Areas of Special Geotechnical Interest

I. A wet area with soft soil was found on both sides of a small stream, which crosses centerline in a culvert beneath the existing roadway embankment. The wet area is at the following location:

-L- Station

13+50, Right Side

II. Groundwater was found within 3 feet ground surface, possibly affecting construction equipment, at the following locations:

-L- Stations

12+00 to 13+50

III. Hard rock was found above proposed grade at the following locations:

-L- Stations

15+50 to 19+35

IV. A wet cut in rock will be encountered at the following locations:

-L- Stations

16+00 to 19+00

Geotechnical Descriptive Analysis

Station 11+00 to 14+50

Plans for this segment call for widening the existing roadway embankment on the Right Side. The maximum thickness of new fill is to be approximately 14 feet. The fill area is a small valley with saprolite on the slopes and alluvial soils on the valley floor. A very small, sluggish stream flows along the north side of the valley floor and enters a culvert beneath the existing highway embankment.

A boring 45 feet Right of Station 12+50, near the center of the valley, encountered 3 feet of wet, very loose silty sand (A-2-4) overlying 4 to 5 feet of yellow, wet, soft silt (A-4) over about 2 feet of loose sand and gravel (A-1-b). Those alluvial strata are underlain by loose to medium dense, micaceous, silty sand (A-2-5) saprolite beginning at a depth of 9.5 feet.

A boring at the north margin of the valley floor, beside the stream, encountered only 4 feet of alluvium overlying saprolite. The alluvial soil there is composed entirely of very soft, saturated sandy, silty clay (A-7-5) with a Liquid Limit of 44 and a Plastic Index of 12.

Ground water in both borings was at a depth of less than 2 feet.

Station 14+50 to 19+35

A large, right side cut is planned for this segment. The maximum depth of cut at the ditch line is to be 35 feet, and the exposed cut face will be as much as 100 feet high, depending on the angle. Hard rock is exposed in much of the existing cut at this site.

Three rock core borings approximately 50 feet deep were made on the hillslope above the existing cut, and four additional borings were made with augers to determine the depth to the rock line. Very thin, residual and colluvial fine soils were found at the surface in a few borings. The borings encountered 3 to 12 feet of saprolite and 0 to 6 feet of weathered rock overlying the hard rock. The saprolite was composed of stiff to hard, micaceous, sandy silt (A-4) and subordinate amounts of medium dense, micaceous, silty sand (A-2-4). The depth to hard rock varied between 3.1 and 19.0 feet, with the greater depths found in the northern half of the area. The depth to good quality, fresh rock varied from 27.6 feet to 44.5 feet in the 3 core borings, again with the greater depths found in the northern part of the proposed cut.

A Schmidt Net analysis was done with 154 strike and dip orientations taken from joints in the outcrops that are exposed in the existing cut and at the base of the hill, beside the bridge abutment. Results indicate that almost all of the joints fall into 4 sets with the following orientations:

(1) 130-160, 35-50° (foliation), smooth
(2) 170-185, 50°, rough to smooth
(3) 220-240, 60-90°, smooth
(4) 310-345, 60-80°, rough to smooth

Most joints, with the exception of foliation joints, have continuities of about 2-5 feet. Foliation joints may have continuities of 10 feet or more and spacing of less than a foot to about 4 feet. Joint set 2 is spaced a few feet apart. Sets 3 and 4 are too few in number and too widely dispersed over the outcrop for spacing to be a factor.

The joint orientations allow the possibility of wedge or plane failures on cut slopes at 0.75:1 (H:V) or steeper. A small wedge failure in the existing cut, involving several cubic feet of rock, occurred on the intersection of the south-dipping joint set (175, 50°) with an atypical, west-dipping joint.

Static ground water was found at depths between 25 and 30 feet.

Station 19+35 to 22+75

This interval is to be occupied by the proposed new bridge.