

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

DATE: September 14, 1983

TO : James L. Deaton, P.E., District 1 Director

FROM : Heber Vlam, P.E., Engineer of Materials and Research *H.V.*

SUBJECT: NM-2037(4); SR-89 Washington Blvd.
44th South St. to 27th South St.
Slope Stability and Settlement Investigation
Approximate Station 48+00 to 53+00

As requested by the District One Materials Engineer, we are in the process of investigating stability and settlement problems in the north bound lane of Washington Boulevard near Burch Creek.

Three test holes, varying in depth from 17 to 120 feet were drilled in the area for the stability and settlement study. Correlation of subsoils between holes is good. The test holes show that the ground water is approximately 6 to 10 feet below natural ground. In general the subsoils in hole number 2 may be described as follows: from the ground surface to a depth of 14 feet - dark tan silty fine sand; from 14 feet to 38 feet - dark tan silty clay with thin lenses of sandy silt; from 38 feet to 96 feet - grayish light brown silty clay with lenses of sandy silt; from 96 feet to 100 feet - interbedded silty clay and sandy silt; from 100 feet to 108 feet - grayish light brown silty clay; from 108 feet to the maximum depth of exploration - interbedded sandy silt and silty clay. Drill hole number 3, located approximately 166 feet northeasterly from hole number 2, in the section of the road which has settled, shows a good correlation of soil layers but approximately 10 to 12 feet deeper up to a depth of 90 feet. The subsoils correlate at nearly the same elevation thereafter. Because the soil bedding is relatively flat, we therefore believe this is evidence of a probable high angle shear plane to a depth of 90 feet, somewhere between holes number 2 and 3 generally parallel to Washington Blvd. Also, soil samples from 96 feet depth in Drill Hole 2 show evidence of shear failure with disoriented bedding planes and the appearance of low angle slippage (nearly parallel the bedding planes). See Drilling Logs (attached). These shear plane may have occurred some time prior to the settlement.

The ground water table was found to be at approximately 6 to 10 feet deep. Subsurface water from several possible sources, in the shallower permeable layers, has percolated through the silty sand materials and caused major settlement in the north bound lane of the Washington Boulevard, by removal of fine grained material.

As per our discussion with District Materials Engineers on August 23rd, we recommend that these shallower seepage water zones be dewatered by means of an underdrain approximately 15 feet deep and incorporating a perforated pipe not less than 8 inches in diameter. We also recommend the use of permeable filter fabric surrounding the underdrain granular backfill to optimize the drain pipe. An impermeable membrane is recommended on the side of the trench toward the settled and damaged section of the road to prevent further seepage of water, downslope through the subgrade.

The recommended location for the underdrain is as follows: starting at 15 feet deep on the left outside shoulder near station 53+50 (approximately 40 feet left of ℄) to station 53+00 and 40 feet right of ℄, then northerly to the existing drain pipe at approximate station 48+75. Testing of the soil samples obtained from test holes number 2 and 3 are in progress. Stability analysis can be done when the testing is completed.

Attachment

SSakhai/vj

cc: Dyke LeFevre

Richard N. Griffin