UNION ROAD – GOLDEN HILL ROAD TO CA STATE ROUTE 46

RECOMMENDATIONS

Pavement Maintenance Options (Short-Term)

These options are not available for this street because of structural deficiencies and/or pavement cracking condition.

Pavement Rehabilitation Options (Long-Term)

Overlay Options

For option 1, we recommend 4 inch digouts of base failures, placing a 1/2 inch HMA leveling course and a 2 inch RHMA overlay.

Estimated Cost: $409,000 Estimated Life Expectancy: 10-12 Years

An overlay using HMA is not recommended because the 4-1/2 inch requirement due to reflecting cracking exceeds the 3-1/2 inch overlay that is feasible due to geometric constraints.

Recycle and Mill and Replace Options

For alternate 1, we recommend milling off 2 inches of existing AC and placing 2 inches of RHMA.

Estimated Cost: $304,000 Estimated Life Expectancy: 12-15 Years

Milling and replacing with HMA is not recommended because of the structural deficiency and thin asphalt concrete layer over the PCC pavement.

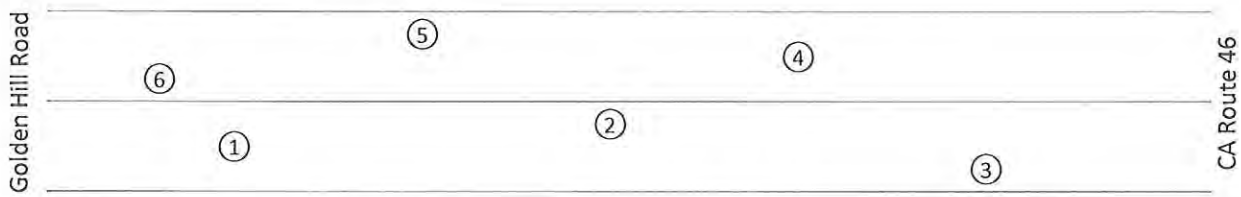
CIR is not recommended because of the underlying PCC pavement.

Reconstruction Options

For option 1, we recommend removing the pavement to a depth of 10 inches and placing 10 inches of new HMA. The HMA should be placed in 4 lifts.

Estimated Cost: $1,394,000 Estimated Life Expectancy: 20 Years

Pavement Engineering Inc.
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management



NOTES:
- NTS
- ACTUAL ROAD MAY NOT BE STRAIGHT
- NOT ALL ROADS CONNECTING TO THIS STREET ARE SHOWN
- WIDTH OF ROAD MAY VARY WITHIN THE BOUNDARY SECTION
- ALL LOCATIONS SHOWN ARE APPROXIMATED

Union Road

[Section of Road ≈ 3100ft]

TRAFFIC LAYOUT:
- 2-WAY STREET
- 1 LANE EACH WAY

VISUAL DESCRIPTION FOR THIS SECTION OF ROAD

The pavement exhibits moderate to severe block cracking and alligator cracking in the wheel paths in front of El Paso Self Storage. Some of the alligator cracking has progressed to base failure. The westbound lanes are in worse condition. There is a likelyhood that the underlying PCC does not streach across the entire westbound lane. There are intermittant roadside improvements. Previous maintance includes skin patching.

CORING LOG

Symbol	Location	Core Data		R-value
1	East of Golden Hill Road 500ft	AC PCC AB	3.50" 5.00" NO BASE	66
2	East of Golden Hill Road 1500ft	AC PCC AB	2.00" 5.75" NO BASE	37
3	East of Golden Hill Road 2500ft	AC AB	5.75" 18.25"+	-
4	East of Golden Hill Road 2000ft	AC PCC AB	5.25" 5.75" NO BASE	44
5	East of Golden Hill Road 1000ft	AC PCC	3.00" 5.50"	-
6	East of Golden Hill Road 300ft	AC PCC	4.00" 5.00"	-

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

Pavement Engineering Inc.
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management

Golden Hill Road

CA Route 46

NOTES:
- NTS
- ACTUAL ROAD MAY NOT BE STRAIGHT
- NOT ALL ROADS CONNECTING TO THIS STREET ARE SHOWN
- WIDTH OF ROAD MAY VARY WITHIN THE BOUNDARY SECTION
- ALL LOCATIONS SHOWN ARE APPROXIMATED

Union Road

[Section of Road ≈ 3100ft]

TRAFFIC LAYOUT:
- 2-WAY STREET
- 1 LANE EACH WAY

DEFLECTION ANALYSIS

Lane	Tolerable	TI	80th Percentile	Percent Reduction	HMA Overlay
West Bound	17	8.0	25.06	32.16	1.80 - inches
East Bound	17	8.0	15.95	0.00	0.00 - inches
				Overlay Required by Reflective Cracking	4.50 - inches

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

PAVEMENT ENGINEERING INCORPORATED

Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

03/27/13

City of Paso Robles

Road: Union
From: Golden Hill
To: W/O HWY 46
Lane/Line: EB

Survey Date: 03/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065

Deflection Data Analysis

Deflection Readings (Equivalent Deflectometer Units)

No. of Tests	Low	Mean	High	Std. Dev.
31	7.44	12.86	23.55	3.68

Road Surface

Thickness	Traffic Index
0.47	8.00

Structural Design

Tolerable	80th Percentile	90th Percentile	% Reduction	GE Deficient
17.00	15.95	17.56	0.00	0.00

HMA Overlay
0.00

PAVEMENT ENGINEERING INCORPORATED

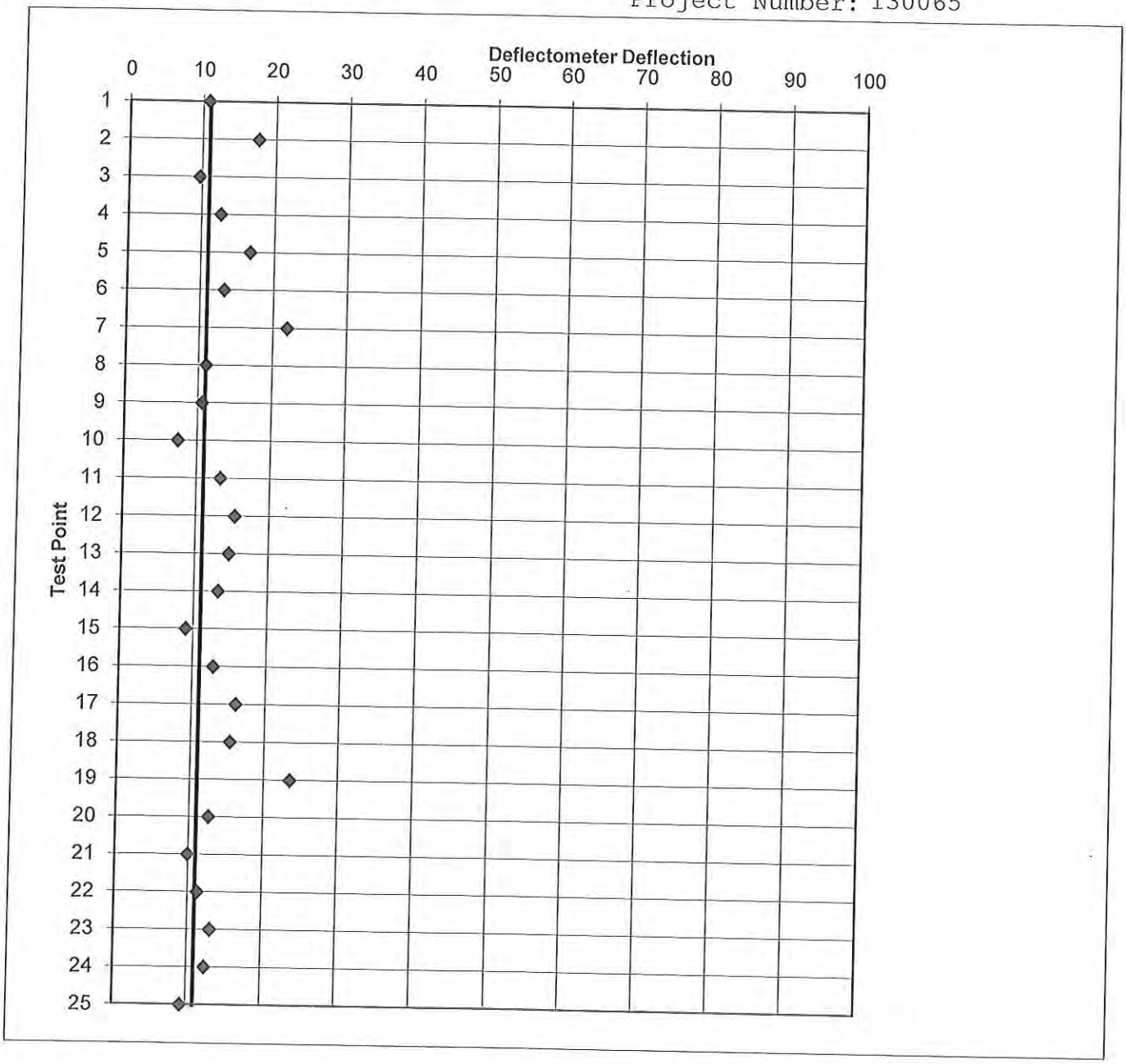
Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

03/27/13

City of Paso Robles

Road: Union
From: Golden Hill
To: W/O HWY 46
Lane/Line: EB

Survey Date: 03/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065



PAVEMENT ENGINEERING INCORPORATED

Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

Date: 3/27/2013

Client: City of Paso Robles
Road: Union
From: Golden Hill
To: W/O HWY 46
Lane/Line: EB

Interval: 100
Survey Date: 3/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065

Test Points	Dynaflect	Conditions	Comments	Deflection	Exclude
1	0.50			10.843	
2	0.80			17.649	
3	0.45			9.709	
4	0.58			12.658	
5	0.76			16.742	
6	0.61			13.339	
7	0.99		COP	21.960	
8	0.51			11.070	
9	0.49		Tuley	10.616	
10	0.35			7.440	
11	0.61			13.339	
12	0.70			15.381	
13	0.67			14.700	
14	0.61			13.339	
15	0.42			9.028	
16	0.59			12.885	
17	0.73			16.061	
18	0.70			15.381	
19	1.06			23.548	
20	0.58			12.658	
21	0.46			9.936	
22	0.52			11.297	
23	0.60			13.112	
24	0.57			12.431	
25	0.43			9.255	
26	0.37		Union	7.894	
27	0.51			11.070	
28	0.63			13.793	
29	0.42			9.028	
30	0.45			9.709	
31	0.58			12.658	

PAVEMENT ENGINEERING INCORPORATED

Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

03/27/13

City of Paso Robles

Road: Union
From: W/O HWY 46
To: Golden Hill
Lane/Line: WB

Survey Date: 03/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065

Deflection Data Analysis

Deflection Readings (Equivalent Deflectometer Units)

No. of Tests	Low	Mean	High	Std. Dev.
31	7.89	17.66	45.78	8.80

Road Surface

Thickness	Traffic Index
0.47	8.00

Structural Design

Tolerable	80th Percentile	90th Percentile	% Reduction	GE Deficient
17.00	25.06	28.93	32.16	0.28

HMA Overlay
0.15

PAVEMENT ENGINEERING INCORPORATED

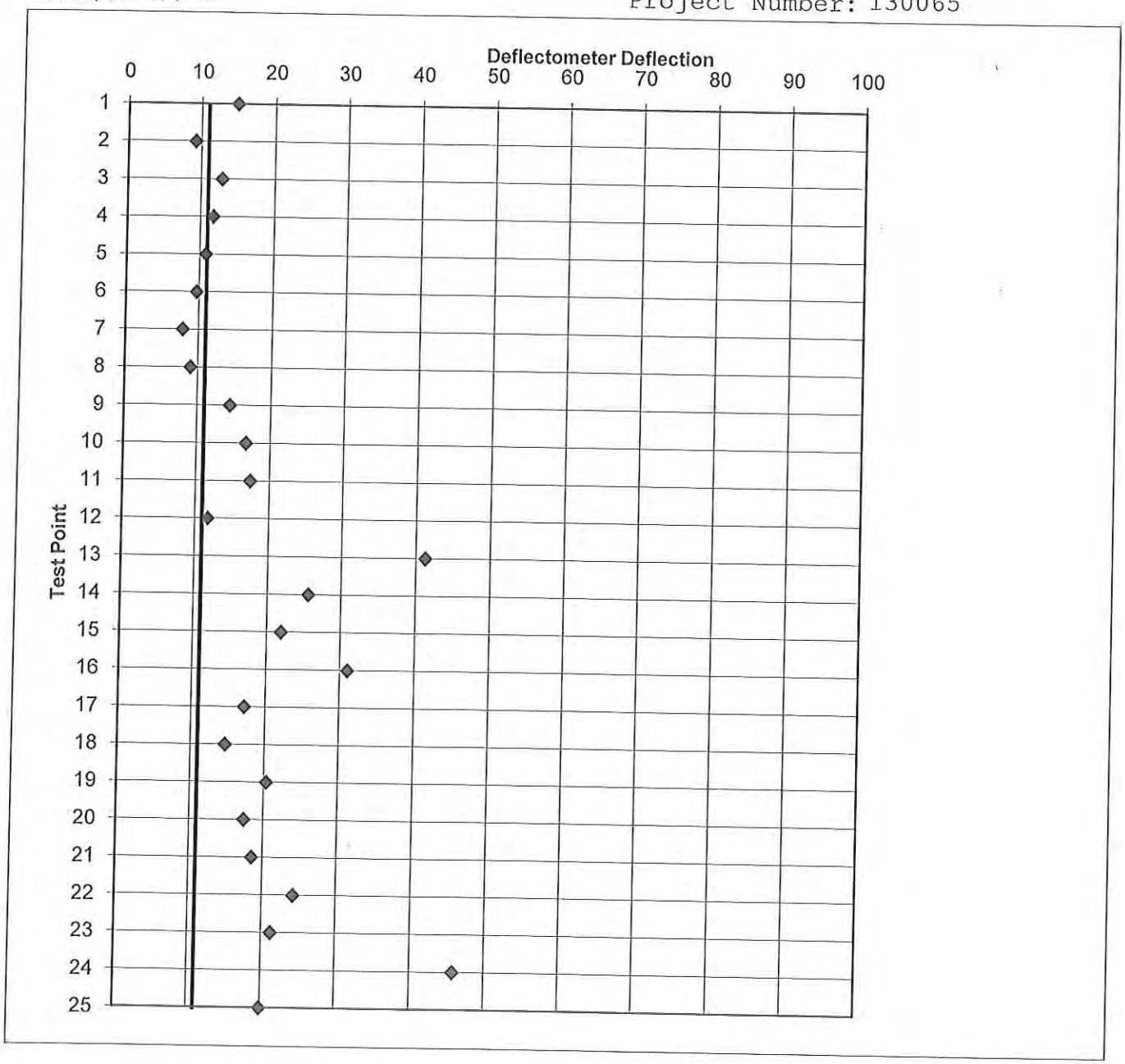
Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

03/27/13

City of Paso Robles

Road: Union
From: W/O HWY 46
To: Golden Hill
Lane/Line: WB

Survey Date: 03/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065



PAVEMENT ENGINEERING INCORPORATED

Redding (530) 224-4535 | Petaluma (707) 769-5330 | San Luis Obispo (805) 781-2265

Date: 3/27/2013

Client: City of Paso Robles
Road: Union
From: W/O HWY 46
To: Golden Hill
Lane/Line: WB

Interval: 100
Survey Date: 3/14/13
Thickness: 0.47
Traffic Index: 8.00
Project Number: 130065

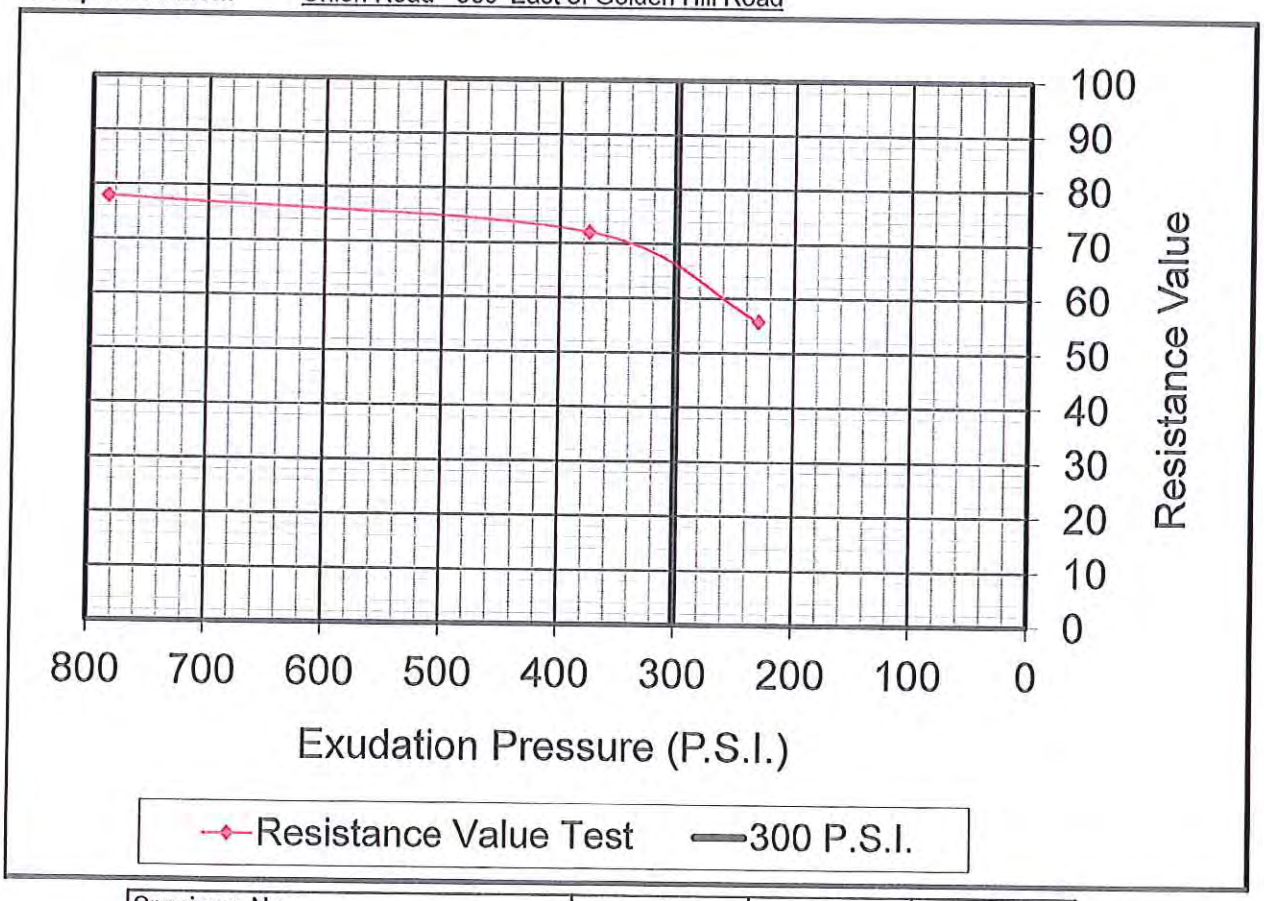
Test Points	Dynaflect	Conditions	Comments	Deflection	Exclude
1	0.68			14.927	
2	0.43			9.255	
3	0.59			12.885	
4	0.54			11.751	
5	0.50			10.843	
6	0.45		Union	9.709	
7	0.37			7.894	
8	0.42			9.028	
9	0.66			14.473	
10	0.76			16.742	
11	0.79			17.422	
12	0.54			11.751	
13	1.84			41.243	
14	1.15			25.590	
15	0.99			21.960	
16	1.39			31.034	
17	0.78			17.196	
18	0.67			14.700	
19	0.92			20.372	
20	0.79			17.422	
21	0.84			18.557	
22	1.09			24.228	
23	0.96			21.279	
24	2.04			45.781	
25	0.90			19.918	
26	0.85			18.784	
27	0.80			17.649	
28	0.61			13.339	
29	0.60			13.112	
30	0.45			9.709	
31	0.42			9.028	

Pavement Engineering Inc.
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management

RESISTANCE (R) VALUE TEST

ASTM D 2844

Laboratory No.: L130083W
Project No.: 130065
Sample Date: March 12, 2013
Report Date: March 25, 2013
Client: City of Paso Robles
Project Name: City of Paso Robles 2013 Pavement Analysis
Sample Description: Brown Sand with Silt
Sample Location: Union Road - 500' East of Golden Hill Road



Specimen No.	1	2	3
Moisture Content (%)	7.7	6.8	7.2
Dry Density (PCF)	132.3	133.7	133.2
Resistance Value (R)	56	78	72
Exudation Pressure (PSI)	230	786	375
Expansion Pressure	0	0	0

RESISTANCE VALUE AT 300 P.S.I. 66

AASHTO R18

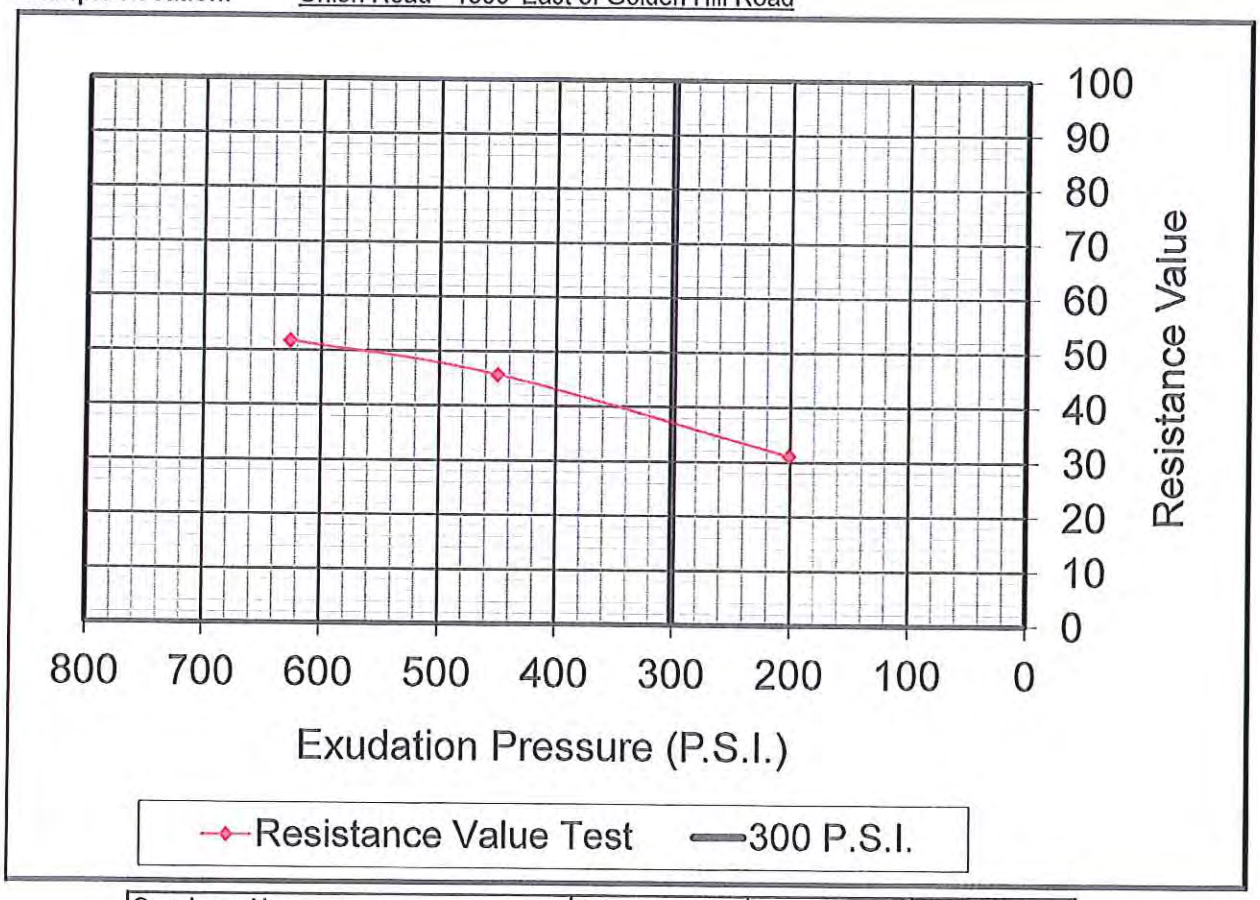
Reviewed By: Craig Long
Craig W. Long
Laboratory Operations Manager

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

Pavement Engineering Inc.
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management

RESISTANCE (R) VALUE TEST
ASTM D 2844

Laboratory No.: L130083C
Project No.: 130065
Sample Date: March 12, 2013
Report Date: March 21, 2013
Client: City of Paso Robles
Project Name: City of Paso Robles 2013 Pavement Analysis
Sample Description: Brown Clayey Sand
Sample Location: Union Road - 1500' East of Golden Hill Road



Specimen No.	1	2	3
Moisture Content (%)	8.4	9.3	8.9
Dry Density (PCF)	129.4	129.1	129.8
Resistance Value (R)	52	31	46
Exudation Pressure (PSI)	626	201	451
Expansion Pressure	0	0	0

RESISTANCE VALUE AT 300 P.S.I. 37

AASHTO R18

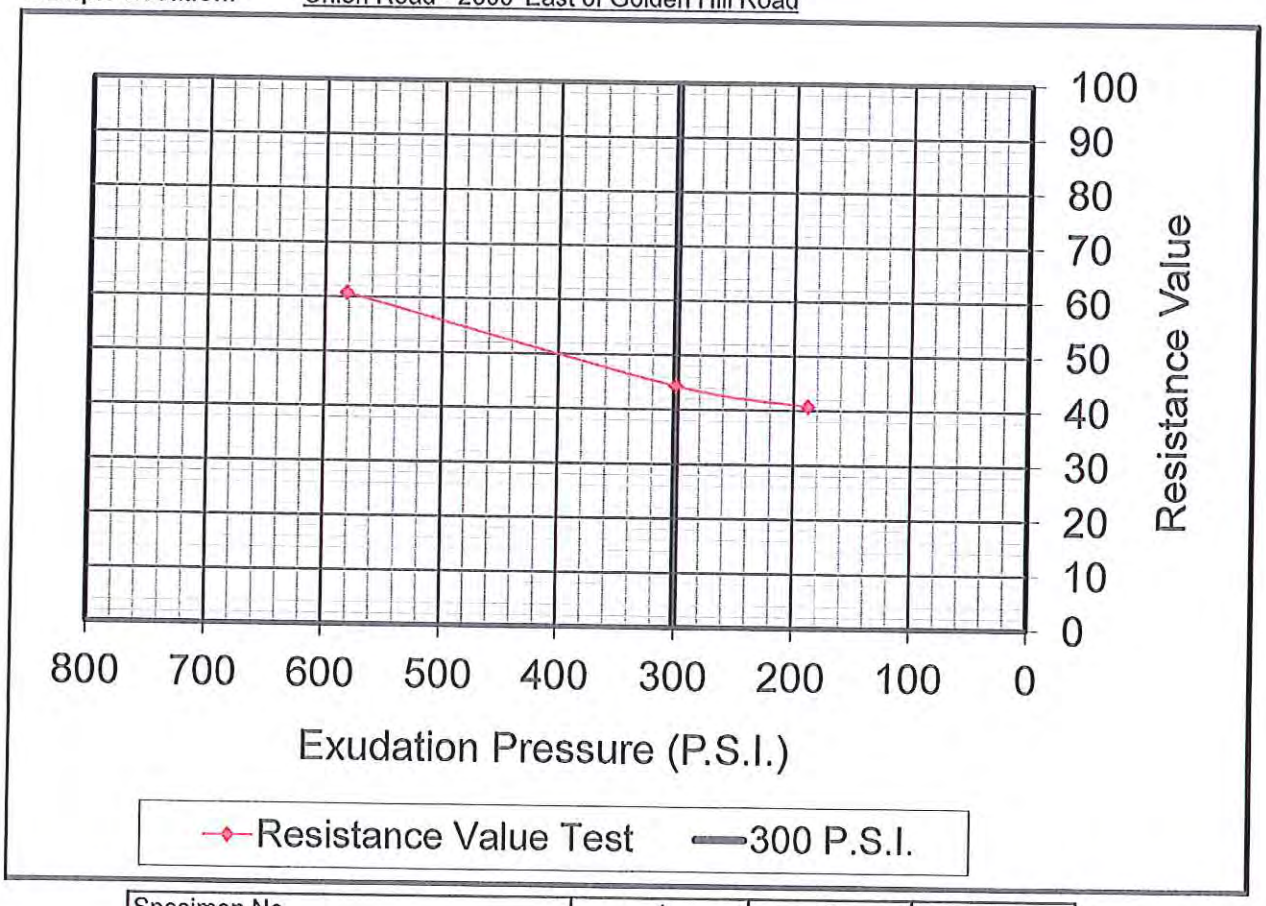
Reviewed By: Craig Long
Craig W. Long
Laboratory Operations Manager

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

Pavement Engineering Inc.
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management

RESISTANCE (R) VALUE TEST
ASTM D 2844

Laboratory No.: L130083Z
Project No.: 130065
Sample Date: March 12, 2013
Report Date: March 25, 2013
Client: City of Paso Robles
Project Name: City of Paso Robles 2013 Pavement Analysis
Sample Description: Light Brown Clayey Sand
Sample Location: Union Road - 2000' East of Golden Hill Road



Specimen No.	1	2	3
Moisture Content (%)	13.7	12.8	14.7
Dry Density (PCF)	118.4	120.2	117.2
Resistance Value (R)	44	61	41
Exudation Pressure (PSI)	301	582	188
Expansion Pressure	43	255	0

RESISTANCE VALUE AT 300 P.S.I. 44

AAP® AASHTO R18

Reviewed By: Craig Long
Craig W. Long
Laboratory Operations Manager

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

UNION ROAD – GOLDEN HILL ROAD TO CA STATE ROUTE 46
Golden Hill Road looking Eastbound

UNION ROAD – GOLDEN HILL ROAD TO CA STATE ROUTE 46
Tuley Court looking Westbound

UNION ROAD – GOLDEN HILL ROAD TO CA STATE ROUTE 46
Tuley Court looking Eastbound

UNION ROAD – GOLDEN HILL ROAD TO CA STATE ROUTE 46
Hwy 46 looking Westbound