APPENDIX A

Basis of Design and Design Criteria Memorandum

Job No: Y01-500
CR 41 over Cache Creek, Replacement Bridge

Files are stored in: Engineering / Client / Yolo/Y01500 Buckeye and Rumsey/Rumsey
CAD files stored in: Engineering / Client / Yolo/Y01500 Buckeye and Rumsey/Rumsey/CAD
CAD ID No.: Y01500

Roadway Design Criteria

Design Document
Determine which documents will control the design:

- [X] California Highway Design Manual (must be used if the project is on or connecting to a State Highway)
- [X] AASHTO A Policy on Geometric Design of Highways and Streets (Green Book 2004)
- [X] Local Standard (Yolo County Standards)
- [X] AASHTO Guidelines for Geometric Design of Very-Low Volume Local Roads

Units
Does the client prefer English or Metric Units?

- [X] English
- [ ] Metric

Deliverables
Does the Client prefer AutoCAD or Microstation? Design in AutoCAD Civil 3D
Will there be an electronic submittal? Yes
Does the Client have particular CAD Standards Yes **Dept PM still negotiating
*Make sure to get the clients color table, plot driver, and Standards
How will the roadway be designed? [X] InRoads [ ] Civil 3D

Design Parameters (You are responsible for validating or altering design criteria listed on the field review form)
What is the Current and Future ADT? 180 (2010) 335 (2030) (From HBP forms)
What is the roadway classification? Local Rural (Farmland & Winery nearby)
Is there any future plan which may change the roadway classification? NO
What is the terrain? [X] Level [ ] Rolling [ ] Mountainous
What is the operating speed of the facility? 45 mph (no posted signs visible)
What is the design speed of adjacent roadway sections? 55 mph
What is the design speed of current roadway within project limits? 45 mph
Are there any obstacles (both existing and future) which may affect stopping sight distance? Nothing on mainline, trees/bridge barrier may affect driveway sight distance
Are there any other planned projects within or adjacent to the project limits? No
The minimum Design Speed for this criteria should be? 40 MPH
Are there any right of way issues which may affect alignment? No
Are there any Environmentally Sensitive Areas which may affect alignment or design? None

Does the Client have any special requests or considerations they want addressed? Minimize Right of Way Impacts

The proposed design speed for this project is 45 MPH
Does this meet the standards Yes/No. If No, what form of Design Exception is needed

Design Criteria Cont'd

Max Super Elevation: 12%

Minimum Horizontal Curve Radius (Be sure not to exceed max super): 510'

Max Allowable K value for crest vertical curves 61 SSD 45MPH =360'

Max Allowable K value for sag vertical curves 79

Minimum Length of Vertical Curves $L_{min} = 3V = 135'$

Max Grade 5%

Cross Section based on: ☐ New Construction ☐ 3R Criteria ☒ Roadway ☐ Bridge (Low Volume Guide)

Shoulder Width 2' paved

Lane Width: 2-10' Bridge: Paved Approach Width - 32' (Clear)

Edge of Shoulder to Hinge Point 4' AB @ 3%

Side Slopes 2:1

Meets Roadside Design Guide Criteria ☒ Yes ☐ No

Minimum Vertical Clearance Bridges

☐ Freeway 16.5' ☐ Non-Freeway 15.5' ☐ Rail Road 23' ☒ Other Convey Q50 and Q100, Design Exception Required

Minimum soffit elevation: Elev XX.XX

*Be sure Profile takes into account Superelevation, Bridge skew, Falsework and Superstructure Depth

Structural Section

TI R value

Proposed Structural Section (consider life cycle costs)***

0.50' HMA (Per Structural Section Calculations)

1.0' AB

0 AS (consider stabilization options if low R value)

***No R value data yet, County min is 0.33' HMA over 1.0' AB

Detours Required to Construct

Duration 0 Alternative Routes Yes Proposed Design Speed_____

Drainage Requirements

Onsite Drainage 10 YRS Storm

Allowable Spread on Shoulder Full

Cross Culverts 10 YRS Storm

(consider life cycle costs)

Design Engineer to present to PIC, PM, and PE

Design Engineer Krassimir Panayotov, PE

Signatures:

Project Engineer Project Manager Principal In Charge

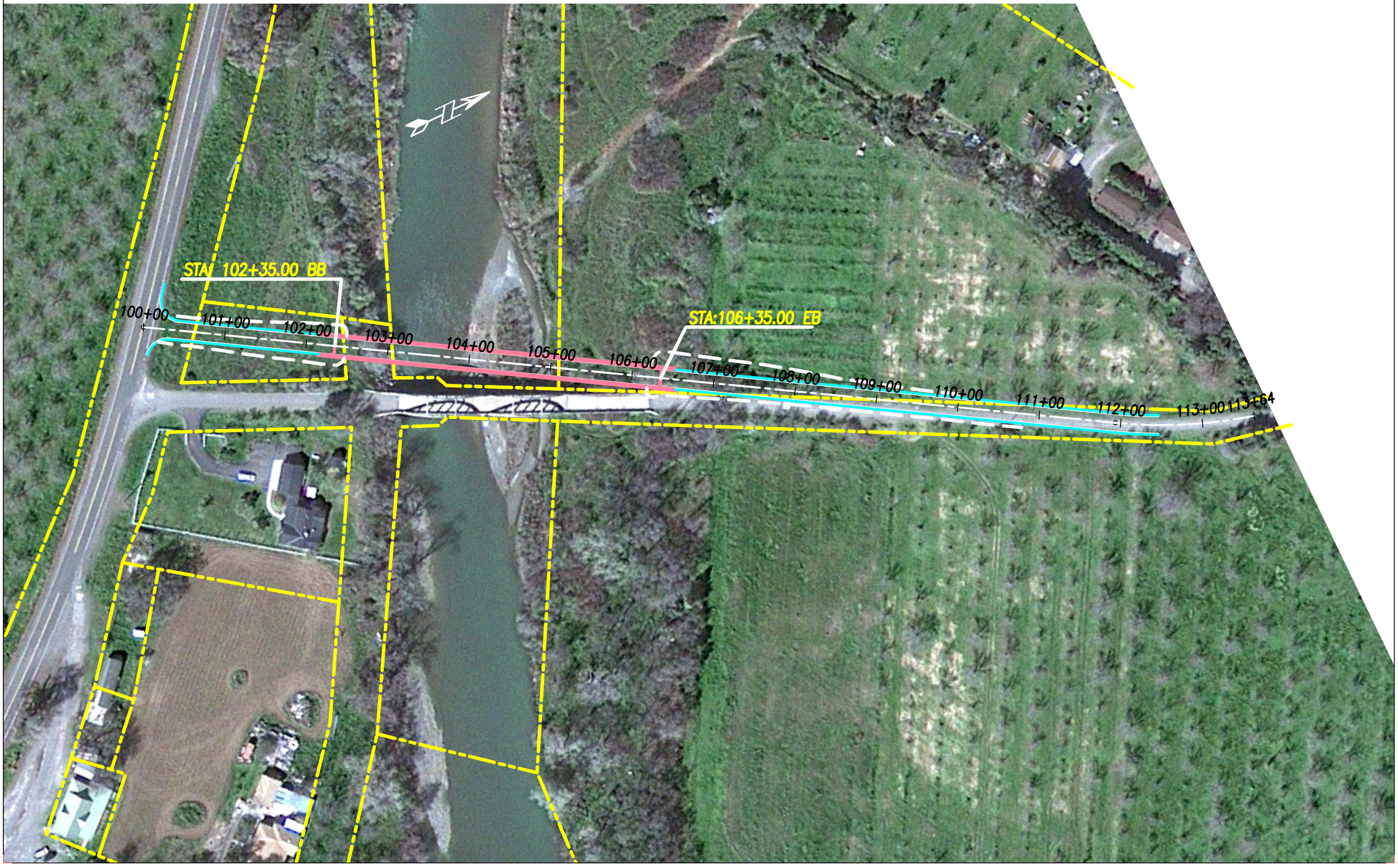
Criteria	Local Standards (Yolo Cnty 2008)	AASHTO Guidelines (2011)	AASHTO Low-Volume Guidelines (2001)	Caltrans HDM (Sixth Edition)	Proposed Standard
Street Type/Functional Classification	Rural Street	Rural Local Road	Rural Local Road Major Access	Local Streets or Roads	Rural Local
Structural Sections	Follow CT HDM procedures. Increase GE by factor of 1.35 for TI <=9, 1.25 TI>9. Min Section 4" AC/ 12" AB	Based on R value and TI	Based on R value and TI	Based on R value and TI (Chapter 630)	** No TI or R values yet
Design Speed	Rural/Unposted - 65mph	40 mph – Based on level terrain and ADT 325 (p.5-1)	40 mph – Based on level terrain and ADT 325 (p.5-2)	Refer to AASHTO or Local Agency Std	45 mph (HBP Application)
Lane Width	2 -12'	40 mph, 2-9' (p.5-5) 45 mph, 2-10'	Total Width, TW & Shld 40 mph – 18' (24' for Ag) 45 mph – 20' (26'for Ag)	Min 24' paved (310.1)	2-12'
Shoulder Width	8' (4' full paved section + 4' AB section)	2 foot graded (p.5-6)	See above	Refer to AASHTO or local std	5' (2' full paved section + 3' AB section) see Public Access Below
Public Access to Creek	General Plan Policy CO-1.23, CO-1.26	N/A	N/A	N/A	TBD -Need wider shoulders/parking/ADA creek access, prevent motor vehicles
Bridge Width (Clear)	32'	40 mph – 22' 45 mph – 24'	40 mph – 18' (24' for Ag) 45 mph – 20' (26'for Ag)	-	28' (12' lanes, 2' shldr)
Bicycle Lane Width	4'	Refer to AASHTO Bike Guide	Refer to AASHTO Bike Guide	Min 4' shoulder (1000.1)	Not a designated bicycle lane
Median Width	N/A	-		N/A	N/A
Median cross slope	N/A	-		N/A	N/A
Minimum Right of Way Width	54'			10' from catch point of C/F (304.2)	54' min, 40'existing, additional may be req'd
Normal Cross Slope	2%, 3% choker	1.5% to 2% (p.5-3)		1.5% to 3% (301.2)	2%, 3% choker
Side Slopes	2:1 or flatter	Depends on slope stability (refer to Roadside Design Guide)		4:1 or flatter (304.1)	2:1 side slope subject to Geotechnical Verification, 1.5:1 front

Criteria	Local Standards (Yolo Cnty 2008)	AASHTO Guidelines (2011)	AASHTO Low-Volume Guidelines (2001)	Caltrans HDM (Sixth Edition)	Proposed Standard
					slopes protected with RSP
Maximum Superelevation Rate	*Minimum tangent length between reversing curves 50’	12% max (p.5-3)		Refer to AASHTO or local std	12%
Minimum Horiz Curve Radius	None listed	40 mph – 381’ 45 mph – 500’	40 mph - 395’ (Exh 3) 45 mph – 510’	40 mph – 550’ (203.2) 45 mph – 700’	510’
Pavement Corner Radii	Driveway – 20’ min	15-25 feet (p.619)		30’ (Bus Design Vehicle)	20’ for driveway
Grade	.5% Min existing streets	5% Max (p.5-3)		Refer to AASHTO or local std	0.5% min to 5% max
Minimum Corner Sight Distance at Intersections	N/A	40 mph – 445’ 45 mph – 500’ (p.9-38) (assuming stop at driveway)		Setback – 10’ + shldr Corner sight distance = SSD (500’) (405.1)	610’ (for driveway turn) Setback – 10’ + shldr
Minimum Stopping Sight Distance	Per CT HDM	40 mph -305’ (p.5-4) 45 mph – 360’ 45 mph K Crest – 61 45 mph K Sag - 79	40 mph -250’ (Exh.12) 45 mph – 300’ 45 mph K Crest – 42 45 mph K Sag - 79	45 mph - 360’ (201.1) 45 mph K Crest – 98 45 mph K Sag - 78	45 mph – 300’ 45 mph K Crest – 61 45 mph K Sag - 79
Clear Zone Width	None listed	7 to 10 feet from ETW (p.5-8)		Refer to AASHTO or local std	AASHTO 7 to 10 feet from ETW (p.5-8), guardrail shielding required in zone
Drainage Design	Per Yolo Cnty Drainage Manual Drainage systems – 10 yr storm Open Channel – 1’ FB above 100 yr	Refer to AASHTO drainage manuals		Conventional Highway, Rural – 25 yr storm, spread within the shoulder Culvert – 10yr no headwater above inlet top, 100yr with objectionable backwater	Use Yolo Cnty Drainage Manual Drainage systems – 10 yr storm Open Channel – 1’ FB above 100 yr
Design Vehicle	None listed	Large School Bus		Ca Truck (404.3) (not an STAA route)	Ca Truck

APPENDIX B

Preliminary Roadway Alternatives

Replacement on the New Alignment

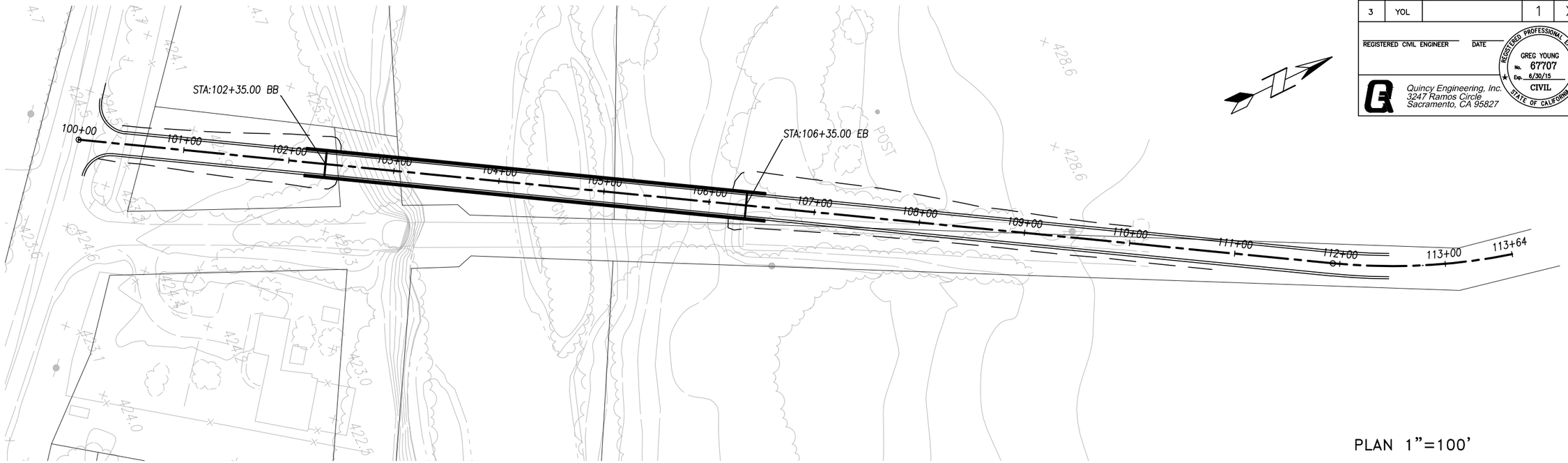


DIST	COUNTY	PROJECT	SHEET No.	TOTAL SHEETS
3	YOL		1	X

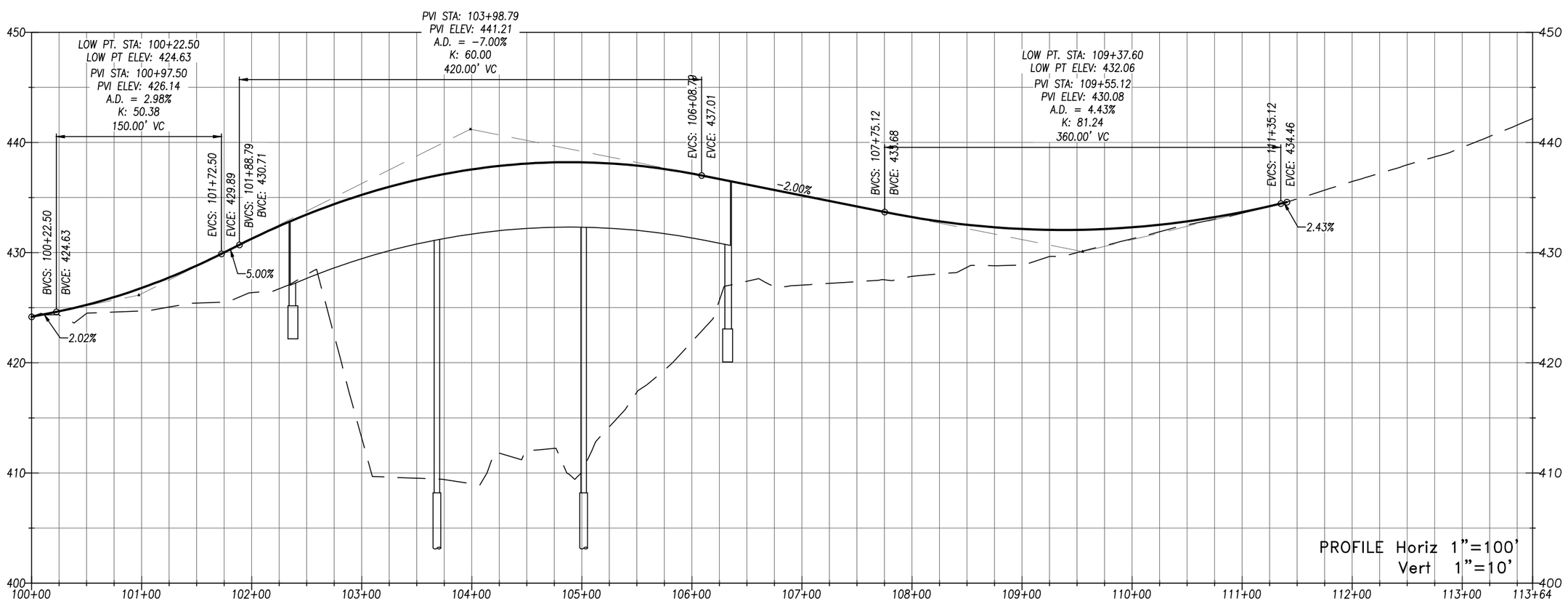
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER — GREG YOUNG No. 67707 Exp. 6/30/15 CIVIL — STATE OF CALIFORNIA

Quincy Engineering, Inc.
3247 Ramos Circle
Sacramento, CA 95827



PLAN 1"=100'



PROFILE Horiz 1"=100'
Vert 1"=10'

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5

APPR.	REVISIONS DESCRIPTION	DATE	REV. No.

	BY	DATE
DESIGN	G. YOUNG	09/03/13
DRAWN	N. JARRELL	09/03/13
CHECKED	xxxx	
SCALE:	As Shown	

YOLO COUNTY
PUBLIC WORKS DIVISION
292 West Beamer Street
Woodland, CA 95695-2598
Phone: (530) 666-8775 FAX: (530) 666-8728

BRIDGE REPLACEMENT ON UPSTREAM ALIGNMENT

SHEET No.
GP-1

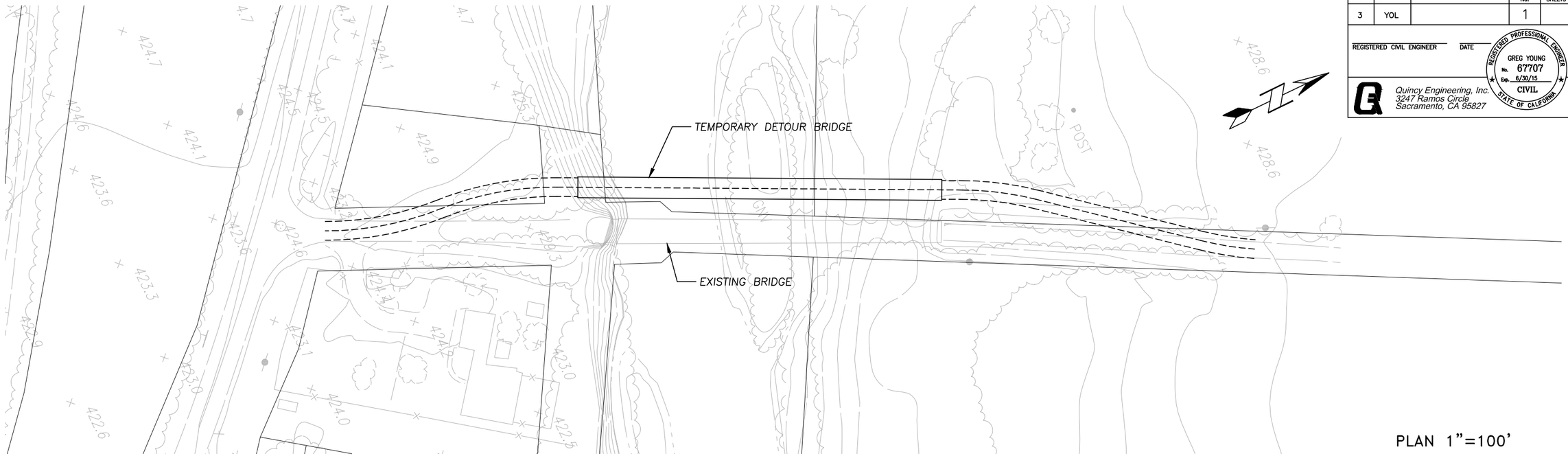
S:\Client\Yolo\Y01-500 Buckeye and Rumsey\Rumsey\CAD\Roadway\Y01500roa-REV1.dwg 10-01-13 09:31:59 AM nickj

DIST	COUNTY	PROJECT	SHEET No.	TOTAL SHEETS
3	YOL		1	

REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
GREG YOUNG
No. 67707
Exp. 6/30/15
CIVIL
STATE OF CALIFORNIA

Quincy Engineering, Inc.
3247 Ramos Circle
Sacramento, CA 95827



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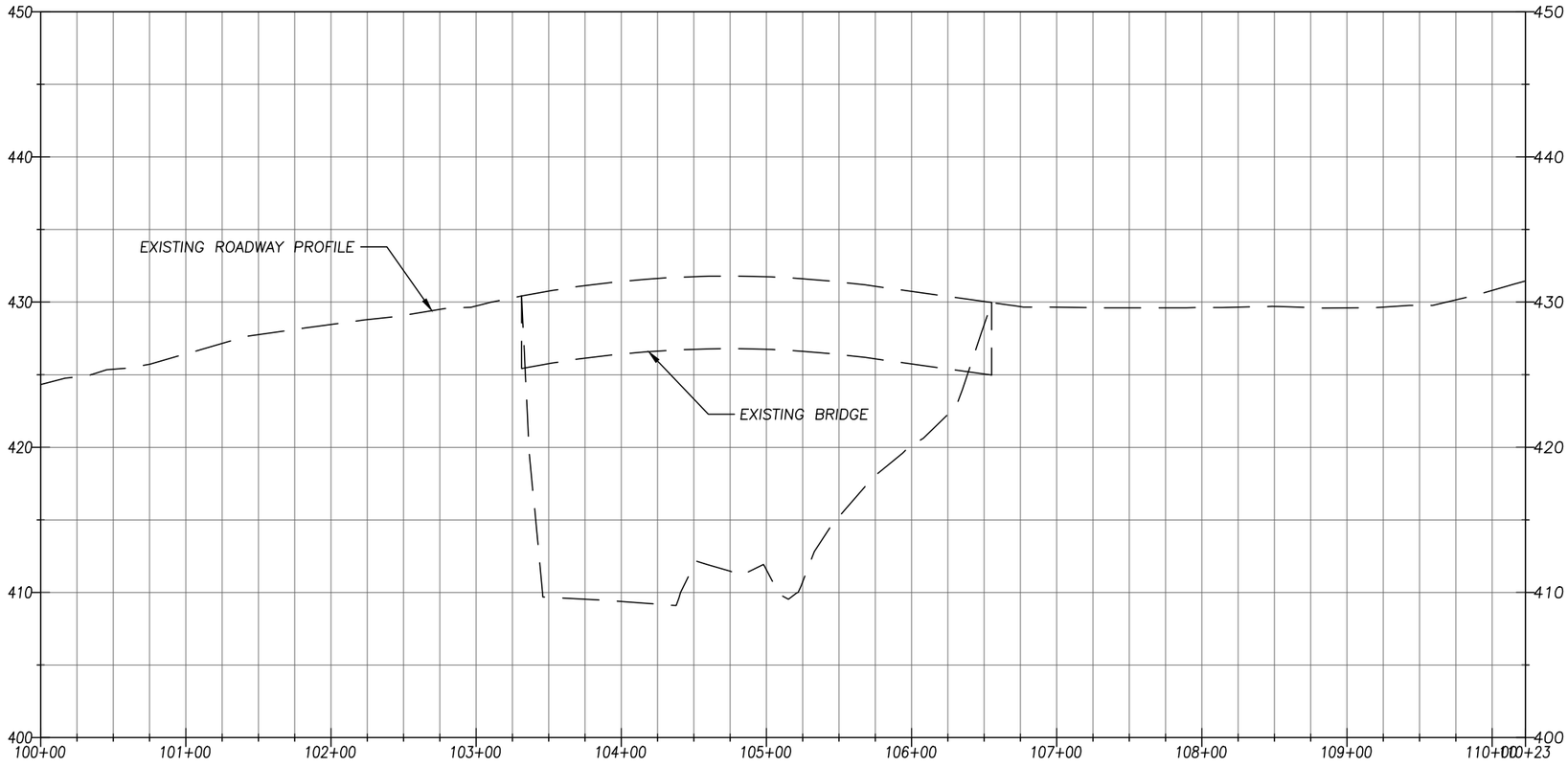

PROFILE Horiz 1"=100'
Vert 1"=10'

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BRIDGE REHABILITATION ON EXISTING ALIGNMENT

SHEET No.
GP-1

APPENDIX C

Preliminary Structure Alternatives

DIST	COUNTY	PROJECT	SHEET No.	TOTAL SHEETS
3	YOL		1	X

PROGRESS PRINT
REGISTERED CIVIL ENGINEER — DATE

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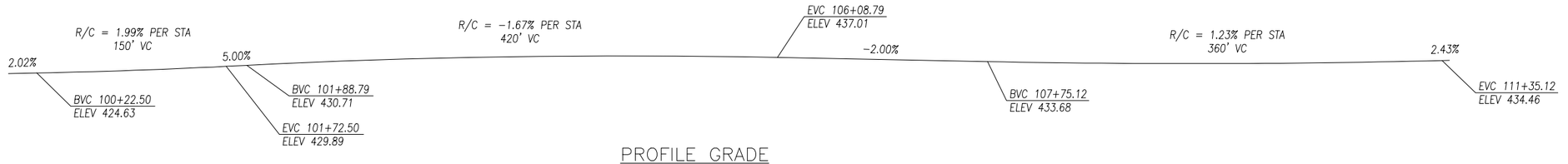
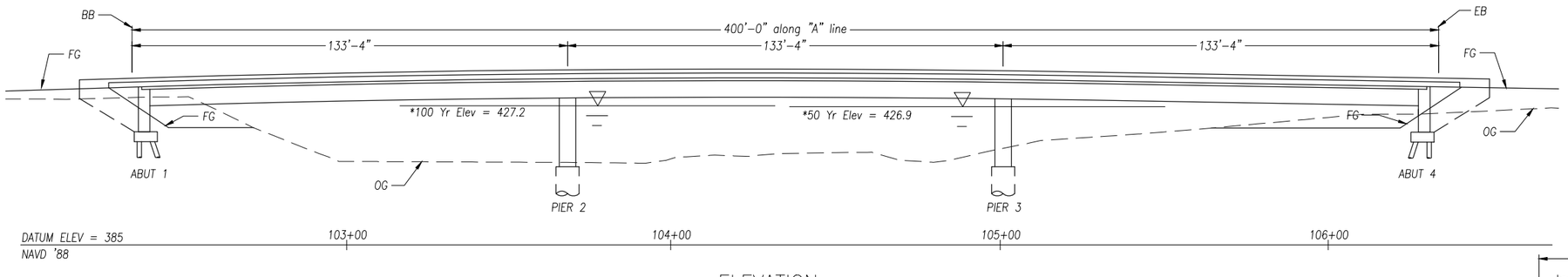
GREG YOUNG
No. 67707
Exp. 6/30/15
CIVIL
STATE OF CALIFORNIA

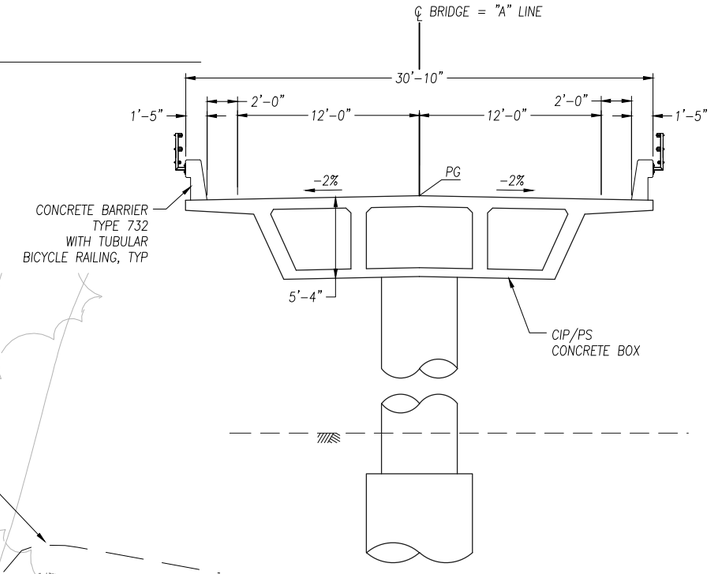
QUINCY ENGINEERING, INC
3247 Ramos Circle
Sacramento, CA 95827 - 2501

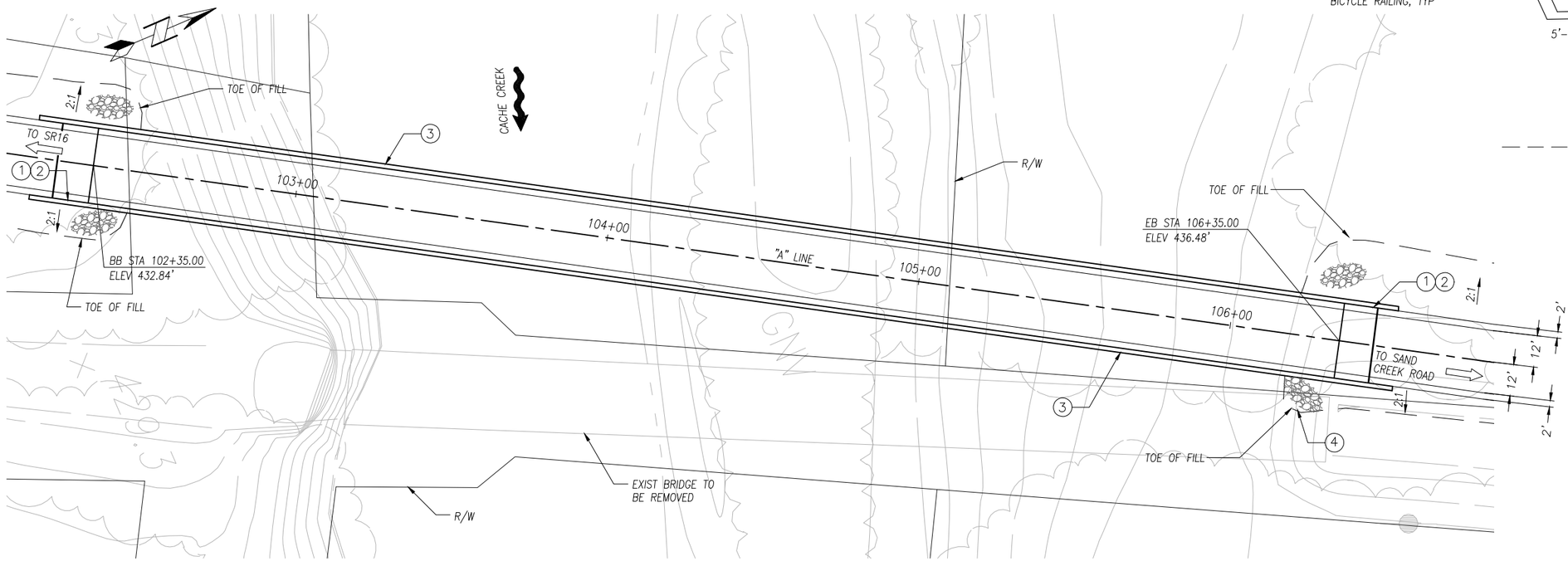


PROFILE GRADE
NO SCALE



ELEVATION
1"=20'





PLAN
1"=20'

TYPICAL SECTION
1"=5'

LEGEND

1. PAINT "Br. No. 22C-XXXX"
2. PAINT "CACHE CREEK BRIDGE"
3. CONCRETE BARRIER TYPE 732
4. ROCK SLOPE PROTECTION

INDICATES DIRECTION OF FLOW
INDICATES DIRECTION OF TRAVEL
INDICATES EXISTING BRIDGE (BRIDGE NO. 22C-0003) TO BE REMOVED
* INDICATES HIGH WATER ELEVATION

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5

APPR.	REVISIONS DESCRIPTION	REV. No.	DATE	BY
			9/26/13	G. YOUNG
			9/26/13	N. JARRELL

DESIGN
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CHECKED xxxx
SCALE: As Shown

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Woodland, CA 95695-2598
Phone: (530) 666-8775
FAX: (530) 668-8728

BRIDGE REPLACEMENT ON UPSTREM ALIGNMENT

SHEET No.
GP-1

DIST	COUNTY	PROJECT	SHEET No.	TOTAL SHEETS
3	YOL		1	X

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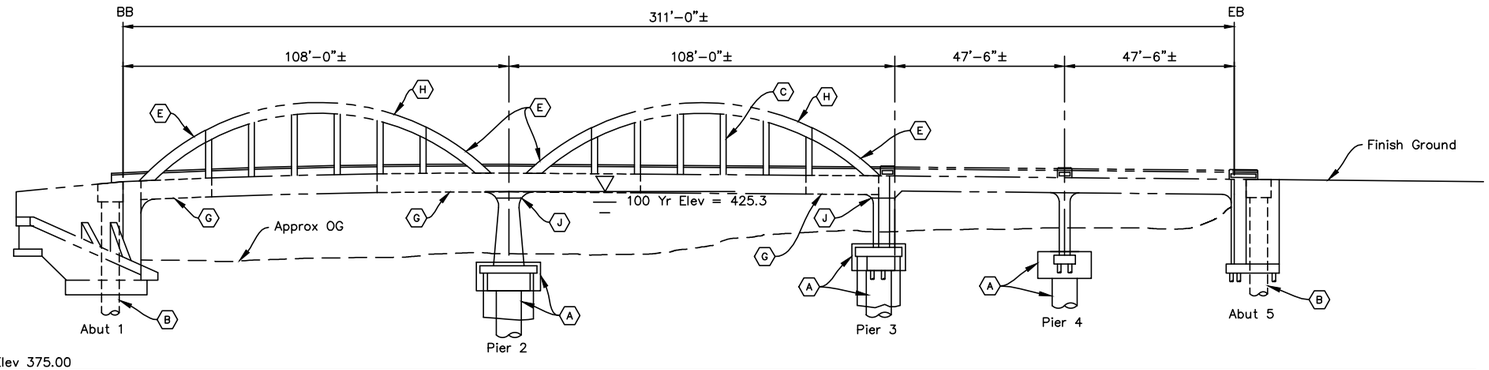

ELEVATION
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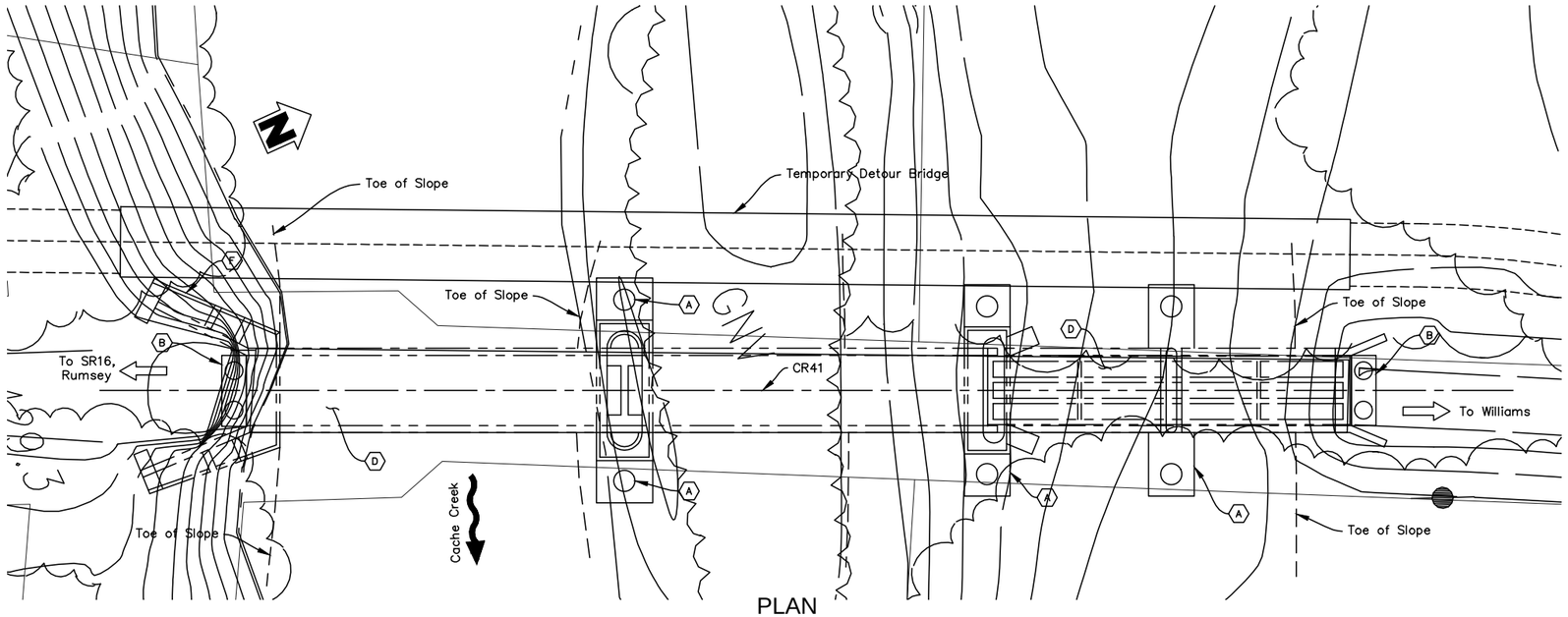
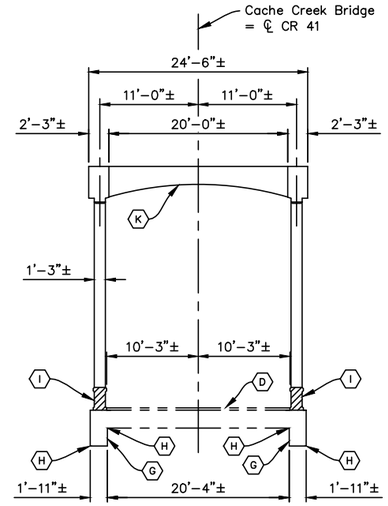


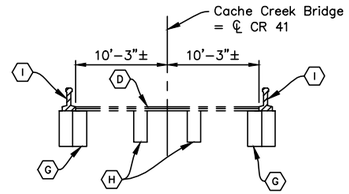
PLAN
1"=20'

LEGEND:

- Indicates New Construction
- Indicates Exist Structure
- Indicates Cache Creek Water Edge
- Indicates Direction of Flow
- Indicates Direction of Traffic



TIED ARCH TYPICAL SECTION
1/8"=1'–0"



APPROACH SPAN TYPICAL SECTION
1/8"=1'–0"

RETROFIT REHAB LEGEND:

- (A) CIDH Piling and Pier Footing Overlay
- (B) CIDH Piling and Cap behind Abutment
- (C) Fiber–Warp or Replace and Strengthen Hangers
- (D) Refinish Deck
- (E) Fiber–Wrap or Replace and Strengthen Arch Rib from Spring Line to first Column
- (F) Reconstruct Wingwall
- (G) Bolster Exterior Girders
- (H) Patch Spalled or Delaminated Concrete
- (I) Refinish Concrete Railing
- (J) Bolster Bent Cap
- (K) Fiber–Wrap Portals

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5

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	BY	DATE
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DRAWN	N. JARRELL	9/03/13
CHECKED	xxxx	
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