

June 20, 2014

**APPROVED**

Richmond American Homes  
4350 South Monaco Street  
Denver, Colorado

By: PER Date: 6-20-14

 City of Fort Collins  
Engineering Department

Attn: Kelly Martinez

Subject: Alternate Pavement Design Recommendations for Full Depth Concrete  
Overland Trail Widening at Bella Vira Subdivision  
Fort Collins, Colorado  
FC06224.002-135 L1

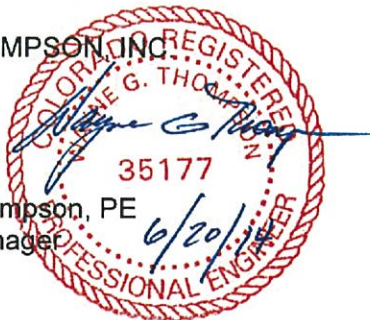
Dear Mr. Martinez

CTL | Thompson, Inc. performed a Subgrade Investigation and Pavement Recommendation Report for the Overland Trail Widening at Bella Vira Subdivision (Project No. FC06224.002-135, revised May 5, 2014). This letter presents a pavement alternative for full depth concrete instead of asphalt.

For our pavement analysis, we used a spreadsheet template utilizing the AASHTO Guide for Design of Pavement Structures, Part II. For the design ESAL, we used 4,200,000, which is a 50% increase over the 2,804,000 utilized in our full report. This increase is a standard design increase to reflect the pavement's response to loading. Our effective k-value is low, reflecting the soils below the recently installed Aggregate Base Course.

Based on our calculations, a minimum concrete thickness of 8.57 inches was calculated. We understand that a 9-inch thick concrete section will be installed. Please refer to the original report for all other design, maintenance, and soils information. Please contact our office if you have any questions.

CTL | THOMPSON, INC.



Wayne Thompson, PE  
Branch Manager

Attachment: Rigid Pavement Design Results

# Rigid Pavement Design - Based on AASHTO Supplemental Guide

Reference: *LTPP DATA ANALYSIS - Phase I: Validation of Guidelines for k-Value Selection and Concrete Pavement Performance Prediction*

## Results

Project # FC06224.002-135  
Description: Subgrade Investigation and Pavement Recommendations

Location: Overland Trail

### Slab Thickness Design

Pavement Type	JRCP	
18-kip ESALs Over Initial Performance Period (million)	4.20	million
Initial Serviceability	4.5	
Terminal Serviceability	2.5	
28-day Mean PCC Modulus of Rupture	650	psi
Elastic Modulus of Slab	3,400,000	psi
Elastic Modulus of Base	30,000	psi
Base Thickness	10.0	in.
Mean Effective k-Value	50	psi/in
Reliability Level	90	%
Overall Standard Deviation	0.34	
Calculated Design Thickness	<b>8.57</b>	in

### Temperature Differential

Mean Annual Wind Speed	8.6	mph
Mean Annual Air Temperature	48.1	°F
Mean Annual Precipitation	14.9	in
Maximum Positive Temperature Differential	<b>6.53</b>	°F

### Modulus of Subgrade Reaction

<u>Period</u>	<u>Description</u>	<u>Subgrade k-Value, psi</u>
3	Spring	50
3	Summer	50
3	Fall	50
3	Winter	50