May 30, 2019

Weld County Public Works Department
1111 H Street
Greeley, Colorado 80632

Attn: Mr. Erich Green, P.E., L.S.I.
P: (970) 400-3742
E: egreen@weldgov.com

Re: Weld County Road 39 Embankment Construction
WCR 39 Extension
Between WCR 50.5 and WCR 52
LaSalle, Colorado
Terracon Project No. 21185119

Dear Mr. Green:

Previously, Terracon Consultants, Inc. (Terracon) prepared a Geotechnical Engineering Report (Project No. 21185119 (revised); report dated April 29, 2019) for the Farnsworth Group, Inc. regarding the design and construction of the proposed Weld County Road 39 extension. The report contained over-excavation recommendations necessary for subgrade improvement. These recommendations stated the approximately 2 to 4 feet of organic clay soils should be removed beneath the proposed embankment areas. Weld County informed Terracon the over-excavation recommendations cannot be attained in some areas as a result of shallow utilities that cannot be relocated. Weld County has developed a reinforced embankment design using displacement fill construction and geosynthetic reinforcement (see Attachment).

Terracon provided an initial review of the design in a conference call with Weld County personnel (May 22, 2019). Weld County design engineers incorporated Terracon’s comments, which are reflected in the proposed attached section. Based on Weld County’s proposed alternative, over-excavation would be limited to approximately 18 inches below existing grade. To reduce the risk of potentially unstable subgrade resulting from incomplete removal of the organic, highly compressible clay soil identified as part of Terracon’s field exploration, geosynthetic-encapsulated, 3-inch minus, angular rock will be placed and will be used to stabilize and likely displace a portion of the unstable subgrade.

A free-draining layer of geosynthetic encapsulated material meeting the gradation requirements of AASHTO M 43 No. 57 or 67 rock will be placed above the 3-inch minus layer, extending to approximately 10 inches above existing site grades. The proposed embankment section, varying from minimal thickness to up to about 5½ feet, will consist of minimum R-value 40 material as recommended in Terracon’s revised report, followed by the recommended pavement section.
Discussion

The recommendations for complete removal of the organic soils offer the lowest-risk alternative for differential movements associated with compressible, low-strength subgrade and should be followed to the extent possible. In areas where these recommendations cannot be attained, the design proposed by Weld County offers an acceptable alternative for construction. For the 3-inch minus layer as well the No. 57/67 section, each section should be thoroughly proofrolled with a loaded tandem-axle dump truck prior to placement of the subsequent embankment section. The proofrolling should be observed by Terracon.

The recommendations presented in this report should be used in conjunction with those presented in our initial Geotechnical Engineering Report for the project. The General Comments should be reviewed and understood to apply to those engineering recommendations and opinions presented herein.

We appreciate the opportunity to continue to be of service to you on this project. If you have any questions or concerns regarding the content of this report, please feel free to contact us.

Sincerely,
Terracon Consultants, Inc.

Kurt F. Stauder, P.G.
Project Geologist

Eric D. Bernhardt, P.E.
Geotechnical Department Manager

Attachments: Weld County Typical Structure Section
TYPICAL ROAD STRUCTURE SECTION
STA 9+25 TO STA 21+71.78

1. OVERLAP OF GEOSYNTHETIC MATERIAL SHALL BE AT THE DIRECTION OF WELD COUNTY AND MEET MANUFACTURER SPECIFICATIONS.
2. THE SECTION SHOWN SHALL BE EXTENDED TO THE EAST RIGHT-OF-WAY (ROW) FOR THE ACCESS ROAD SHOWN AT STATION 13+25.44.
3. REFER TO SEPARATE ROCK TRANSITION PROFILE DETAIL FOR ROCK AND GEOSYNTHETIC MATERIAL TRANSITIONS IN THE HERCP CULVERT AREA.

NOTES:

1. NO. 57/NO. 67 ROCK (10 INCHES THICK)
2. 3 INCH MINUS ANGULAR ROCK - 2 FRACTURED FACES MINIMUM (18 INCHES THICK)
3. HMA (5 INCHES THICK)
4. CLASS 6 ABC (6 INCHES THICK)
5. EMBANKMENT MATERIAL (VARIES 0 FEET TO 5.5 FEET THICK)