



April 6, 2005

Imago Enterprises
140 Palmer Drive
Fort Collins, Colorado 80525

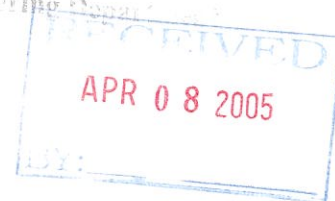
Attn: Mr. Les Kaplan

Re: Pavement Design Recommendations
Turn Lane and Acceleration/Deceleration Lanes
Colorado State Highway 68 (Harmony Road) at Cambridge Avenue
Fort Collins, Colorado
EEC Project No. 1042058

APPROVED
By: RAC Date: 4-12-05
EARTH ENGINEERING
CONSULTANTS, INC.



City of Fort Collins
Engineering Department



Mr. Kaplan:

Earth Engineering Consultants, Inc. (EEC) personnel have completed the requested pavement design for the proposed turn lane and acceleration/deceleration lanes for Colorado State Highway 68 at Cambridge Avenue in Fort Collins. The pavement section design was based on traffic load projections provided by City of Fort Collins Engineering Department personnel and subgrade information developed by EEC. The recommended pavement design section is included with this report.

A diagram indicating test boring locations and logs of the materials encountered in the test borings are included with this report. In general, the subgrade soils consist of cohesive sandy clay with low to moderate swell potential. The new pavement sections will include 2 feet of granular base or subbase below the composite section.

We recommend all existing vegetation, topsoil and/or existing pavements be removed from the new pavement area. After stripping, the in-place subgrades should be scarified to a depth of 9 inches, adjusted in moisture to $\pm 2\%$ of standard Proctor optimum and compacted to at least 95% of standard Proctor maximum dry density. In accordance with current CDOT design, we recommend 2 feet of aggregate subbase be placed below the composite pavement section. Soils below that depth could consist of the site clays. The pavement design is based on the subbase having an R-value of at least 50. Soils below the pavements should be placed in loose lifts not to exceed 9 inches thick, adjusted in

moisture as outlined for scarified materials and compacted to at least 95% of standard Proctor maximum dry density. The moisture content of granular soils should be adjusted to a workable moisture content.

Pavement section recommendations for the turn lane and acceleration/deceleration lane along Harmony Road are provided below in Table I. The section recommendations are based on an R-value of 6 as established in laboratory testing of the subgrade soils for Cambridge Avenue. The equivalent daily load axle rating for Harmony Road as indicated in Table I was provided by Rick Richter, City of Fort Collins Engineering and is based on the anticipation that the turn and acceleration lanes may become through traffic lanes at a future date. Alternative pavement sections could be considered and we would be pleased to provide alternative pavement sections, at your request.

Table 1: Recommended Pavement Section Harmony Road Turn and Acceleration Lanes		
	<u>Accel/Decel Lanes</u>	
ESAL (20 year)	4,200,000	
Reliability	90%	
Serviceability Loss	2.0	
R-Value	5	
DWSN	5.22	
Composite Pavement Sections	<u>Strength Coefficient</u>	<u>Component Thickness</u>
HBP (Grading S)	0.44	5.0"
Aggregate Base (Class 6)	0.11	12.0"
Sub Base (R = 50 or greater)	0.07	24.0"
Section Structural Number		5.20

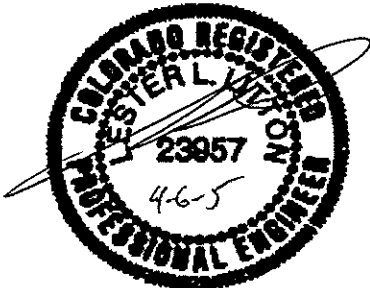
Asphaltic concrete (HBP) for use in the roadway should consist of CDOT (City of Fort Collins) Grading S materials utilizing 100 design gyrations with PG 58-28 asphaltic cement for the lower lift(s) and PG 64-28 for the top 2 inches. The asphalt cement grades are consistent with current City of Fort Collins guidelines. Aggregate base should be consistent with CDOT criteria for Class 6 aggregate base materials.

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It is recommended that the geotechnical engineer be retained to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observations during earthwork and pavement construction phases to help determine that the design requirements are fulfilled. This report has been prepared for the exclusive use of Imago Enterprises for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we can be of further service to you in any other way, please do not hesitate to contact us.

Very truly yours,
Earth Engineering Consultants, Inc.



Lester L. Litton, P.E.
Principal Engineer

cc: Rick Richter – City of Fort Collins Engineering Department (4)
Gregg Seebohm- Double Eagle
Todd Gonser - Colorado Department of Transportation – Region 4 Materials Lab
Gloria Hice-Idler – CDOT – Traffic Division