



December 12, 2006

TO: D. Yankauskas/G. Golphenee  
Northwest Region, MS NB 82-77

FROM: T. M. Allen/M. A. Frye  
E&EP Geotechnical Division, 47365

SUBJECT: SR-20, MP 44.75 vic., XL0832  
Quiet Cove Road Vic. to SR 20 Spur  
Meadow Creek Bridge Temporary Detour Wall  
Geotechnical Recommendations

### Introduction

This memorandum presents geotechnical recommendations for the temporary detour wall at the proposed Meadow Creek Bridge associated with the subject project. This project involves safety improvements to SR 20 from south of Meadow Creek Bridge to Sharpes Corner. The improvements involve alignment and profile changes, construction of left-turn channelization, lane and shoulder widening, and closure of several intersections. As part of a new alignment, a new bridge will be constructed over Meadow Creek.

Meadow Creek currently passes under SR 20 in a 4-foot diameter culvert. The culvert will be removed, and an open channel constructed to convey Meadow Creek under a new, single-span bridge. A temporary detour to maintain traffic will be constructed to the south of the existing embankment that carries SR 20 over Meadow Creek. A temporary retaining wall is necessary to keep the detour within WSDOT Right-of-Way.

### Retaining Wall Description

The temporary retaining wall will be approximately 130 feet in length (D-line Station 4+40 to 5+90, approximately 32 feet left) and have a maximum height of approximately 20 feet. We understand the existing culvert carrying Meadow Creek will be extended to the southeast and the existing channel filled up to the bottom of wall elevation. The wall will support approximately 6 feet of embankment fill and SR 20 traffic. The embankment slope at the top of the wall will be 2:1 (Horizontal:Vertical).

### Subsurface Conditions

Soils at the site consist of loose fill and alluvium overlying very dense glacial deposits. A detailed description of subsurface conditions is available in our November 8, 2005 geotechnical report titled *Quiet Cove Road Vic. To SR 20 Spur Meadow Creek Bridge*. Bridge layout sheets, subsurface profiles, and boring logs are available in our earlier report. The location of the borings should be shown in the Contract Plans and copies of the boring logs should be provided in the Contract Provisions.

Groundwater is not expected to be encountered during construction of this wall.

### **Geotechnical Recommendations**

Based on site conditions, wall geometry, and the temporary nature of the wall, we recommend a geosynthetic wall be used. Based on our analysis, a Type 6 wall as shown in Standard Plan D-3 is suitable for this wall. Standard Plan D-3 is for permanent geosynthetic wall with a cast-in-place or shotcrete fascia. Our analysis indicates the reinforcing lengths and geosynthetic strengths for a Type 6 Standard Plan D-3 wall are suitable for the temporary wall proposed for this project. The permanent facing shown in Standard Plan D-3 is not necessary. Additionally, as this wall will be temporary, the embedment requirements shown in Standard Plan D-3 are not necessary. The bottom reinforcing layer can be at the same elevation as finished grade at the face of wall. The four foot horizontal bench shown in Standard Plan D-3 should be constructed. Your office should write a special provision, or include a note on the plans, eliminating the fascia and embedment requirements shown on Standard Plan D-3.

We recommend the soil used to backfill the existing stream channel be gravel borrow compacted in accordance with Standard Specification 2-03.3(14)C, Method C. The existing embankment should be cleared and grubbed prior to construction of the wall. Additionally, the existing embankment slope should be terraced in accordance with Standard Specification 2-03.3(14).

Settlements are anticipated to be less than two inches and occur during construction.

### **Recommended Additional Services**

Because the future performance and integrity of the geotechnical elements of this project will depend largely on proper PS&E preparation and diligent construction procedures, we recommend that the Geotechnical Division (GD) in conjunction with the Regional Materials Engineer (RME) provide the following post-report services:

The GD should prepare the Summary of Geotechnical Conditions to be included in the PS&E as an appendix. The summary should be prepared as part of the PS&E review process.

The GD/RME should review all construction plans and specifications to verify that the design criteria presented in this report have been interpreted correctly and properly integrated into the design.

The GD/RME should attend pre-construction conferences with the Construction Project Engineer and Contractor to discuss important geotechnical related construction issues.

The GD/RME should review Contractor submittals for all shoring walls and other geotechnical elements of this project.

The RME should observe all exposed subgrades after completion of stripping and excavation to contract elevations. The RME should confirm that suitable soil conditions have been reached and determine appropriate subgrade compaction methods.

In addition to the aforementioned services, the Geotechnical Division can provide inspector training for construction personnel, assist in change of condition claims, and review cost reduction incentive proposals (CRIPs).

### **Intended Report Use and Limitations**

This report has been prepared to assist the Washington State Department of Transportation in the engineering design and construction of the subject project. It should not be used, in part or in whole for other purposes without contacting the EEP Geotechnical Division for a review of the applicability of such reuse. This report should be made available to prospective contractors for their information or factual data only and not as a warranty of ground conditions.

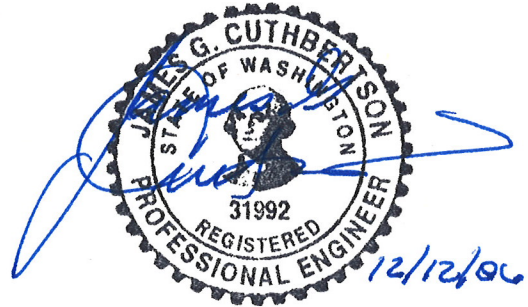
The conclusions and recommendations contained in this report are based on the Geotechnical Division's understanding of the project at the time that the report was written and on site conditions that existed at the time of the field exploration. If significant changes to the nature, configuration, or scope of the project occur during the design process, the Geotechnical Division should be consulted to determine the impact of such changes on the recommendations and conclusions presented in this report.

Site exploration and testing describes subsurface conditions only at the sites of subsurface exploration and at the intervals where samples are collected. These data are interpreted by members of the Geotechnical Division who then render an opinion regarding the general subsurface conditions. The distribution, continuity, thickness, and characteristics of identified (and unidentified) subsurface materials may vary considerably from that indicated by the subsurface data. While nothing can be done to prevent such variability, the Geotechnical Division is prepared to work with the Design Team to reduce the impacts of variability on project design, construction, and performance. Periodic geotechnical observation during construction may be beneficial in this respect. This ongoing involvement of the Geotechnical Division throughout the design and project development process will also help to avoid costly mistakes associated with misinterpretation of the contents of this report and resulting shortcomings of project design or contract documents.

The conclusions and recommendations presented in this report assume that surface and subsurface conditions, as observed during field exploration activities are representative of the site conditions throughout the project area. Because of this assumption, these recommendations should be considered subject to change depending on the actual subsurface conditions encountered. Actual subsurface conditions can be discovered only during earthwork and construction operations. Accordingly, the Geotechnical Division should be involved in the construction of the project in order to make appropriate observations and recommendations for alteration in design, as appropriate.

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If you have questions or require further information, please contact Tony Allen at (360) 709-5450 or Mark Frye at (360) 709-5469.



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