Testing Procedures

Drilling and Sampling: Standard penetration tests (SPT) were conducted for every ten feet of boring advancement. SPT tests were conducted in accordance with ASTM D1586, using a 140 pound hammer falling a distance of 2.5 feet. "Undisturbed" soil samples were generally obtained on a ten-foot interval midway between the SPT tests. The undisturbed samples were retrieved using a modified California sampler (split spoon sampler with brass rings, D_o=2.5 in, D_I=1.94 in) for relatively undisturbed soil samples. The soil samples recovered within the brass rings were sealed with plastic caps/tapes and transported to Caltrans laboratory facilities for testing. Rock core samples were taken using a 4 in diameter diamond impregnated drilling bit, where 2.25 in core samples were taken from the core barrel, logged in the field, and placed in core boxes with labeled depths.

Note: Please refer to Table 2 for a list of completed borings.

Cone Penetration Test: The CPT soundings were performed according to ASTM D5778-95. The Caltrans CPT apparatus employed is a truck-mounted, Hogentogler electric cone penetration testing system. CPT soundings were performed at selected locations, as shown in Table 2, to depths from 0.79 to 35 feet below ground surface. All penetrations were terminated either at required depth, or when the CPT penetrating cone was stopped due to resistance levels greater than CPT operating specifications (Tip Resistance at 47826 kPa /500tsf).

Laboratory Testing: The laboratory testing program consisted of moisture-density determinations (California Test Method (CTM 226)), grain-size distribution (CTM 203), direct-shear (CTM 222), consolidation/collapse potential testing of undisturbed soil specimens (CTM 219), compaction tests (CTM 216), and corrosion tests (CTM 532, 417, 422) of disturbed bulk samples (see Section 13). The results of Laboratory testing are presented in Appendix VI.

The Soil Collapse Test is done as a part of the consolidation testing under CTM 219. The vertical pressure on the soil specimen is increased to 100kPa (or 1tsf/2000psf). At this vertical pressure, distilled water is added to the oedometer to measure the amount of one-dimensional collapse of soil specimen. The collapse potential is defined as the change in height of specimen due to inundation divided by the initial height of the specimen.

For compaction testing, instead of adding and subtracting moisture from the soil specimen at field moisture condition, the soil samples are dried, and water is added at 2% increment for compaction to determine the maximum dry density/optimum moisture content.

Table 2. Summary of Completed Boring Information

(08-SBd-58-PM 22.2/31.1, EA: 08-043510)

Boring Number	Location	Equipment	Soil Exploration Method	Depth of boring (ft)	Ground Elevation (ft)
Main Alignment of Proposed Route 58					
B-1	1221+56, CL	CS1000	Drilling/Mud Rotary	31.5	2247
B-2	1234+69, CL	CS1000	Drilling/Mud Rotary	36.5	2250
B-5	1271+00, 164 ft Lt CL	CME-750	Drilling/Mud Rotary	34	2337
B-7	1270+67, 115 ft Rt CL	Track rig	Drilling/Mud Rotary	40.3	2320
B-8	1277+33, 164 ft Lt CL	CME-750	HQ Core/Mud Wash	64	2350
B-9	1277+65, 164 ft Rt CL	CME-750	HQ Core/Mud Wash	45	2341
B-10	1280+85, 33 ft Rt CL	Track rig	HQ Core/Mud Wash	59	2350
B-11	1280+61, 164 ft Lt CL	CME-750	HQ Core/Mud Wash	89.9	2343
B-13	1284+16, 43 ft Lt CL	Mobile B-47	HQ Core/Mud	21.7	2348
B-14	1284+00, 164 ft Rt CL	Mobile B-47	HQ Core/Mud	49.2	2348
B-16	1291+90, 82 ft Lt CL	Mobile B-47	HQ Core/Mud	42.7	2318
B-17	1290+65, 148 ft Rt CL	Track rig	HQ Core/Mud	45	2332
B-18	1296+40, 82 ft Lt CL	Track rig	HQ Core/Mud	44.5	2315
B-19	1296+10, 131 ft Rt CL	Track rig	HQ Core/Mud	45	2324
B-20	1303+70, 115 ft Lt CL	Track rig	HQ Core/Mud	30	2303
B-22	1310+05, 98 ft Rt CL	Track rig	HQ Core/Mud	23	2298
B-24	1349+50, CL	CS1000	Drilling/Mud Rotary	36.5	2233
B-25	1362+62, CL	CS1000	Drilling/Mud Rotary	36.5	2232
B-26	1375+75, CL	CS1000	Drilling/Mud Rotary	36.5	2228
B-27	1388+87, CL	CS1000	Drilling/Mud Rotary	36.5	2224
B-35	1420+03, CL	Mobile B-47	Drilling/HSA	31.5	2215
B-36	1447+26, CL	Mobile B-47	Drilling/HSA	31.5	2203
B-37	1473+83, CL	Mobile B-47	Drilling/HSA	31.5	2196
B-38	1500+08, CL	Mobile B-47	Drilling/HSA	31.5	2190

Boring Number	Location	Equipment	Soil Exploration Method	Depth of boring (ft)	Ground Elevation (ft)
B-39	1526+65, CL	Mobile B-47	Drilling/HSA	31.5	2184
B-40	1579+15, CL	Mobile B-47	Drilling/HSA	31.5	2181
MLC-1	1420+03, CL	Hogentogler	CPT Sounding	19.4	2215
MLC-2	1447+03, CL	Hogentogler	CPT Sounding	6.4	2203
MLC-3	1473+83, CL	Hogentogler	CPT Sounding	30.8	2196
MLC-4	1500+08, CL	Hogentogler	CPT Sounding	26.2	2190
MLC-5	1526+65, CL	Hogentogler	CPT Sounding	30.0	2184
MLC-6	1579+15, CL	Hogentogler	CPT Sounding	32.2	2181
North of Proposed Rt 58 WB Offramp toward Lenwood Rd. (for Proposed Retaining Wall)					
B-33	1639+84, 644 ft Lt CL	CME-750	Drilling/HSA	41.5	2176
B-34	1636+56, 625 ft Lt CL	CME-750	Drilling/HSA	46.5	2174
A-13-001	1635+10, 662 ft Lt CL	CME-750	HQ Auger	49.5	2174
A-13-002	1637+60, 599 ft Lt CL	CME-750	HQ Auger	60	2173
A-13-003	1639+60, 546 ft Lt CL	CME-750	HQ Auger	50	2173
Lenwood Road (for Proposed Approach Embankment)					
B-28	84+49, 16 ft Lt CL	CME-85	Drilling/HSA	61.5	2176
B-29	91+05,16 ft Lt CL	CME-85	Drilling/HSA	61.5	2175
B-30	97+61, 39 ft Rt CL	Mobile B-47	Drilling/Mud Rotary	51.5	2175
B-32	110+79, 16 ft Lt CL	Mobile B-47	Drilling/Mud Rotary	56.5	2176
LWC-1	110+79, 16 ft Lt CL	Hogentogler	CPT Sounding	36.1	2176
LWC-3	97+61, 16 ft Lt CL	Hogentogler	CPT Sounding	22.8	2176
Frontier Road (for Proposed Soundwalls, North of Main Alignment)					
SWC1	1316+69, 262 ft Lt CL	Hogentogler	CPT Sounding	19.2	2268
B-23A	1323+25, 262 ft Lt CL	Mobile B-47	Drilling/Mud Rotary	31.5	2250
SWC2	1331+46, 262 ft Lt CL	Hogentogler	CPT Sounding	10.3	2240
B-23B	1341+30, 262 ft Lt CL	Mobile B-47	Drilling/Mud Rotary	31.5	2231

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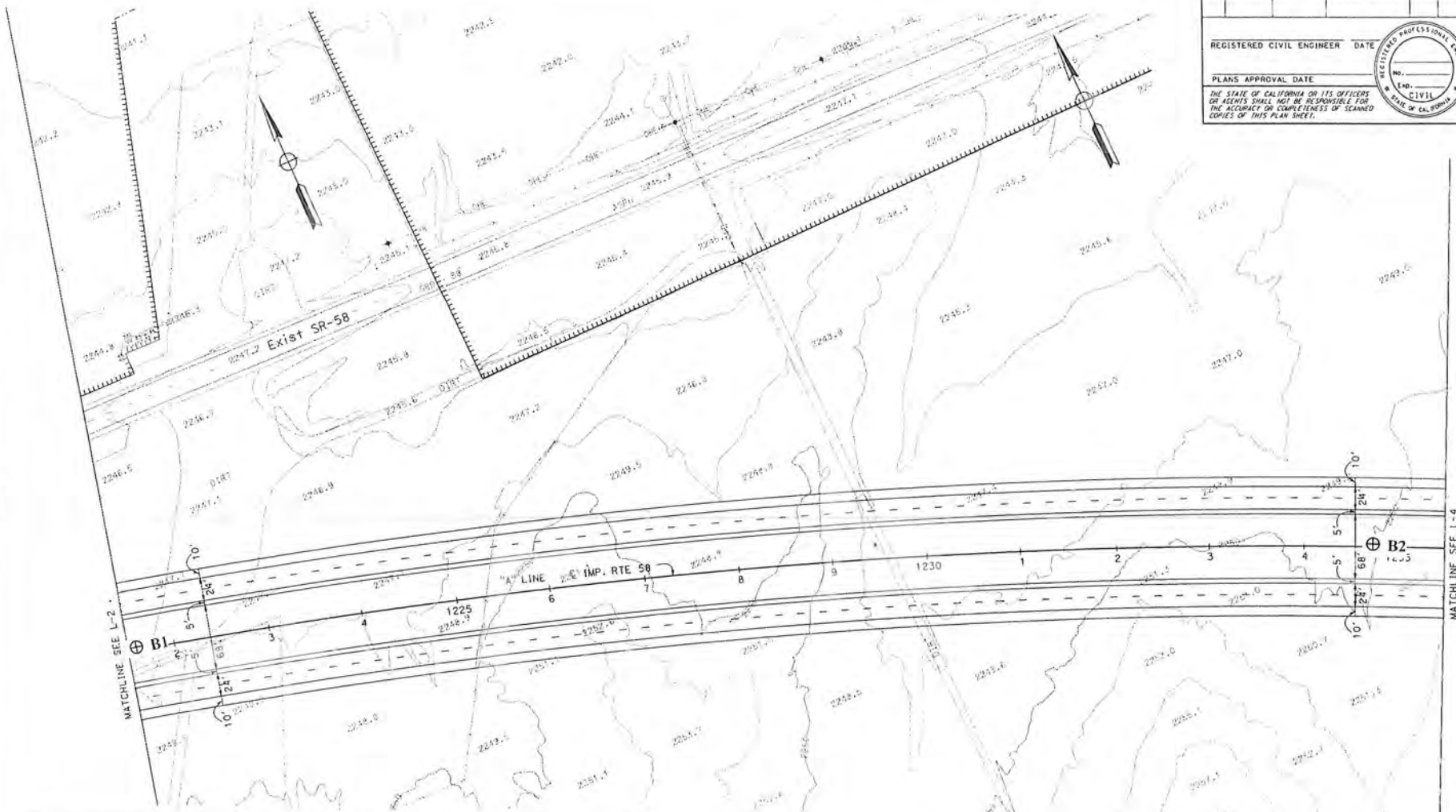

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	Boring Location Map	
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1		Figure No. 2-1

⊕ Approximate Boring Locations

LAYOUT

SCALE: 1"=50'

L - 3

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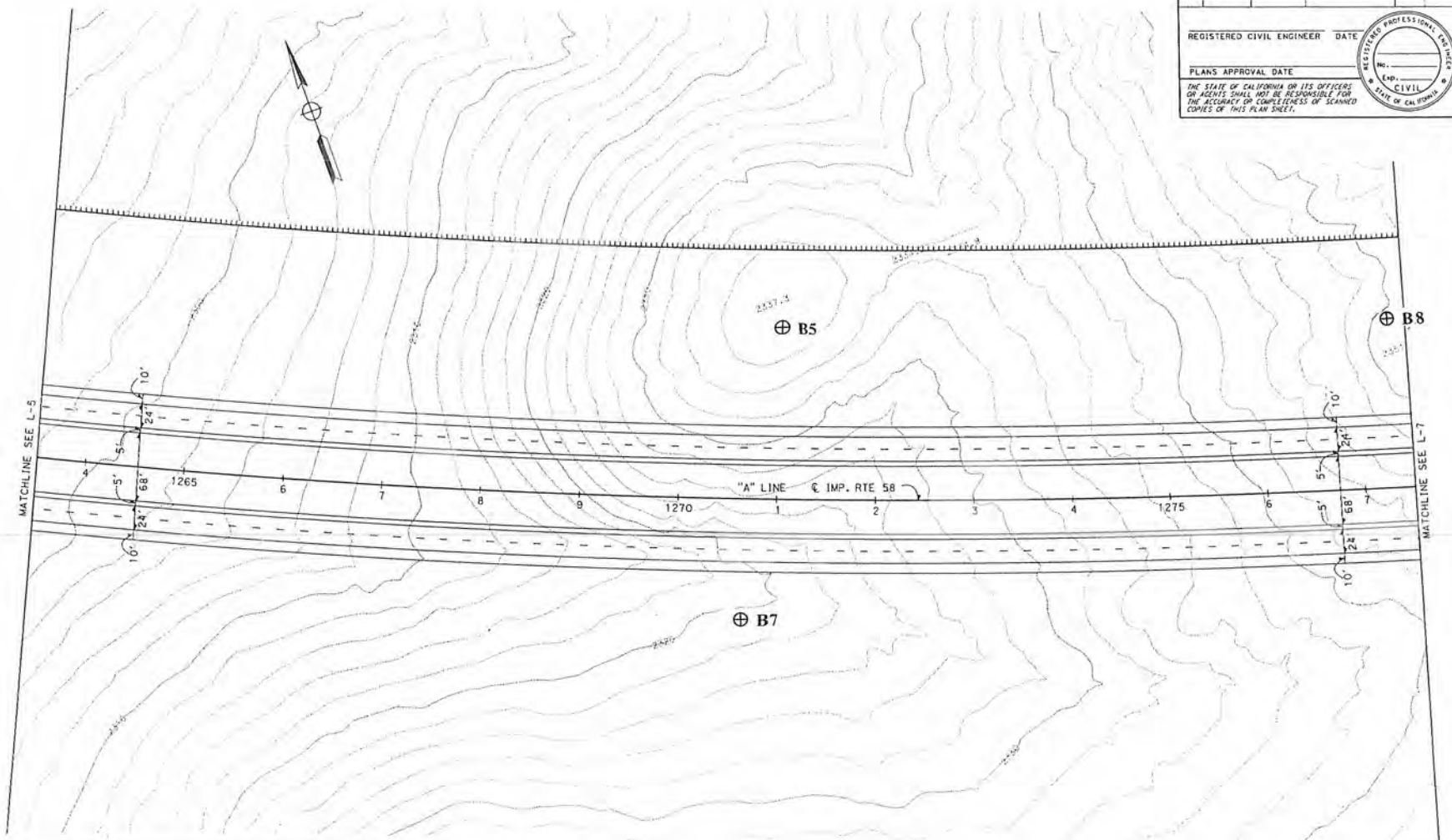

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	Boring Location Map	
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1		Figure No. 2-2

LAYOUT

SCALE: 1"=50'

L-6

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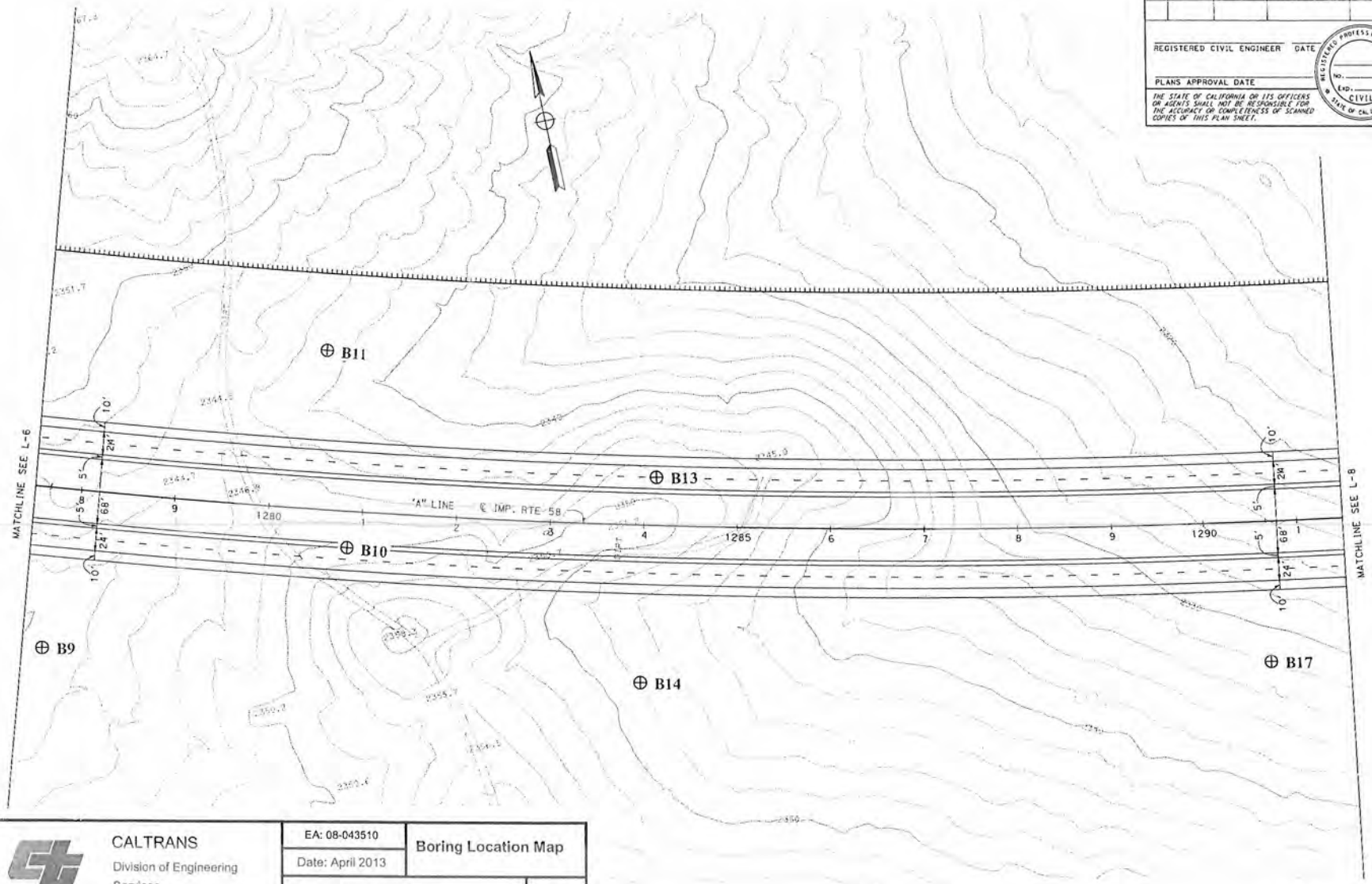

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	Boring Location Map
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-3

LAYOUT

SCALE: 1"=50'

L-7

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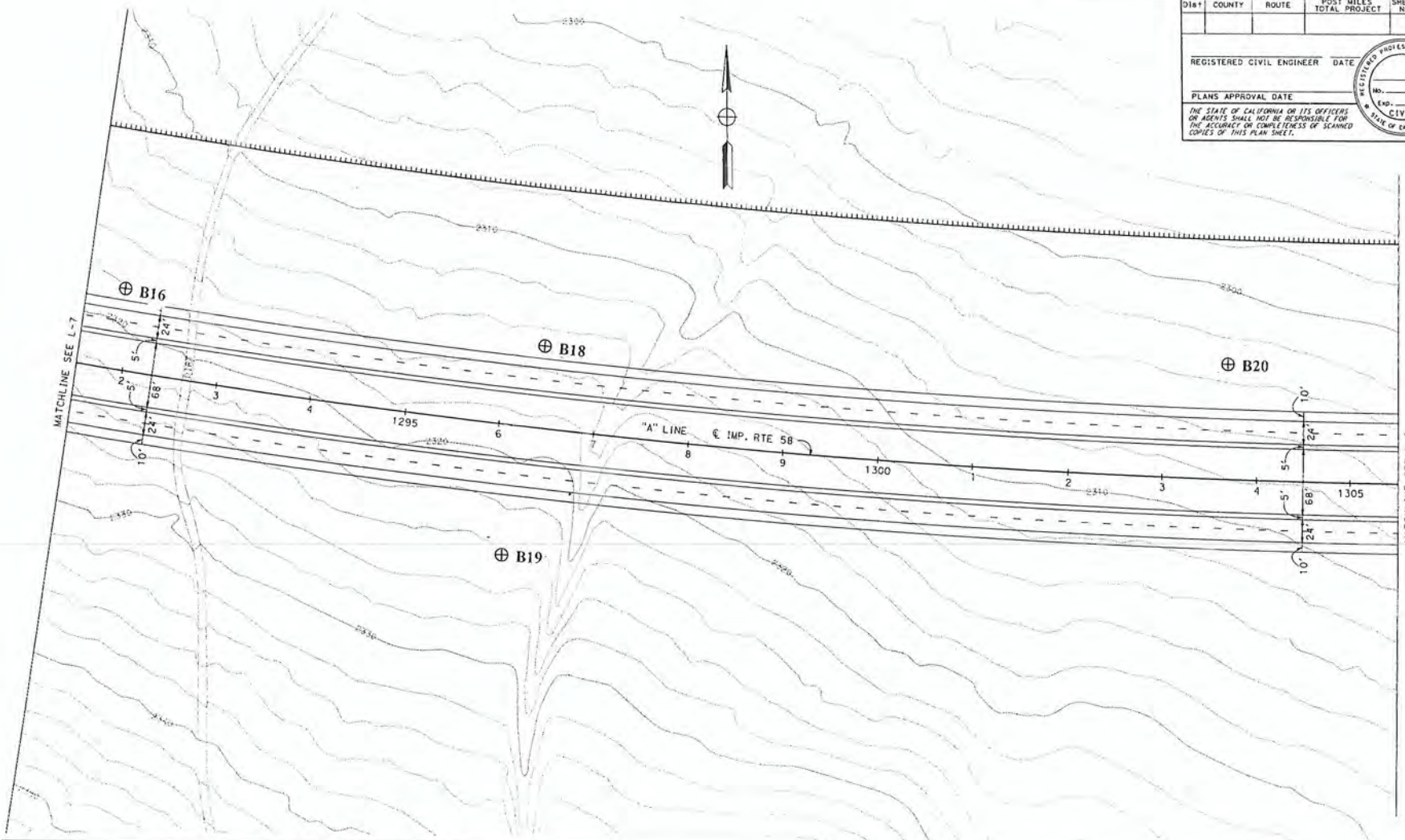

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	**Boring Location Map**
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-4

LAYOUT

SCALE: 1"=50'

L - 8

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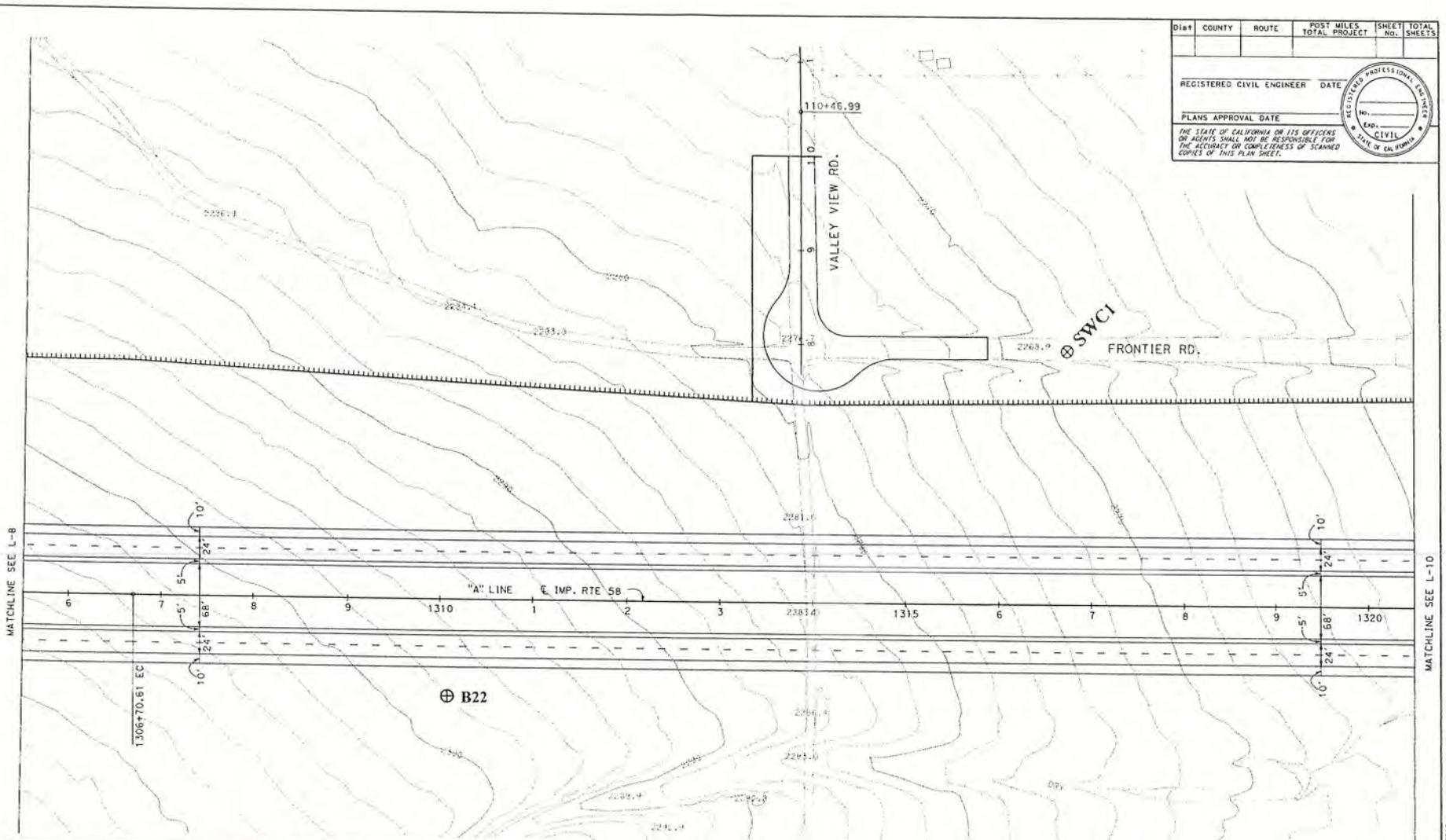

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	SR58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-5

LAYOUT

SCALE: 1"=50'

L - 9

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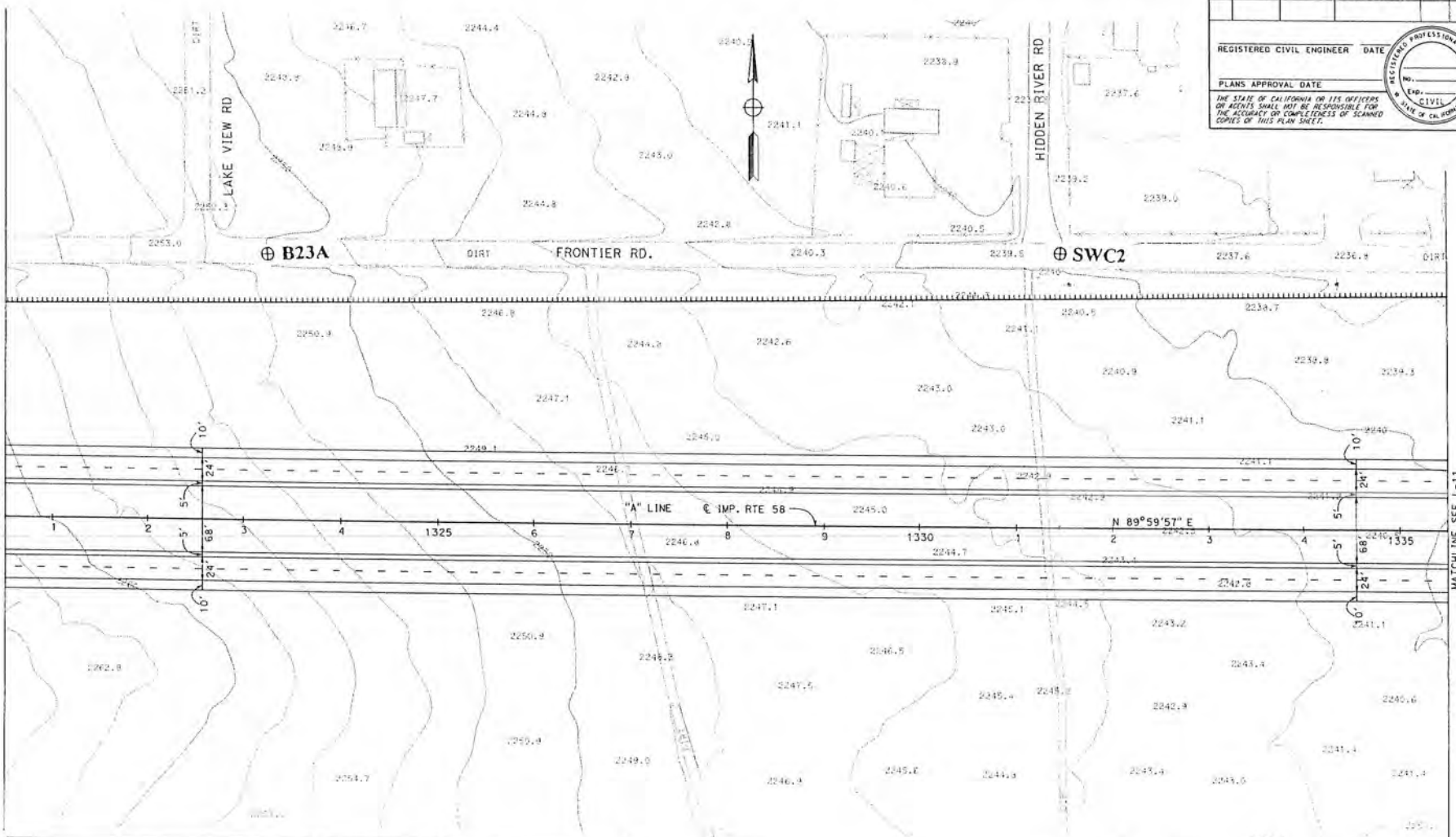

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Date: April 2013

Boring Location Map

SR 58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-6

LAYOUT

SCALE: 1"=50'

L-10

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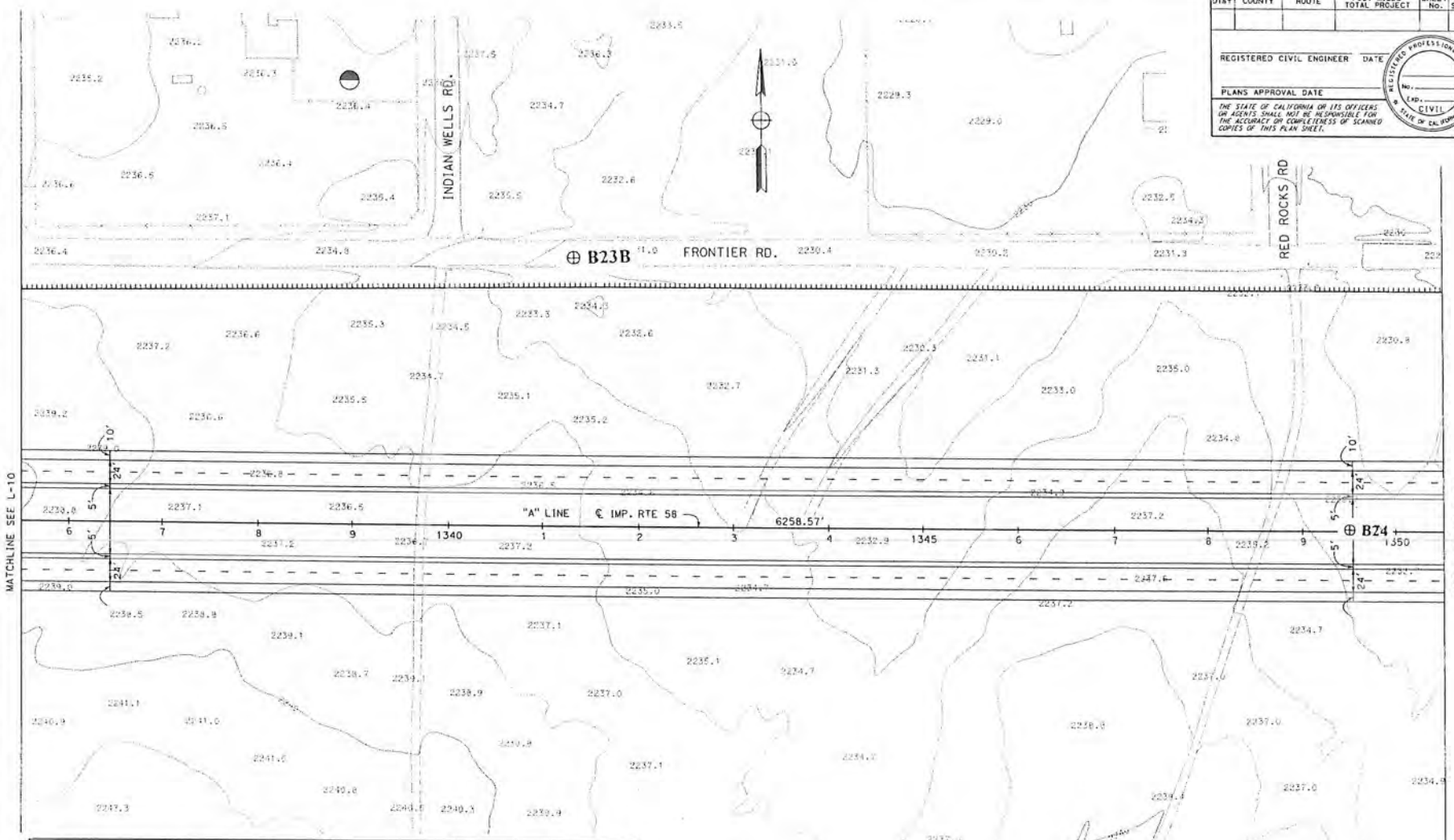

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CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	**Boring Location Map**
	SR58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-7

LAYOUT

SCALE: 1"=50'

L-11

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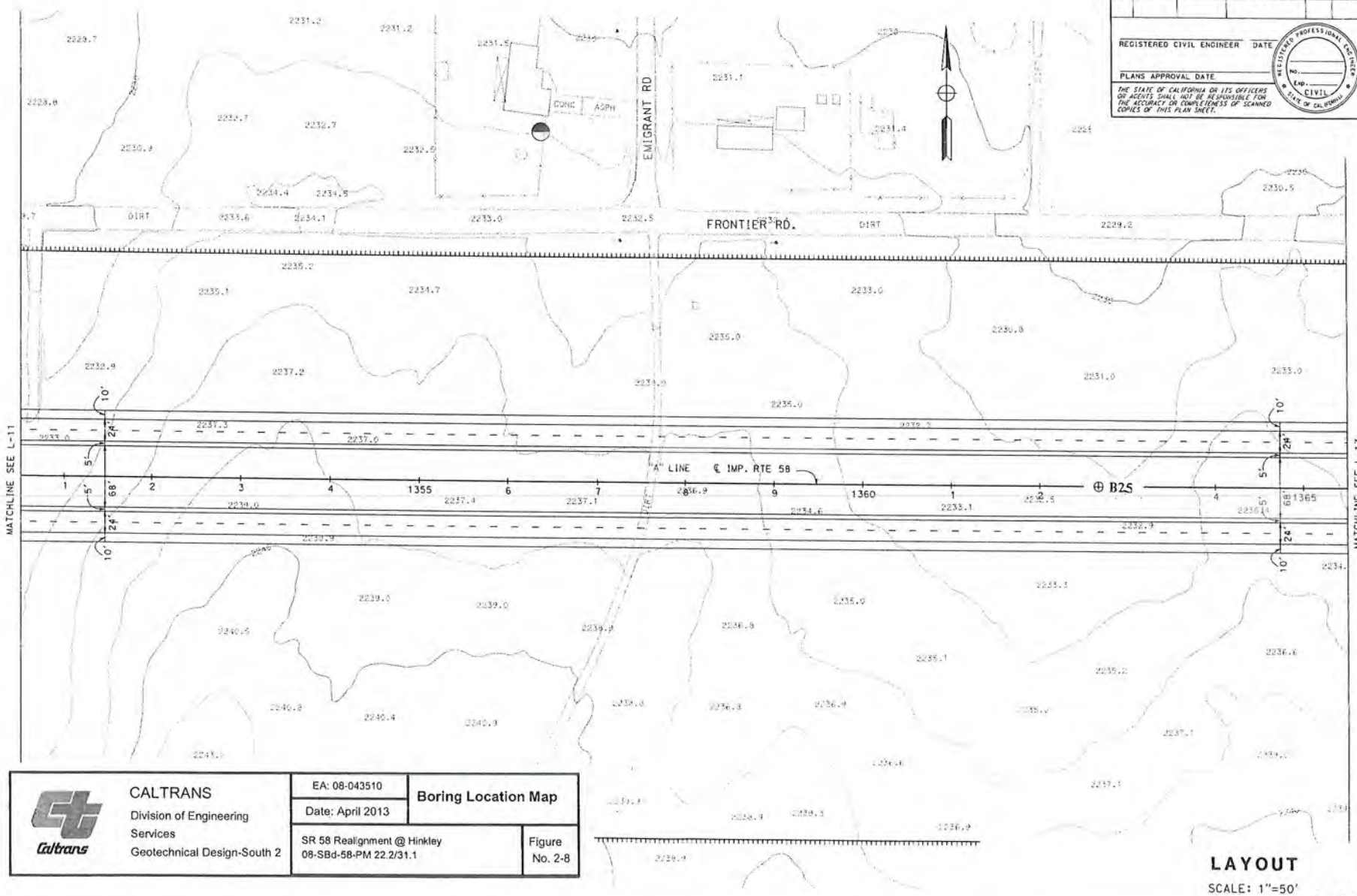

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	Date: April 2013	
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-8

LAYOUT

SCALE: 1"=50'

L-12

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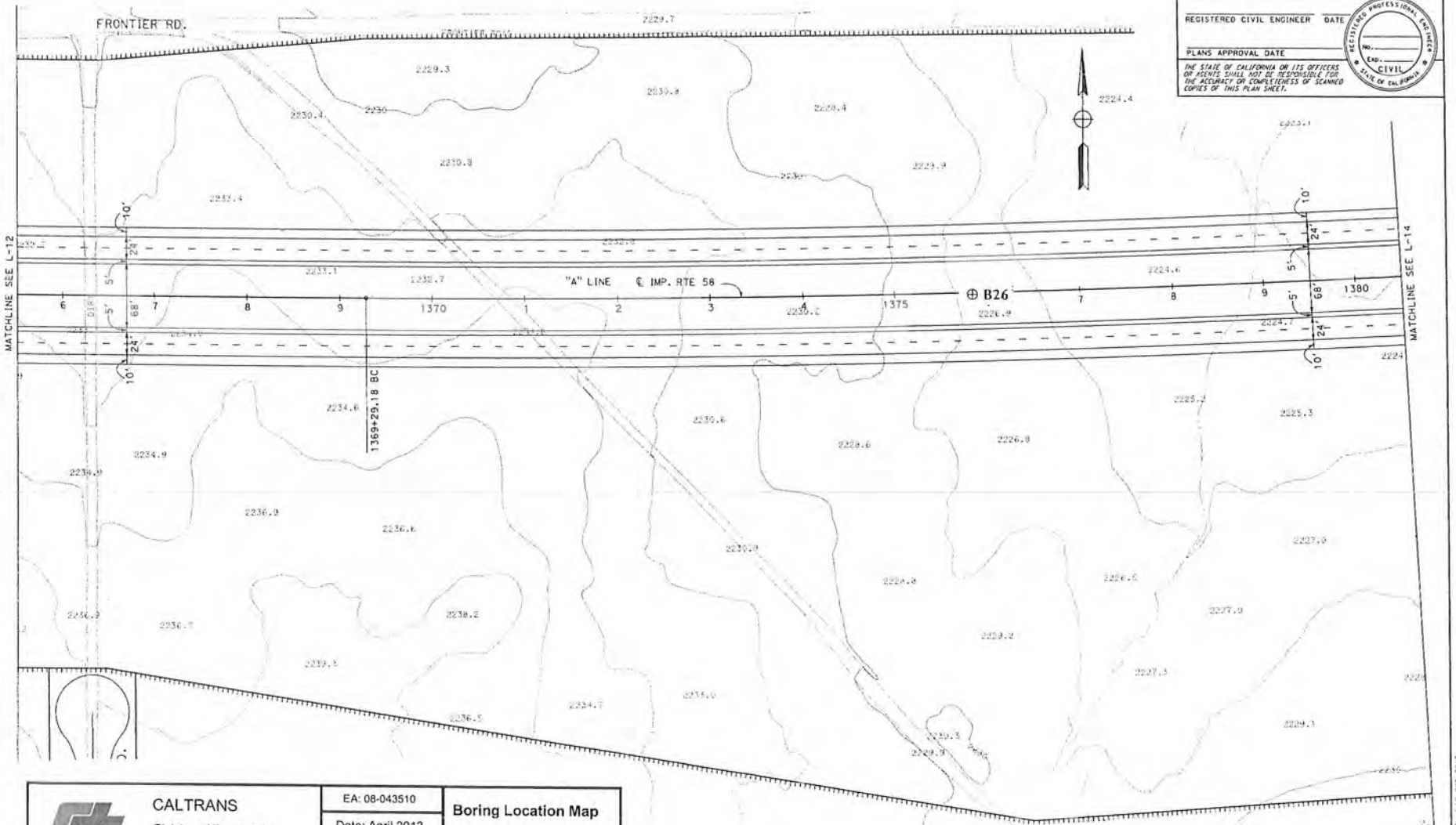

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	**Boring Location Map**
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-9

LAYOUT

SCALE: 1"=50'

L-13

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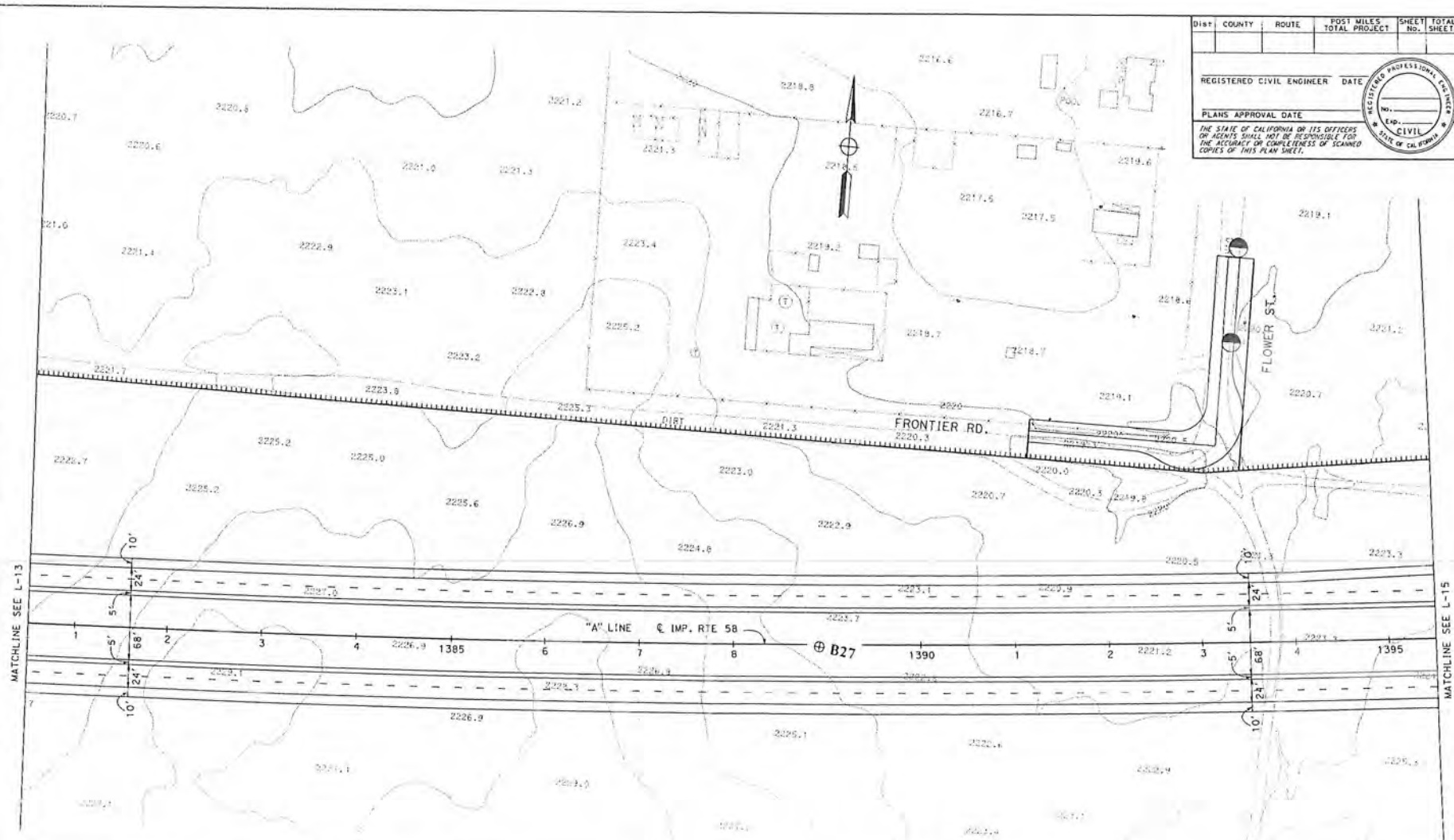

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	SR58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-10

LAYOUT

SCALE: 1"=50'

L-14

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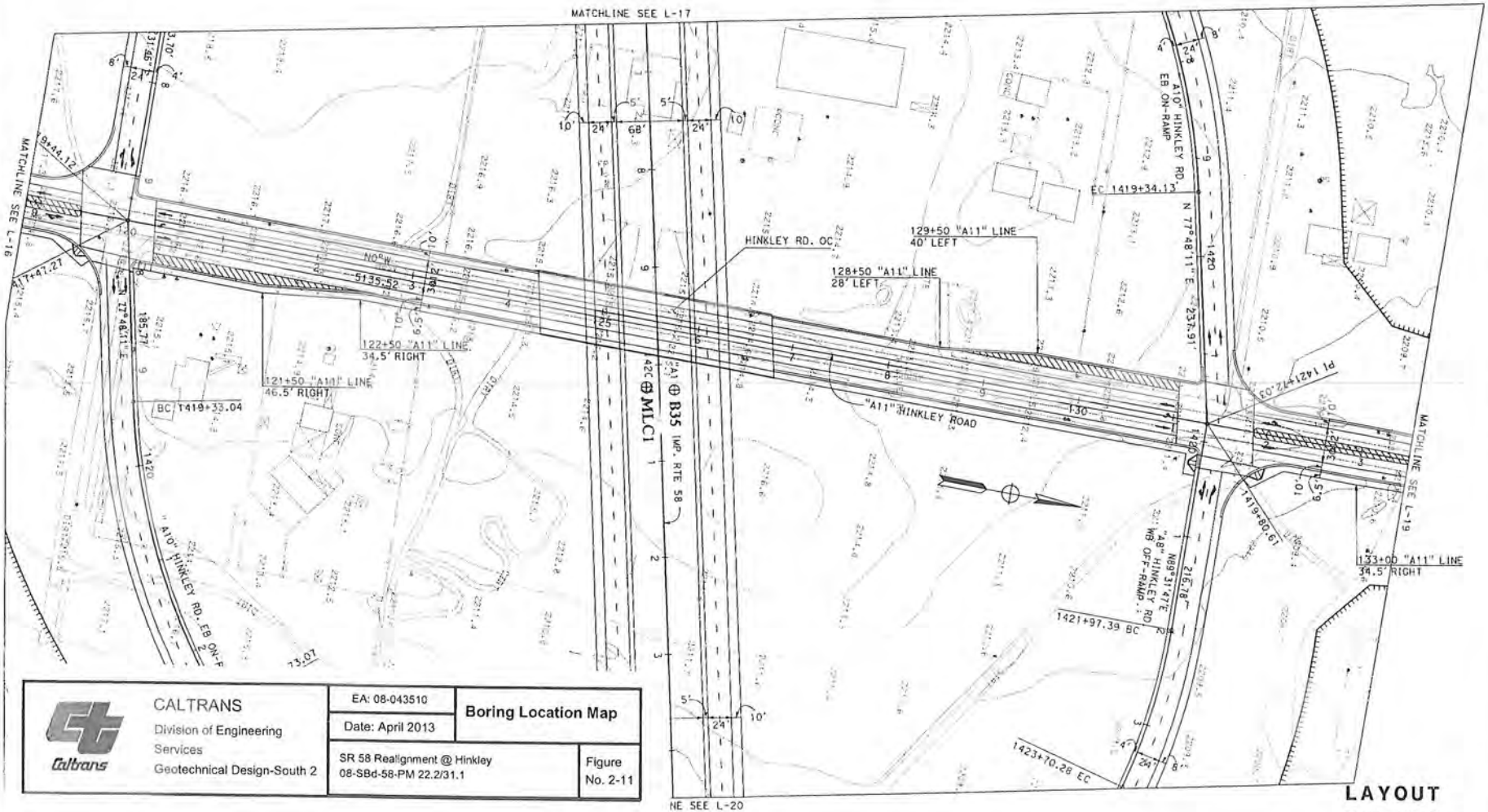

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EA: 08-043510
Date: April 2013

Boring Location Map

SR 58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-11

LAYOUT

SCALE: 1"=50'

L-18

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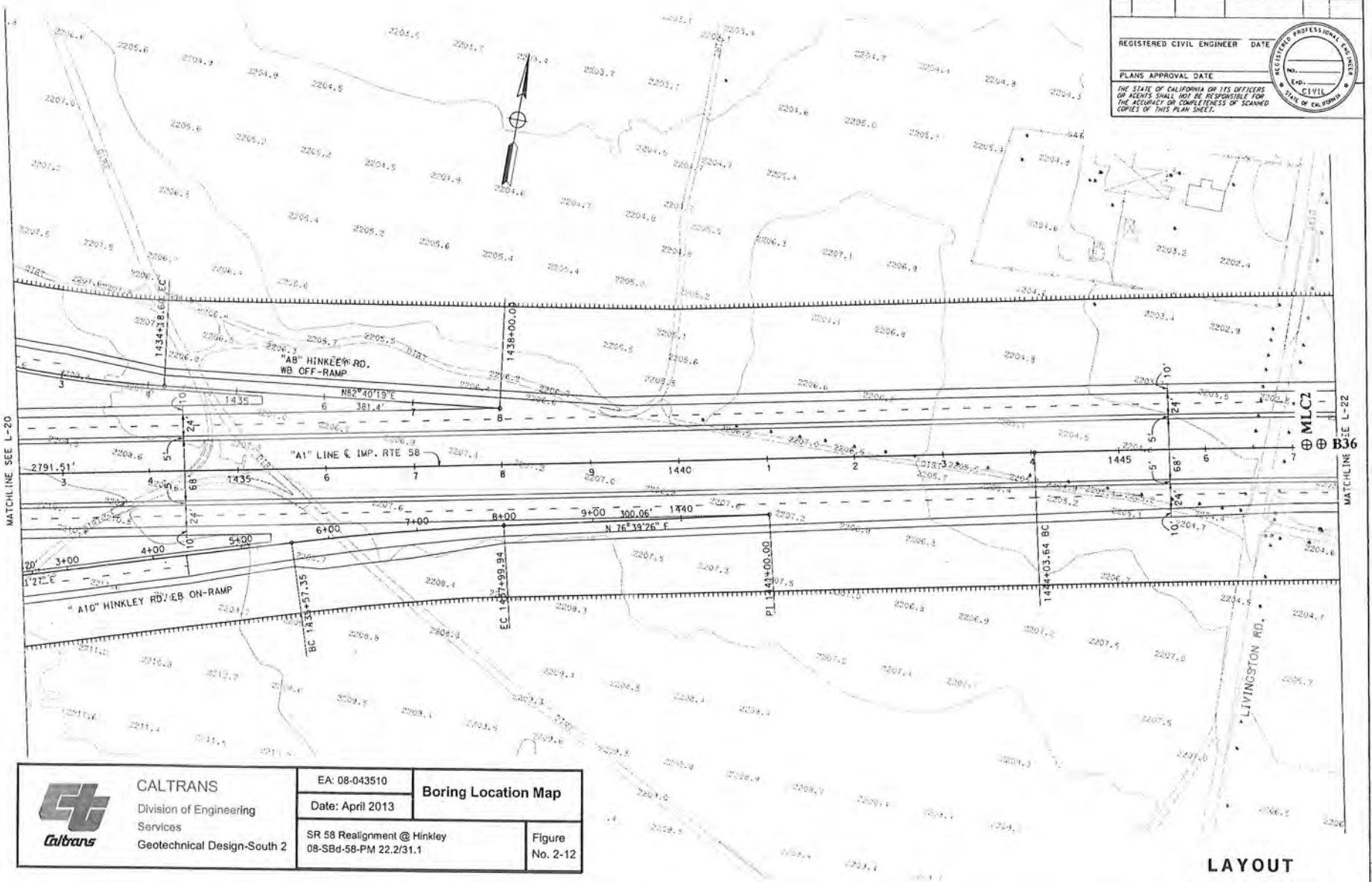

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Geotechnical Design-South 2

EA: 08-043510
Date: April 2013

Boring Location Map

SR 58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-12

LAYOUT
SCALE: 1"=50'

L-21

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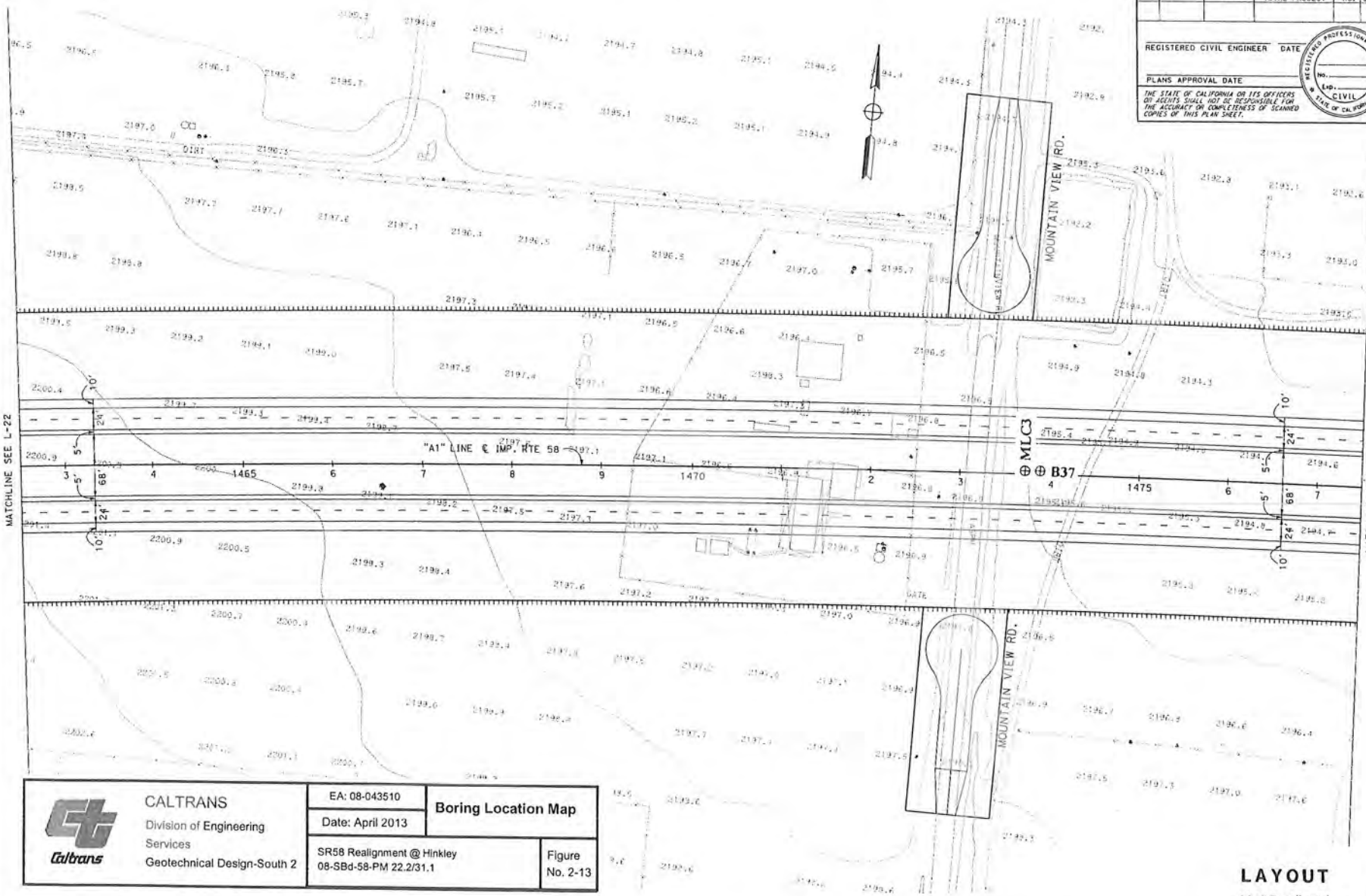

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

CALTRANS
Division of Engineering Services
Geotechnical Design-South 2

EA: 08-043510

Date: April 2013

Boring Location Map

SR58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-13

LAYOUT

SCALE: 1"=50'

L-23

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s112557
DGN FILE => 804351ea023.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 00000000001

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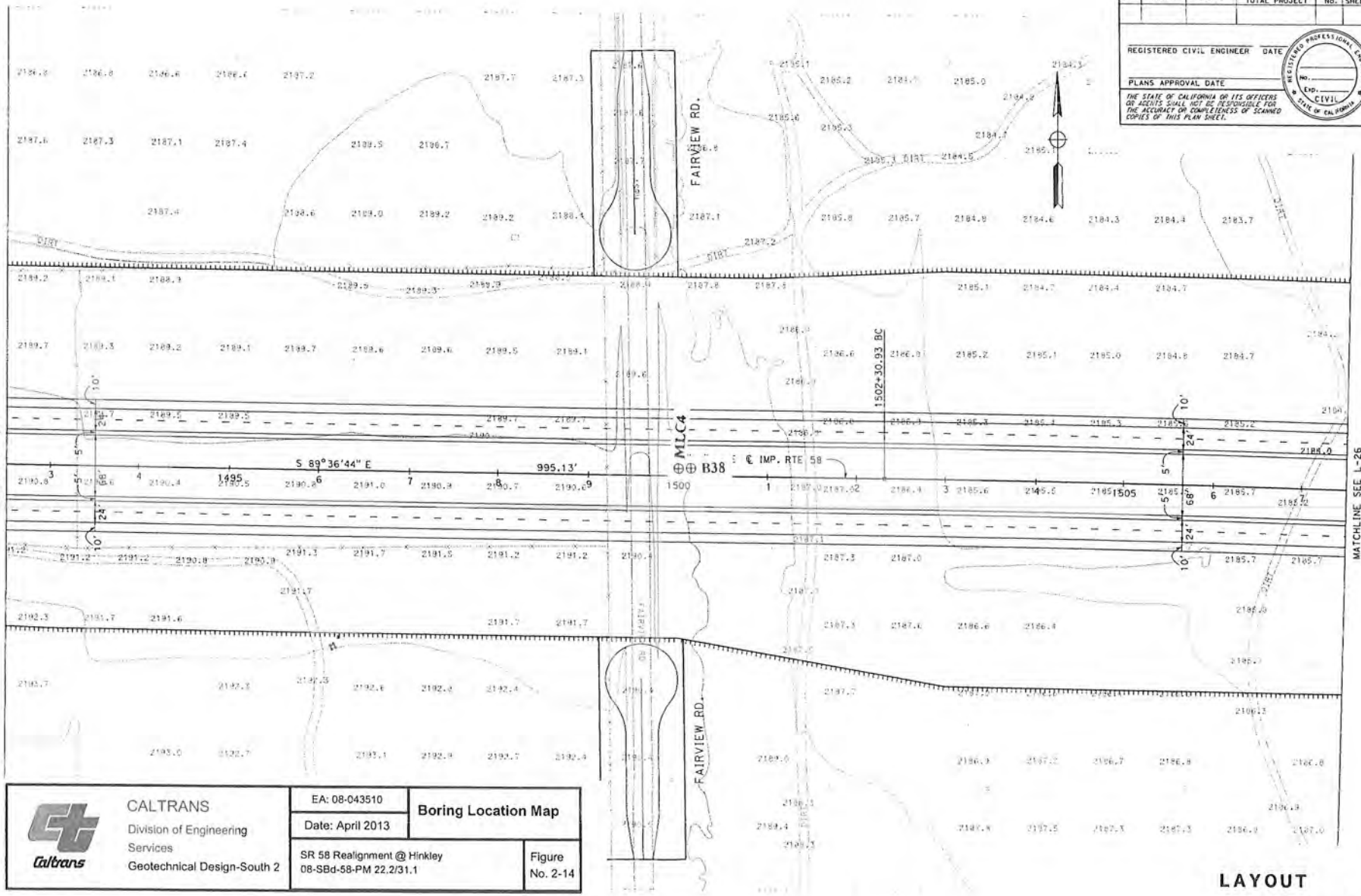

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER NO. EXP. CIVIL STATE OF CALIFORNIA

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013 **Boring Location Map** SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1 Figure No. 2-14

LAYOUT

SCALE: 1"=50'

L-25

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s112557
DGN FILE => 804351ea025.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 0000000001

LAST REVISION DATE PLOTTED => 17-OCT-2012
00-00-00 TIME PLOTTED => 11:24

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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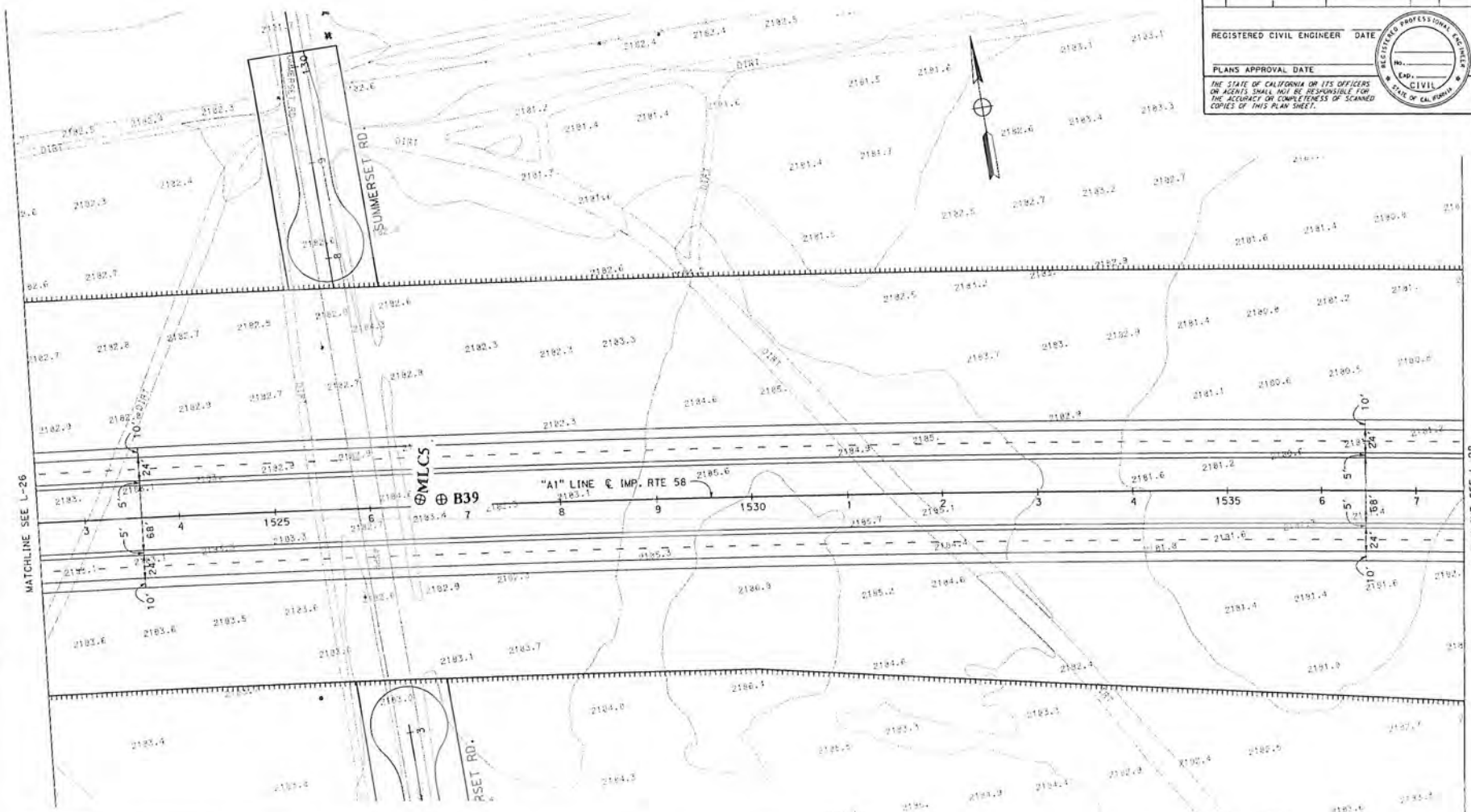
REGISTERED PROFESSIONAL ENGINEER NO. EXP. CIVIL STATE OF CALIFORNIA



CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	Boring Location Map	
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1		Figure No. 2-15

LAYOUT

SCALE: 1"=50'

L-27

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => 17-OCT-2012

TIME PLOTTED => 11:25

BORDER LAST REVISED 7/2/2010

USERNAME => s112557

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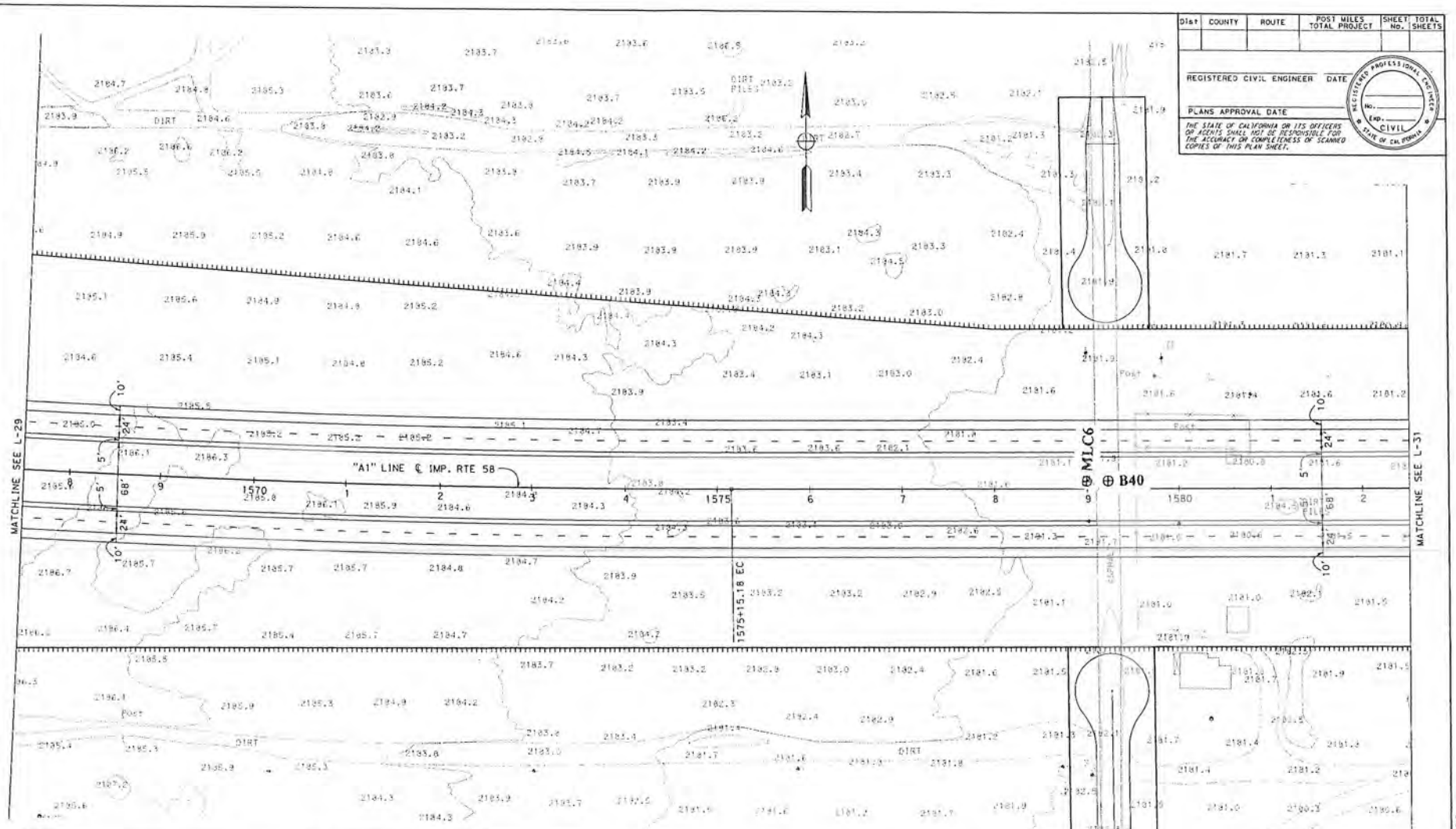
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 00000000001



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013 **Boring Location Map** SR58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1 Figure No. 2-16

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION DATE PLOTTED => 17-OCT-2012
00-00-00 TIME PLOTTED => 11:23

BORDER LAST REVISED 7/2/2010

USERNAME => s112557
DGN FILE => 8043510e030.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 00000000001

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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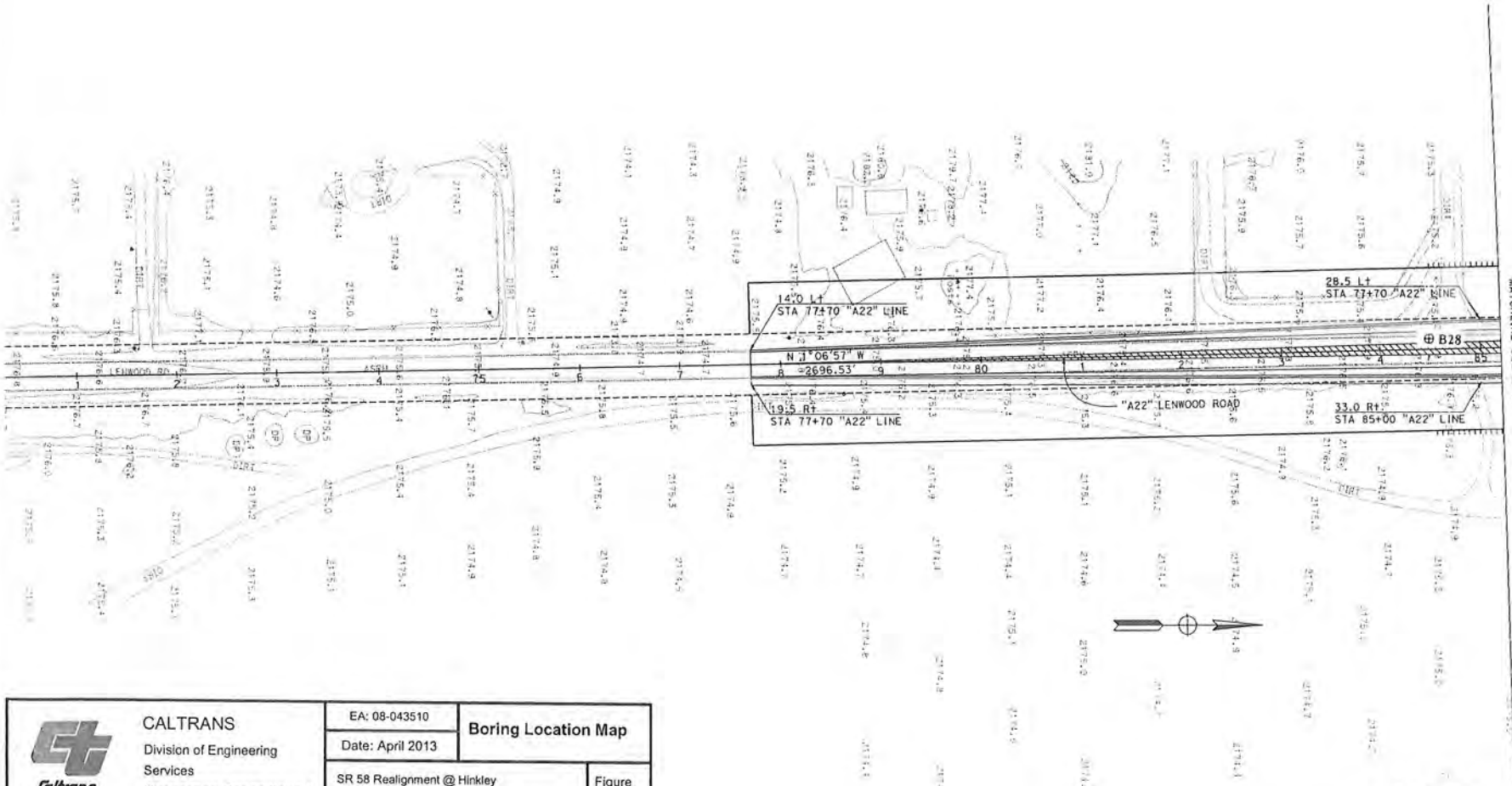
REGISTERED PROFESSIONAL ENGINEER NO. EXP. CIVIL STATE OF CALIFORNIA



CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	**Boring Location Map**
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1	Figure No. 2-17

LAYOUT

SCALE: 1"=50'

L-35

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 00-00-00 DATE PLOTTED => 17-OCT-2012 TIME PLOTTED => 11:50

BORDER LAST REVISED 7/2/2010

USERNAME => s112557
DGN FILE => B0435fwd035.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 00000000001

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	58	R22.2/R31.1	XX	XX

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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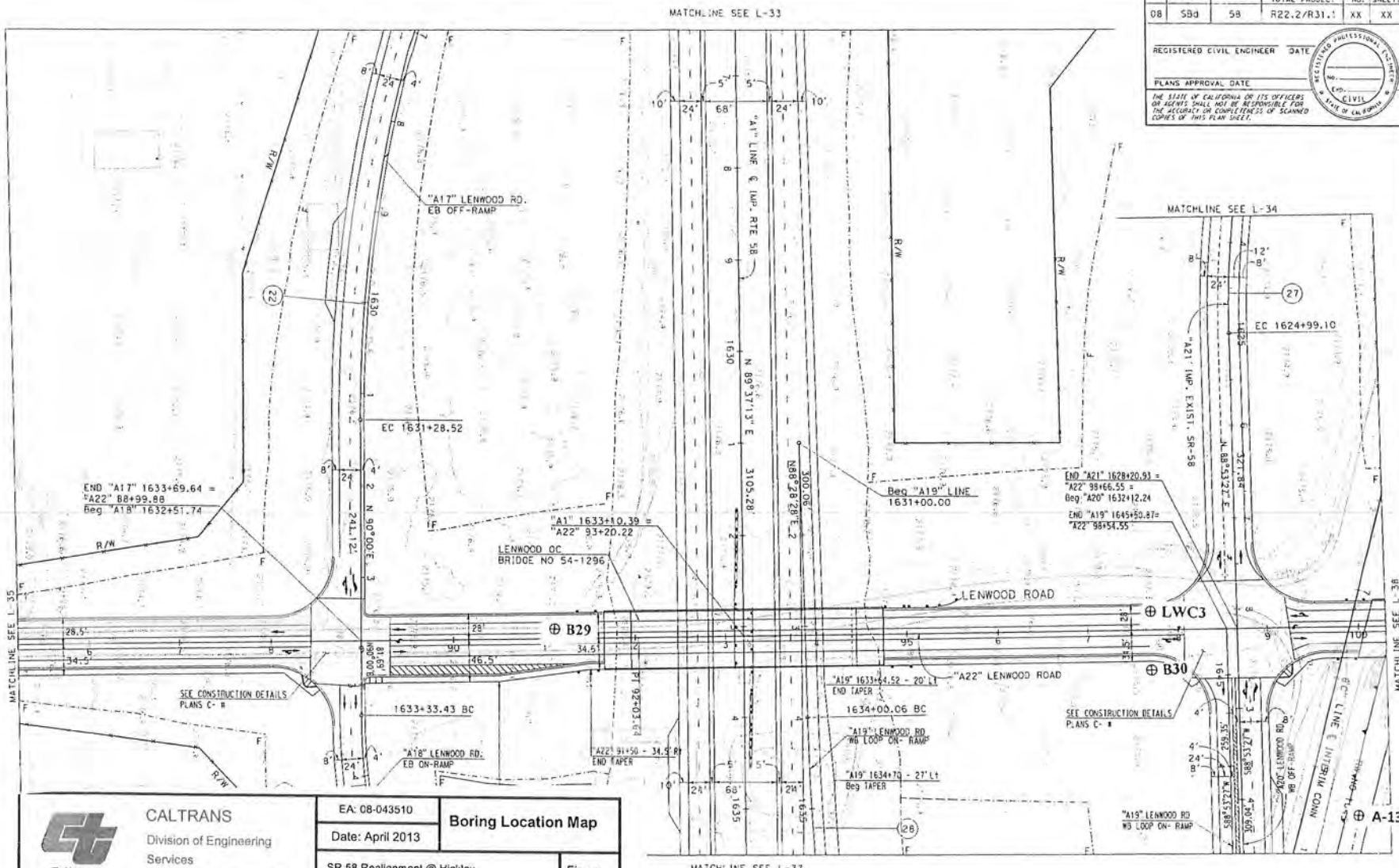

28	3000'	3°31'41"	92.39'	184.73'

CALTRANS
Division of Engineering Services
Geotechnical Design-South 2

EA: 08-043510

Date: April 2013

Boring Location Map

SR 58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-18

LAYOUT

SCALE: 1"=50'

L-36

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR: DIBORO KANABOLO

CALCULATED-DESIGNED BY: DAT WONG

CHECKED BY: JUSTINE NIU

REVISED BY

DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => s128626
DGN FILE => 804351ed036.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2239

PROJECT NUMBER & PHASE 08000000101

LAST REVISION 00-00-00 DATE PLOTTED => 09-2013 TIME PLOTTED => 11

DIst	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	58	R22.2/R31.1		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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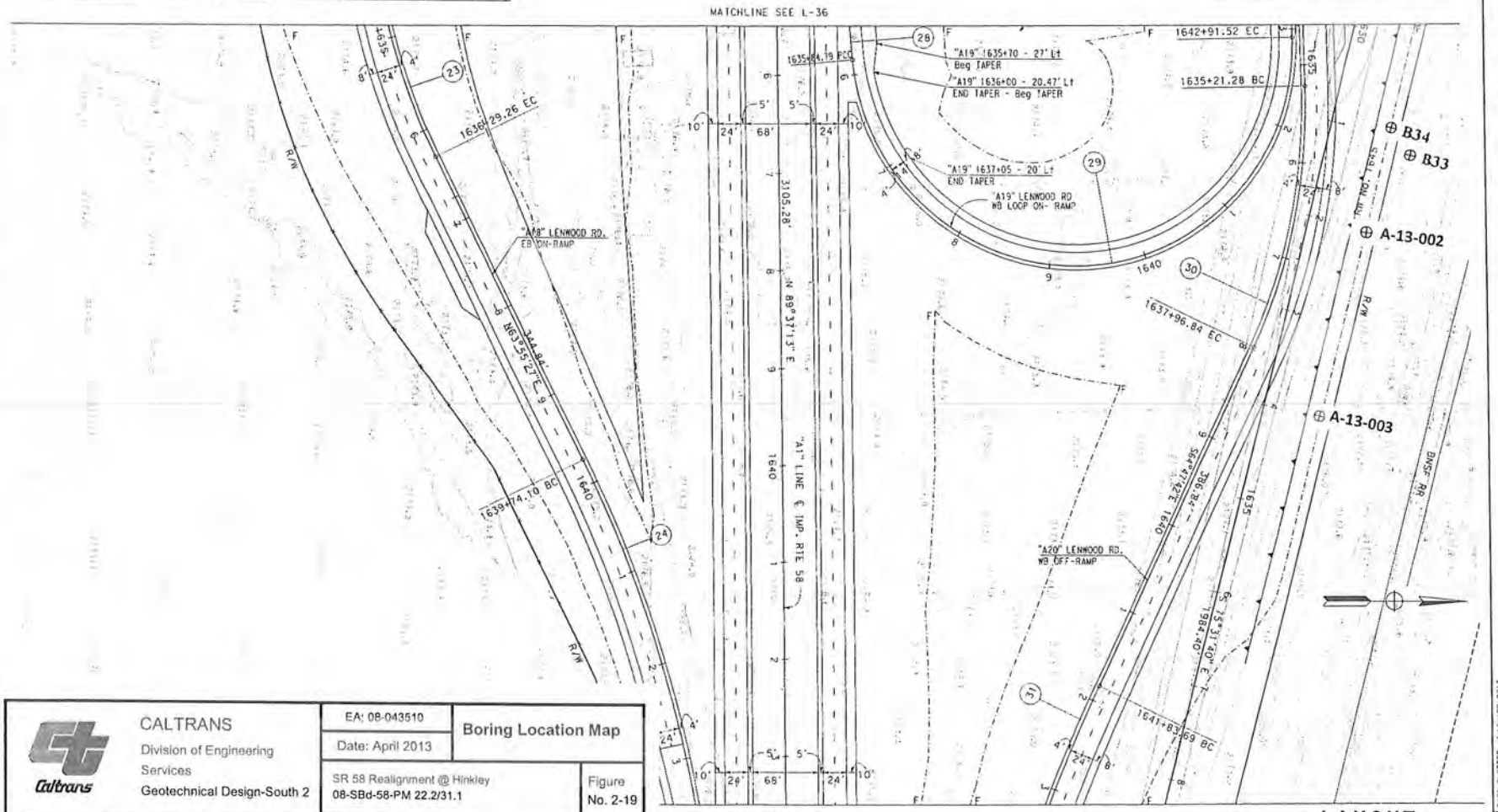
REGISTERED PROFESSIONAL ENGINEER — CIVIL — STATE OF CALIFORNIA

CURVE DATA

No.	R	Δ	T	L
23	650'	26°4'34"	150.52'	295.82'
24	1350'	21°10'07"	252.26'	498.78'
28	3000'	3°31'41"	92.39'	184.73'
29	230'	176°3'20"	6679.24'	706.73'
30	600'	26°18'52"	140.26'	275.56'
31	1600'	16°38'31"	234.01'	464.73'



CALTRANS
Division of Engineering Services
Geotechnical Design-South 2

EA: 08-043510
Date: April 2013

Boring Location Map

SR 58 Realignment @ Hinkley
08-SBd-58-PM 22.2/31.1

Figure No. 2-19

LAYOUT
SCALE: 1"=50'

L-37

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FUNCTIONAL SUPERVISOR: DIBORO KANABOLO
CALCULATED-DESIGNED BY: DAT WONG
CHECKED BY: JUSTINE NIU
REVISED BY / DATE REVISED

BORDER LAST REVISED 7/2/2010
USERNAME = s128626
DGN FILE = B0435Ie0037.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2239
PROJECT NUMBER & PHASE 08000000101
DATE PLOTTED = 10-JAN-2013
TIME PLOTTED = 13:31

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	58	R22.2/R31.1	XX	XX

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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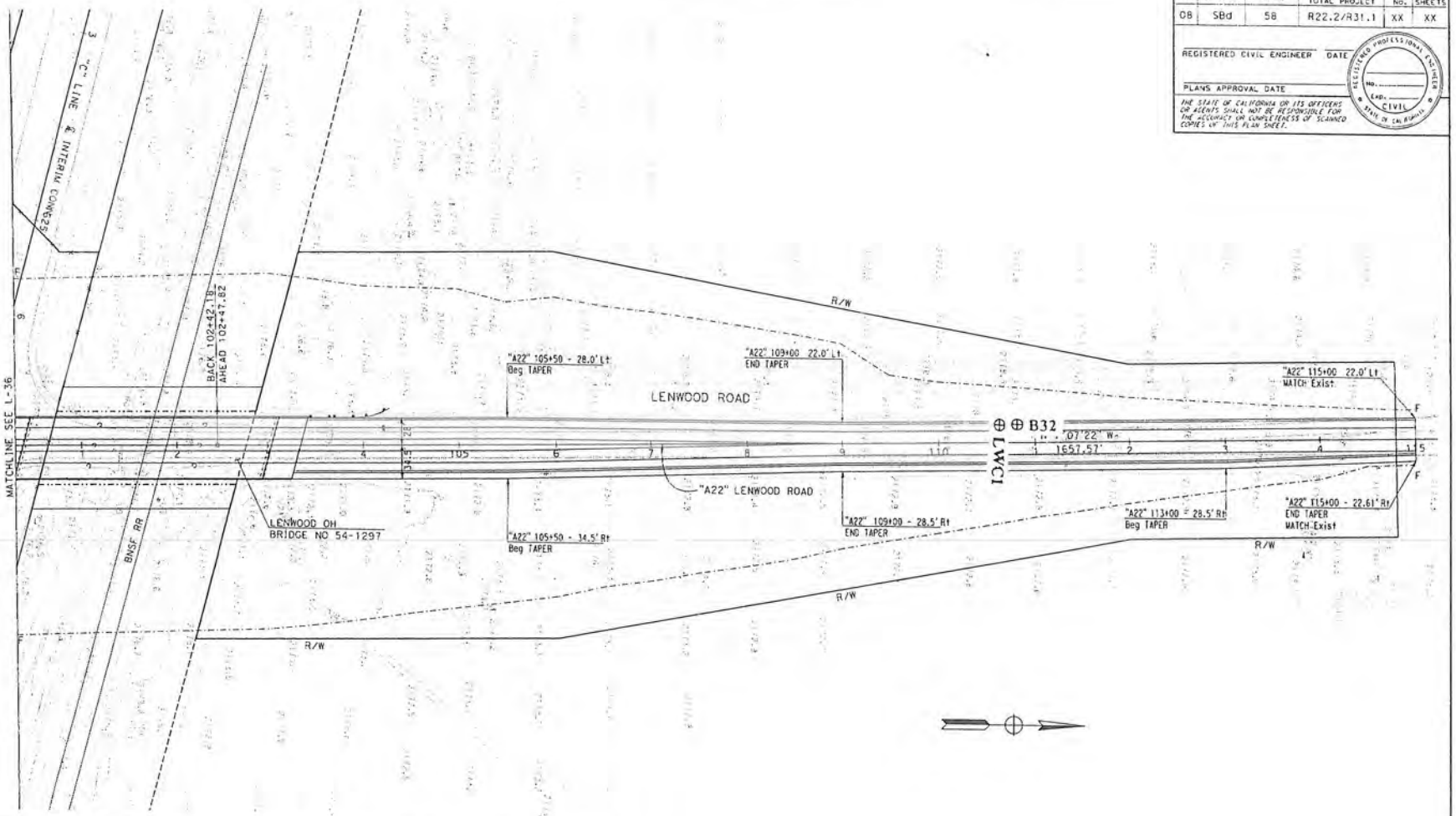
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA



CALTRANS Division of Engineering Services Geotechnical Design-South 2	EA: 08-043510 Date: April 2013	Boring Location Map	
	SR 58 Realignment @ Hinkley 08-SBd-58-PM 22.2/31.1		Figure No. 2-20

LAYOUT

SCALE: 1"=50'

L-38

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR: DIBORO KANABOLO

CALCULATED-DESIGNED BY: DAT WONG

CHECKED BY: JUSTINE NIU

REVISED BY

DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME = x136126

DGN FILE = x0435100036.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2239

PROJECT NUMBER & PHASE 08000000101

DATE PLOTTED = 10-APR-2013

TIME PLOTTED = 15:32

LAST REVISED 00-00-00