

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

DATE: November 16, 1981

TO : Those Listed Below

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

SUBJECT: I-15-5(11)213 - Mills Junction to South Nephi; Foundation Report for "E" Ramp Over U.P.R.R., I-15 N.B.L. over U.P.R.R. at I-15 Station 836+68.4 and I-15 S.B.L. over U.P.R.R. at I-15 Station 838+20.9.

*TJS RIE
Section 17K*

SITE CONDITIONS

Three prestressed concrete beam structures are proposed to carry "E" Ramp, I-15 N.B.L. and I-15 S.B.L. over the Union Pacific Railroad tracks approximately 1.2 miles south of Nephi. Each structure will consist of three spans and the approximate dimensions and skew angles are as follows:

<u>Structure</u>	<u>Length Ft.</u>	<u>Width Ft.</u>	<u>Skew Angle Degree</u>
"E" RAMP	218	30	53
I-15 N.B.L.	221	44	53
I-15 S.B.L.	201	72	48

The approach embankments for "E" Ramp, I-15 N.B.L. and I-15 S.B.L. are approximately 31 to 34 feet high.

Surface drainage at the structure site is good.

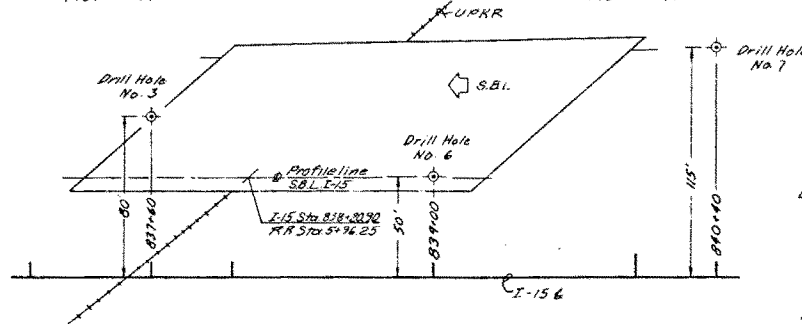
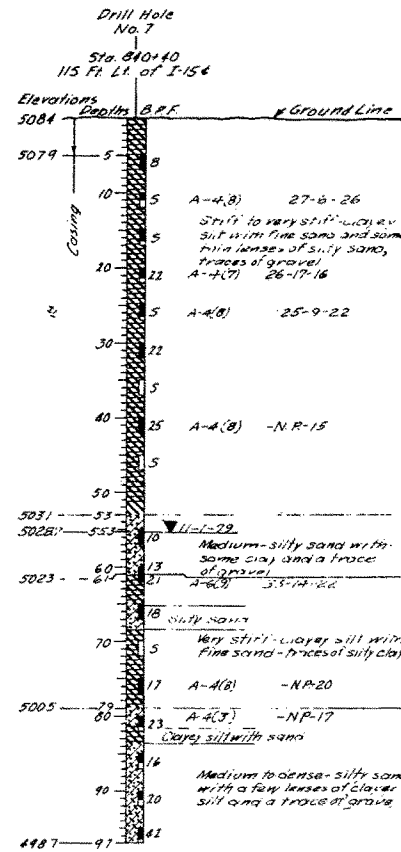
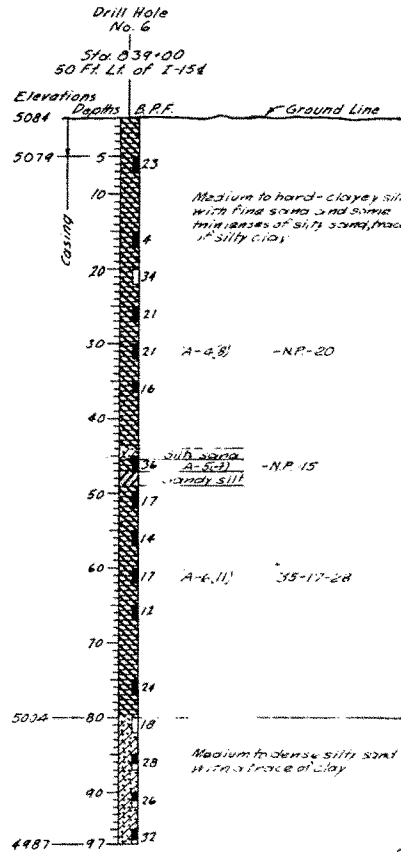
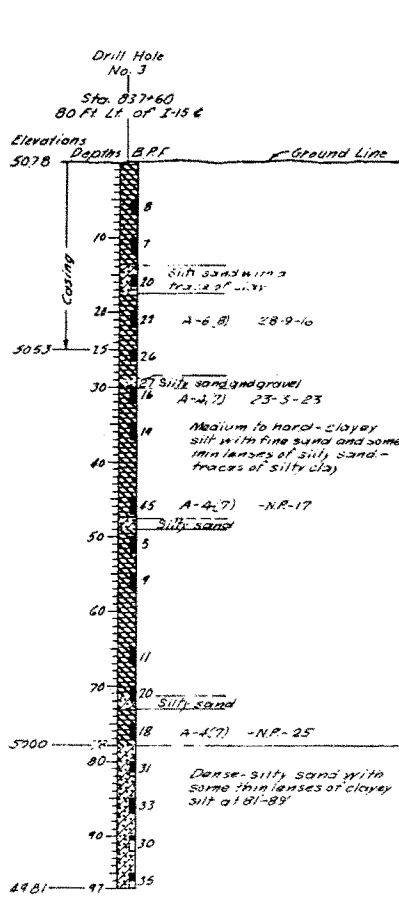
SUBSURFACE EXPLORATION

Seven test holes were drilled at this site to a maximum depth of 97 feet. Correlation of soils between test holes is good, and a general description of the subsurface materials is as follows: from the ground surface to an approximate depth of 76 feet - medium to stiff clayey silt with fine sand and occasional layers of silty sand and traces of gravel; from 76 feet to the maximum depth of exploration - medium to dense silty sand with traces of clay and gravel. Refer to the Drilling Logs, Figure 1, for more detailed descriptions of subsurface materials and test hole locations.

Ground water was measured at an approximate depth of 55 feet.

FOUNDATION RECOMMENDATIONS

One-foot diameter steel pipe piles or tapered steel piles with 9-inch minimum diameter tips are recommended to support this structure. The estimated tip elevations for 160 kip piles are as follows:

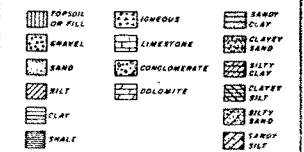


NOTE: Water table observations were not possible in Drill Holes No. 3 and No. 6, because of wall casing.

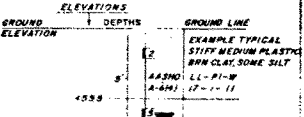
Date Drilled: Oct - Nov 79

KEY TO DRILLING LOG
RELATIVE DENSITY (NON-PLASTIC SAND/SILT)
VERY LOOSE - LESS THAN 4 BLOWS PER FOOT
LOOSE - 4 TO 10 BLOWS PER FOOT
MEDIUM - 10 TO 30 BLOWS PER FOOT
DENSE - 30 TO 50 BLOWS PER FOOT
VERY DENSE - MORE THAN 50 BLOWS PER FOOT

CONSISTENCY (PLASTIC SILT & CLAY)
VERY SOFT - LESS THAN 2 BLOWS PER FOOT
SOFT - 2 TO 4 BLOWS PER FOOT
MEDIUM - 4 TO 8 BLOWS PER FOOT
STIFF - 8 TO 15 BLOWS PER FOOT
VERY STIFF - 15 TO 30 BLOWS PER FOOT
HARD - MORE THAN 30 BLOWS PER FOOT



DRILL HOLE NO. 0+00 E OR LT OR RT IN FT. OFFSET
STATION



GROUND ELEVATION

DEPTHS

GROUND LINE

EXAMPLE TYPICAL STIFF MEDIUM PLASTIC BRN CLAY, SOME SILT

4530

4538

GROUND WATER TABLE

4532

DATE

STRATA CHANGE

15'

10'

20'

25'

30'

35'

40'

45'

50'

55'

60'

65'

70'

75'

80'

85'

90'

95'

100'

105'

110'

115'

120'

125'

130'

135'

140'

145'

150'

155'

160'

165'

170'

175'

180'

185'

190'

195'

200'

205'

210'

215'

220'

225'

230'

235'

240'

245'

250'

255'

260'

265'

270'

275'

280'

285'

290'

295'

300'

305'

310'

315'

320'

325'

330'

335'

340'

345'

350'

355'

360'

365'

370'

375'

380'

385'

390'

395'

400'

405'

410'

415'

420'

425'

430'

435'

440'

445'

450'

455'

460'

465'

470'

475'

480'

485'

490'

495'

500'

505'

510'

515'

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695'

700'

705'

710'

715'

720'

725'

730'

735'

740'

745'

750'

755'

760'

765'

770'

775'

780'

785'

790'

795'

800'

805'

810'

815'

820'

825'

830'

835'

840'

845'

850'

855'

860'

865'

870'

875'

880'

885'

890'

895'

900'

905'

910'

915'

920'

925'

930'

935'

940'

945'

950'

955'

960'

965'

970'

975'

980'

985'

990'

995'

1000'

LOCATION OF SAMPLE

12'

18'

24'

30'

36'

42'

48'

54'

60'

66'

72'

78'

84'

90'

96'

102'

108'

114'

120'

126'

132'

138'

144'

150'

156'

162'

168'

174'

180'

186'

192'

198'

204'

210'

216'

222'

228'

234'

240'

246'

252'

258'

264'

270'

276'

282'

288'

294'

300'

306'

312'

318'

324'

330'

336'

342'

348'

354'

360'

366'

372'

378'

384'

390'

396'

402'

408'

414'

420'

426'

432'

438'

444'

450'

456'

462'

468'

474'

480'

486'

492'

498'

504'

510'

516'

522'

528'

534'

540'

546'

552'

558'

564'

570'

576'

582'

588'

594'

600'

606'

612'

618'

624'

630'

636'

642'

648'

654'

660'

666'

672'

678'

684'

690'

696'

702'

708'

714'

720'

726'

732'

738'

744'

750'

756'

762'

768'

774'

780'

786'

792'

798'

804'

810'

816'

822'

828'

834'

840'

846'

852'

858'

864'

870'

876'

882'

888'

894'

900'

906'

912'

918'

924'

930'

936'

942'

948'

954'

960'

966'

972'

978'

984'

990'

996'

1000'

NO. OF BLOWS OF A 140 LB HAMMER FALLING 30 INCHES, REQUIRED TO DRIVE A STD. 1.5" I.D. R.O.D. SAMPLE TUBE 1 FT.

CLASSIFICATION OF EACH SAMPLE AND RESULTS OF CLASSIFICATION TESTS.

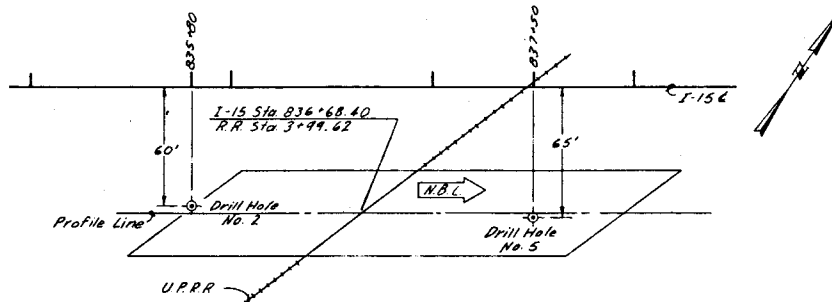
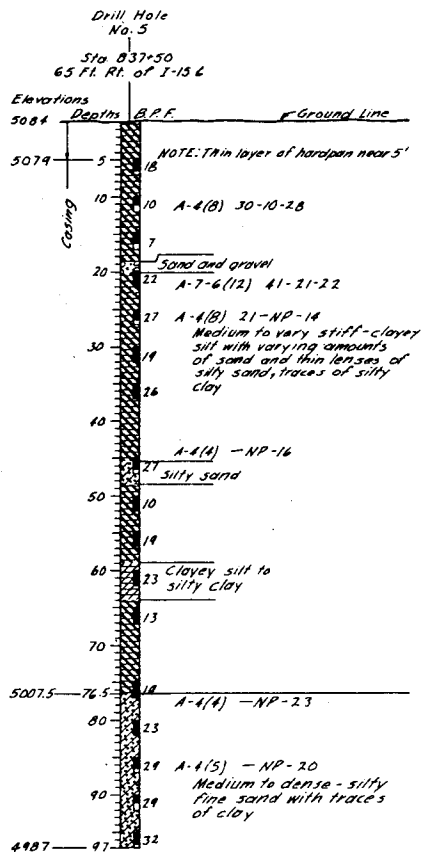
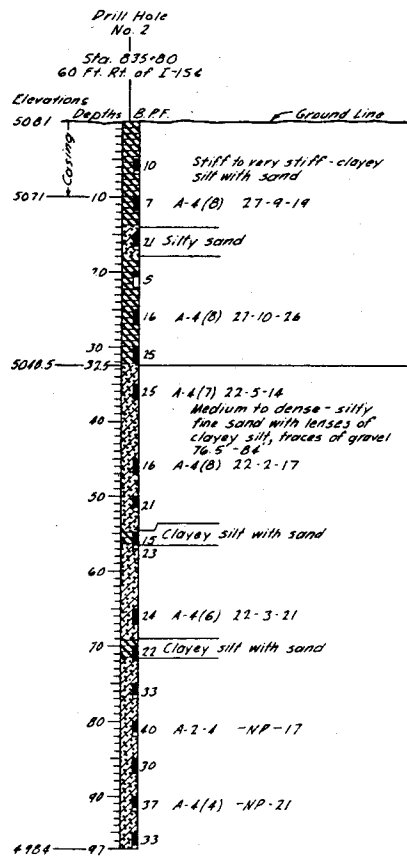
ABBREVIATIONS
LL - LIQUID LIMIT IN %
P.I. - PLASTIC INDEX
w. - NATURAL MOISTURE CONTENT IN %
W.G. - WELL GRADED
PEN. - PENETRATION
G.W.T. - GROUND WATER TABLE
B.P.F. - BLOWS PER FOOT
N.P. - NON PLASTIC

NOTE: REFUSAL = 50 OR MORE BLOWS PER FOOT

UTAH DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH SECTION
MILLS JUNCTION TO SOUTH NEPHI
I-15 SBL OVER UPRR

DRAWN BY: R. STIER
CHECKED BY: D. P. HANCOCK
DESIGNED BY: S. J. BARR
RECOMMENDED BY: L. H. COLEMAN
DATE: 8/31/79
COUNTY: JUAB

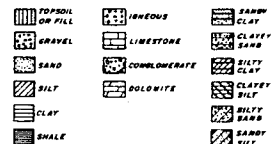
REVISIONS



NOTE: A water table was not observed in these drill holes.
Date Drilled: 10-79

KEY TO DRILLING LOG
RELATIVE DENSITY (NON-PLASTIC SAND & SILT)
VERY LOOSE - LESS THAN 4 BLOWS PER FOOT
LOOSE - 4 TO 10 BLOWS PER FOOT
MEDIUM - 10 TO 30 BLOWS PER FOOT
DENSE - 30 TO 50 BLOWS PER FOOT
VERY DENSE - MORE THAN 50 BLOWS PER FOOT

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HARD - MORE THAN 30 BLOWS PER FOOT



DRILL HOLE NO. STATION 0+00 E OR L OR RC IN FT. OFFSET

GROUND ELEVATION	DEPTHS	GROUND LINE	EXAMPLE TYPICAL
4555	5		STIFF MEDIUM PLASTIC CLAY, SOME SILT
4555	15		DATE
4552			THINWALL SHELBY TUBE, UNDISTURBED SAMPLER USED.
4548			SPLIT BARREL UNDISTURBED SAMPLER WITH LINES PRINTS ON CALL FORM TYPE SAMPLER
			REASON NOT RECOVERED
			CLASSIFICATION OF EACH SAMPLE AND RESULTS OF CLASSIFICATION TESTS.

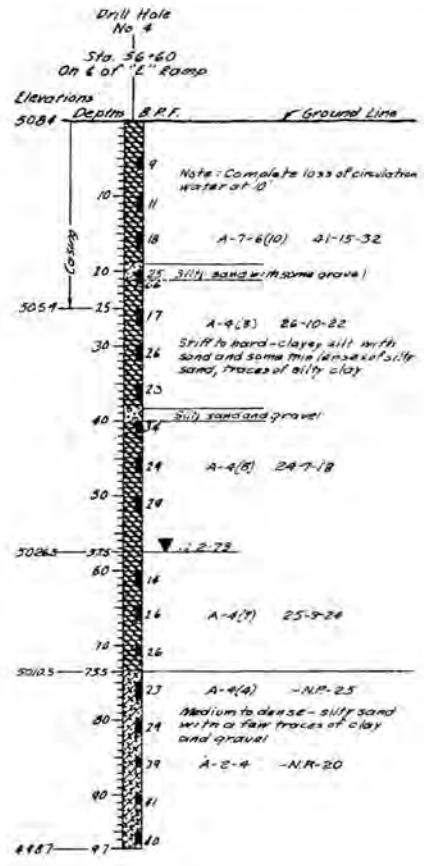
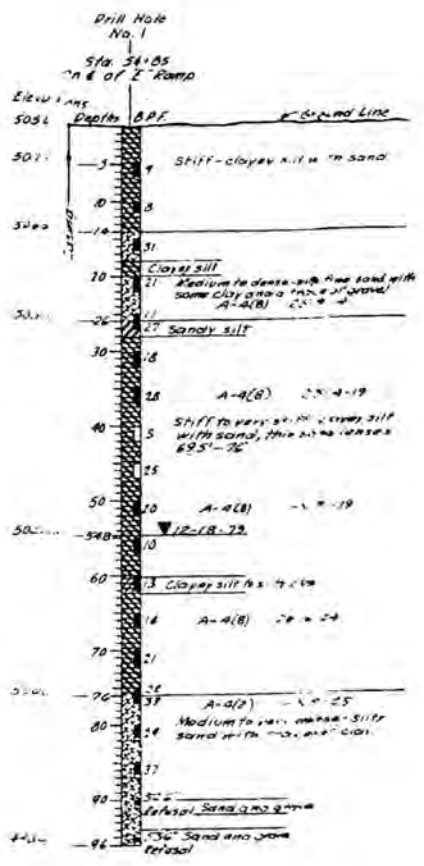
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G.W.T. - GROUND WATER TABLE
B.P.F. - BLOWS PER FOOT
N.P. - NON PLASTIC

NOTE: REFUSAL + 50 or more blows per ft.

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
MATERIALS AND RESEARCH SECTION
MILLS JUNCTION TO SOUTH NEPHI
I-15 NBL OVER U.P.R.R.

DESIGNED BY: B. K. STYER	CHECKED BY: Boyd C. ...	PROJECT NUMBER: 1-15-5(11)2
CONTRACT NO. 837-000	DATE: 10-79	STATION: JUAB
REVISIONS	DATE	DESCRIPTION

NO.	BY	DATE	REVISIONS



KEY TO DRILLING LOG

RELATIVE DENSITY (NON-PLASTIC SANDS & SILTS)
 VERY LOOSE - LESS THAN 4 BLOWS PER FOOT
 LOOSE - 4 TO 10 BLOWS PER FOOT
 MEDIUM - 10 TO 30 BLOWS PER FOOT
 DENSE - 30 TO 50 BLOWS PER FOOT
 VERY DENSE - MORE THAN 50 BLOWS PER FOOT

CONSISTENCY (PLASTIC SILT & CLAY)
 VERY SOFT - LESS THAN 2 BLOWS PER FOOT
 SOFT - 2 TO 4 BLOWS PER FOOT
 MEDIUM - 4 TO 8 BLOWS PER FOOT
 STIFF - 8 TO 15 BLOWS PER FOOT
 VERY STIFF - 15 TO 30 BLOWS PER FOOT
 HARD - MORE THAN 30 BLOWS PER FOOT

LEGEND:

- TOPSOIL OR MUD
- GRAVEL
- SAND
- SILT
- CLAY
- SHALE
- IRREGULAR
- LIMESTONE
- CONGLOMERATE
- DOLOMITE
- SANDY CLAY
- CLAYEY SAND
- SILTY CLAY
- CLAYEY SILT
- SILTY SAND
- LIQ. SAND
- SILT

DRILL HOLE NO. STATION
 0-100' E ONLY OR 10 INCHES OFFSET

ELEVATIONS
 GROUND ELEVATION
 4335
 GROUND WATER TABLE
 4322
 STRATA CHANGE
 4348
 LOCATION OF SAMPLE
 20'
 25'
 30'
 35'
 40'
 45'
 50'
 55'
 60'
 65'
 70'
 75'
 80'
 85'
 90'
 95'
 100'

EXAMPLE TYPICAL
 STIFF MEDIUM PLAT. BRN CLAY SOME SILT
 LL-PI-W
 4-60
 17-11

DATE

THIN WALL SHEET PILE UNDISTURBED SAMPLER USED

SPLIT BARREL UNDISTURBED SAMPLER WITH LINEAR PINS OR CALIFORNIA TYPE SAMPLER

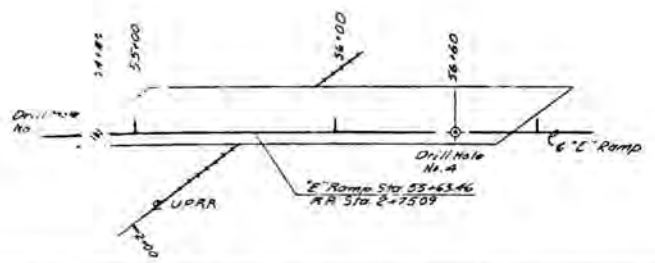
REASON NOT RECOVERED

NO. OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES REQUIRED TO DRIVE A 2 1/2 IN. O.D. SAMPLE TUBE 1 FT

CLASSIFICATION OF EACH SAMPLE AND RESULTS OF CLASSIFICATION TESTS

ABBREVIATIONS
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 P.E.N. - PENETRATION
 E.W.T. - GROUND WATER TABLE
 B.P.F. - BLOWS PER FOOT
 N.P. - NON PLASTIC

NOTE: REFUSAL = 30 or more blows per ft



Note: Drilled 10, 1972

NO.	BY	REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
 MATERIALS AND RESEARCH SECTION
 MILLS JUNCTION TO SOUTH NEPHI
 "E" RAMP OVER U.P.R.R.

DESIGNED BY: *R. J. ...* CHECKED BY: *S. B. ...* 1-15-50(12)
 COMPILED BY: *...* DRAWN BY: *...* 857-01
 APPROVED BY: *...* 4/1/50
 J.U.A.B.