Weathered Rock N=100. The minerals themselves are fresh to very slightly weathered.

**Gravelly Sand, A-1-B** The sample at the top of the residual section at boring EB2-B returned a classification of A-1-B, probably with feldspars or garnets as the larger grains.

**Silty Sand, A-2-4** Other than the sample at EB2-B, above, all residual soil was classified as A-2-4. Blow counts were N=30 to N= 60

**Weathered Rock**

Weathered rock is the interval that yields a N value of N=100 for no more than 1 foot and no less than 60 blows /0.1foot. On this project, weathered rock was proven at EB1-A, and interpreted as a transition zone at EB1-B and EB2-C.

**ROCK:**

The rock is banded gneiss with variation in mineral size and composition and has somewhat contorted foliation. It is essentially un-fractured. Because the banding is generally horizontal, sudden change could occur with depth.

**HYDROLOGY:**

The water level was measured at the time of boring, and at 24 hours. Water level was at 7' below the road surface and was probably controlled by the stream level.

**SCOUR:**

Hydrology calculated abutment scour at this bridge site for a 100 year event and for an overtopping event. The table below summarizes abutment scour for the 100 year event using Hydrology scour and our ground elevation.

| Bent | Boring | Grnd Elev | Weathered Rock Elev | Q100 Scour | Q100 ScourElev | Adjusted Scour Elev. | Scour Adjustment |
|---|---|---|---|---|---|---|---|
| EB-1 | A | 2509.3 | 2501 | 9.4' | 2499.9 | 2499.9 | No Change |
| | B | 2508.7 | 2497 | 9.4' | 2499.3 | 2499.3 | No Change |
| EB-2 | C | 2510.6 | 2496 | 13.9' | 2496.7 | 2496.7 | No Change |
| | B | 2510.7 | 2505 | 13.9' | 2496.8 | 2504 | 7.2' up |

**Adjusted Scour Recommendation**

Our recommended scour elevations put the scour no deeper than one foot into weathered rock as determined by drilling. In the case where the weathered rock is below the calculated scour, no change is recommended.

## FOUNDATION SUBGRADE DESCRIPTION; BENT BY BENT

### END BENT ONE (EB-1)

The bridge is being changed from a 35' single span bridge to a 50' single span bridge. The new end bent 1 will be located about 10' outboard of the existing endbent 1. It has a planned centerline location of –L-16+77, and skew of $90^0$.

**Boring EB1-A.** The "A" Boring was drilled at -L-16+77, 5.00' LT., elevation 2514.81 on the edge of the existing roadway with hollow stem auger followed by NW casing and SPT to refusal. The boring encountered 5.5'of fill: Loose A-1- tan, micaceous sand. Gravelly alluvial soil, some with N=65 was found down to a depth of 12.0'. From 12.0 there was a rapid transition in residual soil to weathered rock at 13.6, and SPT refusal at 15.5. Refusal was found at 22.3' where the boring was terminated.

**Boring EB1-B.** The "B" Boring was drilled at -L-16+76, 14.0' RT., elevation 2514.71 on the shoulder of the existing roadway. The boring encountered 6.0'of medium dense tan sandy clayey slightly micaceous A-1 soil. From 6.0' to 12.0 medium dense, tan A-1 sediments were found, followed, down to 17.3', by dense residual micaceous brown tan and white soil. From 17.3' to refusal at 18.3', weathered rock was drilled. Coring in crystalline rock began at 18.3', and continued to the end of boring at 29.4, where the boring was terminated.

**Groundwater:**

Groundwater was found at 7.0 feet below road surface in both borings.

**Rock Surface:**

SPT refusal was at elevation 2499, on the A side, and at 2496 on the B side.

### END BENT TWO (EB-2)

The new endbent 2 will be located about 5' outboard of the existing endbent 2, at –L- 17+27 with skew of 90. Because of concerns with overhead power, one boring was completed at the "B" side, and one at the centerline "C" location.

**The "B" hole** at this bent was reported at –L-17+30, 18.00' RT., elevation 2515.61'.

**Soil stratigraphy:** From surface to 5.0', loose, tan sandy A-2-4 roadway fill was found. From 5.0' to 8.4' medium dense, tan, A-1 sediment was encountered. From 8.4' to SPT refusal at 10.7 we found micaceous residual soil. Auger refusal and end of boring was at 11.9' depth.

**The "C" hole** at this bent was reported at –L-17+27', offset zero, elevation 2515.7.

**Soil stratigraphy:** From surface to 5.0', loose A-2 silty clayey sand roadway fill was drilled. From 5.0 to 8.0 medium dense A-1 sediments were drilled. From 8.0 to 19.7 micaceous to very micaceous medium dense to dense residual soil was drilled. At 19.7' to 20.0', weathered rock was logged, and at 20.0', coring began in crystalline rock. Coring continued to 24.9', where the boring was terminated.

**Groundwater:**

Groundwater was measured at 7' on the "B" side and at 7' on the "C" side. The groundwater is at the roadway fill-alluvium boundary.

**Rock Surface:**

Crystalline rock elev. was at 2505' on the "B" side, and at 2496' at the "C" side.

## CLOSING STATEMENT

The geotechnical foundation investigation, analysis and recommendations are based on plans sealed 09/12/03. If any significant changes are made in the design or location of the proposed structure, the subsurface information and recommendations will have to be reviewed and modified as necessary.

Respectfully Submitted

Roger Q Callaway, L.G.# 1098
Project Geologist
Geotechnical Unit, Matthews Field Office