETAILS	BY E. Moehler	CHECKED D. Sun	LAYOUT	BY A. Salama	CHECKED H. Hanson			POST MILES
SIGN OFF DATE	QUANTITIES	BY T. Lee	CHECKED T. Tran	SPECIFICATIONS	BY	PLANS AND SPECS COMPARED			

WARM SPRINGS CREEK BRIDGE
GENERAL PLAN

DESIGN GENERAL PLAN SHEET (ENGLISH) (REV. 5/9/00)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 1 OF 35

FILE => cagp01-truss.dgn

SCO171364.T1.08.05.06 Figure 2-5 wscb with falsework.pdf 01/06

DGNNAME => Preparation DATE PLOTTED => 16-JAN-2006 TIME PLOTTED => 16:53

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	New			

REGISTERED CIVIL ENGINEER

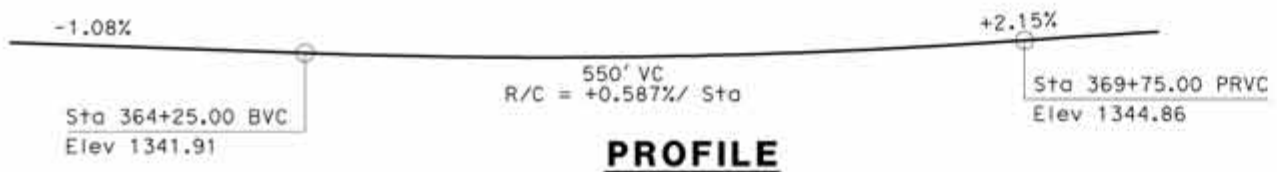
PLANS APPROVAL DATE

Ayman E. Salama No. 56085 Exp. 12-31-07 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

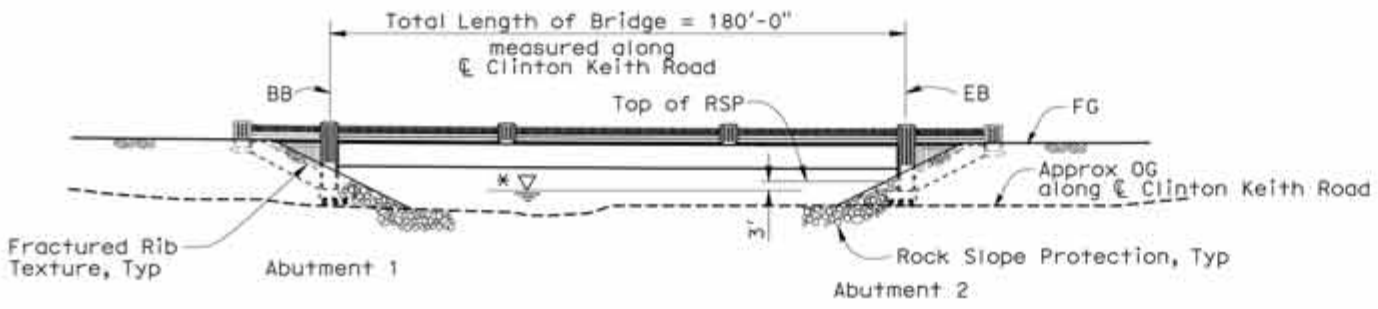
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

COUNTY OF RIVERSIDE
4080 LEMON STREET
RIVERSIDE, CA 92502

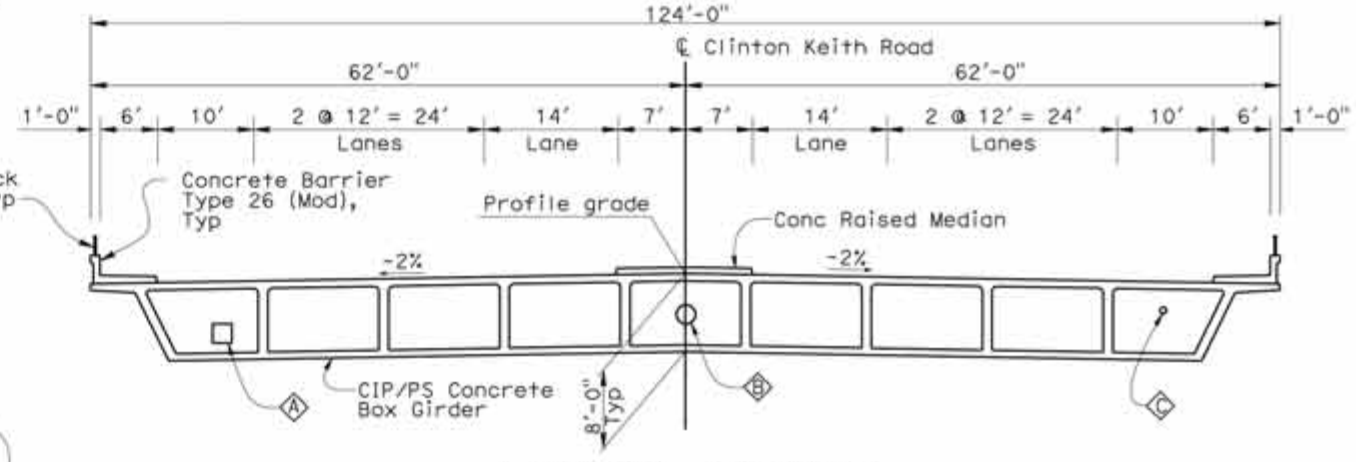
CH2MHILL
3 HUTTON CENTRE DRIVE, SUITE 200
SANTA ANA, CALIFORNIA 92707



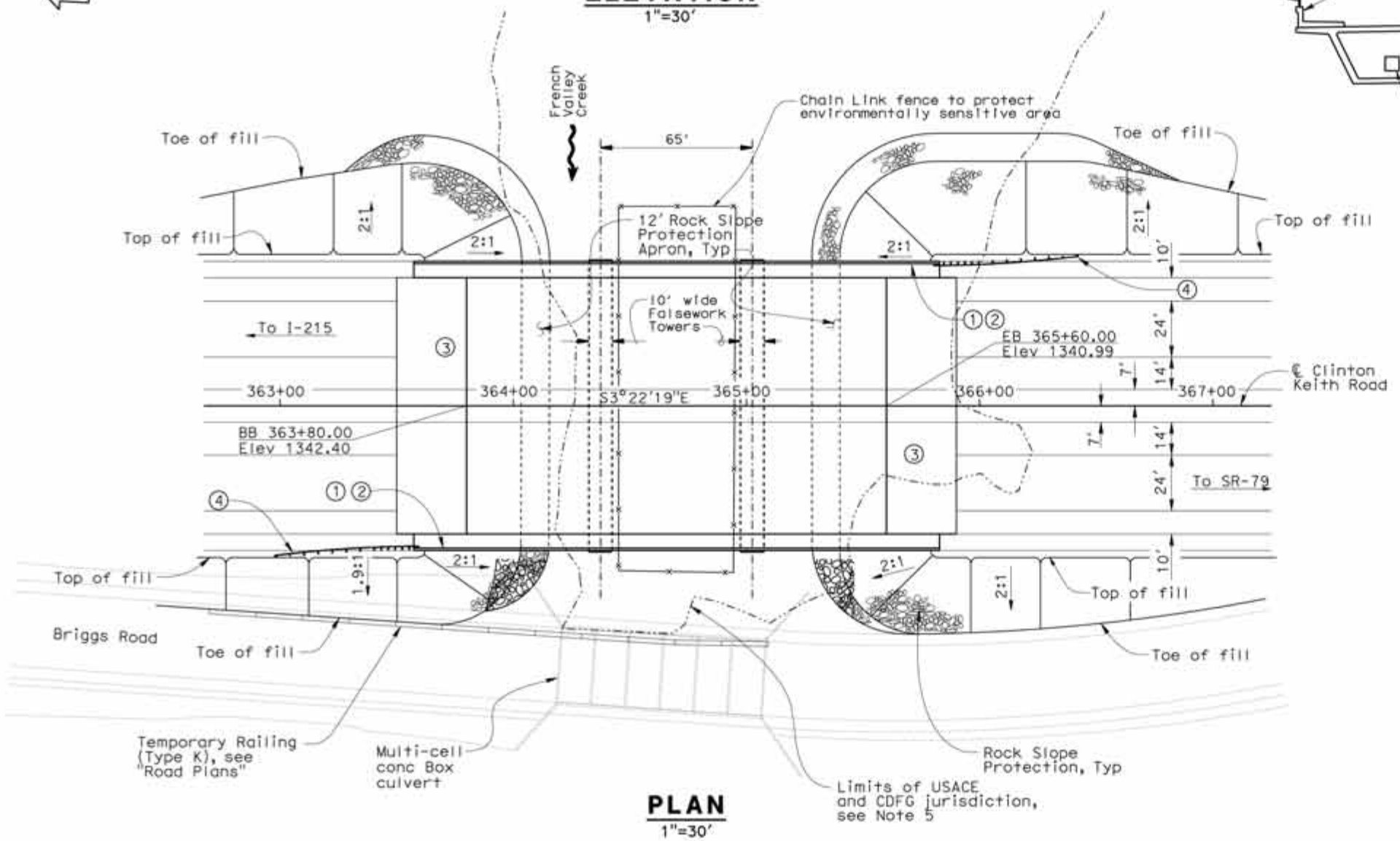
PROFILE
No Scale



ELEVATION
1"=30'



TYPICAL SECTION
1"=10'



PLAN
1"=30'

UTILITIES

- (A) Future Utility Opening
- (B) 24" ø County of Riverside Storm Drain line
- (C) 8" ø Gas line for The Gas Company

LEGEND

- (1) Paint "French Valley Creek Bridge"
- (2) Paint bridge number and year constructed
- (3) Structure Approach Type N(30S)
- (4) MBGR, see "Road Plans"
- Jurisdictional Limits
- Rock Slope Protection

NOTES:

1. For "General Notes", "Standard Plans", "Index to Plans", "Concrete Strength and Type Limits" and "Quantities" see "Deck Contours" sheet.
2. For Concrete Barrier Architectural Details, see "Architectural Details No. 1, 2, 3 & 4" sheets.
3. For utilities information, see "Typical Section" sheet.
4. For "Pile Data Table", see "Foundation Plan" sheet.
5. Contractor shall use falsework towers within the limits of United States Army Corps of Engineers (USACE) jurisdiction to keep the impacted area during construction below the allowable limits accepted by USACE (0.5 acre). See special provisions for details.

INITIAL PS&E

FIGURE 6: FRENCH VALLEY CREEK BRIDGE

DESIGN OVERSIGHT	DESIGN	BY A. Salama	CHECKED H. Haroun	LOAD FACTOR DESIGN	LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD		PREPARED FOR THE COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT	Ayman Salama PROJECT ENGINEER
	DETAILS	BY E. Maechler	CHECKED H. Haroun	LAYOUT	BY A. Salama	CHECKED H. Haroun		
SIGN OFF DATE	QUANTITIES	BY T. Tran	CHECKED T. Lee	SPECIFICATIONS	BY A. Salama	PLANS AND SPECS COMPARED		

BRIDGE NO. M8410 — POST MILES

FRENCH VALLEY CREEK BRIDGE
GENERAL PLAN

DESIGN GENERAL PLAN SHEET (ENGLISH) (REV. 5/9/00)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

FILE =\$ dagpol-flg-truss.dgn

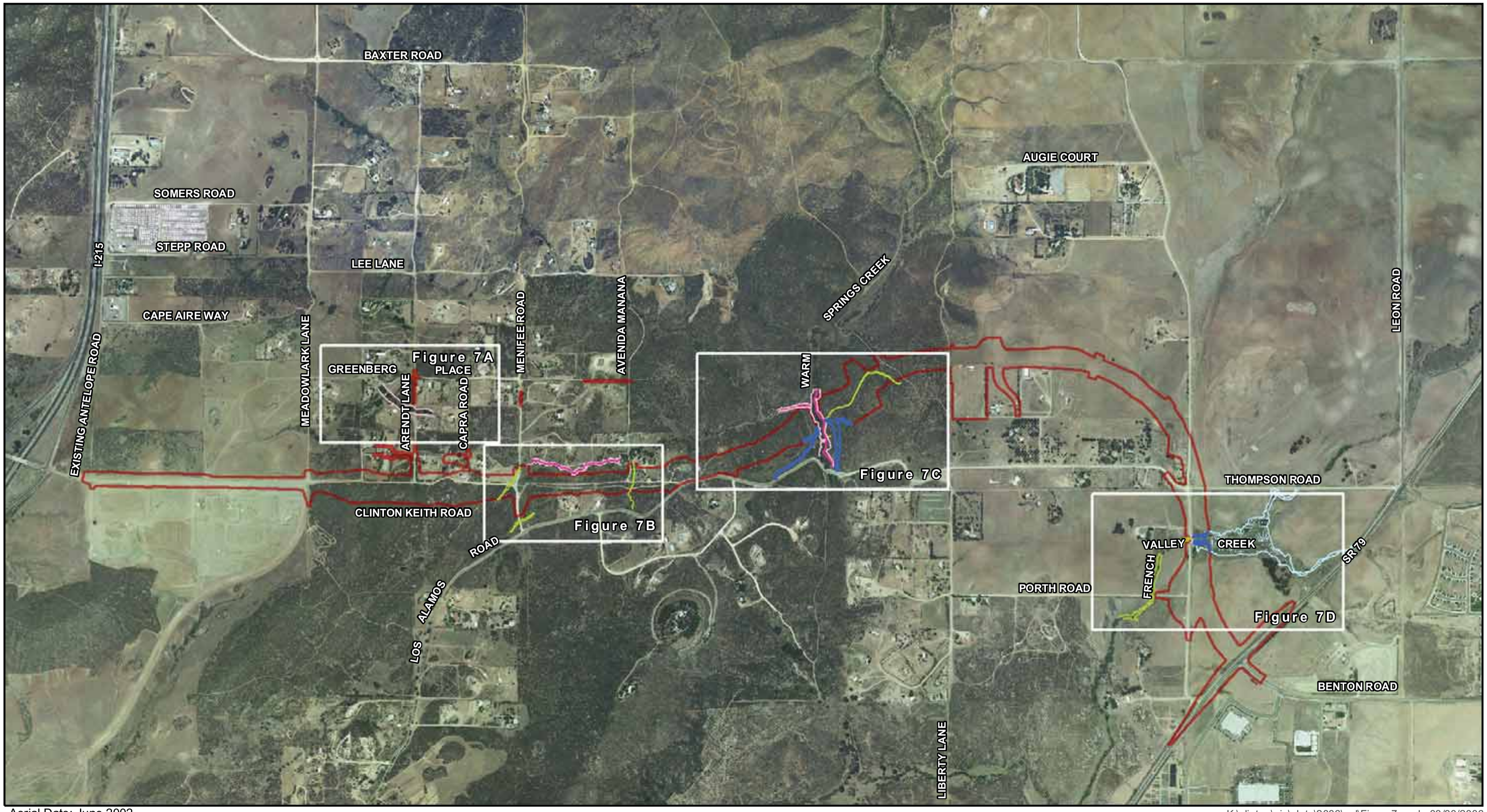
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) — OBJECTS 01/23/06

SHEET 1 OF 22

DESIGNAME: =\$ PROPOSED DATE PLOTTED =\$ 18-JAN-2006 TIME PLOTTED =\$ 10:46

SCO171364.T1.06.05.06 Figure 2-6 fvcb with falsework.pdf 01/06



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure7.mxd 03/30/2006

Legend:

- Project Permanent Impact Area[1]
- Temporary Construction Access Impact Area[1]

Jurisdictional Limits[1]

- USACE / RWQCB / CDFG
- USACE / RWQCB
- CDFG
- Wetland - USACE / RWQCB / CDFG[2]

Source: 1 - CH2MHILL; 2 - Klinefelter, 2003

N

0 1,200

Feet

Figure 7
Jurisdictional Sites Key Map

Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 03/30/2006

Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure7a.mxd 02/09/2006

Legend:

- Project Permanent Impact Area[1]
- Temporary Construction Access Impact Area[1]

Jurisdictional Limits[1]

- USACE / RWQCB / CDFG
- USACE / RWQCB
- CDFG
- Wetland - USACE / RWQCB / CDFG[2]

Source: 1 - CH2MHILL; 2 - Klinefelter, 2003

N

0 150

Feet

Figure 7a
Jurisdictional Delineation
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006

Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure7b.mxd 02/09/2006

Legend:

- Project Permanent Impact Area[1]
- Temporary Construction Access Impact Area[1]

Jurisdictional Limits[1]

- USACE / RWQCB / CDFG
- USACE / RWQCB
- CDFG
- Wetland - USACE / RWQCB / CDFG[2]

Source: 1 - CH2MHILL; 2 - Klinefelter, 2003

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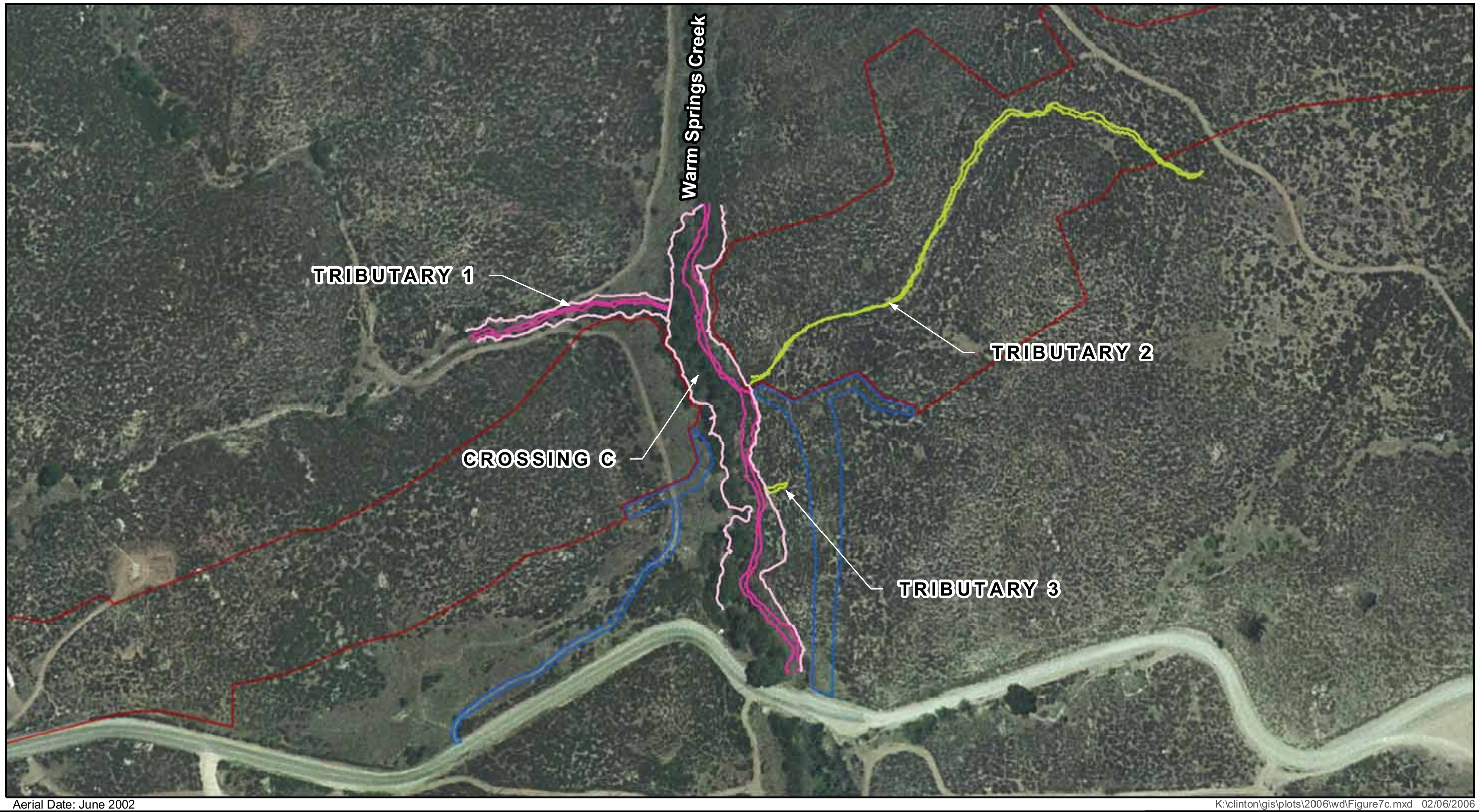
Feet

Figure 7b
Jurisdictional Delineation
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure7c.mxd 02/06/2006

Legend:

- Project Permanent Impact Area[1]
- Temporary Construction Access Impact Area[1]

Jurisdictional Limits[1]

- USACE / RWQCB / CDFG
- USACE / RWQCB
- CDFG
- Wetland - USACE / RWQCB / CDFG[2]

Source: 1 - CH2MHILL; 2 - Klinefelter, 2003

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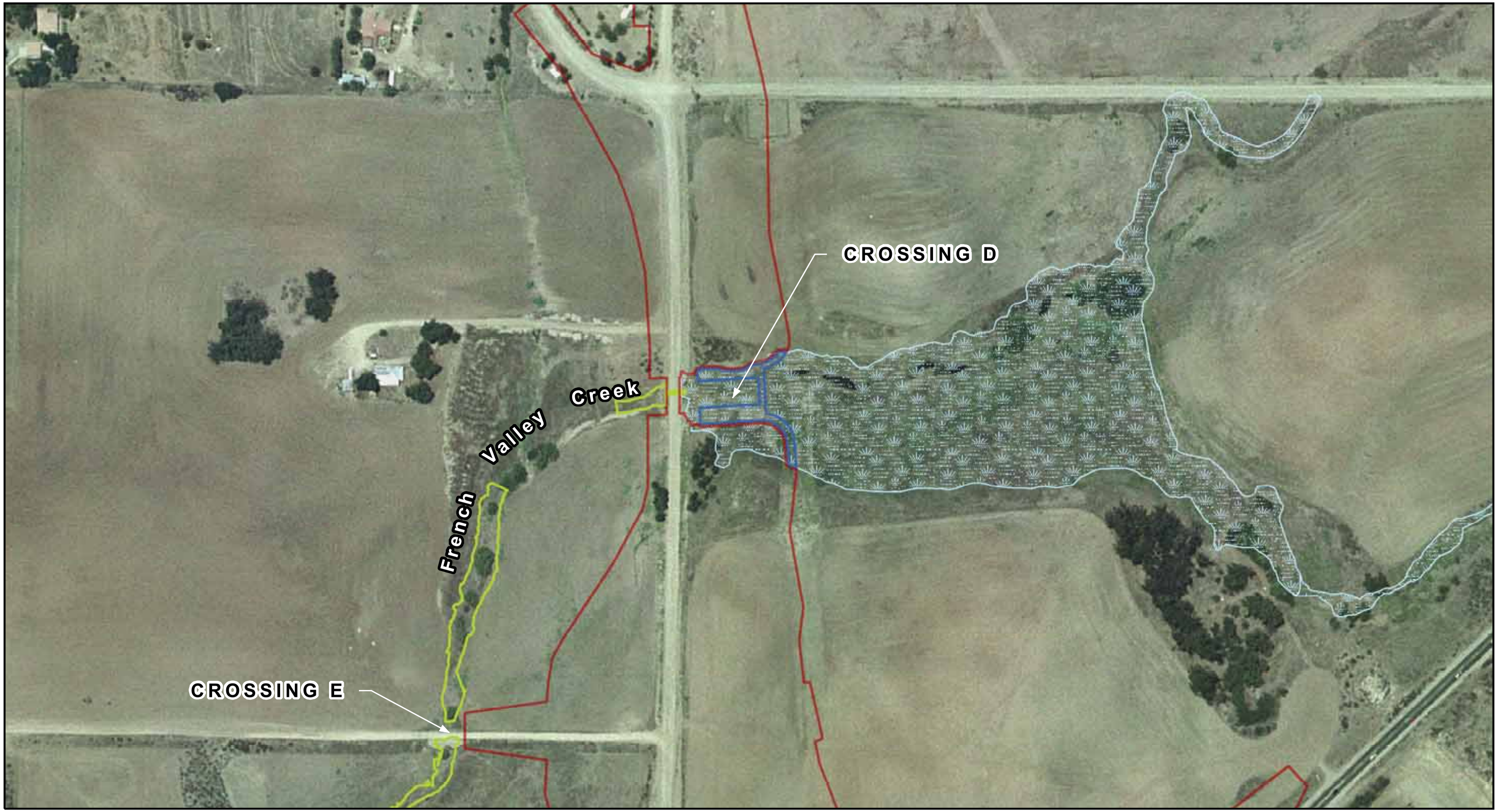
Feet

Figure 7c
Jurisdictional Delineation
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/06/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure7d.mxd 02/09/2006

Legend:

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- Temporary Construction Access Impact Area[1]

Jurisdictional Limits[1]

- USACE / RWQCB / CDFG
- USACE / RWQCB
- CDFG
- Wetland - USACE / RWQCB / CDFG[2]

Source: 1 - CH2MHILL; 2 - Klinefelter, 2003

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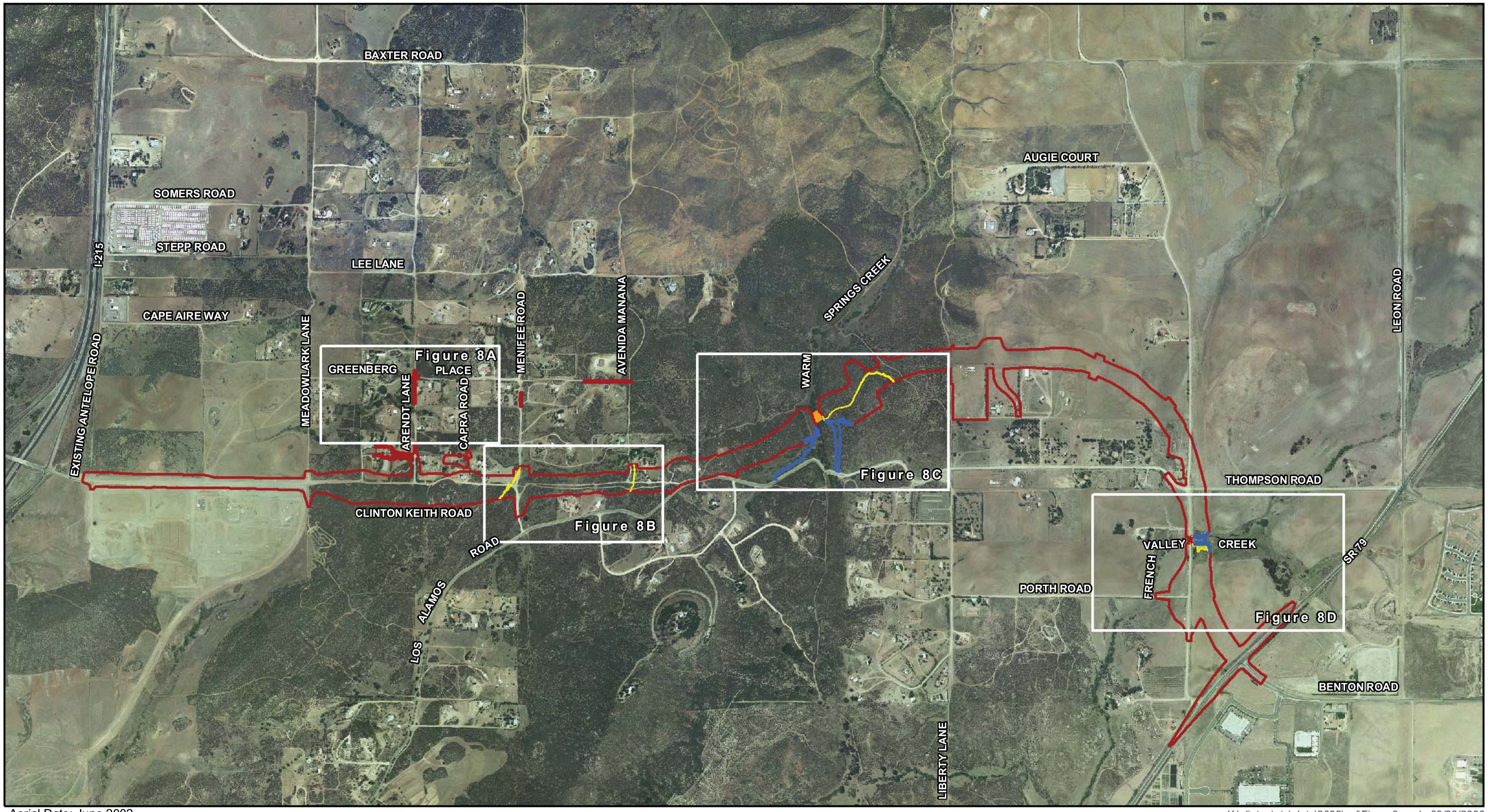
Feet

Figure 7d
Jurisdictional Delineation
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure8.mxd 03/30/2006

Legend:

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- Temporary Construction Access Impact Area[1]
- Permanent Impact to Jurisdictional Area[1]
- Temporary Impact to Jurisdictional Area[1]
- Bridge Shading Impact[1]

Source: 1 - CH2MHILL

N

0 1,200

Feet

Figure 8
Project Impact Areas

Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 03/30/2006

Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure8a.mxd 02/09/2006

Legend:

- Project Permanent Impact Area[1]
- Temporary Construction Access Impact Area[1]
- Permanent Impact to Jurisdictional Area[1]
- Temporary Impact to Jurisdictional Area[1]
- Bridge Shading Impact[1]

Source: 1 - CH2MHILL

N

0 150

Feet

Figure 8a
Project Impact Areas

Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006

Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure8b.mxd 02/09/2006

Legend:

- Project Permanent Impact Area[1]
- Bridge Shading Impact[1]
- Temporary Construction Access Impact Area[1]
- Permanent Impact to Jurisdictional Area[1]
- Temporary Impact to Jurisdictional Area[1]

Source: 1 - CH2MHILL

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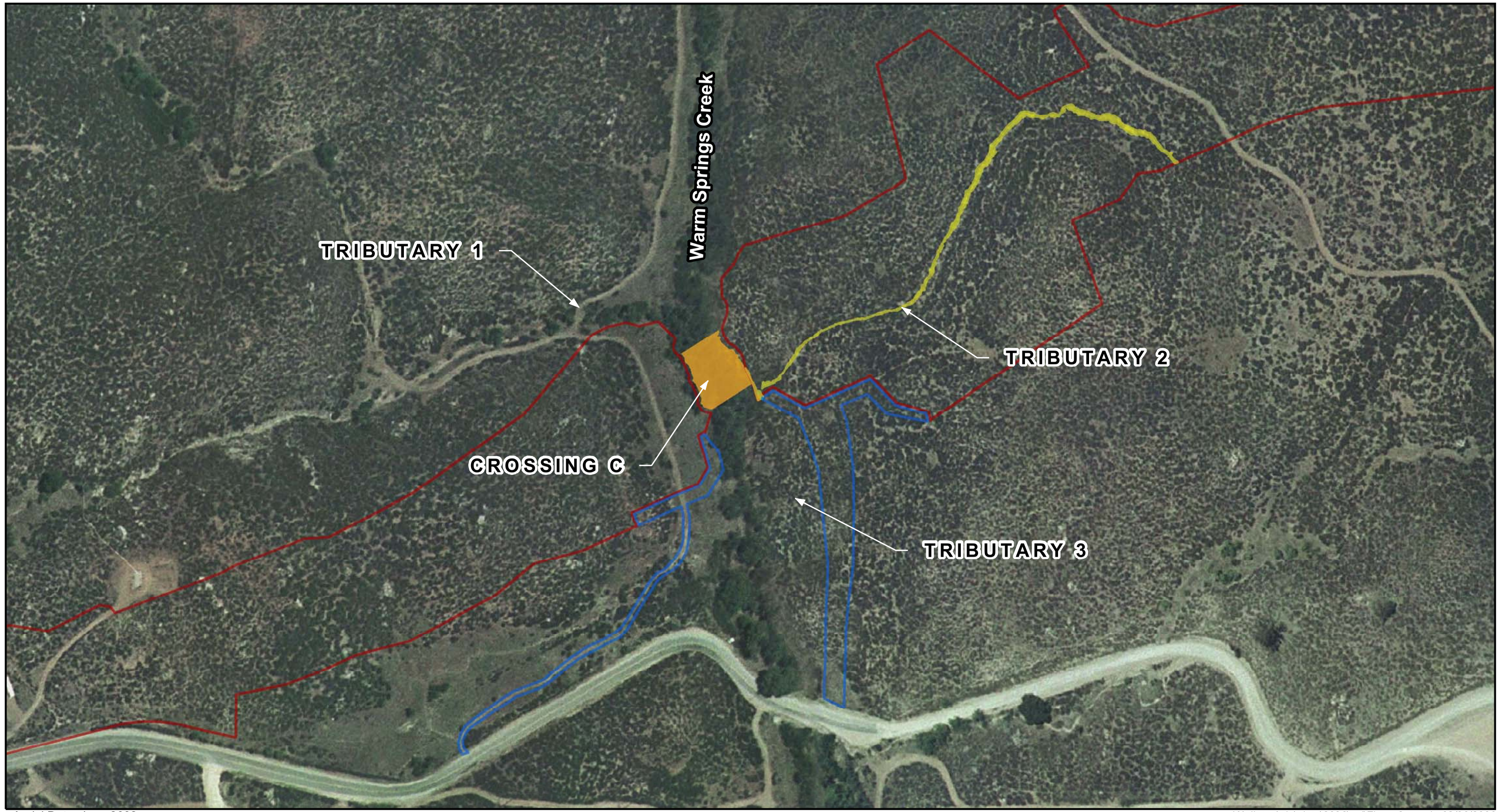
Feet

Figure 8b
Project Impact Areas
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure8c.mxd 02/09/2006

Legend:

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- Bridge Shading Impact[1]
- Temporary Construction Access Impact Area[1]
- Permanent Impact to Jurisdictional Area[1]
- Temporary Impact to Jurisdictional Area[1]

Source: 1 - CH2MHILL

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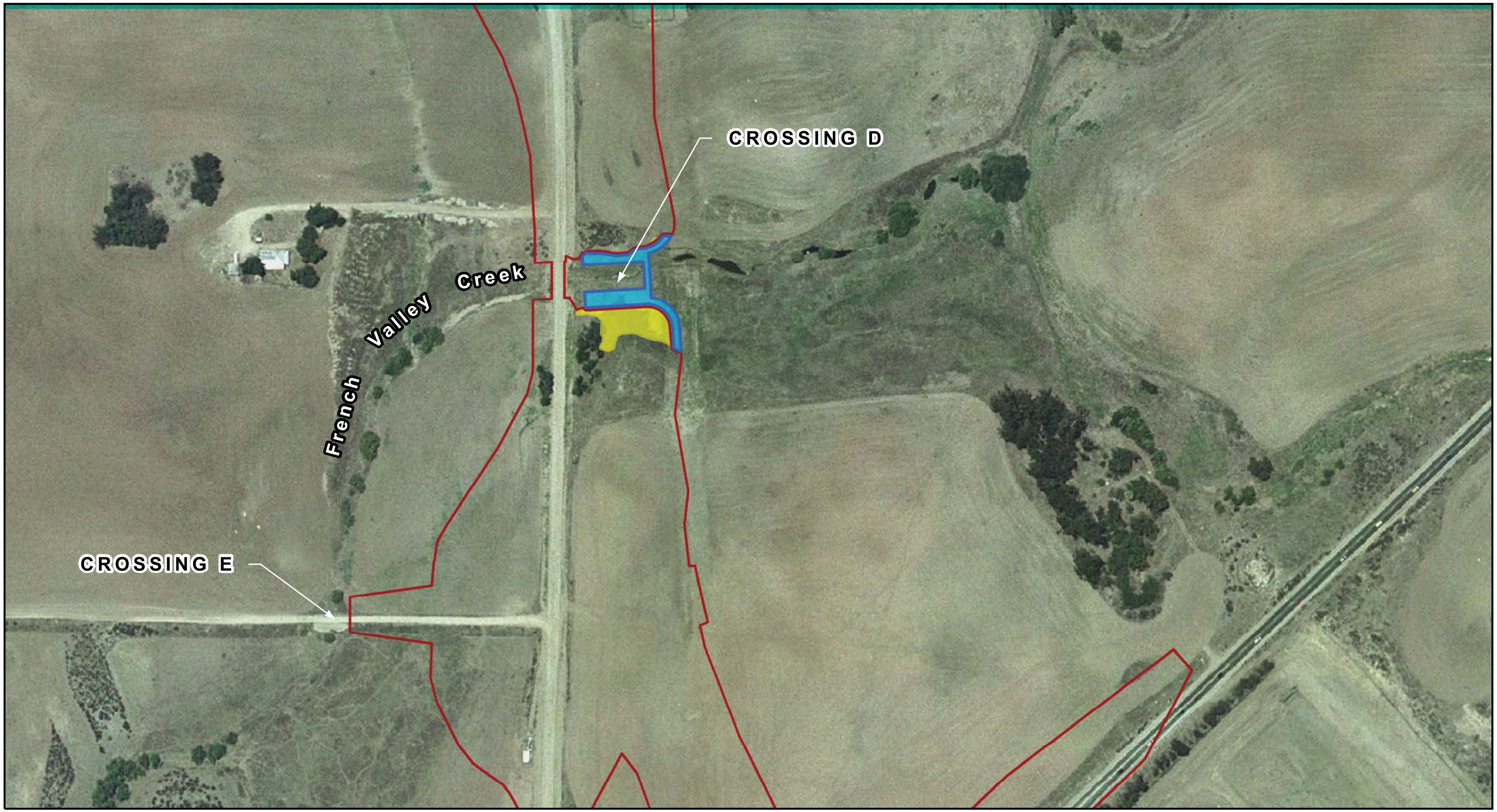
Feet

Figure 8c
Project Impact Areas
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure8d.mxd 02/09/2006

Legend:

- Project Permanent Impact Area[1]
- Bridge Shading Impact[1]
- Temporary Construction Access Impact Area[1]
- Permanent Impact to Jurisdictional Area[1]
- Temporary Impact to Jurisdictional Area[1]

Source: 1 - CH2MHILL

N

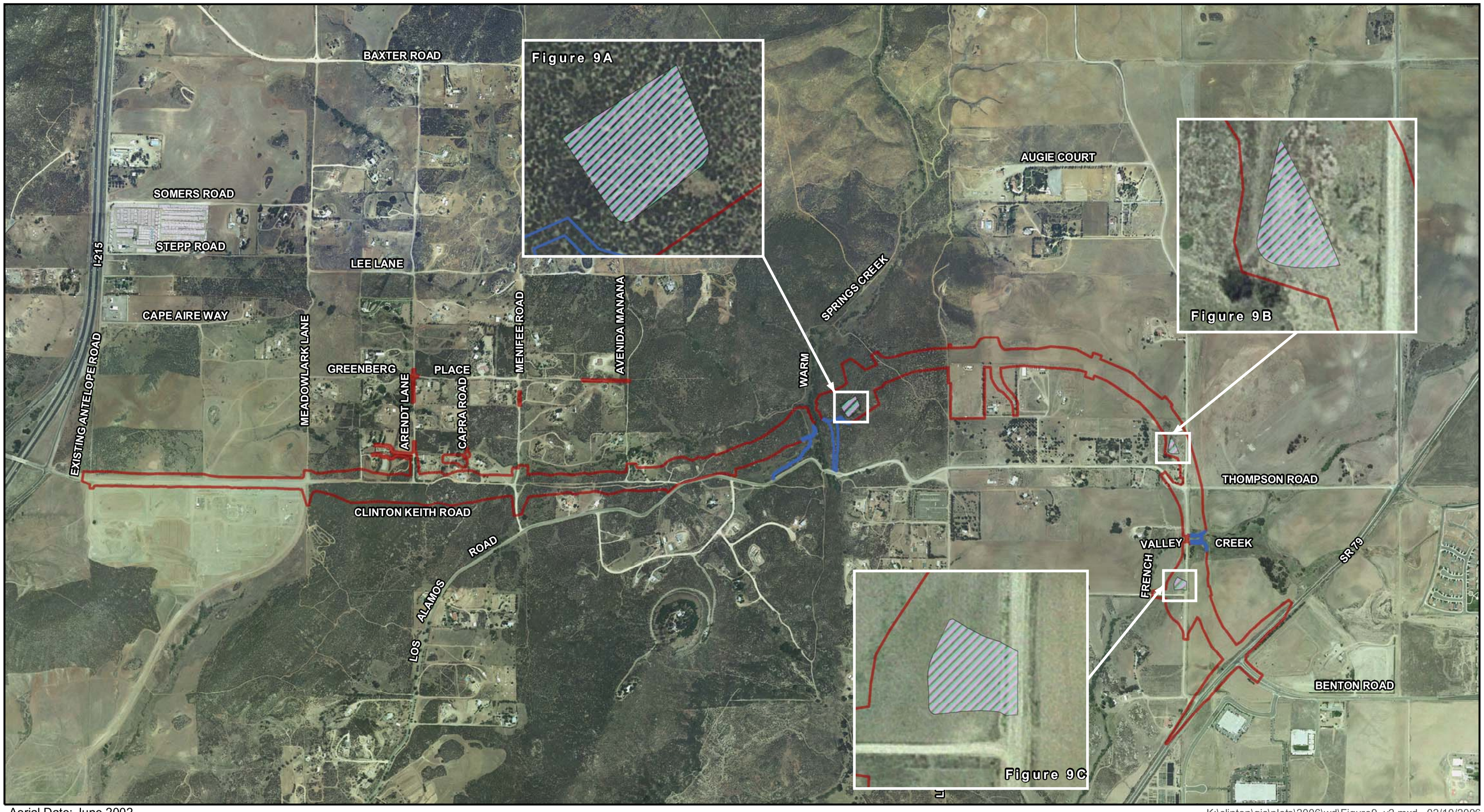
0 200

Feet

Figure 8d
Project Impact Areas
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/09/2006



Aerial Date: June 2002

K:\clinton\gis\plots\2006\wd\Figure9_v2.mxd 02/10/2006

Legend:

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- Temporary Construction Access Impact Area[1]
- Detention Basin[1]

Source: 1 - CH2MHILL

N

0 1,200

Feet

Figure 9
Detention Basin Locations

Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/10/2006

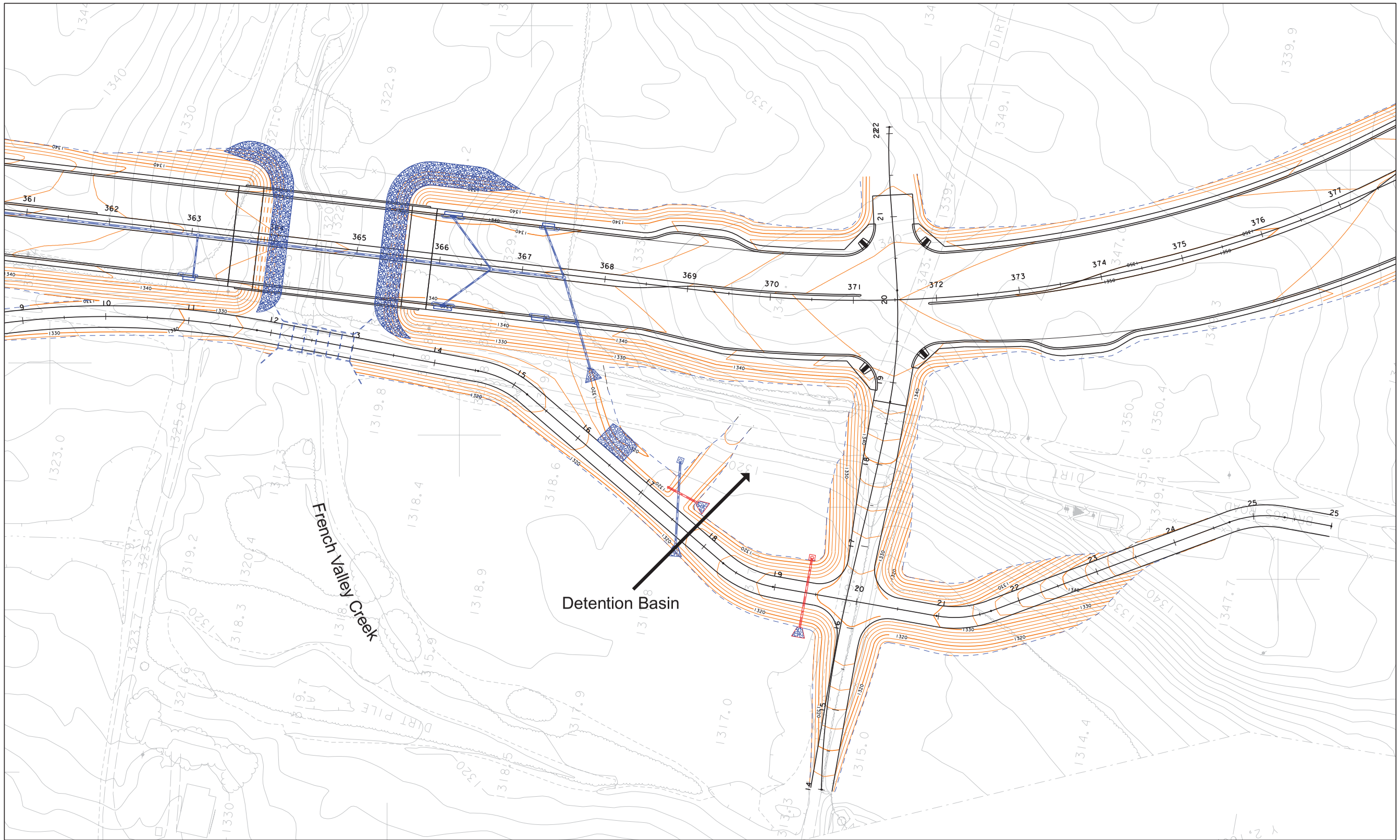

Figure 9c
Detention Basin Design
for French Valley Creek
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/10/2006

SCO171364.T1.06.08.01 fig1.ai 2/06

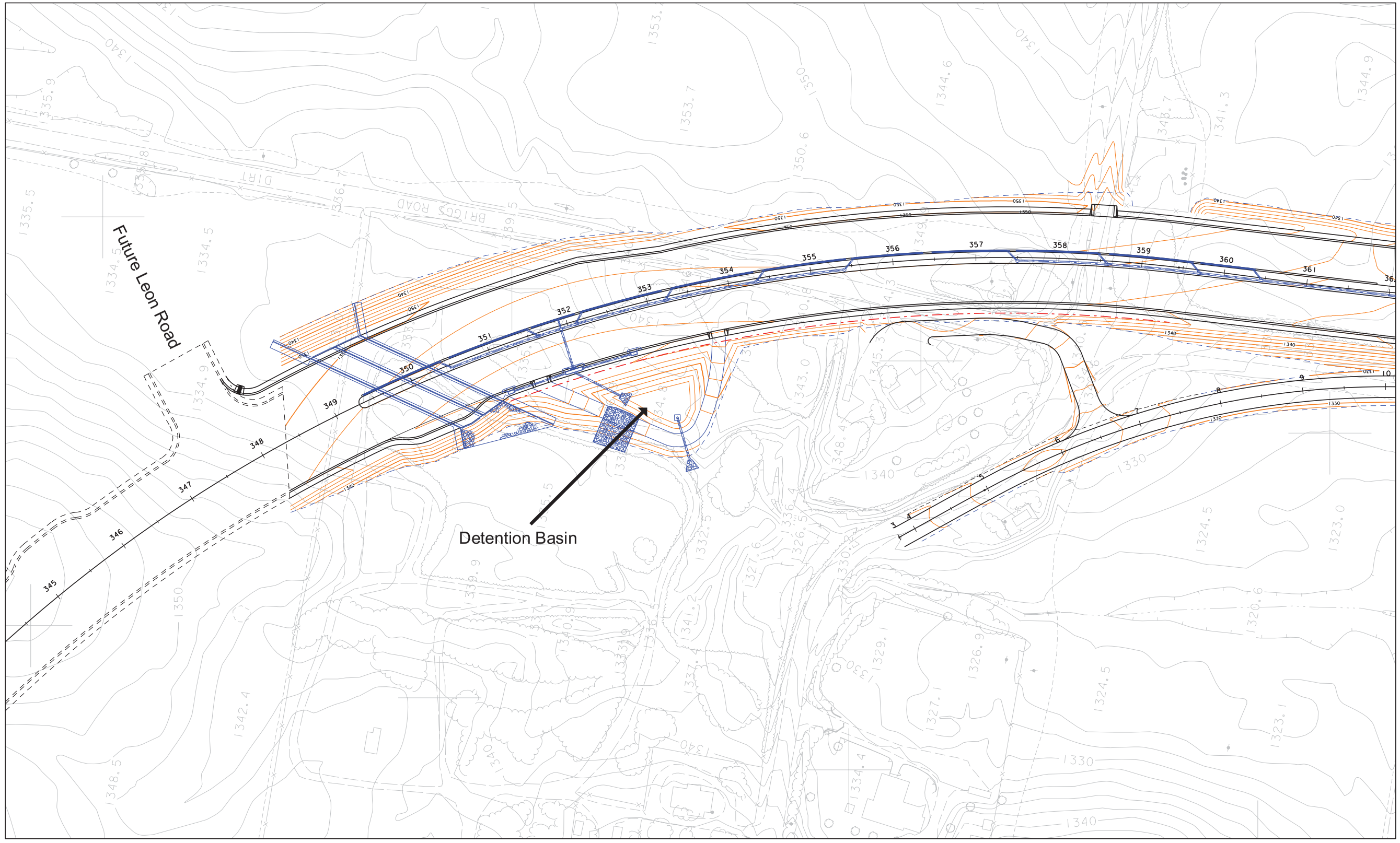

Figure 9b
Detention Basin Design
for Future Leon Road
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/10/2006

SCO171364.T1.06.08.01 fig2.ai 2/06

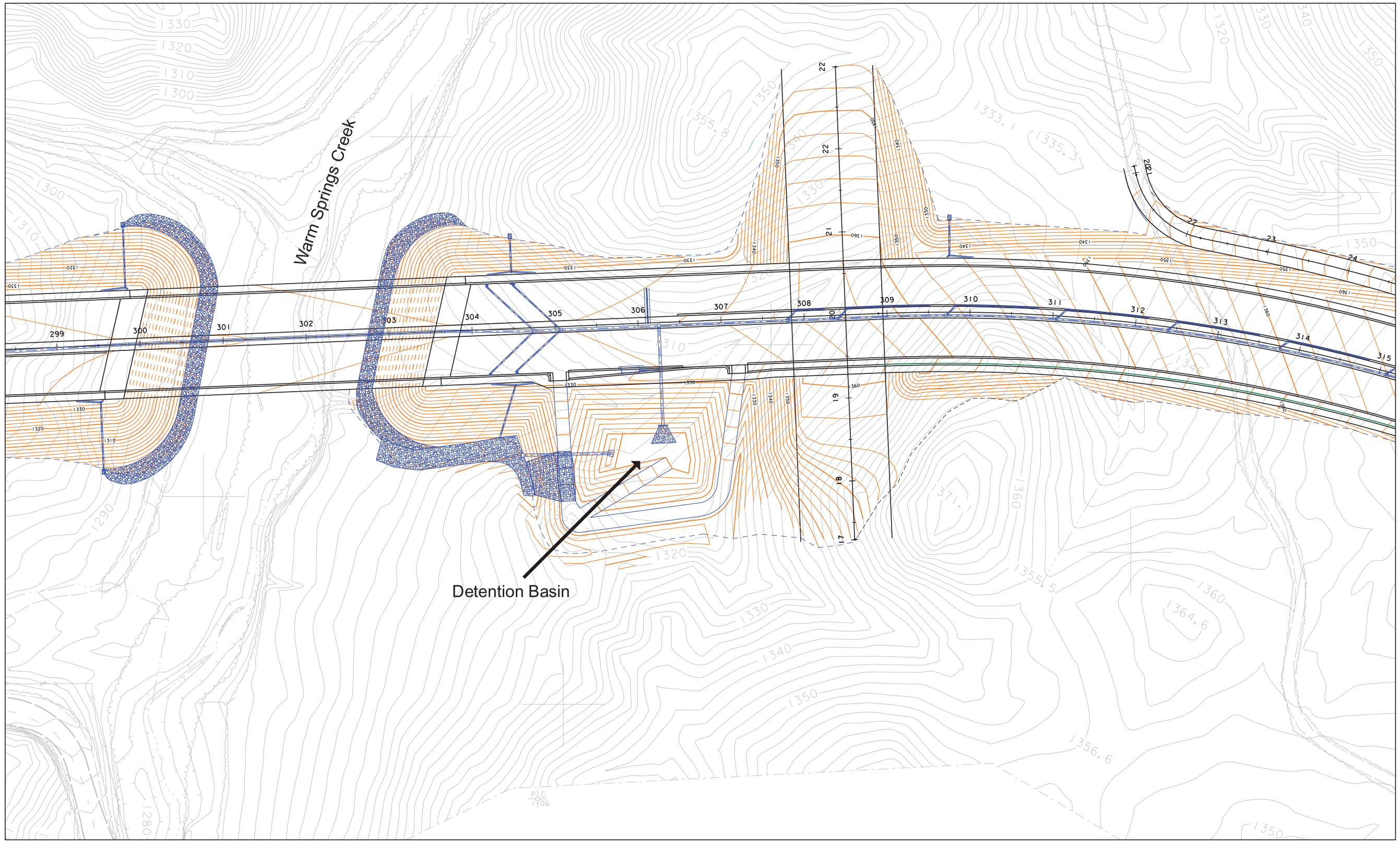

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Figure 9a
Detention Basin Design
for Warm Springs Creek
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Date: 02/10/2006

SCO171364.T1.06.08.01 fig3.ai 2/06

Appendix A: Site Photographs

Photograph 1 - Crossing A - View north of excavated channel that releases into a riparian corridor

Photograph 2 - Crossing A - View south of excavated channel. Culvert extends across Clinton Keith Road, but area south of the road is not a jurisdictional area.

Figure A1
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 3 - Crossing B - View north of culvert to jurisdictional channel

Photograph 4 - Crossing B - View south of culvert and non-jurisdictional area

Figure A2
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 5 - Crossing C - View north along west bank of Warm Springs Creek

Photograph 6 - Crossing C - View north along west bank of Warm Springs Creek

Figure A3
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 7 - Crossing C - View south along western riparian vegetation perimeter

Photograph 8 - Crossing C - View east along western riparian corridor

Figure A4
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 9 - Crossing C - Warm Springs Creek

Photograph 10 - Crossing C - Warm Springs Creek culvert under Los Alamos Road

Figure A5
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 11 - Crossing C - Eastern Bank of Warm Springs Creek and mouth of Tributary 2

Photograph 12 - Crossing C - View northeast of Tributary 2, similar composition of vegetation throughout area

Figure A6
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 13 - Crossing C - Closeup of bed of Tributary 2

Photograph 14 - Crossing C - View east of Tributary 3 to Warm Springs Creek

Figure A7
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 15 - Crossing C - View west of Tributary 3 to Warm Springs Creek

Photograph 16 - Crossing D - View east of French Valley Creek from Briggs Road

Figure A8
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 17 - Crossing D - View east of French Valley Creek near center of survey area

Photograph 18 - Crossing D - View west of French Valley Creek from eastern limit of survey area

Figure A9
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 19 - Crossing D - View east of culvert on west side of Briggs Road

Photograph 20 - Crossing E - View east along Porth Road to location where French Valley Creek crosses; junction with Briggs Road in the background

Figure A10
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 21 - Crossing E - View south along French Valley Creek from Porth Road

Figure A11
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Photograph 23 - Crossing F - View north where culvert crosses Menifee Road

Photograph 24 - Crossing F - View west of Menifee Road

Figure A12
Site Photographs
Clinton Keith Road Extension Project
Delineation Document

CH2MHILL

Appendix B
Water Quality Management Plan for Clinton Keith Road Extension from Antelope Road to State Route 79

Project Specific
Water Quality Management Plan

For:
Clinton Keith Road Extension from Antelope Road to State Route 79

DEVELOPMENT NO. N/A
DESIGN REVIEW NO. N/A
WORK ORDER NO. B2-0472

Prepared for:
Riverside County TLMA
4080 Lemon Street 8th Floor
Riverside, CA 92502-1090

(951) 955-6880

Prepared by:
CH2MHill
3550 Vine Street, Suite 320
Riverside, CA 92507
(951) 276-3003
S.C. George Hsu P.E., Drainage Engineer

WQMP Preparation/Revision Date:
May 2006

OWNER'S CERTIFICATION

This project-specific Water Quality Management Plan (WQMP) has been prepared for:

Riverside County TLMA by CH2MHill for the project known as **Clinton Keith Road Extension** at 4080 Lemon Street 8th Floor.

This WQMP is intended to comply with the requirements of Riverside County Flood Control and Water Conservation District for Clinton Keith Road Project B20472, which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under Riverside County Flood Control and Water Conservation District Water Quality Ordinance.

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this WQMP.

"I certify under penalty of law that the provision of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

4080 Lemon Street 8th Floor
Riverside, CA 92502-1090
(951) 955-6880

Contents

I. Project Description

The proposed Project is a new section of Clinton Keith Road located in western Riverside County along the northern jurisdiction of the City of Murrieta and unincorporated Riverside County. The Project is generally located between I-215 and SR-79. Clinton Keith Road currently is a six-lane Arterial (Urban) Highway from Antelope Road to Whitewood Road/Meadowlark Avenue. From that intersection it continues east as a two-lane dirt road for approximately 0.8 mile to its intersection with Los Alamos Road. Clinton Keith Road does not currently exist east of Los Alamos. The current Clinton Keith Road alignment was adopted by the County in the County General Plan Amendment 409.

Clinton Keith Road will include a total of six travel lanes and introduce 35.5 acres of new road pavement (6.6 acres to be constructed by DR Horton prior to this project). Construction of the project would require the disturbance of existing soils as a result of the following activities: construction staging, grading for the proposed roadway, and grading of the resulting cut/fill slopes. The total area of soil disturbance is estimated to be approximately 58.4 acres (excluding the DR Horton-constructed portion of roadway). Cut and fill slopes outside of the roadway prism will be sloped at a ratio of 1 vertical to 2 horizontal. Where topography requires slope construction outside of the basic roadway right-of-way, an additional slope easement (variable in width) will be acquired by the County.

The two major water courses along the roadway alignment are Warm Springs Creek and French Valley Creek, which will be bridged with structures. There are also four cross-culverts to pass off-site runoff under the roadway. These structures and cross-culverts will be designed to pass the 100-year storm event. Treatment control BMPs are proposed at several locations along the alignment as appropriate.

Project Owner: Riverside County TLMA
4080 Lemon Street 8th Floor
Riverside, CA 92502-1090
(951) 955-6880

WQMP Preparer: CH2MHill
3550 Vine Street, Suite 320
Riverside, CA 92507
(951) 276-3003

Project Site Address:	Clinton Keith Road from Antelope Road to SR-79 Riverside County, CA
Planning Area/ Community Name:	French Valley
APN Number(s):	392-290-037, 900-030-005, & 963-060-005
Thomas Bros. Map:	P. 898 G. G7, H7, J7; P. 899 G. A7, B7; P. 929 G. B1
Project Watershed:	Santa Margarita
Sub-watershed:	2.32 Murrieta, 2.33 French
Project Site Size:	58.4 Acres

Standard Industrial Classification (SIC) Code: N/A

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): N

Additional Permits/Approvals required for the Project

AGENCY	Permit required (yes or no)
State Department of Fish and Game, 1601 Streambed Alteration Agreement	Yes
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification & General Construction National Pollutant Discharge Elimination System Permit/Storm Water Pollution Prevention Plan Best Management Practices	Yes
US Army Corps of Engineers, CWA section 404 permit	Yes, NWP 14
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	Yes, via MSHCP
US Fish and Wildlife, Consistency determination through the County of Riverside Resource Conservation Authority to support Biological Condition in Section 404 Permit	Yes
County of Riverside Resource Conservation Authority, Joint Project Review of Proposed Project and Consistency Determination	Yes
California DOT, Encroachment Permit	Yes
City of Murrieta, Encroachment Permit	Yes

II. Site Characterization

Land Use Designation or Zoning: North and East of Clinton Keith Road: rural residential, medium residential, commercial, and conservation; South and West of Clinton Keith Road: rural residential, medium residential and business park

Current Property Use: North and East of Clinton Keith road: rural residential, conservation; South and West of Clinton Keith Road: rural residential

Proposed Property Use: North and East of Clinton Keith Road: rural residential, medium residential, commercial retail, and conservation; South and West of Clinton Keith Road: rural residential

Availability of Soils Report: N

Phase 1 Site Assessment: N

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Warm Springs Creek	None	MUN, AGR, IND, PROC, REC1, REC2, WARM, WILD	Approximately 7 miles to DeLuz Creek HSA
French Valley Creek	None	MUN, AGR, IND, PROC, REC1, REC2, WARM, WILD	Approximately 7 miles to DeLuz Creek HSA

III. Pollutants of Concern

According to the RCFC & WCD BMP Design Handbook, potential pollutants associated with urban runoff from streets, highways, and freeways are pathogens, metals, organic compounds, sediments, trash & debris, and oil & grease. Warm Springs Creek and French Valley Creek (the two proximate receiving waters) do not appear on the Clean Water Act Section 303(d) list of impaired water bodies.

Urban Runoff Pollutants:	Sediment/Turbidity, Organic Compounds, Trash & Debris, Bacteria & Viruses, Oil & Grease, Metals. The proximate receiving waters are not impaired according to the 303(d) list.

IV. Hydrologic Conditions of Concern

The project will add 35.5 acres of new paved surface area, creating some increase of on-site runoff. To protect gullies and creeks receiving on-site runoff directly, the design will incorporate extended detention basins (EDBs) and rock-slope protection (RSP) to prevent scour and erosion as needed. The cumulative increase to peak runoff flows would be attenuated before it reaches the proximate receiving waters. Adverse impacts to downstream channel conditions and sediment loading potential are anticipated to be minor.

V. Best Management Practices

V.1 Site Design BMPs

Areas of clearing and grubbing include existing vegetated areas that will become the roadway, as well as proposed cut or fill slopes. All other areas will be preserved. Preserved vegetated areas are outside the grading limits, will be maximized, and are shown on the contour grading plans. Due to limited right-of-way, this project would have little room for incorporating Site Design BMPs. The Project's footprint is kept to a minimum for the right-of-way take by daylighting using the maximum suggested slope of 2:1.

Table 1. Site Design BMPs

			Included	
Design Concept	**Technique**	**Specific BMP**	**yes**	**no**
Site Design Concept 1	Minimize Urban Runoff			
		Maximize the permeable area (See Section 4.5.1 of the WQMP).	yes	
		Incorporate landscaped buffer areas between sidewalks and streets.		no
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	yes	
		Use natural drainage systems.		no
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.		n/a
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives.	yes	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept).		no

Table 1. Site Design BMPs (Cont.)

Design Concept	Technique	Specific BMP	Included	
			yes	no
Site Design Concept 1	Minimize Impervious Footprint			
		Maximize the permeable area (See Section 4.5.1 of the WQMP).		n/a
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low -traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.		no
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised.	yes	
		Reduce widths of street where off-street parking is available.	yes	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.		n/a
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		no
Site Design Concept 1	Conserve Natural Areas			
		Conserve natural areas (See WQMP Section 4.5.1).	yes	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	yes	
		Use natural drainage systems.		no
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		no

Table 1. Site Design BMPs (Cont.)

			Included	
Design Concept	**Technique**	**Specific BMP**	**yes**	**no**
Site Design Concept 2	Minimize Directly Connected Impervious Areas (DCIAs)	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible.		n/a
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	yes	
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.		no
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.		no
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.		no
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s.		no
		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4.	yes	
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4.		n/a
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.		n/a
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving.		n/a
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		no

V.2 Source Control BMPs

The inlets proposed for this project would be located in a populated suburban location where the risk of dumping illicit materials is low. Stenciling of MS4 inlets will be incorporated nonetheless as a preventative measure.

Slope surface protection for the new cut-and-fill slopes will be provided using either vegetative or hard-surface methods. In the existing project area, there is currently no protection provided by hard-surface methods and much of the existing areas will be protected only by vegetative methods. The proposed project will follow a similar pattern, using vegetative methods to protect new slopes of 1:2 (H:V) or flatter. Upon completion of the project, all new and modified slopes will be sprayed with an erosion-control, Type D seed mix. For new slopes steeper than 1:2, slope paving (shotcrete) will be applied to protect the slope from erosion. Rock slope protection (RSP) may be included to protect the fill slopes near existing tributary creek beds.

Where the cut-and-fill slopes will be steeper than 1:4, asphalt concrete dike, toe of fill ditches, and downdrains/overside drains will be used to control runoff and minimize gullies and scour.

Where cross-culverts convey on- and off-site runoff under the highway, flared end sections will be specified at the inlet/outlet of the culverts, and RSP will be provided at the culvert outlets to minimize scour and erosion at cross-culvert transitions.

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees		n/a	Project is a public road
Activity Restrictions		n/a	Project is a public road
Irrigation System and Landscape Maintenance		n/a	Project is a public road
Common Area Litter Control		n/a	Project is a public road
Street Sweeping Private Streets and Parking Lots		n/a	Project is a public road
Drainage Facility Inspection and Maintenance	yes		
Structural Source Control BMPs			
MS4 Stenciling and Signage	yes		
Landscape and Irrigation System Design		n/a	None planned
Protect Slopes and Channels	yes		
Provide Community Car Wash Racks		n/a	None planned
Properly Design:			
Fueling Areas		n/a	None planned
Air/Water Supply Area Drainage		n/a	None planned
Trash Storage Areas		n/a	None planned
Loading Docks		n/a	None planned
Maintenance Bays		n/a	None planned
Vehicle and Equipment Wash Areas		n/a	None planned
Outdoor Material Storage Areas		n/a	None planned
Outdoor Work Areas or Processing Areas		n/a	None planned
Provide Wash Water Controls for Food Preparation Areas		n/a	None planned

V.3 TREATMENT CONTROL BMPS

Based on the site conditions, three types of treatment control BMPs are proposed for this project. The three feasible BMPs are : 1) extended detention basins (EDBs) , 2) water quality inlets, and 3) grass swales.

Four EDBs are being proposed to treat 86.1% of the on-site runoff. Three EDBs that will be constructed under this improvement will be maintained by the Riverside County Transportation Department. Water quality inlets will be used inside of catch basins to treat 8.4% of on-site runoff at the west end of the project; while grass swales to treat 5.5% of on-site runoff at the east end of the project. Off-site water does not require treatment.

The roadway project starts near Antelope Road (approx. Station 210+52). The segment to Meadowlark Avenue (Station 237+13) will be widened on one side only. For this area, the on-site runoff from the pavement will be collected in the existing and proposed catch basins and treated by water quality inlets.

The first EDB will be at east of Warm Springs Creek on the south side of the roadway (about Station 304+48). The area draining to this basin begins at Meadowlark Avenue and ends at the high point around Trois Valley Street (Station 326+20). This basin will receive about 55.8% of this project's total on-site runoff (V_{BMP} = 100,000 ft^3) with a footprint of approximately 220 feet by 280 feet.

The second basin will be constructed by the DR Horton development prior to this project. It is located at the northwest corner of the proposed Leon Road and Clinton Keith Road. It will treat the on-site runoff from near Trois Valley Street to Leon Road (Station 347+63). This basin will receive about 13.4% of this project's on-site runoff.

The third basin is located immediately south of "Unnamed" Creek RCB near the low point (Station 351+92). It will treat the on-site runoff from Leon Road to the high point (Station 356+35). The tributary area for this basin accounts for about 5.5% of this project's total on-site runoff (V_{BMP} = 9,800 ft^3) with a footprint of approximately 120 feet by 200 feet.

The fourth EDB is located in the corner bounded by Clinton Keith Road, realigned Briggs Road, and Porth Road. This detention basin is located near the low point (Station 366+09) and will treat on-site runoff from the high point (Station 356+35) to the high point near Station 374+52. The tributary area for this basin accounts for about 11.4% of this project's total on-site runoff (V_{BMP} = 20,300 ft^3) with a footprint of approximately 120 feet by 300 feet. In order to reduce the frequency of overflow onto Porth Road, this EBD will be designed to drain a 10-year flood by its outlet pipe.

The portion of Clinton Keith Road from the high point near Station 374+52 to the intersection with SR-79 (approx. Station 381+03) will be collected by drainage systems before outlet into grass swales along west side of SR-79. This accounts for about 5.5% of this project's total on-site runoff. The north swale will also treat the runoff coming from SR-79, where the roadway will be widened.

Volumes and footprints for the proposed detention basins are calculated according to the Riverside County Stormwater Quality BMP Design Handbook (2004) and use a slope of 1.1 inches for the design volume curve. Complete engineering calculations for Q_{BMP} and/or V_{BMP}, and Treatment Control BMP design details, are included in Appendix F.

The Q_{10} and the Q_{25} values shown in the riser and spillway calculation spreadsheet assume complete interception of the Q_{10} and the Q_{25} storm flows. Since the trunk lines are sized for the Q_{10} flows, the Q_{25} flow is a conservative number.

Table 3: Treatment Control BMP Selection Matrix

Pollutant of Concern		Treatment Control BMP Categories[9]							
		Veg. Swale /Veg. Filter Strips	Detention Basins[2]	Infiltration Basins & Trenches/Porous Pavement[3][10]	Wet Ponds or Wetlands	Sand Filter or Filtration	Water Quality Inlets	Hydrodynamic Separator Systems[4]	Manufactured/ Proprietary Devices
Sediment/Turbidity		H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Yes/No?	yes	yes	yes				yes		
Nutrients		L	M	H/M	H/M	L/M	L	L	U
Yes/No?	no								
Organic Compounds		U	U	U	U	H/M	L	L	U
Yes/No?	yes	yes	yes				yes		
Trash & Debris		L	M	U	U	H/M	M	H/M	U
Yes/No?	yes	yes	yes				yes		
Oxygen Demanding Substances		L	M	H/M	H/M	H/M	L	L	U
Yes/No?	no								
Bacteria & Viruses		U	U	H/M	U	H/M	L	L	U
Yes/No?	yes	yes	yes				yes		
Oils & Grease		H/M	M	U	U	H/M	M	L/M	U
Yes/No?	yes	yes	yes				yes		
Pesticides (non-soil bound)		U	U	U	U	U	L	L	U
Yes/No?	no								
Metals		H/M	M	H	H	H	L	L	U
Yes/No?	yes	yes	yes				yes		

Abbreviations:

L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.

(3) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.

(4) Includes infiltration basins, infiltration trenches, and porous pavements.

(5) Includes permanent pool wet ponds and constructed wetlands.

(6) Includes sand filters and media filters.

(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.

(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.

(9) Project proponents should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project proponents may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.

(10) Note: Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

V.4 Equivalent Treatment Control Alternatives

Not applicable.

V.5 Regionally-Based Treatment Control BMPs

Not applicable.

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

Each detention basin will have essentially the same O&M requirements. Because the basins will be vegetated, routine mowing may be required. There are currently no standards in place that require inspection and/or cleaning of the trash racks in each detention basin but these activities will need to be performed on an as-needed basis. Waste generated from these activities can be disposed of according to typical county practices.

The Riverside County Transportation Department will be responsible for the O&M of these detention basins. The start-up date of these detention basins is September 2008. Because the proximate receiving waters are not impaired, no on-going water quality monitoring will be required.

VII. Funding

The Riverside County Transportation Department will be responsible for funding the O&M of all BMPs recommended in this WQMP.

Appendix A

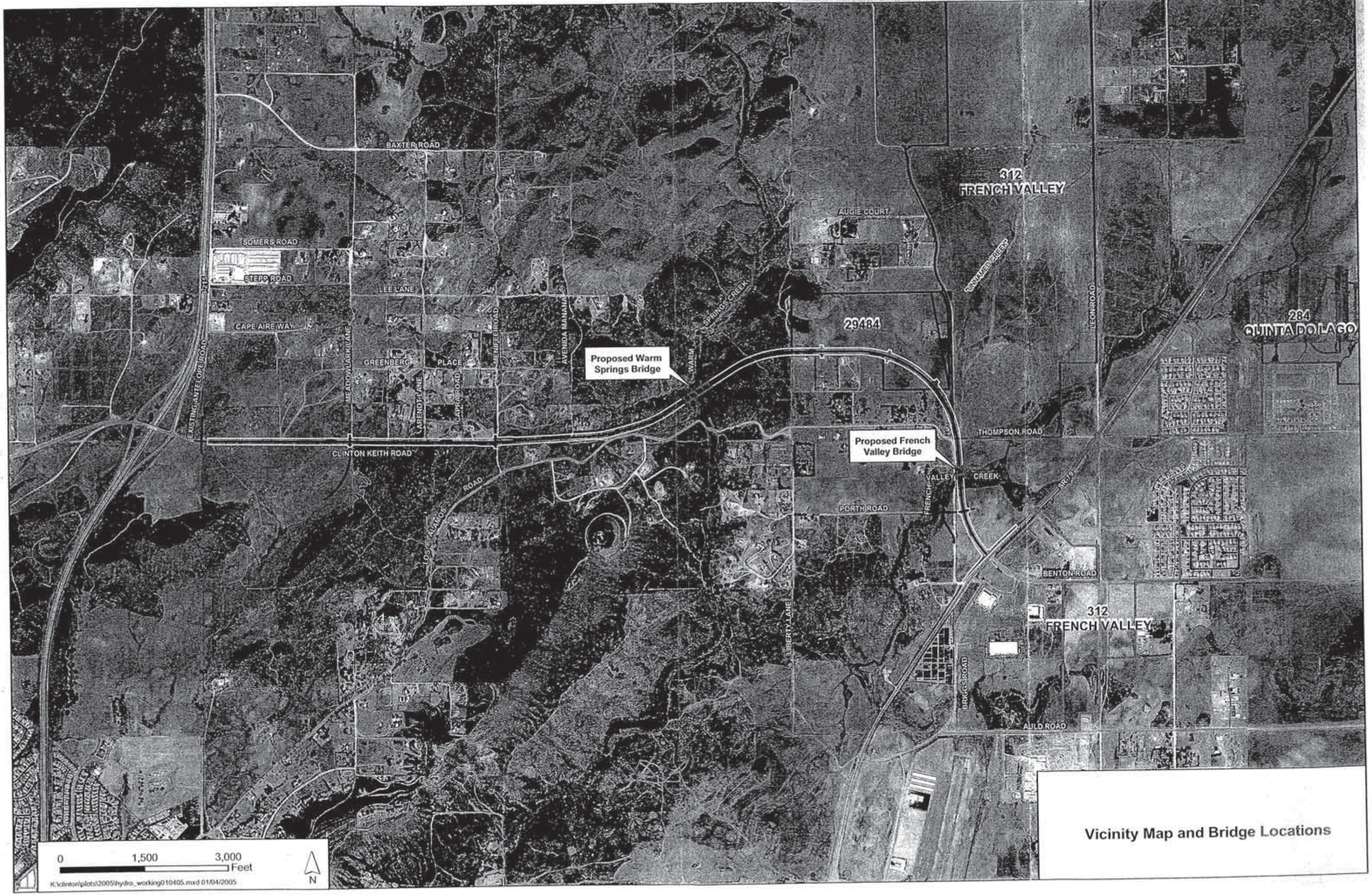
Conditions of Approval

Planning Commission Resolution _____

Dated _____

Appendix B

Vicinity Map and Site Plan



Vicinity Map and Bridge Locations

Appendix C

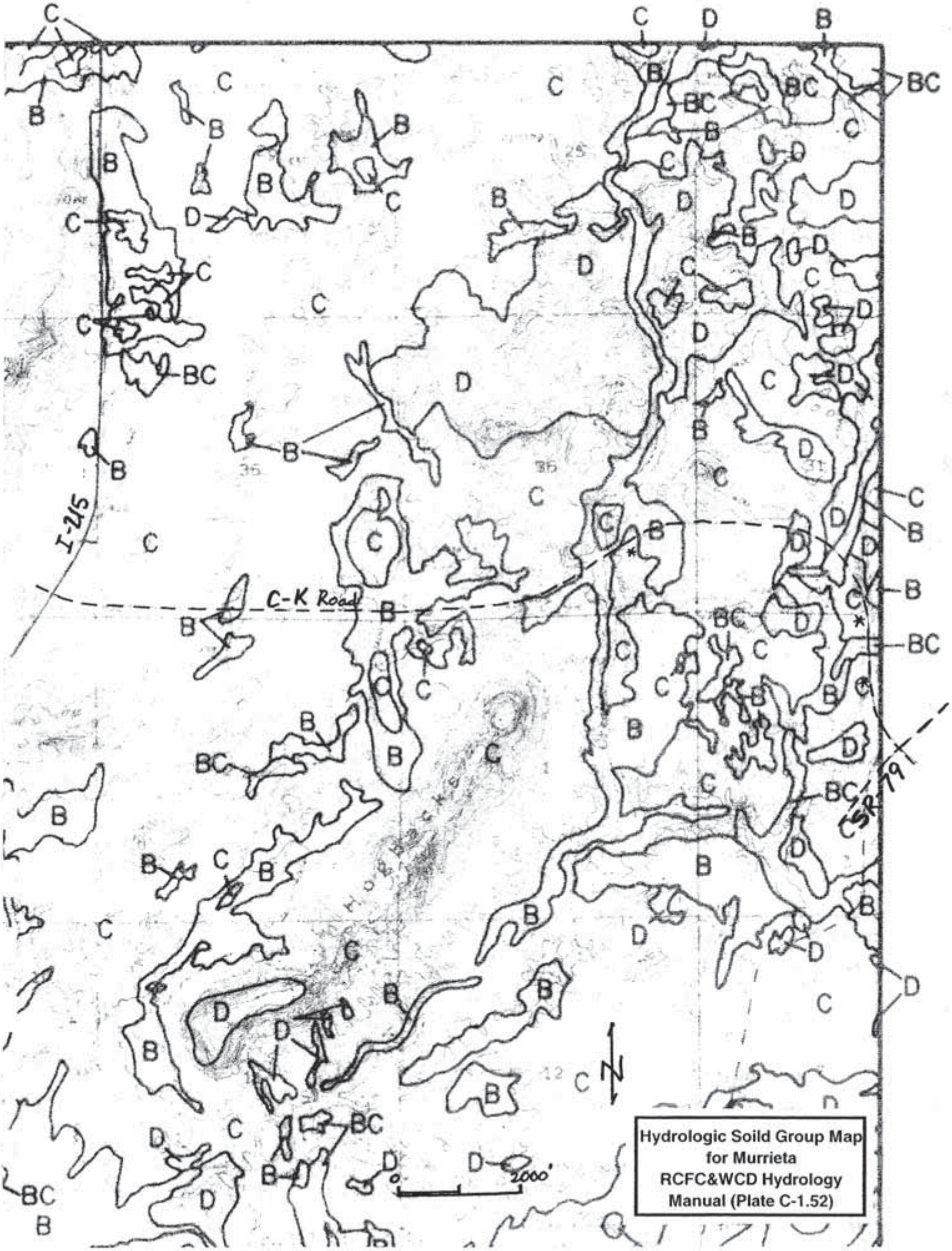
Supporting Detail Related to Hydraulic Conditions of Concern

Appendix D

Educational Materials

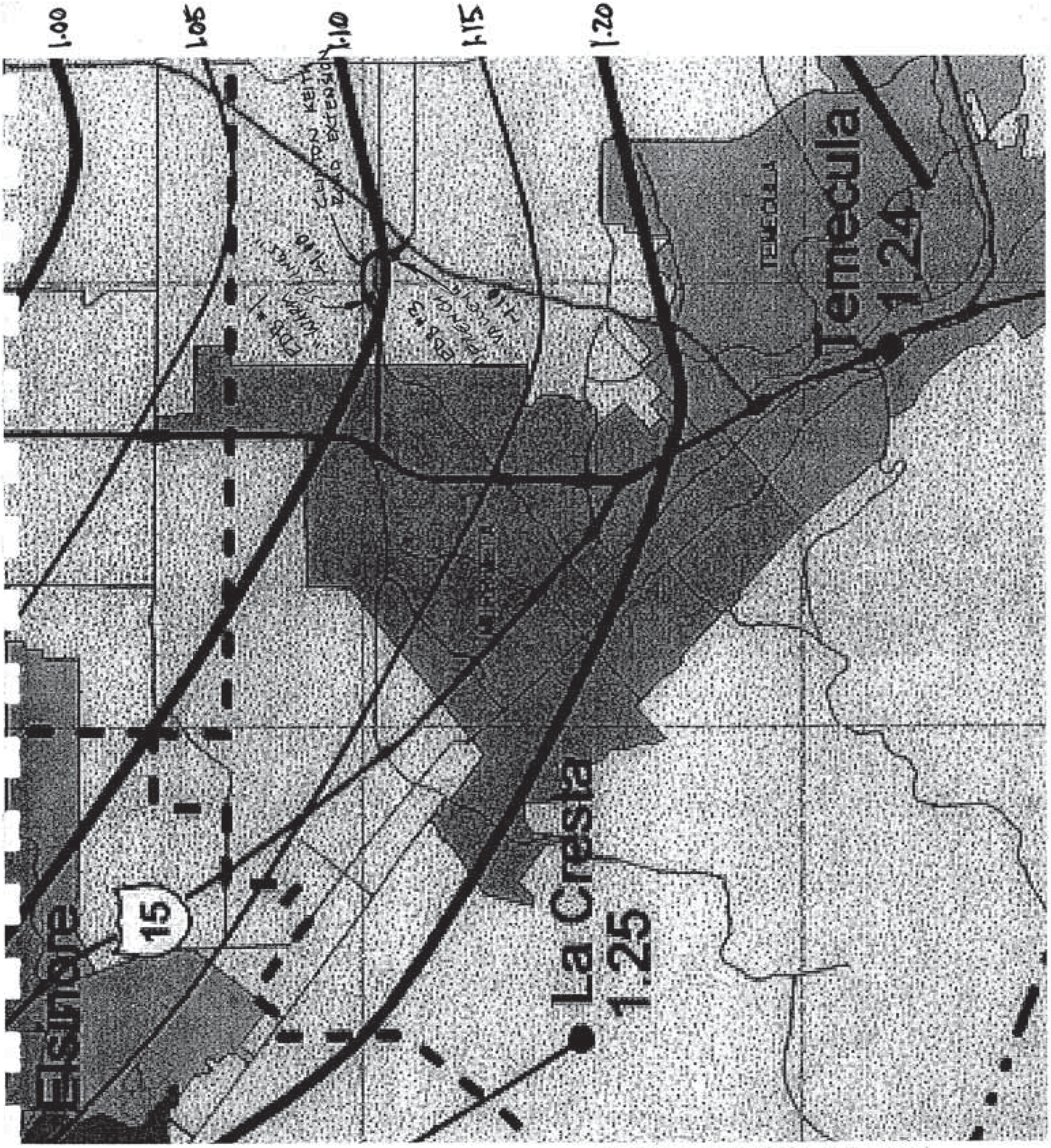
Appendix E

Soils Report


I-215
C-K Road
CSR 79
2000'
Hydrologic Soild Group Map
for Murrieta
RCFC&WCD Hydrology
Manual (Plate C-1.52)

Appendix F

Treatment Control BMP Sizing Calculations and Design Details



SLOPE OF THE DESIGN
VOLUME CURVE

MAY 2004

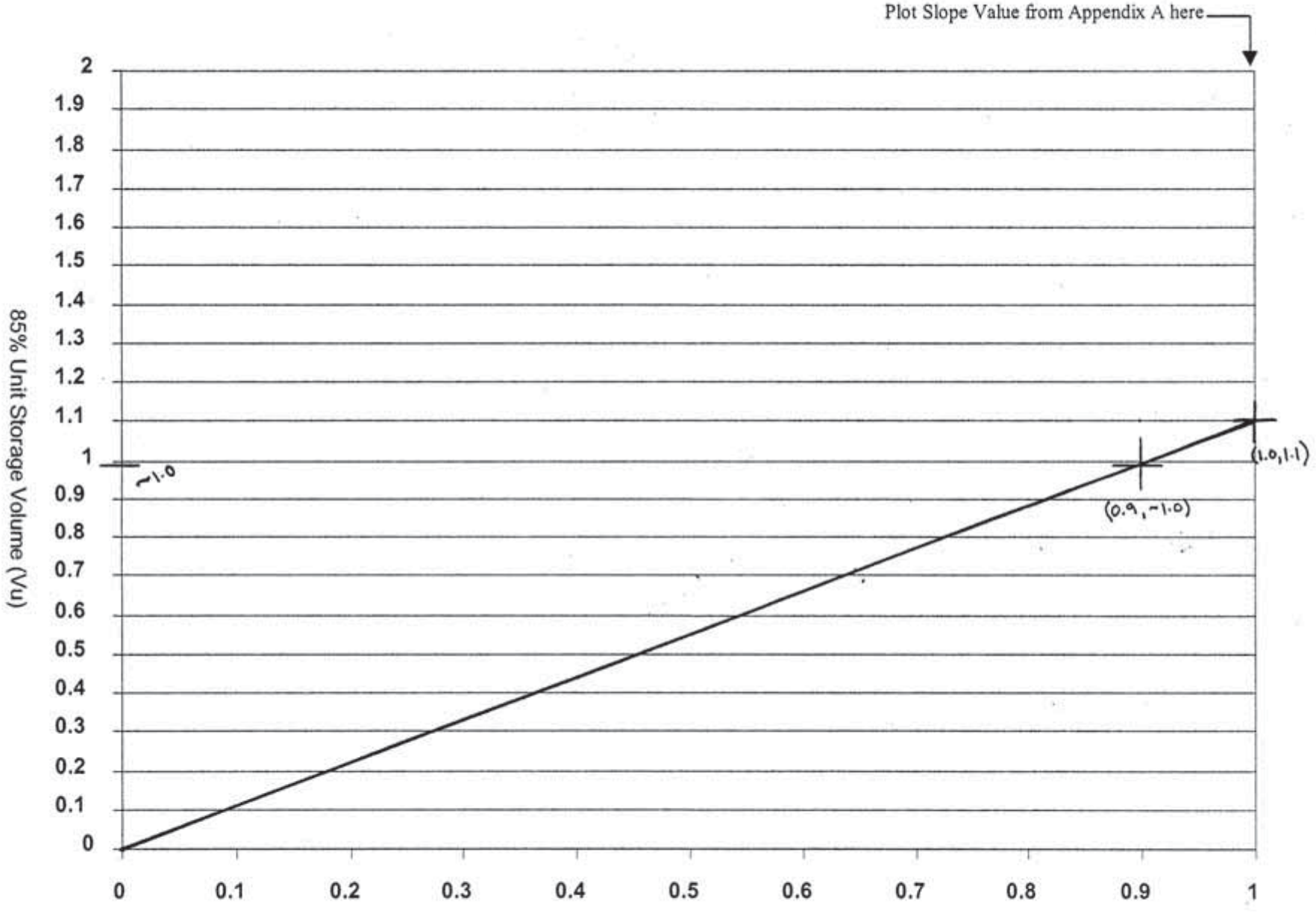


Figure 2 Unit Storage Volume Graph

Worksheet 1

Design Procedure for BMP Design Volume

85th percentile runoff event

Designer: JOEL EVANS / GEORGE HSU
Company: CH2M HILL
Date: 12-1-05
Project: CLINTON KEITH ROAD EXTENSION
Location: EDB #1 (BY WARM SPRINGS CREEK)

1. Create Unit Storage Volume Graph a. Site location (Township, Range, and Section). b. Slope value from the Design Volume Curve in **Appendix A**. c. Plot this value on the Unit Storage Volume Graph shown on **Figure 2.** d. Draw a straight line form this point to the origin, to create the graph	T 6S &R 3W (Section)	*(1)*
	Slope = 1.1	*(2)*
	Is this graph attached? Yes ☒ No ☐	
2. Determine Runoff Coefficient a. Determine total impervious area	$A_{impervious}$ = 27.4 acres	*(5)*
b. Determine total tributary area	A_{total} = 27.4 acres	*(6)*
c. Determine Impervious fraction i = *(5)* / *(6)*	i = 1	*(7)*
d. Use *(7)* in **Figure 1** to find Runoff OR $C = .858i^3 - .78i^2 + .774i + .04$	C = 0.9	*(8)*
3. Determine 85% Unit Storage Volume a. Use *(8)* in **Figure 2** Draw a Vertical line from *(8)* to the graph, then a Horizontal line to the desired V_u value.	V_u = 1.0 in-acre / acre	*(9)*
4. Determine Design Storage Volume a. V_{BMP} = *(9)* x *(6)* [in- acres]	V_{BMP} = 27.4 in-acre	*(10)*
b. V_{BMP} = *(10)* / 12 [ft- acres]	V_{BMP} = 2.3 ft-acre	*(11)*
c. V_{BMP} = *(11)* x 43560 [ft^3]	V_{BMP} = 100,000 ft^3	*(12)*

Notes:

Worksheet 3

Design Procedure Form for Extended Detention Basin

Designer: JOEL EVANS/GEORGE HEN
Company: CH2M HILL
Date: 12-1-05
Project: CLINTON KEITH ROAD EXTENSION
Location: EDB #1 (BY WARM SPRINGS CREEK)

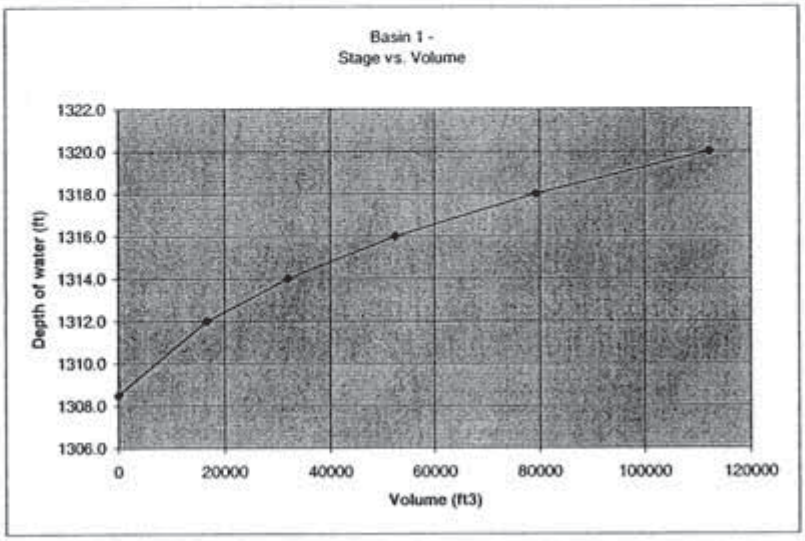
1. Determine Design Volume (Use Worksheet 1) a. Total Tributary Area (minimum 5 ac.) b. Design Volume, V_{BMP}	A_{total} = 27.4 acres V_{BMP} = 100,000 ft^3
2. Basin Length to Width Ratio (2:1 min.)	Ratio = 2:1 L:W
3. Two-Stage Design a. Overall Design 1) Depth (3.5' min.) 2) Width (30' min.) 3) Length (60' min.) 4) Volume (must be ? V_{BMP}) b. Upper Stage 1) Depth (2' min.) 2) Bottom Slope (2% to low flow channel recommended) c. Bottom Stage 1) Depth (1.5' to 3') 2) Length 3) Volume (10 to 25% of V_{BMP})	Depth = 11.5 ft Width = 70 ft Length = 140 ft Volume = 112,700 ft^3 Depth = N/A ft Slope = N/A % Depth = N/A ft Length = N/A ft Volume = N/A ft^3
4. Forebay Design a. Forebay Volume (5 to 10% of V_{BMP}) b. Outlet pipe drainage time (? 45 min)	Volume = N/A ft^3 Drain time = N/A minutes
5. Low-flow Channel a. Depth (9" minimum) b. Flow Capacity (2 * Forebay Q_{OUT})	Depth = N/A ft $Q_{Low\ Flow}$ = N/A cfs
6. Trash Rack or Gravel Pack (check one)	Trash Rack X Gravel Pack _____

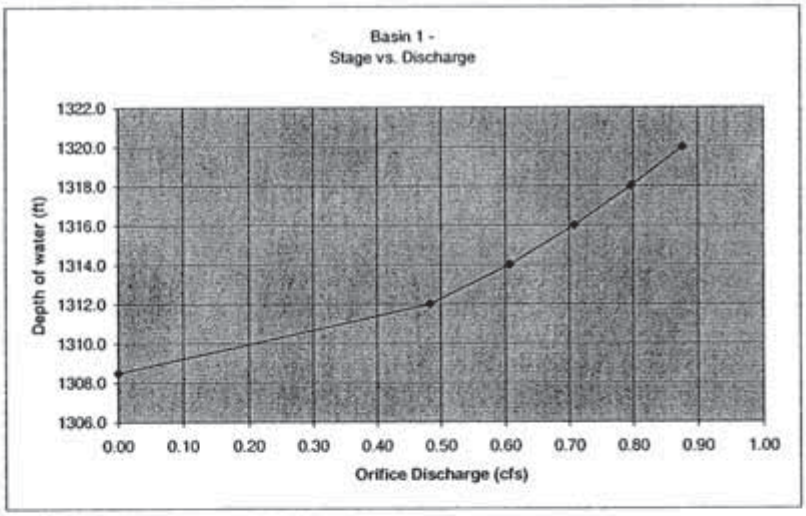
7. Basin Outlet a. Outlet type (check one)	Single orifice _____ Multi-orifice plate _____ Perforated Pipe _X_ Other _____
b. Orifice Area c. Orifice Type d. Maximum Depth of water above bottom orifice e. Length of time for 50% V_{BMP} drainage (24 hour minimum) f. Length of time for 100% V_{BMP} drainage (between 48 and 72 hours) g. Attached Documents (all required) 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Area = 0.049 ft^2 Type 3x 3/4" DIA HOLES Depth = 13.25 ft Time 50% = 31 hrs Time 100% = 62 hrs Attached Documents (check) 1) X 2) X 3) _____ 4) _____
8. Increased Runoff (optional) Is this basin also mitigating increased runoff? Attached Documents (all required) for 2, 5, & 10-year storms: 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Yes _____ No X (if No, skip to #9) Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
9. Vegetation (check type)	X Native Grasses ____ Irrigated Turf ____ Other _____
10. Embankment a. Interior slope (4:1 max.) b. Exterior slope (3:1 max.)	Interior Slope = 33 % Exterior Slope = 33 %
11. Access a. Slope (10% max.) b. Width (16 feet min.)	Slope = 10 % Width = 16 ft

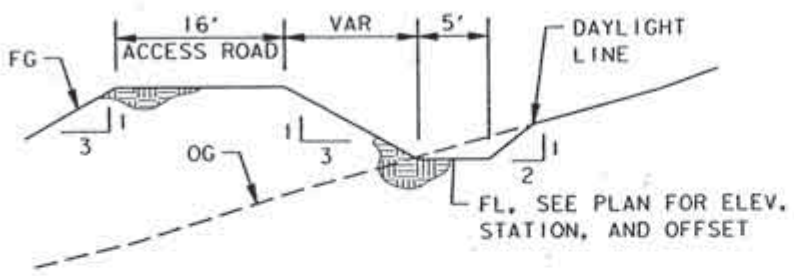
ws elev (ft)	area (ft^2)	volume (ft^3)	discharge (ft^3/sec)
1308.5	3220	0	0.00
1312.0	6310	16677.5	0.48
1314.0	8900	31887.5	0.61
1316.0	11740	52527.5	0.71
1318.0	14900	79167.5	0.80
1320.0	18200	112267.5	0.88

C=	0.66	for thin-walled orifice
g=	32.2	gravity in ft/sec2
H=	1319	WQV ws elevation
H_o=	1308.5	floor/orifice elevation
A=	8900	mid-depth ws area (ft2)
a=	0.0488	orifice area (ft2)
T=	62	drawdown time (hr)
	0.75	3 holes with this dia (in)

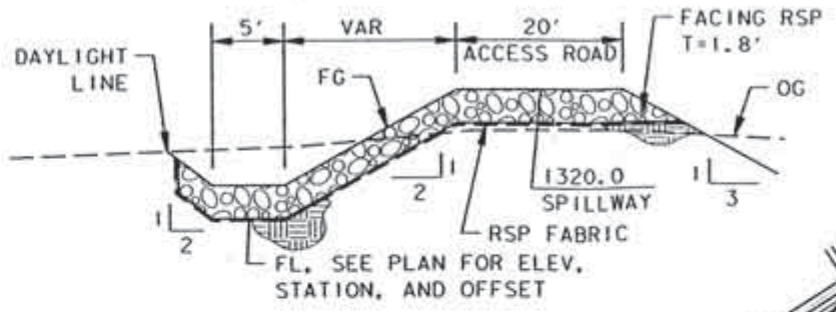
top of riser elev=	1320	
spillway elev=	1320	
Peak ws elev=	1321	
d=	3	riser diameter (ft)
l=	9.4	sharp-crested weir len
C_{RISER}=	3.3	
Q_{RISER}=	31.1	cfs
w=	20	spillway width (ft)
C_{SPILL}=	3.0	
Q_{SPILL}=	60.0	cfs
Q_{TOTAL}=	91.1	cfs
Q_{10}=	40.4	cfs
Q_{25}=	47.2	cfs



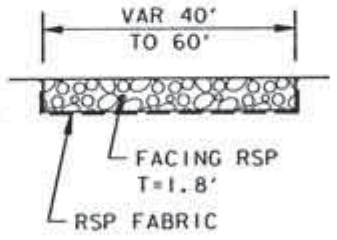




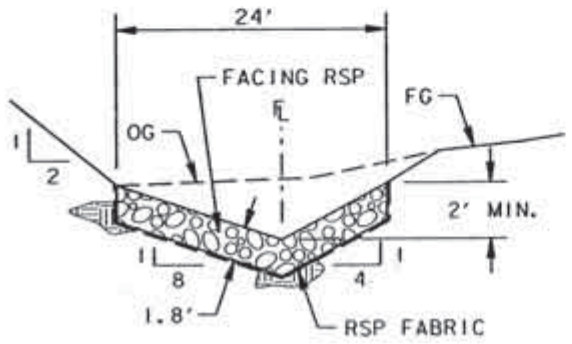
SECTION A-A



SECTION C-C



SECTION B-B



SECTION D-D

BASIN I PLAN
NTS

SECTION E-E

REVISIONS					RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT	CH2MHILL ENGINEERING COMPANY	PROJECT	REFERENCE
REV	BY	DESCRIPTION	APPROVED	DATE	CHARLES SCOTT STALEY RECOMMENED BY: DATE ENGINEERING DIVISION MANAGER	PREPARED BY: DATE SHENG-CHUAN HSU - R.C.E. C45806 3550 VINE STREET, SUITE 320 RIVERSIDE, CA. 92507	**CLINTON KEITH RD** FROM ANTELOPE ROAD TO STATE ROUTE 79 **DRAINAGE DETAILS**	W.O. NO. B2-0472 SURVEY NO. SXXXX F. B. NO. XXXXXX CAD FILENAME D-38.dgn SHEET -- OF 174

Worksheet 1

Design Procedure for BMP Design Volume

85th percentile runoff event

Designer: JOEL EVANS / GEORGE HSU
Company: CH2M HILL
Date: 12-1-05
Project: CLINTON KEITH ROAD EXTENSION
Location: EDB #3 (BY THE UNNAMED CREEK)

1. Create Unit Storage Volume Graph a. Site location (Township, Range, and Section). b. Slope value from the Design Volume Curve in **Appendix A**. c. Plot this value on the Unit Storage Volume Graph shown on **Figure 2.** d. Draw a straight line form this point to the origin, to create the graph	T 6S &R 3W Section	*(1)*
	Slope = 1.1	*(2)*
	Is this graph attached? Yes ☒ No ☐	
2. Determine Runoff Coefficient a. Determine total impervious area	$A_{impervious}$ = 2.7 acres	*(5)*
b. Determine total tributary area	A_{total} = 2.7 acres	*(6)*
c. Determine Impervious fraction i = *(5)* / *(6)*	i = 1	*(7)*
d. Use *(7)* in **Figure 1** to find Runoff OR $C = .858i^3 - .78i^2 + .774i + .04$	C = 0.9	*(8)*
3. Determine 85% Unit Storage Volume a. Use *(8)* in **Figure 2** Draw a Vertical line from *(8)* to the graph, then a Horizontal line to the desired V_u value.	V_u = 1.0 in-acre / acre	*(9)*
4. Determine Design Storage Volume a. V_{BMP} = *(9)* x *(6)* [in- acres]	V_{BMP} = 2.7 in-acre	*(10)*
b. V_{BMP} = *(10)* / 12 [ft- acres]	V_{BMP} = 0.23 ft-acre	*(11)*
c. V_{BMP} = *(11)* x 43560 [ft^3]	V_{BMP} = 9,800 ft^3	*(12)*

Notes:

Worksheet 3

Design Procedure Form for Extended Detention Basin

Designer: JOEL EVANS / GEORGE HSU
Company: CH2M HILL
Date: 12-1-05
Project: CLINTON KEITH ROAD EXTENSION
Location: EDB #3 (BY THE UNNAMED CREEK)

1. Determine Design Volume (Use Worksheet 1) a. Total Tributary Area (minimum 5 ac.) b. Design Volume, V_{BMP}	A_{total} = 2.7 acres V_{BMP} = 9,800 ft^3
2. Basin Length to Width Ratio (2:1 min.)	Ratio = 2:1 L:W
3. Two-Stage Design a. Overall Design 1) Depth (3.5' min.) 2) Width (30' min.) 3) Length (60' min.) 4) Volume (must be ? V_{BMP}) b. Upper Stage 1) Depth (2' min.) 2) Bottom Slope (2% to low flow channel recommended) c. Bottom Stage 1) Depth (1.5' to 3') 2) Length 3) Volume (10 to 25% of V_{BMP})	Depth = 4 ft Width = 40 ft Length = 80 ft Volume = 12,800 ft^3 Depth = N/A ft Slope = N/A % Depth = N/A ft Length = N/A ft Volume = N/A ft^3
4. Forebay Design a. Forebay Volume (5 to 10% of V_{BMP}) b. Outlet pipe drainage time (? 45 min)	Volume = N/A ft^3 Drain time = N/A minutes
5. Low-flow Channel a. Depth (9" minimum) b. Flow Capacity (2 * Forebay Q_{OUT})	Depth = N/A ft $Q_{Low\ Flow}$ = N/A cfs
6. Trash Rack or Gravel Pack (check one)	Trash Rack X Gravel Pack _____

7. Basin Outlet a. Outlet type (check one) b. Orifice Area c. Orifice Type d. Maximum Depth of water above bottom orifice e. Length of time for 50% V_{BMP} drainage (24 hour minimum) f. Length of time for 100% V_{BMP} drainage (between 48 and 72 hours) g. Attached Documents (all required) 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Single orifice _____ Multi-orifice plate _____ Perforated Pipe X Other _____ Area = .011 ft² Type 2x ¼" DIA HOLES Depth = 4.25 ft Time 50% = 26 hrs Time 100% = 52 hrs Attached Documents (check) 1) X 2) X 3) _____ 4) _____
8. Increased Runoff (optional) Is this basin also mitigating increased runoff? Attached Documents (all required) for 2, 5, & 10-year storms: 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Yes _____ No X (if No, skip to #9) Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
9. Vegetation (check type)	X Native Grasses ____ Irrigated Turf ____ Other _____
10. Embankment a. Interior slope (4:1 max.) b. Exterior slope (3:1 max.)	Interior Slope = 33 % Exterior Slope = 33 %
11. Access a. Slope (10% max.) b. Width (16 feet min.)	Slope = 10 % Width = 16 ft

ws elev (ft)	area (ft^2)	volume (ft^3)	discharge (ft^3/sec)
1333.0	1634	0	0.00
1334.0	2209	1921.5	0.06
1336.0	3615	7745.5	0.10
1338.0	5320	16680.5	0.13

C=	0.66	for thin-walled orifice
g=	32.2	gravity in ft/sec2
H=	1336.5	WQV ws elevation
H_o=	1333	floor/orifice elevation
A=	2912	mid-depth ws area (ft2)
a=	0.0110	orifice area (ft2)
T=	52	drawdown time (hr)
	.0.25	2 holes with this dia (in)

top of riser elev=	1337	
spillway elev=	1337	
Peak ws elev=	1337.5	
d=	2	riser diameter (ft)
l=	6.3	sharp-crested weir len
C_{RISER}=	3.3	
Q_{RISER}=	7.4	cfs
w=	20	spillway width (ft)
C_{SPILL}=	3.0	
Q_{SPILL}=	21.2	cfs
Q_{TOTAL}=	28.6	cfs
Q_{10}=	5.7	cfs
Q_{25}=	6.5	cfs