

where a very thin layer of very stiff, sandy silt saprolite is found. Hard rock underlies the soft weathered rock horizon.

Alternating cuts and fills will dominate between Stations 24+80 to 30+63. Embankments through this section will be less than 10.5 meters high and will toe up mainly on soft weathered rock. An existing embankment, located between Stations 30+54 to 30+59 is comprised of a wet, very loose, silty sand with rock fragments, and will provide the base for the fill at this interval. Excavations through this section will be 2.5 to 17.5 meters in depth and will be constructed in residual and soft weathered rock. The residuum is comprised predominately of red-brown, stiff to hard, dry, clayey and fine, sandy silts (A-4, A-5). Groundwater, other than that found associated with Martin Creek, should not be encountered in this interval.

Stations 30+63 to 68+40

This interval involves both large and small cuts and fills. One proposed culvert, one bridge, numerous small creeks and ephemeral drainages and two cuts involving rock quantities will be traversed by the alignment.

This section, Stations 30+63 to 33+21, begins with a large, 37 meter cut. Excavated materials will be mostly soft and hard weathered rock, but hard rock is expected above grade between Stations 31+00 to 33+00. No groundwater is anticipated above grade in this cut.

Between Stations 33+21 to 34+02 construction involves a small, 1.5 meter fill and a 7 meter cut before the alignment descends into another drainage basin. The fill will be founded on a thin layer of hard, clayey, silty saprolite which overlies soft weathered rock. Groundwater is present 1.5 meters below the ground surface. The cut will involve soft and hard weathered rock wholly, except at Station 33+72 right, where a small amount of hard rock will be found in the ditchline. No groundwater will be present.

The alignment traverses the drainage area of Hampton Creek between Stations 34+02 to 37+74. Two abandoned greenhouses are within construction limits in this interval. A 34 meter fill with a dual 2.2 x 2.1 reinforced concrete box culvert has been proposed through this section. Subsurface materials on the side slopes of the valley are generally a thin (less than 2 meters) layer of residuum that consists of soft, clayey silt near the valley floor and hard, sandy silt or soft weathered rock along the steeper slopes of the walls. Soft and hard weathered rock underlies the residuum.

A large cut section (17.5 meters) between Stations 37+74 to 40+57 will consist of up to 12.6 meters of saprolite, comprised of variegated, moist to dry, very stiff to hard, interlayered, clayey and sandy silts (A-4, A-5) with intermittent soft weathered rock seams up to 5.4 meters in thickness. Soft and hard weathered rock lies below the saprolite. Hollow auger refusal was encountered in several borings in this section due to an over 10cm thick quartzite seam within the weathered rock horizon. However, continuous hard rock above grade is not likely, but isolated occurrences of rock may be present.

A 96 meter long bridge has been proposed to carry -LREV- over -Y3-, (SR-1558), and a small creek. Embankment for existing SR-1558, artificial fill, residuum, alluvium, and hard rock will be the materials encountered in this fill section between Stations 40+57 to 42+57. The embankment consists of very stiff, sandy silt with rock fragments. Approximately 1.5 meters of artificial fill, between Stations 41+02 to 41+10, is composed of orange-brown and dark brown, moist, very loose, clayey, silty sand (A-2-5) with wood and rock fragments. The alluvium consists of wet to saturated, soft to very dense, gray silt with gravel and cobbles. Hard rock underlies the alluvium and is seen in the creek bottom as well as in the existing cut slope for SR-1558. The residuum found on the slopes is made up of orange-brown, dry, clayey and sandy silts, overlying soft weathered rock.

Alternating small cuts and fills will characterize construction between Stations 42+57 to 52+64. The embankments involved will be less than 14 meters in height and the cuts will be less than 7 meters. Construction of -LREV- and nearby -Y3-, (SR-1558), will affect one residence and its associated outbuildings near Stations 47+07 to 47+40. The fills will toe up on an existing embankment, residual and alluvial soils. Embankment, at Station 45+72 is negligible. The residual soils are composed of orange-brown, wet to moist, soft to very stiff, silty clays (A-6, A-7-6), with rock fragments. These soils are generally less than 2 meters thick.

Three ephemeral drainages, one of which contains an over 2 meter thick deposit of soft, moist, silty clay alluvial soil, will be crossed by the alignment through this interval. Groundwater will be found within 1.7 meters of the ground surface in these three areas. These drainages are located in the vicinity of approximate Stations 43+52, 49+72, and 50+32, right.

Saprolite composed of purple, yellow, and orange-brown, dry to moist, medium stiff to hard, silty clays and numerous interlayers of clayey and sandy silts, underlie the residual soils. Soft weathered rock and hard rock were encountered in the borings, also.

The subsurface materials encountered in the cut sections will include negligible existing embankments and residual soils, one instance each. The majority of the materials involved are saprolites and soft weathered rock. Saprolite will dominate or be the only subsurface material involved in some cuts, others will be mainly or wholly soft weathered rock. The saprolite comprising these cut sections is the same as that described above underlying the fills. Hard rock will be encountered just above grade between Stations 48+60 to 48+80. Groundwater will not be encountered in any of these cut sections.

Beginning near Station 52+64 through Station 68+40 construction will involve small to large cuts (7.5 to 23 meters), alternately with similar sized fills. The topography traversed by the alignment through this section is composed of steep-sided, rounded to flat topped, fully forested mountains separated by narrow valleys, most of which are floored by small (up to one meter wide), shallow creeks. The underground water and sewer lines for the town of Murphy will be crossed three times over this interval, at Stations 60+20, 61+95 and 64+25. The first two occurrences are in proposed cut sections, the last one a proposed fill section. The cuts through this section will involve subsurface materials consisting of residual soils, saprolitic soils, and soft weathered rock. The residual soils are less than 2 meters in thickness and are composed of orange-brown, moist,

very soft to very stiff, clayey silts and red-brown, moist, soft to very stiff, silty clays, both with varying amounts of weathered rock fragments. The saprolitic soils and soft weathered rock seams are interlayered. In many instances throughout these cut sections, stiff to very stiff saprolite will be at or near grade, below several meters of soft weathered rock material. Many of the saprolite and soft weathered rock seams contain manganese oxide seams that are up to 1cm in thickness in places. The alternating harder and softer seams, coupled with these slick manganese oxide seams may contribute to instability in the cut sections. To avoid this possibility, the recommended cut slope designs take into account the dip angle and orientation of these features. The saprolite is composed of mainly silts, varying from clayey to sandy. Colors are very heterogeneous, red, green, yellow and brown. Most of the soils are dry, but moist to saturated saprolites were encountered. Consistencies ranged from medium stiff to hard, the majority being very stiff to hard. A wet cut is expected between Stations 59+60 to 61+20.

Embankments through these sections will toe up on alluvium. All of these sections contain continuously flowing unnamed creeks. These creeks are generally narrow and shallow, although near Station 58+20, two creeks converge to form an approximate 20 meter wide floodplain. This area is soft and wet, but no organics were observed. Groundwater will be found at the surface or within 2 meters of the ground surface throughout the alluvial deposits associated with these creeks. Saprolite and soft weathered rock will lie along the steep mountain slopes leading down to these drainages. Drilled borings to investigate the subsurface materials on these slopes was not possible due to their steepness. The alluvial materials encountered here are comprised of orange-brown, dark brown, and gray, very soft to hard, silty clays and clayey and sandy silts. Variegated, moist to saturated, medium stiff to hard, clayey and sandy silt saprolites as well as soft weathered rock deposits underlie the alluvium in these areas.

The floodplain of the Hiwassee River is located between approximate Stations 67+02 to 68+40. Groundwater lies from 2.1 to 3.45 meters below the ground surface in this wide floodplain. The alluvium observed here is generally 3.5 to 4 meters in thickness, although thicknesses up to 6.9 meters were found. It is composed of very soft to soft, sandy silt overlying a layer of mixed silt, sand, gravel, and cobbles that ranged from very soft to very dense. Typically underlying this alluvium was soft and hard weathered rock. One boring on the centerline at Station 68+32 indicated the alluvium is sometimes underlain by saprolite. Here the saprolite horizon is composed of hard sandy silt. The boring was not deep enough to reach the SWR horizon.

Stations 68+40 to 69+64

Activity within this section involves construction of a bridge over the Hiwassee River. This will bring the alignment north of the river (east at this particular location) once again. Borings advanced near the beginning of the bridge reveal approximately 3.5 meters of alluvium, consisting of very soft to soft, orange-brown, moist to wet, sandy silt with rounded gravels. Saprolite, approximately 1.2 meters in thickness underlies the alluvium. It is composed of green, dry, sandy silt with a hard consistency. Soft weathered rock lies below the saprolite. Groundwater is 2.8 to 3.7 meters below the ground surface. Near the end of the bridge, over 4 meters of alluvium was observed. It consists of a soft to very stiff, sandy silt overlying a very stiff to hard, interlayered sand, silt, gravel and cobbles (up to 10cm) layer. The saprolite here is 2 to 3.5 meters in thickness

Beginning at Station 76+63 and continuing through Station 81+67, construction involves a large cut section (up to 16.5 meters). This cut will involve interlayered saprolite and soft weathered rock. Seams of soft weathered rock will vary from negligible to over 5.7 meters in thickness. All areas of the cut will have soft or hard weathered rock at grade. Auger refusal on hard rock was encountered in one boring through this interval. Elevation of the ground surface on the plans does not coincide with that observed in the field at this boring location. Rock above grade may be encountered from Stations 80+60 to 81+10. Groundwater is not found above grade through this section.

The fill section from Station 81+67 to Station 83+11 will toe up on alluvium. This alluvium is less than one meter in thickness and is soft, gray, clayey silt. It is underlain by medium stiff to very stiff, sandy silt saprolite with silty clay seams. Groundwater will be encountered at less than 0.5 meters in this interval. A small unnamed creek will be involved in this and subsequent fills along the remainder of the corridor. Alluvial deposits near Station 87+12 consist of 1.2 meters of soft, silty clay with rock fragments. This is underlain by very stiff, sandy silt saprolite.

Three additional borings were advanced at Stations 87+72 to 90+52. All left of centerline. The current construction project ends at Station 87+20, near where -LREV- crosses over (to the left of) existing US-64. These borings are included for future reference.

-Y- Lines

-Y-

This line involves some reconfiguration of the intersection of US 19-74-129 and -LREV-.

-YIREV- and -YIDET-

The -YIREV- alignment involves relocating a portion of existing US-64 to its new tie-in position on -LREV-. Line -YIDET- will link -YIREV- to existing US-64 near the intersection with US 19-74-129, while construction of the intersection of -YIREV- and -LREV- is undertaken. This construction will involve a quantity of hard rock at Station 10+76, -YIREV- or equivalent Station 15+49.5, -YIDET-. This observation is made from three borings that were advanced in August 1985 as noted on the plan view and the corresponding cross-sections.

-Y2-

There is no construction along -Y2-, (SR-1558). This interval involves the construction of a bridge carrying -LREV-, over -Y2-.

-Y3-

The -Y3- alignment involves a major relocation of existing SR-1558. Near its beginning a bridge carrying -LREV- will cross over -Y3-. Line -Y3- will follow its current course until Station 14+71, where it will move south of its present location going across grassed pasture land,

forested areas, impacting one residence with outbuildings, until it rejoins current SR-1558 at Station 19+00. Near Station 20+20, a reworked intersection will involve -Y3-, (SR-1558), relocated -Y4-, (SR-1561), and a pre-existing road leading into a housing development. Two borings were advanced in the cut, one near grade point, along this -Y- Line. At Station 18+40, nearly a meter of stiff, residual, clayey, fine, sandy silt overlies a very stiff saprolite of the same material. At Station 18+67, the cut will involve soft and hard weathered rock and hard rock. Hard rock will be found above grade at Stations 18+55.9 to 19+17. The fill is expected to toe up on medium stiff to very stiff, residual or saprolitic, silty soils.

-Y4-

The -Y4-alignment, (SR-1561), also involves a relocation. It will be east of its current location. Starting at Station 10+40, small cuts and fills will characterize this new alignment. The cuts will involve excavating a thin veneer (less than one meter) of hard (very dense), residual silts and sands with up to 15cm rock fragments and soft weathered rock. Hard rock was found shallow here for a short interval (approximate Stations 11+20 to 11+40), but should not be present above grade. The elevation of the ground surface, as shown in the profile section, does not match that observed in the field. The ground surface elevation drops off toward the ephemeral drainage at Station 12+85, starting at Station 11+50 in the field. The embankment will toe up on medium stiff, silty clay residual soils overlying very stiff to hard, sandy silt saprolite soils near the ephemeral drainage area. While thin, hard, residual soil overlying shallow, soft weathered rock can be expected on the slope between Stations 12+50 to 12+80 (according to the profile), Stations 11+50 to 12+80 (actual ground surface). Groundwater will be within 1.7 meters of the ground surface near the ephemeral drainage area. Line -Y4- will intersect -LREV- at Station 12+87 (-Y4-), it will continue until its intersection with -Y3-, (SR-1558), at Station 14+02 (-Y4-), as described above. Between Stations 13+10 to the intersection with -Y3-, cuts and fills will involve medium stiff to hard, silty clay saprolite.

-Y5-

The -Y5- alignment, (SR-1549), involves a minor relocation. Alluvial soils will provide the foundation for the embankment. They are composed of stiff, silty clays with rounded gravels or medium dense, clayey sands with rounded gravels. The alluvium is less than 2.5 meters in thickness. Very stiff to hard, sandy silt saprolite underlies the alluvium.

-Y6REV-, -Y6-, -Y7-, and -Y10-

The stationing for the -Y7- alignment is shown on the plan view as Stations 73+40 to 77+83.1 and on the profile as Stations 10+00 to 14+43.

These three -Y- Lines are interconnected so they will be discussed together. Line -Y6- is a continuation of -Y6REV- at Station 12+79. Line -Y6REV-, (SR-1548), involves relocation of its intersection with existing US-64. Line -Y7-, (existing US-64), involves obliteration of pavement, ending US-64 at -Y7-, Station 75+64. Line -Y10-, (SR-1549), will involve construction of a new segment of roadway. It will no longer end at -Y6REV-, (SR-1548), it will be built across an old

drive-in theater parking area to connect to -Y7-, (existing US-64). Construction will involve approximately 1.5 meters of medium stiff to stiff, clayey and sandy silt alluvium overlying stiff, silty saprolite.

-Y8-

The -Y8- alignment, (existing US-64), will involve some pavement removal. Existing US-64 will end here, near where -LREV- crosses over the existing highway.

-Y9-

The -Y9- alignment, (SR-1546), will be partly covered by the new alignment of -LREV-. The current intersection with existing US-64 will be moved south to accommodate its new intersection with -LREV-.

and is made up of green, dry to wet, stiff to hard, clayey fine sandy silt with manganese oxide seams. Soft weathered rock underlies the saprolite. Groundwater will be 4.1 meters below the ground surface.

Stations 69+64 to 86+31 (End of Profiles Provided)

This section also involves alternating cuts and fills. Several -Y- Lines will intersect -LREV- throughout this interval. One church, two residences and several outbuildings lie within construction limits. The topography through this interval is rolling to mountainous, both small and large cuts and fills are proposed.

Between Station 69+64 through Station 74+83, the embankment will be placed upon the alluvial materials associated with the floodplain of the Hiwassee River. The floodplain north of the river is wide, nearly 600m, and undulates uphill slowly. Abrupt elevation changes at Station 71+50 and between 74+90 to 75+40 mark an old river terrace and the farthest extent of alluvial deposits found along the centerline, respectively. The alignment traverses a sparsely wooded, grassed pasture along this interval. All borings were dry when drilled, with the exception of a boring at Station 70+12, which lies near a small creek. These borings were filled immediately after drilling due to the presence of livestock in the pasture, therefore no 24-hour groundwater readings were recorded.

The alluvium encountered here is interlayered orange or red-brown, moist, medium stiff to very stiff, or medium dense, sandy and clayey silts, silty clays, and clayey sands, mottled in places, and containing varying amounts of rounded gravels. Its thickness varies from less than half a meter to over 5 meters. A green and orange-brown, dry to moist, very stiff to hard, sandy silt saprolite typically underlies the alluvium in all areas except at Station 71+32. Here, the soft weathered rock horizon directly underlies the alluvium.

Line -Y5-, (SR-1549), presently intersects the -LREV- alignment at Station 74+62. Its new location will be discussed in the section on -Y- Lines.

The cut interval from Stations 74+83 to 76+14 will involve alluvium and interlayered saprolite and soft weathered rock. The alluvium is the same as described above. It will range from 2.5 to 6 meters in thickness. Saprolite ranges from very stiff to hard, and varies from sandy silt to silty clay. One to 4 meter seams of soft weathered rock will be found interlayered within the saprolite horizon.

In the interval from Stations 76+14 to 76+63, the alignment will cross a small unnamed creek and -Y6-, (SR-1578). This small fill will be placed on alluvium consisting of medium stiff to stiff (8 blows), clayey, sandy silt with rounded and angular rock fragments. The alluvium is 1.5 meters in thickness. A stiff, silty saprolite lies below the alluvium. Groundwater can be expected to be at a depth of 1.25 meters within this alluvial deposit.

**ROCK CORE TEST RESULTS**

Sample ID	1	2	3	4
Station	21+35.5	21+35.5	22+63	22+63
Offset	18m RT	18m RT	16.5m RT	16.5m RT
Depth	40.49 - 40.54	29.80 - 29.85	31.06 - 31.11	20.31 - 20.36
Date Sampled	8-29-96	8-29-96	8-29-96	8-29-96
Sample Type	Core	Core	Core	Core
Description	Visible Pyrite	Visible Pyrite	Visible Pyrite	Visible Pyrite
NHCl/NaOH Used	0.10	0.10	0.10	0.10
HCl Used	20.00	20.00	20.00	20.00
NaOH Blank	20.50	20.50	20.50	20.50
C	0.98	0.98	0.98	0.98
Amount NaOH Sample	19.00	19.30	18.00	19.80
Acid Consumed	1.46	1.17	2.44	0.68
NP	3.66	2.93	6.10	1.71
% S	0.67	0.35	0.72	0.41
AP	21.06	10.81	22.63	12.72
NP-AP (NNP)	-17.40	-7.89	-16.53	-11.01
Date Tested	11-7-96	11-7-96	11-7-96	11-7-96
Tested By	UTK	UTK	UTK	UTK

Respectfully Submitted,

L. A. Mann, TEG-I

LAM:mw