2016 PAVEMENT EVALUATION AND REPORT

EAST LAKE VILLAGE SHORES

Yorba Linda, California

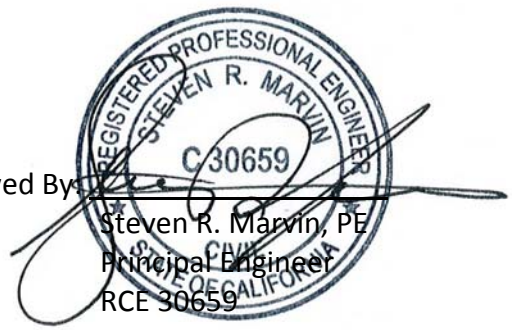
LMI Project No. 41619

Client:
East Lake Village Shores
c/o Ms. Taryn Martin, CCAM
StoneKastle Community Management, Inc.
181 S. Old Springs Road, First Floor
Anaheim Hills, California 92808

October, 2016

Prepared By: _____
Edward S. Perez
Project Engineer

Reviewed By: _____
Steven R. Marvin, PE
Principal Engineer
RCE 30659



LaBelle Marvin

Professional Pavement Engineering
2700 South Grand Avenue, Santa Ana, CA
714-546-3468 – labellemarvin.com

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APPENDIX

1.0 – INTRODUCTION

The following structural investigation report has been prepared for the East Lake Village Shores Homeowners Association, Yorba Linda, California. The following report has been prepared from the forensic investigation of the as-built conditions for the purpose of providing structural improvement recommendations.

2.0 - BACKGROUND

The community residences and roadways built on the immediate ground abutting the centrally located community reservoir. This study was restricted to those roadways and parking areas that serve as resident access only. The community parking and drives servicing the club house were not a part of this study. All drives and parking areas were constructed in early 1980's. The community roadways each have a head in parking areas of various sizes located at the far end from the entrance.

All asphalt concrete drives apart from parking areas are constructed as crowned at centerline asphalt concrete roadways that drain to rolled Portland Cement Concrete (PCC) edge gutters. The parking areas located at the end of each cul-de-sac are PCC slab on grade. All community roadways have been constructed into and around an interior reservoir of water with a buffer separation area that is the residence homes.

3.0 – SCOPE OF WORK

This investigation is limited to areas as indicated above. The objective of this study was to utilize the combination of field core and boring sampling, laboratory subgrade testing, visual review of prevailing conditions and engineering analysis to provide final improvement recommendations. This final report utilizes all information developed during this investigation, combined with engineering judgment and ongoing developments in pavement design and engineering, yielding recommendations for rehabilitation and/or reconstruction.

The specific tasks utilized to complete this report are as follows:

- Pavement Coring and Soil sampling
- Laboratory Testing and Analysis
- Designed Structural Replacement Sections.
- Report describing observations with conclusions and recommendations.
- Phased Street Improvement Plans (Appendix A)
- Engineers Cost Estimates and Quantity Take Offs (Appendix B)
- As-Built Thicknesses and In-situ Moisture Contents Plan and Log (Appendix C)
- Soil Strength R-Value CA 301 (Appendix D)

The investigation performed utilizes a range of measuring techniques to ascertain the present structural condition of the community pavements. The study utilizes pavement core sampling to define the existing section thicknesses to determine the combined effects of subgrade variations, historical traffic use, previous maintenance, and resurfacing. The methodologies employed permit exploration of rehabilitation alternatives, and provide a cross check for the understanding of the roadway history contributing to present conditions. The specific 'hard' data is combined with a visual examination of the pavements during development of testing protocol, field core sampling and during engineering review of conditions prior to development of final recommendations for maintenance, rehabilitation or reconstruction.

The variables associated with pavement performance and pavement rehabilitation present challenges which are addressed during design including current grades, grade restraints, pavement cross slopes, and curb heights. The impact on surface grades and elevations for potential rehabilitation alternatives where analyzed during the investigation, evaluating short and long term performance with related initial and projected long term costs. Balancing the costs and benefits requires consideration of numerous alternative methods of construction, which along with the costs and benefits include certain risks.

Pavement reconstruction provides the greatest product uniformity generally at the highest initial cost. Reconstruction includes the potential of encountering undefined subsurface conditions, utility conflicts, weather delays, and increased costs related to change orders.

Reconstruction also includes obvious substantial disruption to facility usage, and may be hampered with delays where subsurface conditions require design modification or construction changes. The requirement to maintain emergency access to all residents during the construction process will require specialty management.

Inherent in each of the construction procedures, including reconstruction, is the potential for cost increases and delays arising from unknown conditions through material and workmanship change orders, quality control and quality assurance procedures, the risks and implications of material variability and, in the case of resurfacing, grade impacts, grade restrictions along the roadway edges due to the presence or absence of curb or curb and gutter, prior construction history, the potential for reflection of existing cracking through the new wearing surface, etc.

4.0 – FIELD CONDITIONS

Observations of the roadways areas were documented during the visual review performed October of 2016 as referenced above. Observed conditions encountered are described as follows.

- The pavement surface is a smooth black pavement with various anomalies. Isolated areas of the surface have raveled seal surfaces with progressively increasing areas of worn and lost pavement sealed surfaces.
- Pavement fatigue in the form of alligator type cracking is present in isolated areas over each of the eight roadways.
- Pavement cracking is extensive throughout in all areas. The cracking is present in the form of thermal cracks, expansive cracking, isolated joint cracking and others.

Pavement cracks are typically coupled with minor spalling. Spalling is a condition that progressively affects the existing pavement cracks throughout. The condition occurs when had debris is forced by trucking and automobiles down in to existing cracks where it causes the walls of said cracks to break and flake away from varying vertical and horizontal movements resulting in increased and more rapid spalling conditions.

- Isolated pavement surfaces throughout the drives and parking areas have small and large areas of pavement raveling. The raveling condition is characteristic of the loose and loosening surface pavement seals, oils and fine to large aggregates.
- Oil dripping conditions in the parking areas are slight to moderate.
- Tree root damage to the asphalt concrete pavements has occurred in some areas drives.
- The PCC central valley gutter is in good condition with isolated areas of pavement failure.

5.0 – STRUCTURAL INVESTIGATION

The structural investigation was performed though the process of field sampling and laboratory analysis of materials obtained. The pavement core & boring sampling were performed at fourteen (14) locations during this investigation. Access through the asphalt pavements was provided through six (6) inch diameter core holes, cut through the surface utilizing portable coring equipment. The core samples obtained provide information relative to as-built pavement layered sections, historical use of overlays and fabric, where present. The existing roadway history is reflected in the core sampling. Laboratory analysis of the material obtained in sampling through the core hole yielded in-situ moisture contents, soil strengths, (R-value, CA Test No. 301), and designed structural replacement sections.

A summary of the LaBelle-Marvin, Inc., structural interlayer data follows.

STRUCTURAL SUMMARY

As-Built Sections

- Asphalt Concrete Thickness Measurements, Variable: 3" to 5"
- Aggregate Base Thickness Measurements: 3 $^{1}/_{2}$" to 5 $^{1}/_{2}$"

In-situ Moisture Soils Contents Sampled

- Clayey Silt (Boring 10-1): 18.4%
- Sandy Silt (Boring 10-2, 10-6, 10-7 & 10-8): 14.6% to 16.9%
- Silty Sand (10-3): 15.1%
- Sand (10-4 & 10-5): 8.1% to 8.6%

Equilibrium R-value:

- Clayey Silt (Boring 10-1): 13 by Expansion @ 18.2%.
- Silty Sand, (Boring 10-3): 52 by Expansion @ 15.62%.
- Sandy Silt (Boring 10-6): 10 by Expansion @ 19.2%.

The coring and boring data yielded a wealth of information relative to the history, performance and projected improvement plans for the community roadways and parking areas. The following is a summary of those observations.

- The original structural layer system was improved with thin asphalt concrete overlays for some areas at some point in time since original construction.
- The original construction employed little or no construction supervision/quality control of the materials thickness placement as determined by the observed wide range of measured thicknesses for both the asphalt concrete and aggregate base layers. This

condition resulted variable materials quality construction that did not contribute to the long term life of the pavement.

- The single use of five (5) inches of asphalt concrete as a thickened pavement section without aggregate base may represent a construction attempt to overcome wet grade conditions during construction. This area does not appear to be a repair made to the site.
- The soil types for the site are mixture of the extremely strong and non-expansive soil to a significantly weaker and expansive type soil. The weaker soil types follow the obvious and most immediate requirements for short and long term improvement.

6.0 – TRAFFIC USE ESTIMATES

The estimate of future traffic use was developed based on typical residential traffic and related trucks serving residences in the community. A traffic Index of 5.5 was utilized to represent anticipated traffic over the next 20 years for the community roadways. The structural implications based on these traffic estimates provide the basis for developing the final rehabilitation recommendations.

7.0 – CONDITION AND STRUCTURAL ANALYSIS

Evaluation of pavement conditions and structural needs along the roadway includes analysis of the existing pavement sections, visual pavement conditions, and ride qualities, grade and cross slope issues. The various measurements are compared to the impacts from traffic as represented over time by the Traffic Index.

Structural Section Component Analysis – Laboratory Based

Component analysis was performed at both laboratory equilibrium conditions and corresponding to actual in-place field moistures determined during this investigation for the existing site subgrade materials.

Comparison of replacement section thickness requirements with current thicknesses provides an initial basis for development of probable structural deficiencies. Subgrade strengths vary with changes in subgrade moisture.

Comparison of replacement section thickness requirements with current thicknesses provides an initial basis for development of probable structural deficiencies. Subgrade strengths in-situ, yielding strengths greatly above or below predicted strengths, will directly impact this analysis.

8.0 – CONCLUSIONS AND RECOMMENDATIONS

The asphalt concrete pavement area was investigated for the purpose of ascertaining the criteria requirements required for the preparation of improvement recommendations. With the work completed for this report this objective has been accomplished. The following is a summary of the improvement plan recommendations.

Design Needs and Rejected Improvement Alternatives

The design needs of the community roadways directed this final improvement recommendation to one that is only total removal and replacement. The other design improvement possibilities that were evaluated for this project include the following.

- The construction of a fabric and overly is not recommended for use in this design due to issues regarding existing pavement cracking, expansive soil conditions, age of the worked pavement cracks, and restrictive grade conditions. In order for a typical engineering fabric and overlay approach to work with these project roadways it will be necessary to place an overlay that exceeds three (3) inches. The placement of that thickness is simply not possible and any overlay would be restricted to two (2) inches,

maximum. The highly expansive nature of the soil with the age of the existing cracks untreated would likely result in reflective cracks in a short period of time.

- The construction of a new roadway system using Asphalt Rubber Hot Mix (ARHM) products is not advisable. An ARHM product is sometimes used as an overlay and can provide a limited degree of crack resistance that may replace the use of an engineering fabric of the life of the pavement. This product may be suitable for open roadway, non-parallel parking and no trash pick-up areas, but are not suitable for the tight turns of the residence cul-de-sac drives. Use of this material would result in less cracking and substantial rutting and considerable surface raveling.
- Removal and reconstruction with the use of a lime treated soil or cement treated soil are not suitable solutions for this project. The advantage of using this method would reduce the export and trucking costs for construction. The problem with this improvement method is that the cul-de-sac ends are all too intricate for this type of operation. Long term results from treated soils may result in block type cracks with the heavy expense of a 4" buffer zone and related design/construction precautions that would make these alternates non-completive economically.
- Section pulverization, grading and placement of a new asphalt concrete overlay is not a suitable solution for this project. The process of milling all materials, which vary from 7 ½ inches to 9 inches, cannot effectively be accomplished with the existence of a total in-place thickness of asphalt concrete over aggregate base material totaling more than 12 inches. In this case the resultant structural section produced after milling, compacting, and placing of a new 3 inch pavement would provide less than a total anticipated 10 year design life for many areas.

Long Term Improvement Recommendations

The improvement recommendation for the long term improvement of the community roadways is recommended as total removal and reconstruction of the structural pavement section that supports all truck and automobile traffic. The attached improvement plan

provided in this report identifies the need to remove and replace the following items. The attached Appendix Cost Estimate has provided this breakdown of anticipated costs suitable for budget purposes. The cost estimate has been provided in two views. A cost for all work in one year is estimated as well as the individual costs for each street area should the community elect to extend the length of the project.

- Removal and reconstruction of all failed Portland Cement Concrete elements as shown on the plan for Via Oparto only at this time. The community may elect to remove and reconstruct community roadways in a manner and plan that accommodates community budgets and is planned over a number of years. As such it will be important to remove any additional areas of PCC slabs, gutters, or curbs that are likewise failed.
- Removal and reconstruction of all asphalt concrete pavement areas. The new pavement section selected will provide the community with the least risk to pavement cracking though no complete assurance can be provided given the high degree of variables that are incorporated in to the construction process.
- Adjustment of all utility lids, rims, etc., is needed at the conclusion of the paving process. All improvements should be performed in accordance with local city ordinance. Ordinances vary from city to city.
- Final striping and marking of all areas is the final item that will be needed for the project.

The placement of pavement seals cannot effectively be accomplished without damage arising from the existing pavement system. Therefore, no maintenance is advised at this time or until a period of five years has elapsed after the construction of any roadway. The five year period is economically prudent and will not permit the roadways to be ruined by excessive oxidation exposure to the elements of sunlight, air and water.

9.0 – REPLACEMENT SECTION ALTERNATIVES

Replacement section alternatives are provided, representing an asphalt concrete over aggregate base thickness based on the known wet grade conditions and the potential for wet grade corrections during construction and expenditure of additional contingency funds.

Subgrade soil conditions, as mentioned above, were extremely wet for this soil type over the roadway segment. Laboratory predicted subgrade strengths were determined to be an equilibrium R-value of 10 at an moisture content of 19.1%. Existing site moisture contents of the soil vary from a measured 14.7% to 18.4%. Data from the R-value determinations indicates that existing soils will not be suitable for supporting construction traffic when moisture contents exceed a region of 14.7% to 15.7%. Due to the combination of the expansive nature of the subgrade soils and the same soils inability to support construction traffic above a measured value as low as 14.7% in some cases, a conservative selection of a design R-value at 5 has been selected.

Recommended Design R-Value: 5

Design Traffic Index 5.5

Use of the following replacement section for the asphalt concrete pavement is recommended in all designated reconstruction areas. Due to the wet nature of the soils in the majority of areas the recommendation for reconstruction selected incorporates the anticipation of some wet grade remediation.

STRUCTURAL REPLACEMENT SECTION ALTERNATIVES | Cabrillo Park		
DESIGN R-VALUE: 5 | TRAFFIC INDEX: 5.5		
Type	Alternative 1	Alternative 2
	ASPHALT CONCRETE	**PORTLAND CEMENT CONCRETE**
	Drives	Drives
Asphalt Concrete	3"	N/A
PCC, 500 psi Flexural (MR)	N/A	8"
Aggregate Base	12"	4"
Geotextile Fabric	yes	no
Aggregate Base Compaction Requirement	95% Min.	95% Min.
Subgrade Compaction Requirement (Upper 6")	90% Min.	90% Min.

Once improvements have been made to community roadways a pavement seal that would initiate the maintenance period should not be placed until the fifth year. Maintenance is then recommended at regular intervals occurring at the end of each 3 years period.

10.0 - ESTIMATED COSTS

Estimated costs for the recommended improvements are provided in the table above for budgeting purposes and within Appendix B – Engineers Cost Estimate. Unit cost estimates include a slight contingency for budgeting and possible phasing.

11.0 - PROJECT BIDDING AND CONSTRUCTION OVERSIGHT

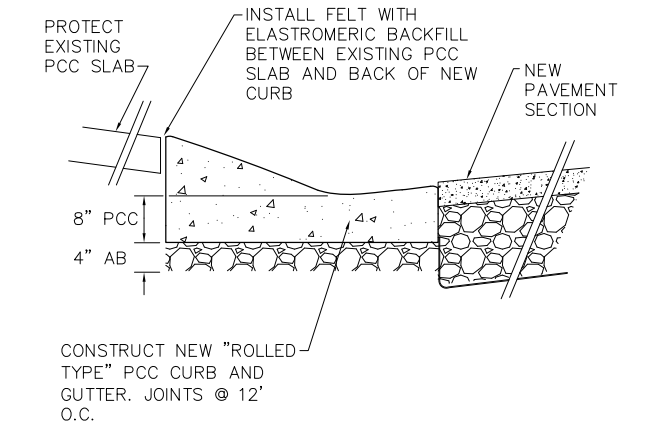
The completed report and support documents combine observed visible pavement conditions, traffic patterns, grade restrictions and engineering judgment.

The final element in community roadway improvement will be project oversight and/or inspection. Pavement repair and rehabilitation often includes encountering unforeseen conditions such as improperly located or buried utilities, local wet subgrade conditions,

variations in existing pavement sections and support, variation in construction material qualities, etc. Site inspection and/or oversight provides the community with the means for reducing risks and improving long term performance through verification of excavation limits and depths, material placement and compaction, finishing methods, material qualities, etc. LMI is prepared to provide a proposal for the above services upon request.

APPENDIX A

IMPROVEMENT PLAN



② TYP. "ROLLED - TYPE" PCC CURB AND GUTTER
NOT TO SCALE

① STRUCTURAL REPLACEMENT SECTION
NOT TO SCALE

NOTES TO CONTRACTOR

CONTRACTOR SHALL COORDINATE START OF WORK WITH THE OWNER AND/OR OWNER'S REPRESENTATIVE A MINIMUM OF 72 HOURS IN ADVANCE.

THE WORK SHALL BE SECTIONED OFF WITH TEMPORARY NO PARKING SIGNS, SO VEHICLES CANNOT PARK WHILE PAVING WORK IS BEING PERFORMED.

CONTRACTOR SHALL NOT TAKE DIRECTION FROM ANYONE OTHER THAN THE OWNER AND/OR OWNER'S REPRESENTATIVE.

CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING STORM DRAIN INLETS AND ADJACENT PROPERTIES DURING COURSE OF WORK.

PROJECT SPECIFICATIONS ARE THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (SSPWC), 2015 ED. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE SSPWC.

CONTRACTOR SHALL VERIFY DEPTH OF UTILITIES PRIOR TO EXCAVATION OF ISOLATED RECONSTRUCTION AREAS.

WORK HOURS SHALL BE ENFORCED. ADEQUATE TRAFFIC CONTROL SHALL BE PROVIDED.

CONSTRUCTION NOTES

① DEMO EXISTING AND REMOVE TO 15" DEPTH. GRADE AND COMPACT EXISTING SUBGRADE PER SPECIFICATIONS. CONSTRUCT NEW 3" ASPHALT CONCRETE PAVEMENT OVER 12" AGGREGATE BASE OVER GEOTEXTILE FABRIC. ADJUST ALL UTILITIES TO NEW FINISH GRADE. SEE DETAIL 1 HEREON.
.

② DEMO, REMOVE AND RECONSTRUCT WITH NEW "ROLLED TYPE" PORTLAND CEMENT CONCRETE CURB AND GUTTER. TYPE AND CONFIGURATION SHALL MATCH EXISTING.
.

③ RESTRIPE COMMUNITY, INCLUDING ALL PARKING STALLS AND ALL PAINTED CURBS. INSTALL NEW FIRE HYDRANT REFLECTORS. STRIPING SHALL FOLLOW EXISTING CONFIGURATION.
.

LEGEND

NEW 3" ASPHALT CONCRETE OVER 12" AGGREGATE BASE OVER GEOTEXTILE – NOTE 1

NEW CURB AND GUTTER – NOTE 2

NO.	DATE	REVISIONS	APP.	DATE
6				
5				
4				
3				
2				
1				

PLANS PREPARED BY:
LABELLE · MARVIN, INC.
PAVEMENT TECHNOLOGY SPECIALISTS
2700 S. GRAND AVENUE SANTA ANA, CA 92705
PH (714) 546-3468 FAX (714) 546-58.41

CLIENT:
EAST LAKE VILLAGE SHORES COMMUNITY ASSOCIATION
STONEKASTLE COMMUNITY MANAGEMENT
22800 SAVI RANCH PARKWAY
YORBA LINDA, CA 92887

PROJECT TITLE
2016 STRUCTURAL PAVEMENT INVESTIGATION REPORT
LOCATION:
EAST LAKE VILLAGE SHORES
NORTHWESTERLY CORNER OF PASEO DE LAS PALOMAS AND VILLAGE CENTER DRIVE
YORBA LINDA, CA

DRAWING NAME:
PAVEMENT IMPROVEMENT PLAN

SHEET No.
1 OF 1
DATE: 10/14/16
SCALE: 1" = 160'
DESIGNED BY: E. PEREZ
DRAWN BY: G. MARVIN

PROJECT NUMBER
41619

APPENDIX B

ENGINEERS COST ESTIMATE

Client: EAST LAKE VILLAGE SHORES COMMUNITY ASSOCIATION
c/o STONEKASTLE COMMUNITY MANAGEMENT
22800 SAVI RANCH PARKWAY
YORBA LINDA, CA 92887

Prepared By:
LaBelle Marvin, Inc.
2700 South Grand Avenu
Santa Ana, CA 92705
PN 41619

ENGINEERS COST ESTIMATE

EAST LAKE VILLAGE SHORES COMMUNITY ASSOCIATION

YORBA LINDA, CA

Date: 10/18.16

STREET IMPROVEMENT RECOMMENDATIONS (BUDGET PURPOSES)

	CONSTRUCTION NOTE		QUANTITY	ESTIMATED COST
1.	DEMO EXISTING AND REMOVE TO 15" DEPTH. GRADE AND COMPACT EXISTING SUBGRADE PER SPECIFICATIONS. CONSTRUCT NEW 3" ASPHALT CONCRETE PAVEMENT OVER 12" AGGREGATE BASE OVER GEOTEXTILE FABRIC.			
		Via Maria	12,806 sf	$89,002
		Via Oparto	11,204 sf	$77,868
		Via Moreno	16,187 sf	$112,500
		Via Apolina	14,628 sf	$101,665
		Via Fonte	15,603 sf	$108,441
		Via Rene	12,165 sf	$84,547
		Via Andalusa	14,172 sf	$98,495
		Via Murcia	10,994 sf	$76,408
	ADJUST ALL WATER VALVES AND MANHOLES TO NEW FINISH GRADE			
		Manhole Covers	27 mh	$11,475
		Water Valves	32 wv	$12,800
2.	DEMO, REMOVE AND RECONSTRUCT WITH NEW "ROLLED TYPE" PORTLAND CEMENT CONCRETE CURB AND GUTTER. TYPE AND CONFIGURATION SHALL MATCH EXISTING.		20 lf	$1,800
7.	RESTRIPE COMMUNITY, INCLUDING ALL PARKING STALLS AND ALL PAINTED CURBS. INSTALL NEW "BLUE" FIRE HYDRANT REFLECTORS. STRIPING SHALL FOLLOW EXISTING CONFIGURATION.		Lump Sum	$1,500
		TOTAL COST		**$776,500**

PRIORITY #	STREET NAME	SUGGESTED BUDGET PER STREET
1	Via Maria	$92,477
2	Via Oparto	$83,043
3	Via Moreno	$116,700
4	Via Apolina	$105,440
5	Via Fonte	$111,816
6	Via Rene	$87,122
7	Via Andalusa	$103,120
8	Via Murcia	$78,983

APPENDIX C

CORE LOCATION PLAN AND SAMPLE LOG

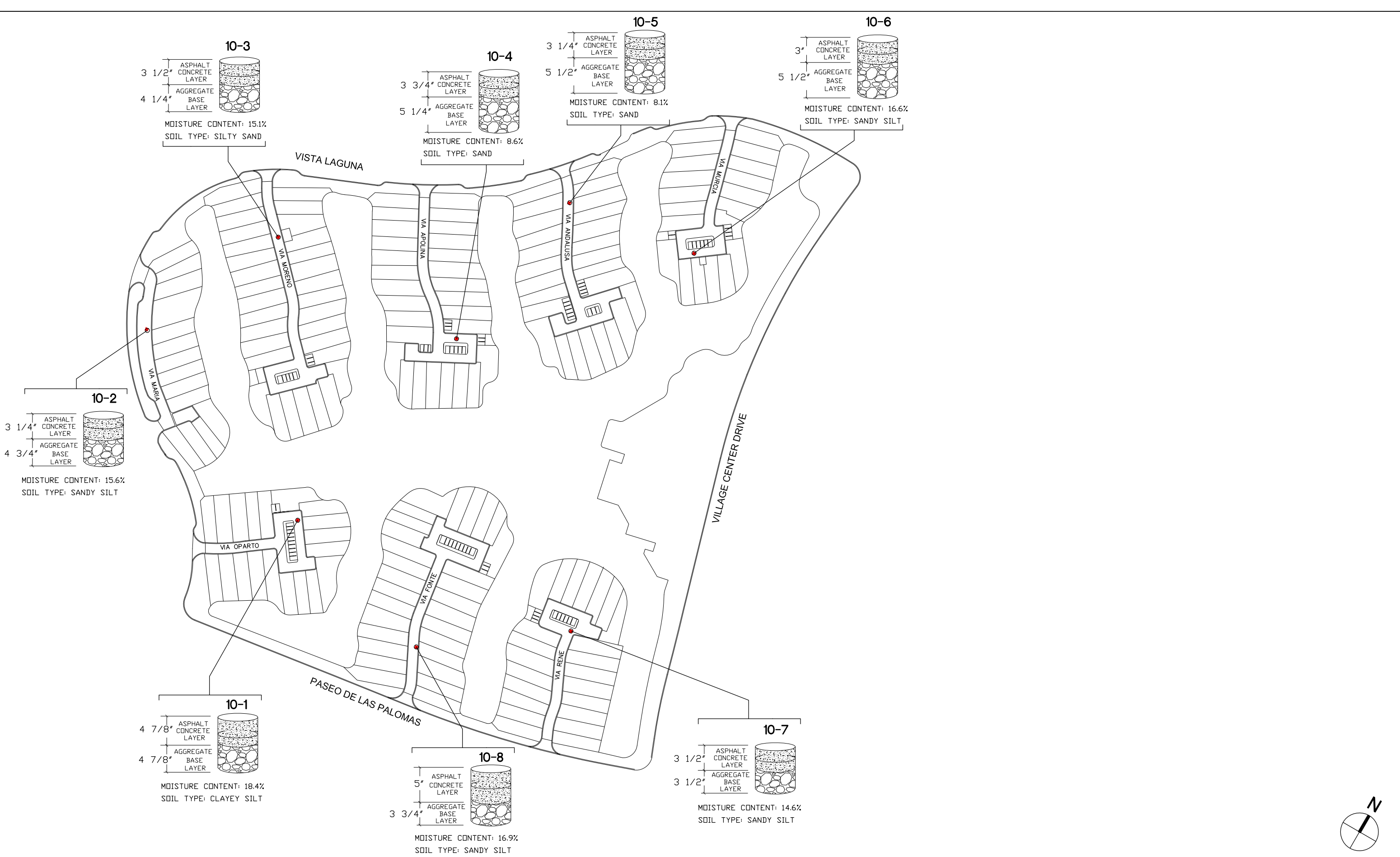
CORING RESULTS

East Lake Village HOA

Client: StoneKastle Communiity Management, Inc.

Cores Obtained: June 2016 **Technician(s): JW / DL**

PAVEMENT CORING DATA							SOIL BORING DATA			
Core	Lane	Dir.	Location	Total Pavement	Cross-Section	Type	Aggregate Base (AB)	Type	Soil Type (Maximum 3' depth)	Moisture Content
10-1	**1**	**N**	**Oparto**	**4 7/8"**	3" 1 7/8"	AC	**4 7/8"**	AB	Brown Clayey Silt	18.4%
	Lateral and Longitudinal Position									
	103'	n/o	rolled curb							
	8'	w/o	rolled curb							
10-2	**1**	**N**	**Via Maria**	**3 1/4"**	1 1/2" 1 3/4"	AC	**4 3/4"**	AB	Brown Sandy Silt	15.6%
	Lateral and Longitudinal Position									
	203'	S	rolled curb							
	11'	W	Curb Face							
10-3	**1**	**N**	**Via Moreno**	**3 1/2"**	2" 1 3/4"	AC	**5 1/4"**	AB	Brown Silty Sand	15.1%
	Lateral and Longitudinal Position									
	243'	E	Vista Laguna							
	5'	N	Rolled Curb							
10-4	**1**	**N**	**Via Apolina**	**3 3/4"**	2" 1 3/4"	AC	**3 1/8"**	AB	Brown Sand	8.6%
	Lateral and Longitudinal Position									
	55'	N	rolled curb							
	18'	W	rolled curb							
10-5	**1**	**N**	**Via Andalusia**	**3 1/4"**	1 1/4" 2"	AC	**4 7/8"**	AB	Brown Sand	8.1%
	Lateral and Longitudinal Position									
	144'	s/o	Vista Laguna							
	10'	w/o	rolled curb							
10-6	**1**	**E**	**Via Rene**	**3"**	1 1/2" 1 1/2"	AC	**5 1/2"**	AB	Brown Silty Sand	16.6%
	Lateral and Longitudinal Position									
	6'	E	rolled curb							
	32'	N	rolled curb							
10-7	**1**	**E**	**Elkader**	**3 1/2"**	1 1/4" 2 1/4"	AC	**3 1/2"**	AB	Brown Silty Sand	14.6%
	Lateral and Longitudinal Position									
	9'	n/o	Dellwood							
	6'	w/o	Island Curb Face							
108	**1**	**E**	**Elkader**	**5"**	1 3/4" 3 1/4"	AC	**3 3/4"**	AB	Brown Silty Sand	16.9%
	Lateral and Longitudinal Position									
	185'	n/o	Paseo De Las Palomas							
	6'	w/o	rolled curb							



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YORBA LINDA, CA

DRAWING NAME:
CORE LOCATION PLAN

SHEET No.
1 OF 1
DATE: 10/14/16
SCALE: 1" = 200'
DESIGNED BY: E. PEREZ
DRAWN BY: G. MARVIN

PROJECT NUMBER
41619

APPENDIX D

LABORATORY TEST RESULTS

R-VALUES (CA 301)

LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 41619

DATE: 10/11/2016

BORING NO. Subgrade 10-1
Via Oporto
Eastlake Village HOA

SAMPLE DESCRIPTION: Brown Slightly Clayey Silt

R-VALUE TESTING DATA | CA TEST 301

	SPECIMEN ID		
	a	b	c
Mold ID Number	4	5	6
Water added, grams	34	60	20
Initial Test Water, %	15.5	18.1	14.1
Compact Gage Pressure,psi	100	60	140
Exudation Pressure, psi	270	164	579
Height Sample, Inches	2.48	2.55	2.47
Gross Weight Mold, grams	3040	3043	3057
Tare Weight Mold, grams	1977	1975	1976
Sample Wet Weight, grams	1063	1068	1081
Expansion, Inches x 10exp-4	95	36	140
Stability 2,000 lbs (160psi)	37 / 95	53 / 126	30 / 76
Turns Displacement	4.23	4.31	3.67
R-Value Uncorrected	29	14	43
R-Value Corrected	29	14	43
Dry Density, pcf	112.5	107.4	116.3

DESIGN CALCULATION DATA

Traffic Index	Given:	5.0	5.0	5.0
G.E. by Stability		0.91	1.10	0.73
G. E. by Expansion		3.17	1.20	4.67

Equilibrium R-Value	**13** by EXPANSION	Examined & Checked: 10 /11/ 16
REMARKS:	Gf = 1.25 0.0% Retained on the 3/4" Sieve.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

LaBelle Marvin

R-VALUE GRAPHICAL PRESENTATION

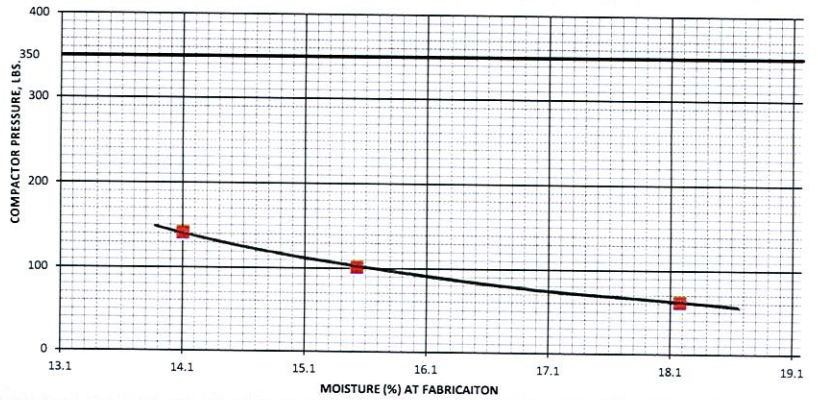
PROJECT NO. 41619

DATE: 10 /11/ 16

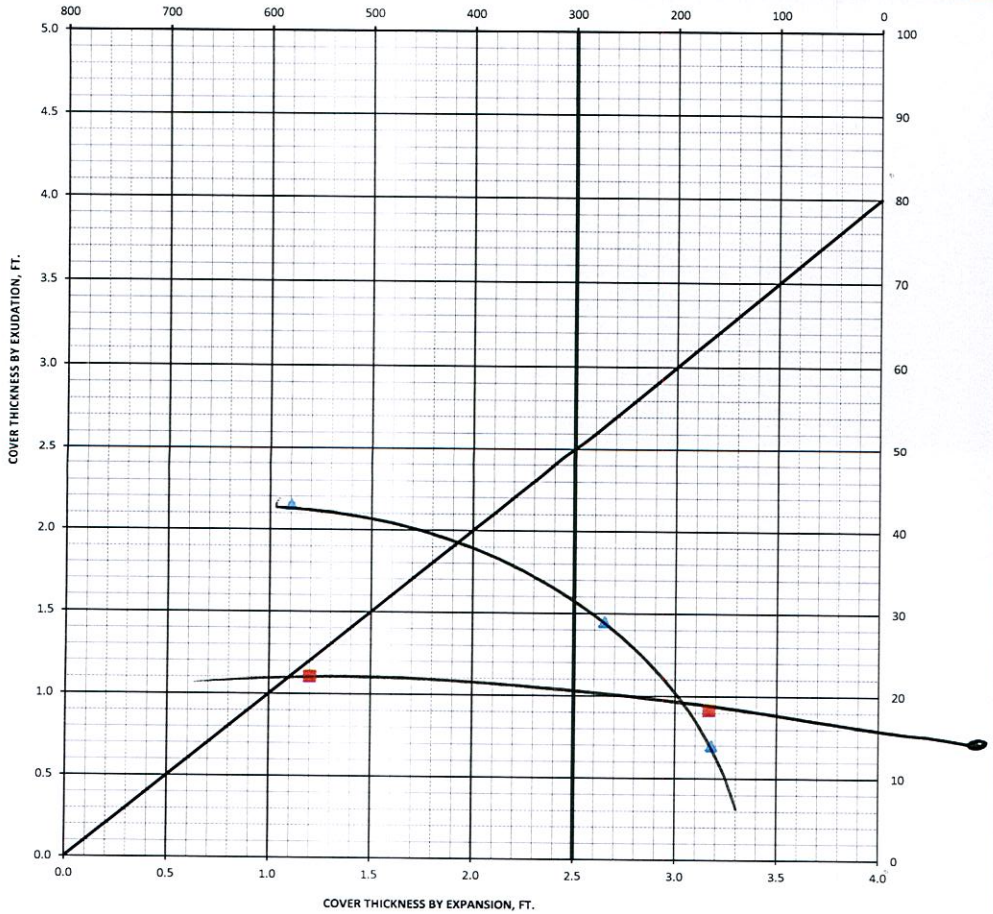
REMARKS:

BORING NO. Subgrade 10-1
Via Oporto
Eastlake Village HOA

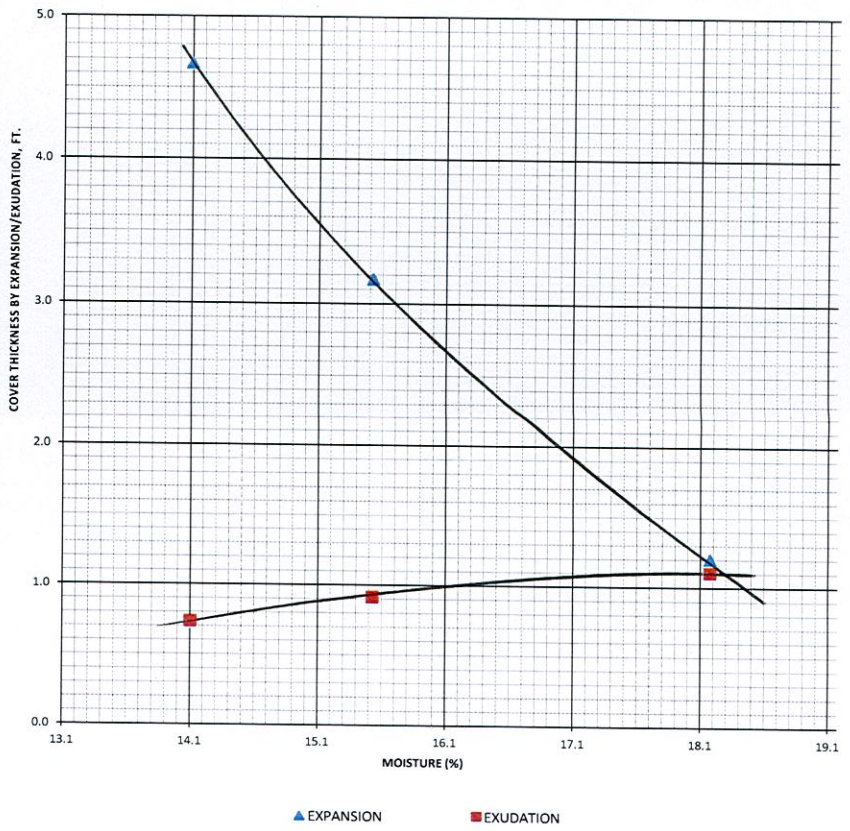
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 41619

DATE: 10/12/2016

BORING NO. Subgrade 10-3
Via Morena
Eastlake Village HOA

SAMPLE DESCRIPTION: Brown Silty Sand

R-VALUE TESTING DATA | CA TEST 301			
	SPECIMEN ID		
	a	b	c
Mold ID Number	7	8	9
Water added, grams	58	36	22
Initial Test Water, %	18.2	15.9	14.5
Compact Gage Pressure,psi	50	80	160
Exudation Pressure, psi	113	247	484
Height Sample, Inches	2.62	2.60	2.52
Gross Weight Mold, grams	3057	3068	2869
Tare Weight Mold, grams	1968	1964	1789
Sample Wet Weight, grams	1089	1104	1080
Expansion, Inches x 10exp-4	0	15	41
Stability 2,000 lbs (160psi)	44 / 105	28 / 62	18 / 36
Turns Displacement	5.33	5.08	4.72
R-Value Uncorrected	20	44	65
R-Value Corrected	22	47	65
Dry Density, pcf	106.6	111.0	113.4

DESIGN CALCULATION DATA

Traffic Index	Given:	5.0	5.0	5.0
G.E. by Stability		1.00	0.68	0.45
G. E. by Expansion		0.00	0.50	1.37

Equilibrium R-Value	**52** by EXPANSION	Examined & Checked: 10 /12/ 16
REMARKS:	Gf = 1.25 0.6% Retained on the 3/4" Sieve.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

LaBelle Marvin

R-VALUE GRAPHICAL PRESENTATION

PROJECT NO. 41619

DATE: 10 /12/ 16

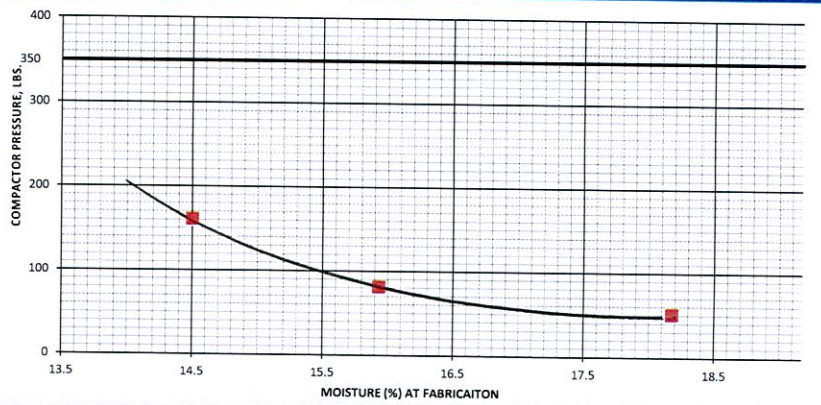
REMARKS:

BORING NO. Subgrade 10-3

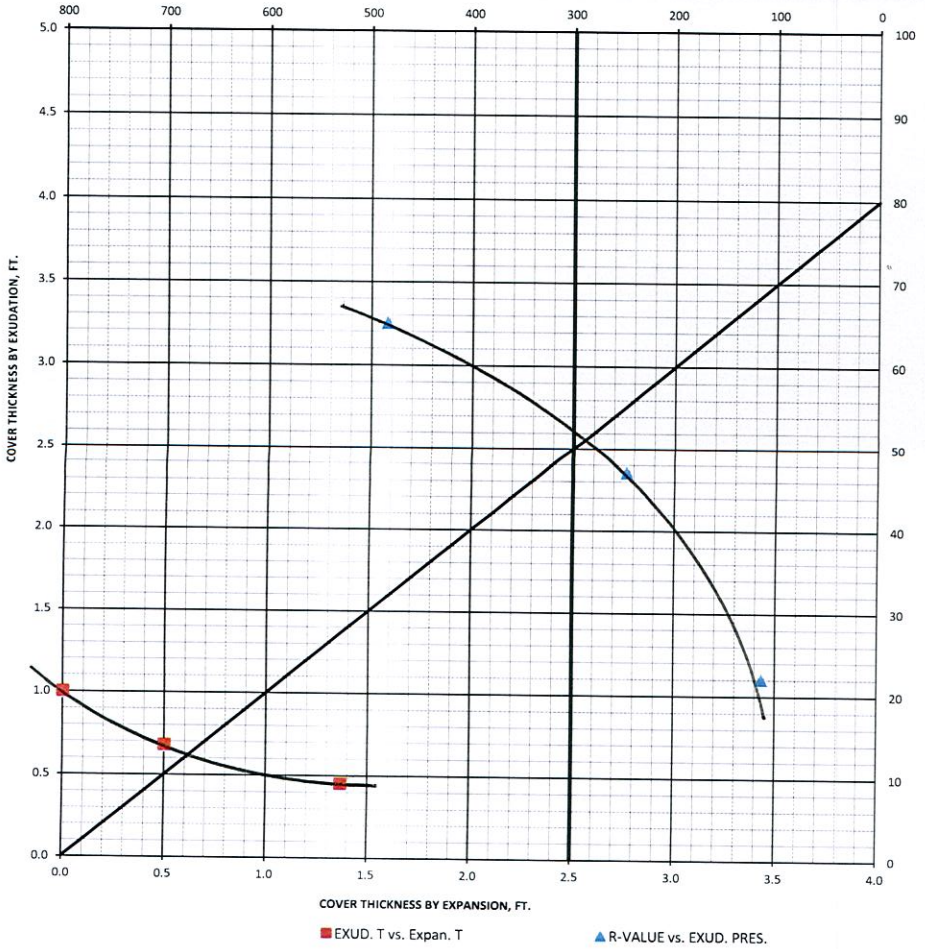
Via Morena

Eastlake Village HOA

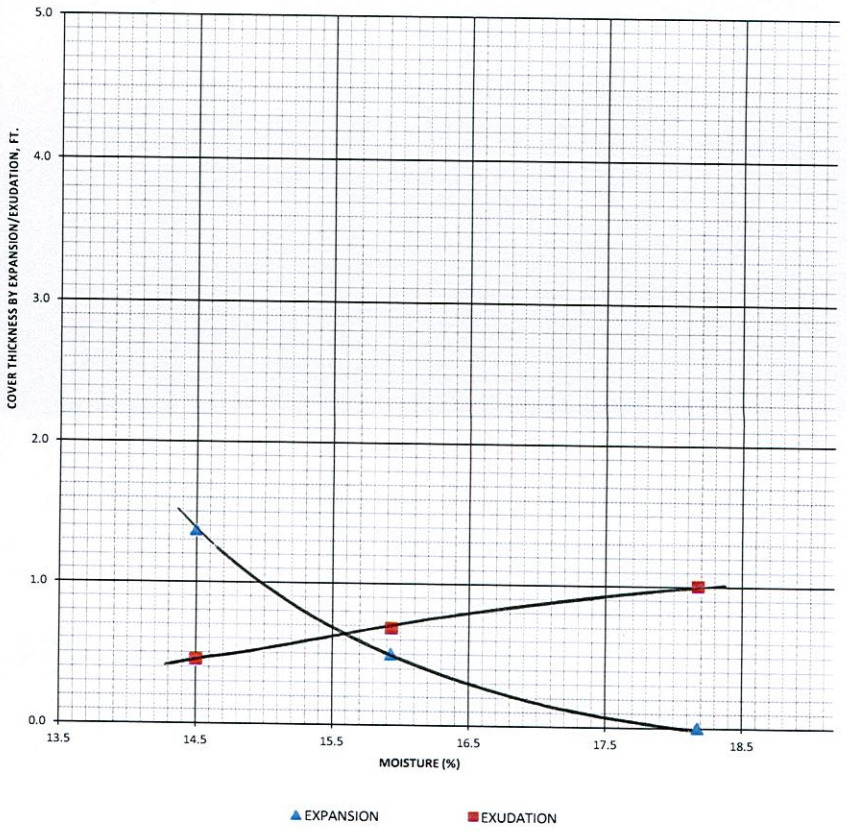
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 41619

DATE: 10/11/2016

BORING NO. Subgrade 10-6
Via Murcia
Eastlake Village HOA

SAMPLE DESCRIPTION: Brown Fine Sandy Silt

R-VALUE TESTING DATA | CA TEST 301

	SPECIMEN ID		
	a	b	c
Mold ID Number	1	2	3
Water added, grams	60	40	25
Initial Test Water, %	18.2	16.2	14.7
Compact Gage Pressure,psi	50	100	140
Exudation Pressure, psi	160	262	522
Height Sample, Inches	2.62	2.62	2.44
Gross Weight Mold, grams	3034	3079	3011
Tare Weight Mold, grams	1965	1969	1977
Sample Wet Weight, grams	1069	1110	1034
Expansion, Inches x 10exp-4	50	87	151
Stability 2,000 lbs (160psi)	45 / 110	33 / 79	30 / 72
Turns Displacement	5.23	5.09	4.76
R-Value Uncorrected	18	33	39
R-Value Corrected	19	36	37
Dry Density, pcf	104.6	110.5	112.0

DESIGN CALCULATION DATA

Traffic Index	Given:	5.0	5.0	5.0
G.E. by Stability		1.04	0.82	0.81
G. E. by Expansion		1.67	2.90	5.03

Equilibrium R-Value	**10** by EXPANSION	Examined & Checked: 10 /11/ 16
REMARKS:	Gf = 1.25 0.0% Retained on the 3/4" Sieve.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

LaBelle Marvin

R-VALUE GRAPHICAL PRESENTATION

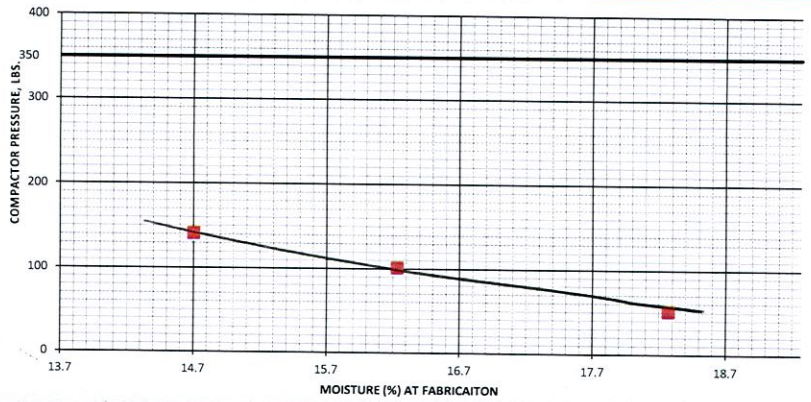
PROJECT NO. 41619

DATE: 10 /11/ 16

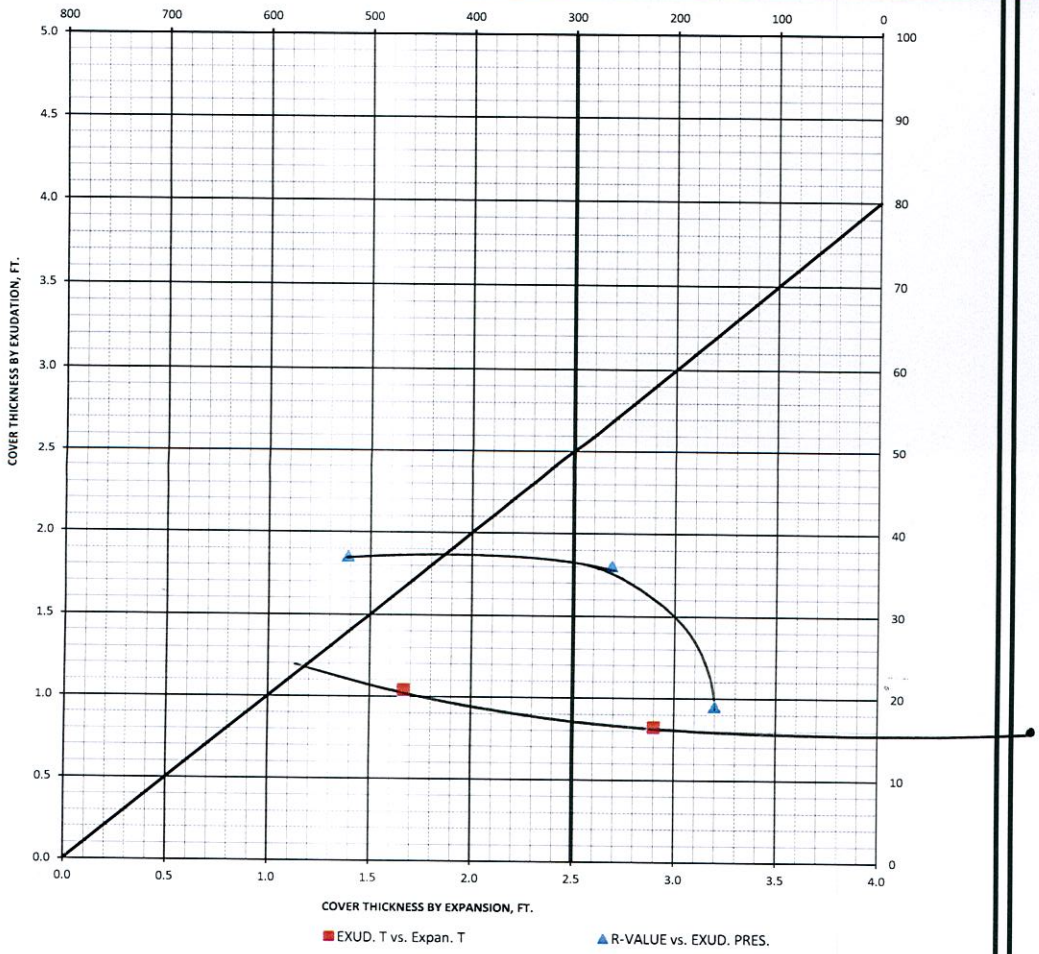
REMARKS:

BORING NO. Subgrade 10-6
Via Murcia
Eastlake Village HOA

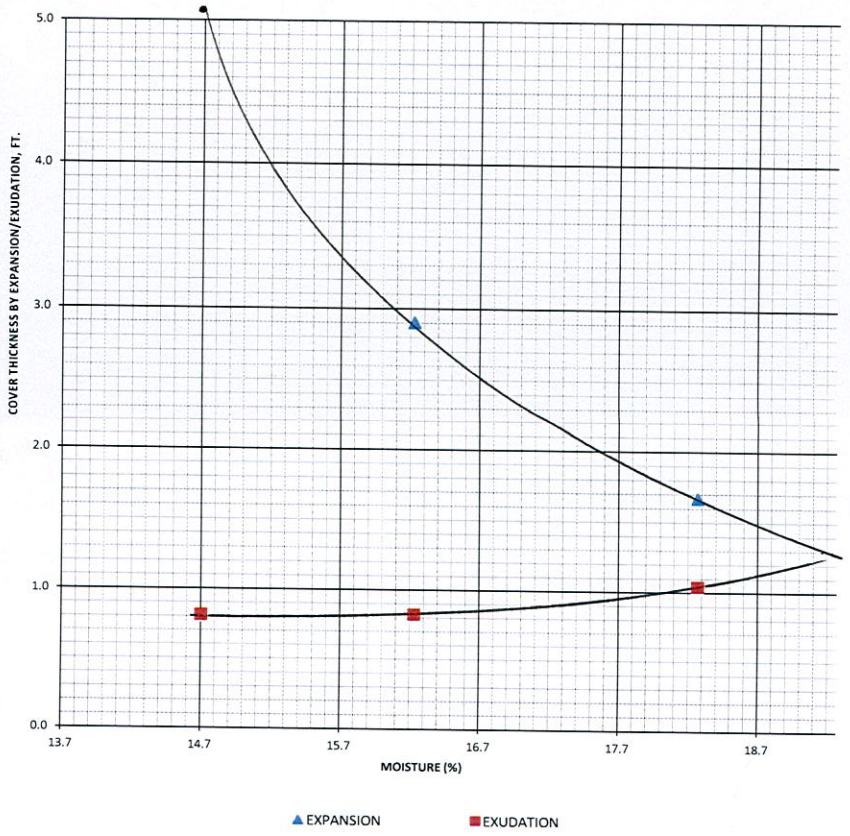
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



APPENDIX E

SPECIFICATIONS

Project Specifications

For

East Lake Village Shores

Yorba Linda, California

Roadway Improvements

Prepared By
LaBelle-Marvin, Inc.
2700 S. Grand Avenue
Santa Ana, CA 92705

Specifications

• Project Standard Specifications

Project specifications are the Standard Specifications for Public Works Construction (SSPWC), 2015 edition. All workmanship and materials shall conform to the SSPWC.

• Submittals

Submittals shall be required for the following: Asphalt Concrete mixes; Aggregate Base mixes; Engineering Fabric; French Drain Elements (pipe, rock, fabric); Portland Cement Concrete; Equipment; and Construction Schedule with phasing plan.

• Public Safety

The Contractor shall comply with all applicable, State, County and City requirements for closure of streets. The Contractor shall provide barriers, guards, light, signs, temporary bridges, flag persons and watch persons, advising the public of detours and construction hazards. The Contractor shall furnish and install, and upon completion of the work, promptly remove all signs and warning devices. All public safety requirements as detailed in the SSPWC, Section 7, 2015 ed., are also binding as part of this contract. Should two or more specifications be in conflict, the more restrictive of the two shall be binding.

• NPDES

National Pollutant Discharge Elimination System (NPDES) storm water permit program is the responsibility of the contractor to implement and must meet best practice standards for all discharge in to the storm drain system.

• Grading

After rough grading has been completed, the subgrade and/or aggregate base shall be loosened to a depth of at least six (6) inches. The loosened material shall be worked to a finely divided condition and all rocks larger than three (3) inches in diameter shall be removed. The moisture content shall be brought to optimum by the addition of water, by the addition and blending of suitable material or by the drying of existing material. Subgrade for base material shall not vary by more than 0.04 foot from the specified grade and cross section limits. Variations within the above specified tolerances shall be compensating so that the average grade and cross section limits are met. The Contractor shall receive written approval of grade from the Owner's representative prior to proceeding with any subsequent work. Grade approval shall be received for subgrade and base grade. The material shall then be compacted by approved equipment to 90 percent of laboratory maximum at or near optimum moisture as determined by ASTM D1557, ASTM D1556 and/or ASTM D2922. The subgrade must be firm and unyielding before the base and/or surface courses are placed. Base material shall be compacted to 95

percent of laboratory maximum at or near optimum moisture as determined by ASTM D1557, ASTM D1556 and/or ASTM D2922. All asphalt placed on subgrade materials shall have subgrade compacted to 95 percent of laboratory maximum at or near optimum moisture as determined by ASTM D1557, ASTM D1556 and/or ASTM D2922.

In the event of wet grade and unsuitable construction grade conditions the following procedures will be followed. The contractor will secure from the Owner's Engineer the directive to construction. If the directive is outside the scope of these services a change order will be issued to make these corrections. The contractor will not pave on wet yielding grades.

• Demolition

Excavation must be regular and rectangular in shape and must be blade cut or saw-cut, as appropriate to the field conditions through the existing pavements. All cuts shall be made in straight lines. All excavation shall be taken to the limits identified on the site drawings. All excavation material shall be hauled from the job site. All removal is considered as Unclassified Excavation.

• Geotextile Fabric

1) Limits of Construction

Location of areas requiring a geotextile fabric shall be performed as identified on the site improvement plan for use in the French Drain system.

2) Construction Materials

The geotextile fabric used in all French Drain areas will be a Mirafi 140 or equal as determined by the Engineer.

3) Construction Methods

The geotexile fabric will be placed, only after approval has been given to proceed with trench construction. The fabric will be placed on the ground and up along the edges of the 12 inch wide by 18 inch depth trench. The contractor shall take care in placing the aggregate backfill in order to not puncture or tear the fabric. The fabric will be laid over itself on the top such that the overlap is a minimum of six inches. Additional aggregate will be placed upon the top of the fabric overlap a maximum of 3 inches. This top layer of aggregate shall separate the bottom of the asphalt concrete and the fabric overlap area.

• Aggregate Base

1) Limits of Construction

Limits of Construction are designated on the improvement plan.

2) Construction Materials

Removal Areas: All crushed miscellaneous base material placed on site shall have a minimum R-value of 80 as approved by the Engineer. Crushed miscellaneous base must also meet requirements in SSPWC, Section 2015, ed. Compaction tests may be required by the Engineer for approval before the surface layer of asphalt concrete is placed.

French Drain Backfill Areas: All base material placed on site within the French Drain system shall be a Class C material from Table 201-1.3.2 (A) of Section 201 of the SSPWC, 2015 ed.

3) Construction Methods

Aggregate Base shall be placed in lifts of a maximum of six (6) inches per. All work shall be performed in accordance with Section 301 of the SSPWC, 2015, ed.

• Cold Pavement Milling (if used)

1) Limits of Construction

Areas requiring pavement milling are identified on the site drawing.

2) Construction Methods

Tapered Header Cuts: All areas designated for placement of the two (2) inch asphalt concrete overlay shall have a minimum six (6) foot tapered cut at roadway edges. At the transition from paving to non-paving the tapered cut will be a minimum width of twelve (12) feet wide. The depth at the edge (PCC edge of pavement), outside limit of proposed paving shall be 1 5/8" below the finish surface of the existing Portland Cement Concrete elevation, along curbs and gutters. The milled surface within the taper shall be uniform and not vary from its highs and lows by more than 3/8 inch maximum and shall be performed in accordance with Section 302 of the SSPWC, 2015 ed.

• Crack Treatment (if used)

1) Construction Limits

All cracks throughout the designated construction areas, having a width greater than 1/8 inch, which are open or filled with debris shall be treated per the following specifications.

2) Construction Methods

Construction methods consist of two (2) separate methods of treatment. These treatments are described below.

a) Crack widths equal to or greater than 1/8 inch but less than ¾ inch, (Construction Item 4A).

All debris and weeds shall be removed from each crack. Debris removal shall be performed by, but not limited to the use of a high pressure air nozzle.

All crack fill materials will be placed flush with the finish surface after all dirt, debris and vegetation have been removed from the crack.

A Crack Preparation Fabric material will be placed upon the filled crack in a centered position such that the fabric is uniformly centered atop each crack.

b) Crack widths equal to or greater than ¾ inch, (Construction Item 4B).

Prior to crack filling, the existing cracks shall be marked out. All cracked areas will be milled out to a depth of two (2) inches and a width of 18 inches. Each area shall then be cleaned and all vertical and horizontal areas will then be tack coated with an SS-1h material and permitted to "break" before proceeding. Each milled area will then be lined on the bottom with a Crack Preparation Fabric (see specs this document). After the crack prep material is placed the crack will be filled with new asphalt concrete material (minimum temperature 280 ^{0}F). The new asphalt concrete material will be placed in one lift, compacted and brought to the finish surface of the existing and surrounding pavement.

3) Construction Materials

Construction materials will consist of a combination of a crack filling emulsion and that of asphalt concrete material for filling the milled areas according to the following schedule.

a) Crack widths equal to or greater than 1/8 inch but less than ¾ inch.

Asphalt based crack filling materials shall comply with the designation as an asphalt based cold applied (Emulsion) crack fill material.

Penetration (150 gr/5 sec) ……..50 - 80
Resiliency…….>50%
Flow at 140^{o}F……..<5 mm
Softening Point .....>150^{o}F
Ductility @ 77^{o}F .....>30 cm
Bond @ 20^{o}F (1" Mandrel).....PASSES
Non-Volatiles (%) .....60% min.
Ash (Non Volatiles).....18% min.

b) Crack widths equal to or greater than ¾ inch.

The crack fill material shall be a Type C2 PG64-10 asphalt concrete material, per Section 203-6 of the SSPWC, 2015, ed.

• Slurry Cement Backfill (if used)

1) Limits of Construction

Limits of Construction are designated on the improvement plan.

2) Construction Materials

The slurry cement back fill will consist of a fluid, workable mixture of Portland Cement clean graded aggregate and water. The Portland Cement will be 2% of the slurry cement backfill mixture.

3) Construction Methods

All slurry cement backfill patch material will be placed and constructed with care permitted to set and cure without being disturbed.

• Portland Cement Concrete

1) Limits of Construction

Limits of new Portland Cement Concrete (PCC) elements are shown on the site drawing. PCC removal and reconstruction is limited to slabs on grade, curb and gutter, and curb only.

2) Construction Materials

All PCC materials will conform to the requirements of a 500 psi flexural strength material at 28 days. All materials will have a maximum slump at the time of pour of 4 inches.

3) Construction Methods

All PCC curbs and gutters shall be constructed by use of forms. All PCC slab on grade areas shall have a pavement medium broom finish surface. Materials will be protected from traffic for a sufficient period to permit curing as up to 14 days or as determined by the Engineer.

All PCC elements shall be protected from all graffiti marks until after a set and hardened condition has occurred. Protection will include a cover to keep the newly placed PCC material out of sight. Contractors failing to protect the PCC elements from graffiti shall be liable to remove and replace each PCC element affected.

• SAC Portland Cement Concrete Patching (if used)

1) Limits of Construction

Limits of Construction are designated on the improvement plan.

2) Construction Materials

A high strength PCC material, exceeding 3,000 psi compressive strength in twenty-four (24) hours, shall be used. The material will match in color as practical as possible the existing color of the immediate PCC materials.

3) Construction Methods

All SAC PCC patch material will be placed and constructed with care and protection so as to protect them from graffiti and or damage until after they have cured.

• Tack Coat

1) Construction Limits

A tack coat of SS-1h material shall be placed on all vertical and horizontal faces to receive new asphalt concrete materials.

2) Construction Materials

The tack coat shall be diluted SS-lh Emulsion per Section 203-3 of the SSPWC, 2015, ed. The tack coat will be a "trackless tack" material in all places where trucking traffic may pick up and track the materials onto the roadway.

3) Construction Methods

The tack coat applied to the cleaned edges of the existing pavement cracks prior to the crack filling with asphalt concrete material.

• Asphalt Concrete

1) Limits of Construction

Limits of Construction shall be as designated on the improvement plan.

2) Construction Materials

The asphalt concrete material used for all areas shall comply with the requirements of the Standard Specifications for Public Works Construction, 2015, ed. The specific type of material used for each type of construction shall comply with the table below.

Requirement for Asphalt Concrete Material Type (Where RAP is Permitted)

Pavement Thickness (inches):	<1	>1 and ≤2	>2
SSPWC Material Type (for use in to AC Cap):	III-D-PG64-10	III-C3-PG 64-10	III-C3-PG 64-10
SSPWC Material Type (for use in AC Base):	-	-	III-B3-PG 64-10

Requirement for Asphalt Concrete Material Type (Where No RAP is Permitted)

Pavement Thickness (inches):	<1	>1 and ≤2	>2
SSPWC Material Type (for use in to AC Cap):	III-D-PG64-10-R0	III-C3-PG 64-10-R0	III-C3-PG 64-10-R0
SSPWC Material Type (for use in AC Base):	-	-	III-B3-PG 64-10-R0

All materials used for the cap on this project will be free of Recycle Asphalt Products (RAP) and designated by the 'R0'. All other mixes may include the 20% maximum RAP mix.

Warm Mix Asphalt Concrete mix may not be used for this project where pave prep materials are specified.

Asphalt concrete materials used for the speed bumps or speed cushions will be a Type III D Mix PG64-10-R0.

The contractor shall submit in accordance with 2-5.3 a Job Mix Formula (JMF) that summarizes each asphalt concrete mix design for each class and grade of asphalt concrete required to construct the Work. Supporting information for the warm mix asphalt (WMA) technology and/or recycling agent, if included in the mixture, shall also be submitted.

The JMF shall indentify the source and the individual grading of each material used to produce the mix design (including the percentage and individual gradation of any manufactured or natural sands), the combined gradation, the optimum binder content (OBC), void content, reclaimed asphalt pavement (RAP) percentage, RAP gradation, RAP binder content, stability value, plant identification, mix number, WMA technology, and the source and performance grade of the paving asphalt. Upon request, the mix design test data represented by the JMF shall be immediately made available to the Engineer.

For all mixtures, the asphalt binder content shall be defined as the total bituminous material present in the mix consisting of the blend of virgin paving asphalt, residual paving asphalt from RAP, and recycling agent.

3) Construction Methods

The minimum paving temperature will be 280 ^{0}F where crack preparation materials are used.

Prior to removal of required pavement areas the Contractor shall saw cut or blade cut all areas to be removed. The removed areas shall then have all vertical faces cleaned and tacked with an SS-1h prior to the placement of the new asphalt concrete materials.

Asphalt concrete shall be placed in lifts having a maximum of four (4) inches. All work shall be performed in accordance with Section 302-5 of the SSPWC, 2015, ed. A tack coat of 'Trackless Tack" placed at a spread rate of 0.05 gallons/sy shall be placed between all lifts and on all veridical faces.

All final grade cross fall will be a minimum 2% from the centerline of the roadway to the edge of the gutter lip. The new gutter lip will be a minimum 3/8" lip generally given the variability of the existing grades.

The asphalt concrete mat making (paving) machine will have a vibratory plate in operation during all of the laydown operations. In the case that the plate is non-operational the contractor will increase his thicknesses to include an additional 1/16 of an inch for each inch of asphalt concrete material placed.

Use of Warm Mix Asphalt Concrete will alter the minimum permissible arrival temperature at the time of rolling. That temperature will not be lower than 240°F. Warm Mix Asphalt Concrete will not be permitted in those areas where the use of crack preparation materials are used.

• Utility Covers

1) Limits of Construction

Location of utility covers requiring adjustment will be marked by the contractor prior to construction..

2) Construction Materials

All water valve covers will be in accordance with the requirements of the Trabuco Canyon Water District. All new manhole lids/covers will be reused. All remaining lids and rim structures will be reused.

3) Construction Methods

The contractor shall notify utility owners at least one (1) week in advance of the intent to adjust grade for each utility cover in the work zone. Adjustment of utility covers will be performed in accordance with Section 302-5.8 of the SSPWC, 2015 ed. All utility covers may be partly paved over and later adjusted to grade.

After the pavement has been completed, the necessary portions of the subgrade, base, and pavement shall be neatly removed, the structure built up, and the manhole frame (base) set to within 1 ½ inches of the surface with Portland Cement Concrete (PCC) conforming

to Section 302-6.1. The remaining area will then be filled with PCC to the surface and finished with a medium broom finish. All completed work will confirm to the surrounding areas and utility lids.

• Sealing (if used)

1) Limits of Construction

Location of the area requiring a pavement seal is designated on the site drawing.

2) Construction Materials

Seal coat material shall be a plant-blended product composed of mineral aggregates uniformly distributed in a petroleum-base asphalt emulsion. The asphalt emulsion shall conform to Section 203-3 of the SSPWC, 2015 ed. The seal coat material shall contain non-asbestos fibers. Seal coat materials, undiluted except as noted, shall conform with the SSPWC Section 203-9, 2015 ed. In no case shall a coal tar product be incorporated into the pavement seal. In complying with the seal requirements the seal will have a minimum of 60% (min.) non-volatiles at the delivery from the supplier and 48% (min.) non-volatiles at the point of seal material placement.

3) Construction Methods

All pavement seal operations shall be performed in accordance with the manufacturer's recommendations. The material spread rate shall be a min., 20 to 25 gallons per 1,000 square feet and shall be placed in a minimum of two (2) coats.

The contractor shall black out all old striping prior to sealing the lot at each stop bar and stencil. This procedure is intended to prevent the shadow effect that occurs due to the old lines or stripes wearing through the new sealed surface. Black out paint shall comply with the striping specifications of this document.

• Striping

1) Limits of Construction

Pavement striping shall be performed in all locations designated on the site improvement plan as well as any areas damaged by construction.

2) Construction Materials

All paint shall conform to Section 210-1 of the SSPWC, 2015, ed. Paint color and type shall match as nearly as practical the existing conditions of the site.

3) Construction Methods

All paint shall be placed in a minimum of two (2) coats per Section 210-1 and Section 314 of the SSPWC, 2015, ed. The single exception to this requirement is that the black out line procedure shall be performed with one coat of paint.

• Submittals

Materials submittals will be submitted in accordance with Section 2-5.3 of the SSPWC, 2015, ed. Submittals shall be required for all materials used on this project.

• Punch List

A formal punch list shall be prepared by the owner's representative after substantial completion of work has been performed. The contractor shall be given written notice of punch list items and the specified period of time to complete such. The punch list may include some or all of the following finish pavement anomalies: non-compliance to line and grade, including localized depressions and/or high areas; rock pockets and/or raveled areas; failed pavement areas; heat-checking; roller marks and/or non-compacted areas; areas stained by the road slurry or pavement seals.

• Completion and Acceptance

1) Completion:

The work will be inspected by the Engineer, LaBelle-Marvin, Inc., (LMI), for acceptance upon receipt of the Contractor's written assertion that the work has been competed.

2) Acceptance:

If in the Engineer's judgment, the work has been completed and is ready for acceptance, it will so certify. The date on which the work is certified by the Engineer is the date the Contractor is relieved of the responsibility to protect the Work. LMI will issue a statement of substantial completion of work notice upon when all work has approached that date. LMI will also issue a final completion notice when Punch List requirements are completed.