

(L-11-01)
cc: C. Knowles
R. Rister
B. Neely
J. Feinauer
R. Guidi

MEMORANDUM

TO: Charles Meyers, P.E.
Chief Highway District Engineer
District 6, Covington

FROM: William Broyles, P.E.
Geotechnical Engineering
Branch Manager

BY: Christopher Slone C. S.
Geotechnical Engineering Branch
Landslide Section

DATE: June 19, 2001

SUBJECT: Boone County
I-275 Slide #8 Beginning @ MP 8.62
Item # 6-2002.00
Stations 334+00 to 340+00
Geotechnical Engineering Report
for Landslide Correction

The Geotechnical Branch has completed its investigation of the above referenced landslide area. The Branch was asked by D-6 and WMB, Inc. to review the failure area and devise a method of correction. The Geotechnical Branch has concluded that keeping the correction within the existing right of way limits is a feasible solution. Flattening the slopes will not require any right of way purchase. The slide area is numbered in the plans are as follows:

Slide #8Eastbound MP 8.62

This project exists in Northwest Boone County on I-275. The failure area is located at milepost 8.62 on I-275. The failing embankment, at the present time is not affecting the roadway. Due to the history of the embankments in the area, roadway problems are likely in the future. Although analyses show that it is possible to stop movement in this location, it is difficult to accurately model landslide situations such as this. Even with the utilization of recommendations presented here, the possibility still exists that unknown data could cause ongoing movement in the embankment.

During a site evaluation, individuals from the Branch were able to approximately able to determine the cause for the failing embankment. The site review showed that this type of failure is common along the I-71, I-75, and I-275 embankments. The shale used in the construction of the

embankments has deteriorated to poor quality and allows sliding to occur. Water penetrating the embankments has caused the shale to break down creating voids. Therefore, the chance of a sliding plane becomes significantly more possible. To correct the embankment to prevent sliding, the Branch recommends the slopes be flattened to 3:1 slopes and drainage blankets added. The Branch has analyzed excavate and replace method to deter any other movement. The drainage blanket is used to provide an exit for water in the embankment to prevent future failures. Excavation will involve 1:1 slopes with benching beginning at the edge of the shoulder as shown in attached sections.

Due to the importance of the Interstate System, the Branch feels that this correction is the best correction to the above referenced slide areas. This method of correction was decided upon for several factors of the area. The size of the embankments limited the options that could be used to correct them, past history of embankments in the area, and cost of the correction method. Other methods of correcting the slide would have to involve costly environmental and design concerns.

Recommendations:

- 1.) Begin construction at approximate Station 334+00 and taper to full construction at Station 334+50. End full construction at Station 339+50 and taper to approximate Station 340+00.
- 2.) Excavate and replace the embankment as shown in the plans.
- 3.) Do not stockpile, even temporarily, material on the embankment or slope.
- 4.) The excavated soils may be reused as long as it is aerated to proper moisture content and recompacted to meet Standard Specifications. Therefore, the excavated material may have to be stockpiled after excavation. Direct payment shall not be permitted for rehandling, hauling and/or double handling, stockpiling, providing area for stockpiling, and/or manipulating the material.
- 5.) Excavation of surface ditches and channel changes adjacent to embankment areas shall be performed prior to the placement of the adjacent embankments. The material excavated for the channel changes and surface ditches is suitable for embankment construction if dried to proper moisture content in accordance with Section 206 of the current Standard Specifications. Direct payment shall not be permitted for rehandling, hauling, stockpiling, and/or manipulating soils.
- 6.) Foundation embankment benches and longitudinal perforated pipe underdrains shall be constructed in accordance with Standard Drawing RGX-010 and RDP-006 with the exception of the vertical bench will not be excavated vertically but will be excavated with a 1:1 slope to allow the use of a continuous rock drainage blanket. A one-foot vertical thickness coarse aggregate Rock Drainage Blanket, in accordance with the current edition of Section 210 of the Standard Specifications for Road and Bridge Construction, shall be placed on the benches for a drainage blanket. The drainage blanket shall be wrapped with Type IV fabric in accordance with Section 214 & 843 of the current Standard Specifications to create a drainage blanket.

7.) All embankment construction consisting of non-durable shale will be in accordance with Section 206 of the current Standard Specifications for Road and Bridge Construction, Embankments Principally of Non-Durable Shale or Embankment of Rock/Shale/Soil Combination, as directed by the Engineer.

8.) Excavating the failed material of the embankment will involve some risk. Therefore, to prevent potential damage to the roadway, the material shall be excavated in small sections (approximately 100 feet in length) and backfilled as soon as possible. In no case shall excavated sections be left open longer than 72 hours.

Included with this report are photos of the site, a project location map, and cross-section sheets showing the proposed correction. Electronic copies of this report are being sent to Ron Rister and Richard Guidi. If you have any questions or comments, please contact this office.

Attachments:

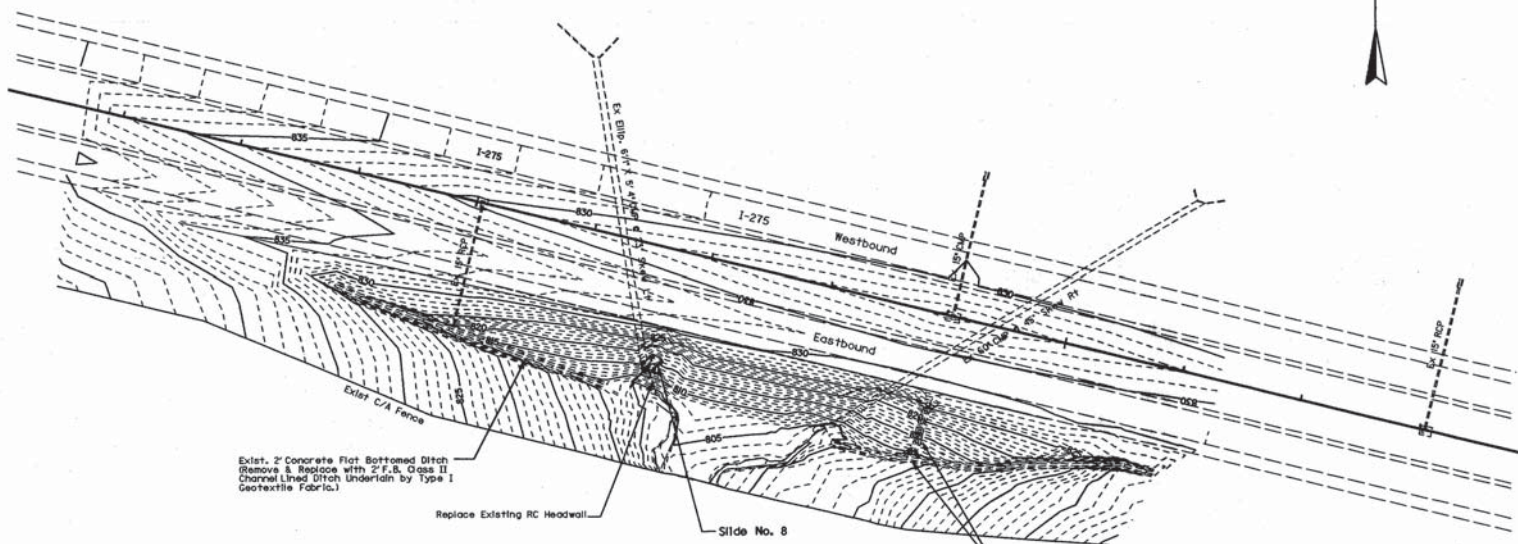
PLAN VIEW
I-275 SLIDE 8

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
BOONE			

ITEM NO. 6-2002.0

335+00

340+00



Exist. 2' Concrete Flat Bottomed Ditch (Remove & Replace with 2' F.B. Class II Channel Lined Ditch Underlain by Type I Geotextile Fabric.)

Replace Existing RC Headwall

Slide No. 8

Exist. 2' Concrete Flat Bottomed Ditch (Remove & Replace with 2' F.B. Class II Channel Lined Ditch Underlain by Type I Geotextile Fabric.)

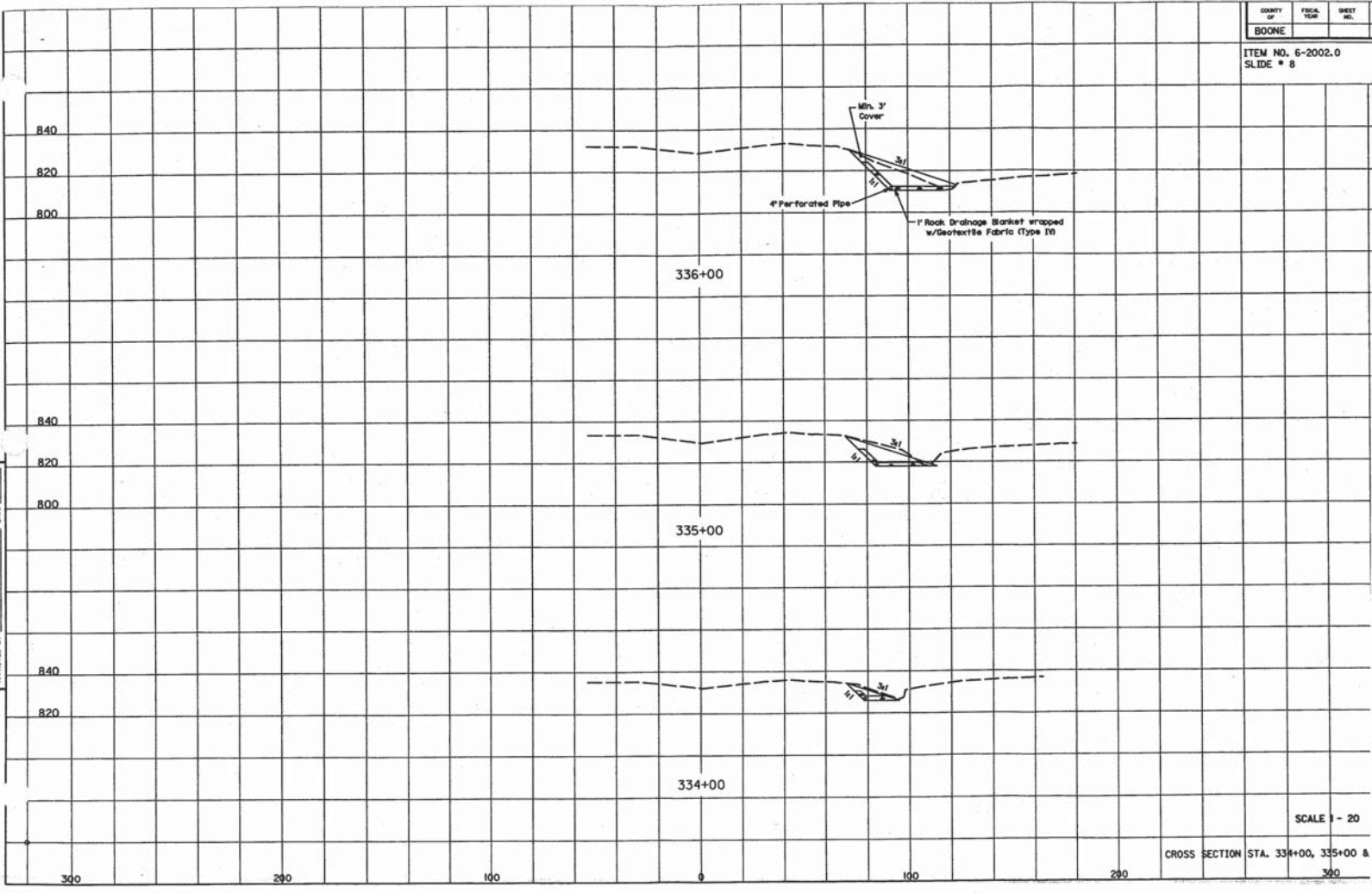
KENTUCKY
DEPARTMENT OF HIGHWAYS
COUNTY OF
BOONE

ITEM NO. 6-2002.0

PROJECT NAME: _____

19 BY _____ DESIGN ENGINEER

QUANTITY	FISCAL	SHEET
OF	YEAR	NO.
BOONE		
ITEM NO. 6-2002.0		
SLIDE # 8		



DATE DATE

APPROVED BY

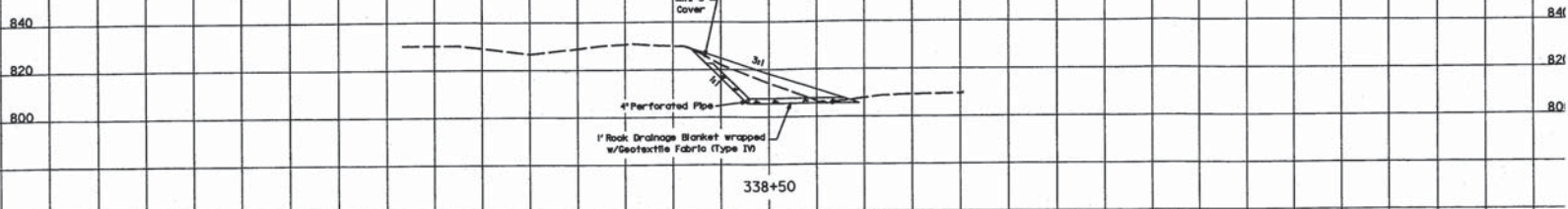
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FORM NO. 6

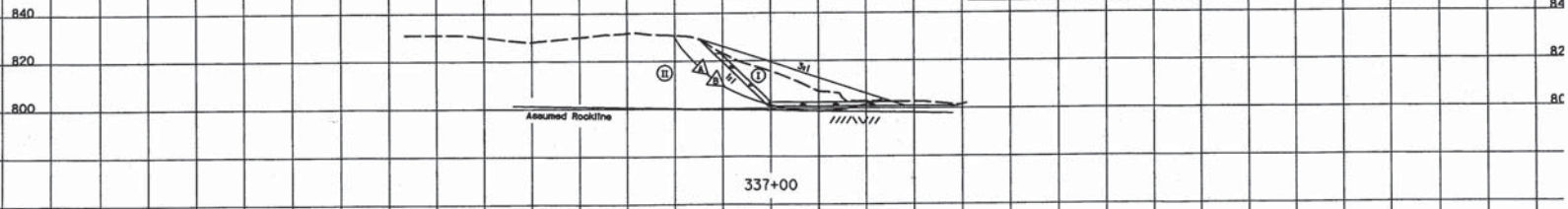
COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
BOONE			

ITEM NO. 6-2002.0
SLIDE # 8



FACTORS OF SAFETY		
SHORT TERM	A	1.6
LONG TERM	B	1.6

ASSUMED SOIL STRENGTH PARAMETERS				
SOIL	I		II	
SHORT TERM	$\phi = 120$ pcf	$\phi = 125$ pcf	$c = 1500$ pcf	$\beta = 0'$
LONG TERM	$\phi = 120$ pcf	$\phi = 125$ pcf	$c = 130$ pcf	$\beta = 18'$



SCALE 1 - 20

CROSS SECTION STA. 337+00 & 338+50
390