REFERENCE: U-5866

PROJECT: 46390

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *GRAHAM*

PROJECT DESCRIPTION *NEW ACCESS ROAD AND BRIDGE OVER CHEOAH RIVER*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5866	1	30

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

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J. WHITT

M. EDWARDS

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SAEDECCO

INVESTIGATED BY *M. BAHIRADHAN*

DRAWN BY *S. BUCHANAN*

CHECKED BY *M. BAHIRADHAN*

SUBMITTED BY *SCHNABEL ENG.*

DATE *SEPTEMBER 2016*

NORTH CAROLINA PROFESSIONAL SEAL 036072 ENGINEER MAHALINGHAM BAHIRADHAN

9/13/16

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-5866	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D50
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [X] HOLLOW STEM AUGERS

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A FEET

NOTES:

TOP OF BORING ELEVATIONS OBTAINED FROM THE PROVIDED PROJECT TIN FILE U5866_LS_TNL.TIN OBTAINED AUGUST 17, 2016.

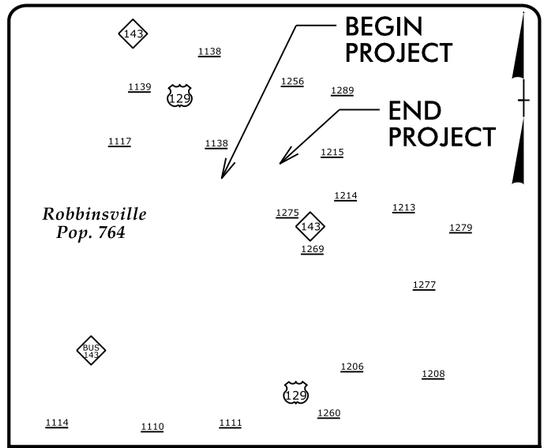
FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

09/08/99

TIP PROJECT: U-5866

See Sheet 1-A For Index of Sheets



VICINITY MAP

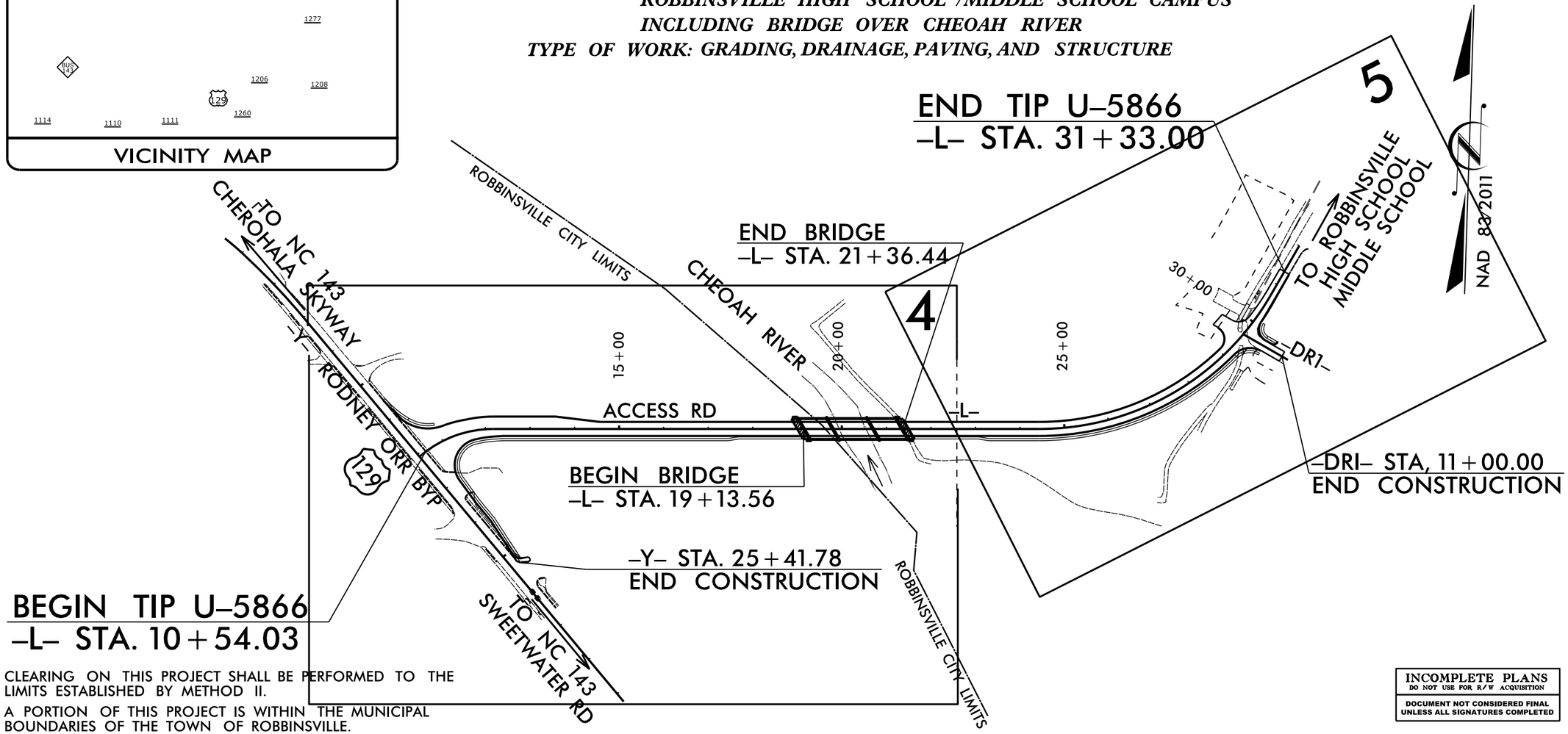
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5866	3	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
46390.1.D1	N/A	PE	

LOCATION: *NEW ROUTE FROM US. 129 (RODNEY ORR BYP) TO ROBBINSVILLE HIGH SCHOOL /MIDDLE SCHOOL CAMPUS INCLUDING BRIDGE OVER CHEOAH RIVER*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, AND STRUCTURE*



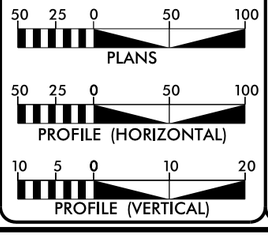
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF ROBBINSVILLE.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = N/A
ADT 2041 = 1200
K = 20 %
D = 60 %
T = 8 % *
V = 30 MPH
* TTST =1% DUAL =7%
FUNC CLASS = URBAN COLLECTOR REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5866	=	0.352 MILES
LENGTH STRUCTURE TIP PROJECT U-5866	=	0.042 MILES
TOTAL LENGTH TIP PROJECT U-5866	=	0.394 MILES

NCDOT CONTACT: WESLEY GRINDSTAFF, PE

PLANS PREPARED BY:
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
253 Webster Road
Sylva, NC 28779

RIGHT OF WAY DATE:
FEB. 17, 2017

LETTING DATE:
JAN. 15, 2019

2012 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

SANDRA G. MELVIN
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

12-SEP-2016 16:22
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smicklewicz AT 08-2110-026

SCHNABEL ENGINEERING SOUTH, P.C.

September 13, 2016

STATE PROJECT: 46390.1.D1
PROJECT ID: U-5866
COUNTY: Graham
DESCRIPTION: New Access Road and Bridge Over Cheoah River

SUBJECT: Geotechnical Report - Inventory

Project Description

The project consists of constructing a new access road and bridge between Rodney Orr By Pass and Robbinsville Middle and High Schools crossing over Cheoah River in Robbinsville, North Carolina. The length of the proposed access road is approximately 1850 feet. The new access road will receive fills on the order of 7 feet or less with some portions of the roadway will be at grade. No cuts other than for ditch lines are planned for the proposed road. The roadway area approximately between STA 15+75 and 13+25 were avoided for performing field investigation, because, it was cited as a historical area which was under archeological review at the time of our field investigation.

The geotechnical investigation was conducted between July 26th and August 1st, 2016. Borings were advanced using a Dietrich D-50 drill rig equipped with an automatic hammer. Standard Penetration Test borings were performed at specific locations to provide subsurface information for design and construction of the proposed roadway. Representative soil samples were collected and submitted to a NCDOT approved laboratory for testing.

The following alignment was investigated for this project. Subsurface profiles and cross sections of this alignment are included in this report.

Line	Station(±)
-L-	10+54.03 to 31+33.00

Physiography, Geology and Surface Water

The project is located in the western end of the Blue Ridge Province in Graham County. Topography in the area is relatively flat. The proposed access road alignment is likely to be located within the Cheoah River flood plain. The project area is vegetated with grass cover except at the banks of the river where it was vegetated with medium size trees and brush.

Geologically, the project area generally consists of fills and alluvial deposits at the surface underlain by residual soils over weathered rock, which is derived from Biotite Schist (Meta volcanic rock of Blue Ridge Belt and Murphy Belt).

Soils Properties

Soils encountered during the investigation are separated into four categories based on their geologic origin. These are fills, alluvial and residual soils, and weathered rock.

Roadway embankment and fill soils consist of brown stiff, slightly plastic sandy silt (A-5) and brown silty clay (A-7-5). The PI value of silt (A-5) was 12, while the PI value the clay (A-7-5) was 17.

Alluvial soils were present below the roadway embankment, fills or at the surface. Alluvial soils consist of slightly plastic red, brown, medium stiff, silty clay and clay (A-7-5 and A-7-6), brown, medium stiff, silt (A-5), brown, medium dense to dense, silty gravel (A-2-4) and brown, loose to medium dense, silty fine sand (A-2-4). The PI value of the alluvial clay (A-7-5 and A-7-6) was 17. The PI value of alluvial silt (A-5) was 9.

Residual soils were encountered in some borings below alluvial soils. Residual soils consist brown and black, dense, gravel (A-1), moderately plastic brown, medium stiff, silt (A-5).

Rock Properties

Weathered rock layer was encountered in one boring between elevations 1969.0 feet and 1971.5 feet. The weathered rock was Biotite Gneiss.

Groundwater

Water levels across the project can vary due to topographic relief and soil permeability. The 24-hour groundwater was measured at two locations. One of those locations did not encounter a water table after 24 hours while the other location (STA 15+47) encountered 24-hour water table at Ele. 1972.9 feet. Groundwater levels may fluctuate with seasonal variations in precipitation.

Areas of Special Geotechnical Interest

1) Alluvial Soils: Alluvial soils were present on the entire alignment at the surface or below fills. Loose/soft surficial alluvial soils were present at these locations.

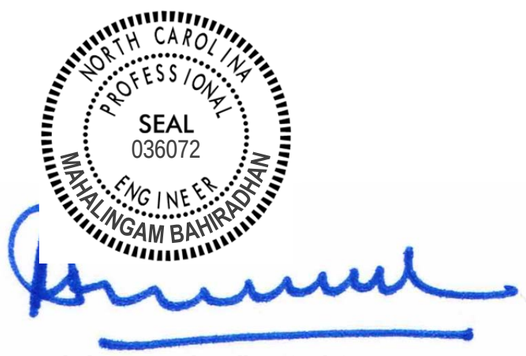
Line	Station (±)	Offset
-L-	13+00 to 17+00	Lt. to Rt.
-L-	24+00 to 28+00	Lt. to Rt.

schnabel-eng.com
T/ 919-439-6910 F/ 919-439-7158
126 Quade Drive / Cary, NC / 27513

2) Groundwater- The following area exhibit a high water table, seasonal high groundwater or the potential for groundwater related construction problems:

Line	Station(±)
-L-	14+00 to 17+00

Respectfully Submitted,
SCHNABEL ENGINEERING SOUTH, P.C.



9/13/16

Mahalingam Bahiradhan (Bahi), PE.
Senior Engineer

PROJECT REFERENCE NO.	SHEET NO.
U-5866	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

0 100 200
FEET
-L- POT 10+36.71
-Y- POT 22+07.00
① -L- PC 10+43.59
② -L- PT 12+17.26
N 48°13' 45" E
S 41°46' 45" E
N 88°
R1
R2
R3
EB1-A
EB1-B
EB2-A
EB2-B
BL-3
SKEW=60 DEGREES
MIN 2' CLEAR UNDER EXISTING SS
MATCHLINE 22+42
POT Sta. 29+22.92
BM-1
FLANGE BOLT ON FIRE HYDRANT NORTHWEST SIDE OF RODNEY ORR BYPASS AND LAURA ST INTERSECTION
ELEV= 1986.38'
SECONDARY GROWTH
FIELD
BERM
BILLBOARD
HTR
ISBK BUS
ISBKD
ISFD
ISMTL BUS
ISF BUS
CHEOAH RIVER
LAURA ST. BST
DUKE POWER R/W
15" RCP-IV

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-5866	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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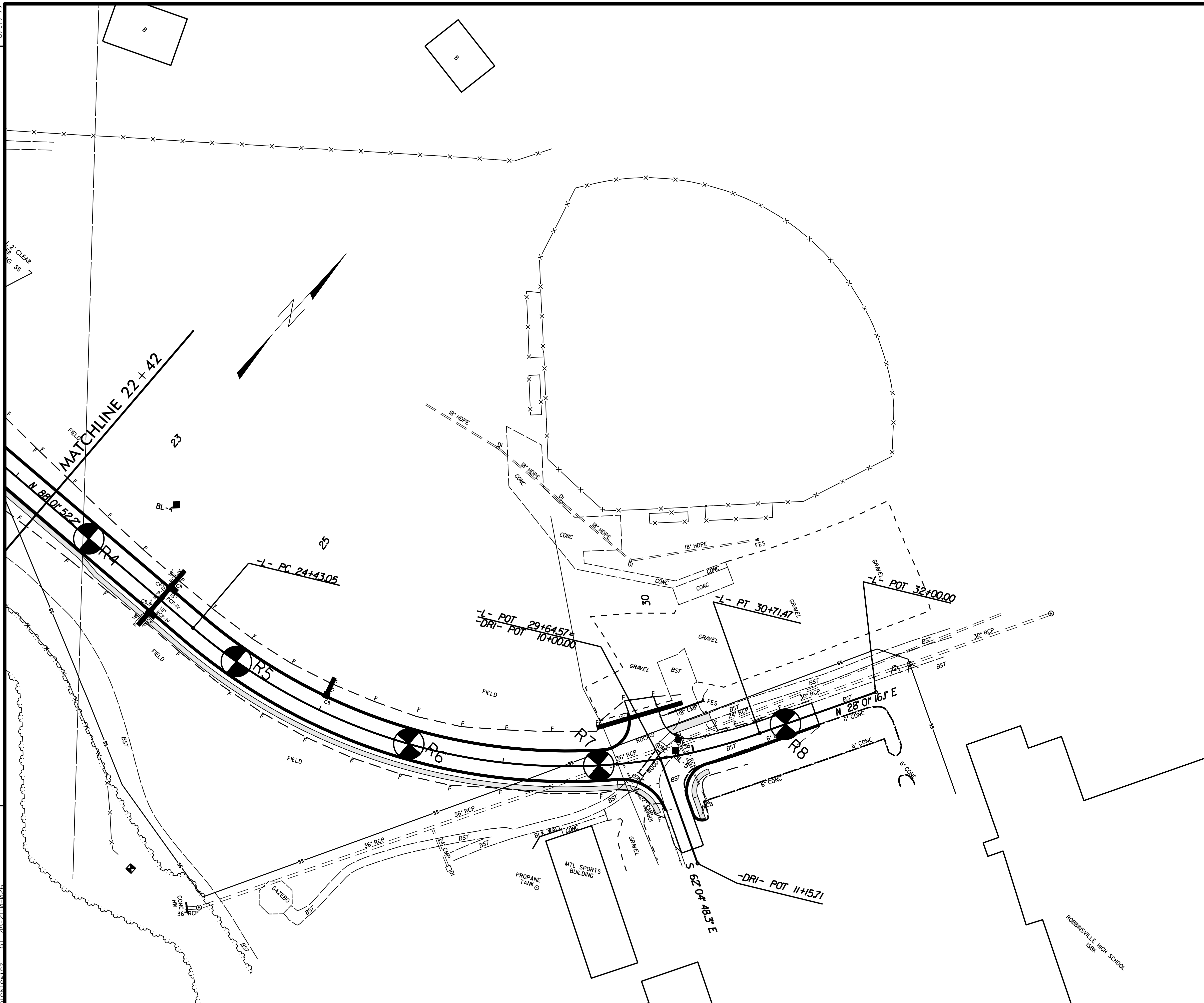
0 100 200
FEET



REVISIONS

8/17/99

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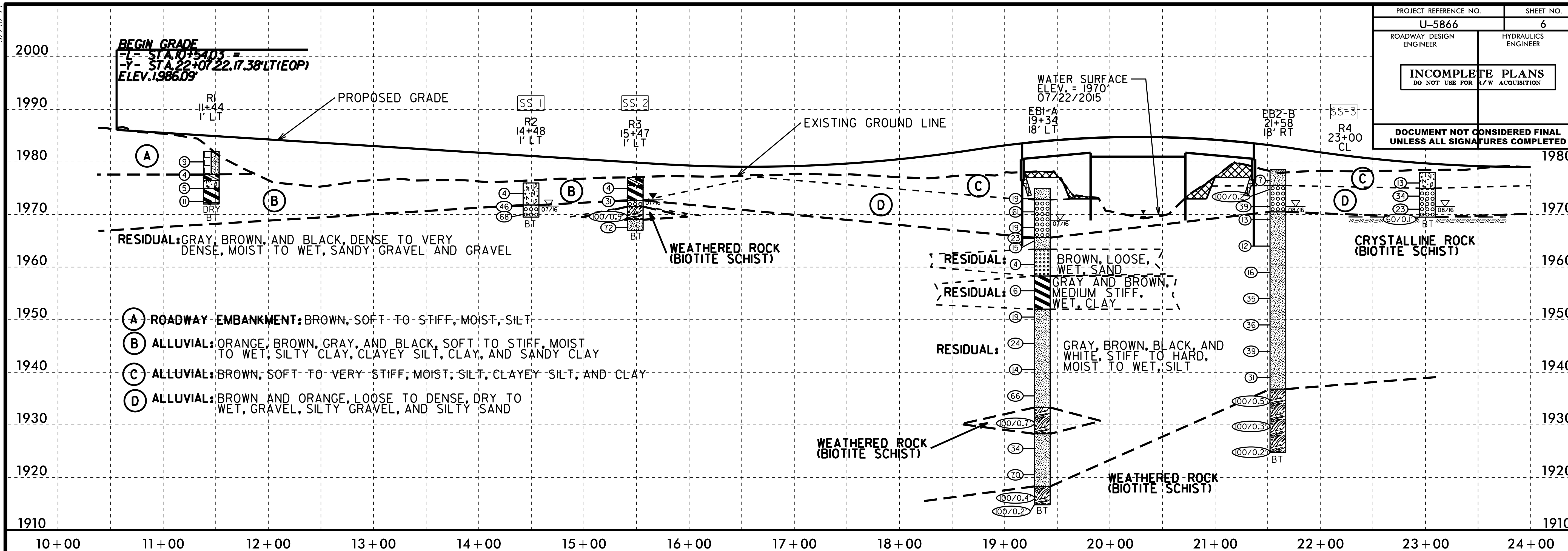
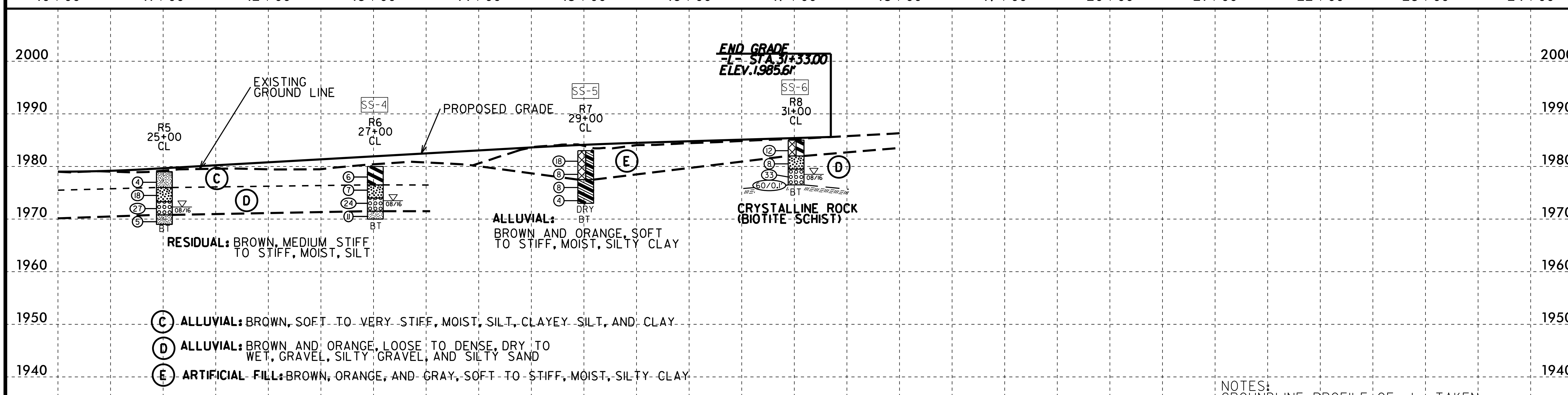
PROJECT REFERENCE NO. U-5866 | SHEET NO. 6
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



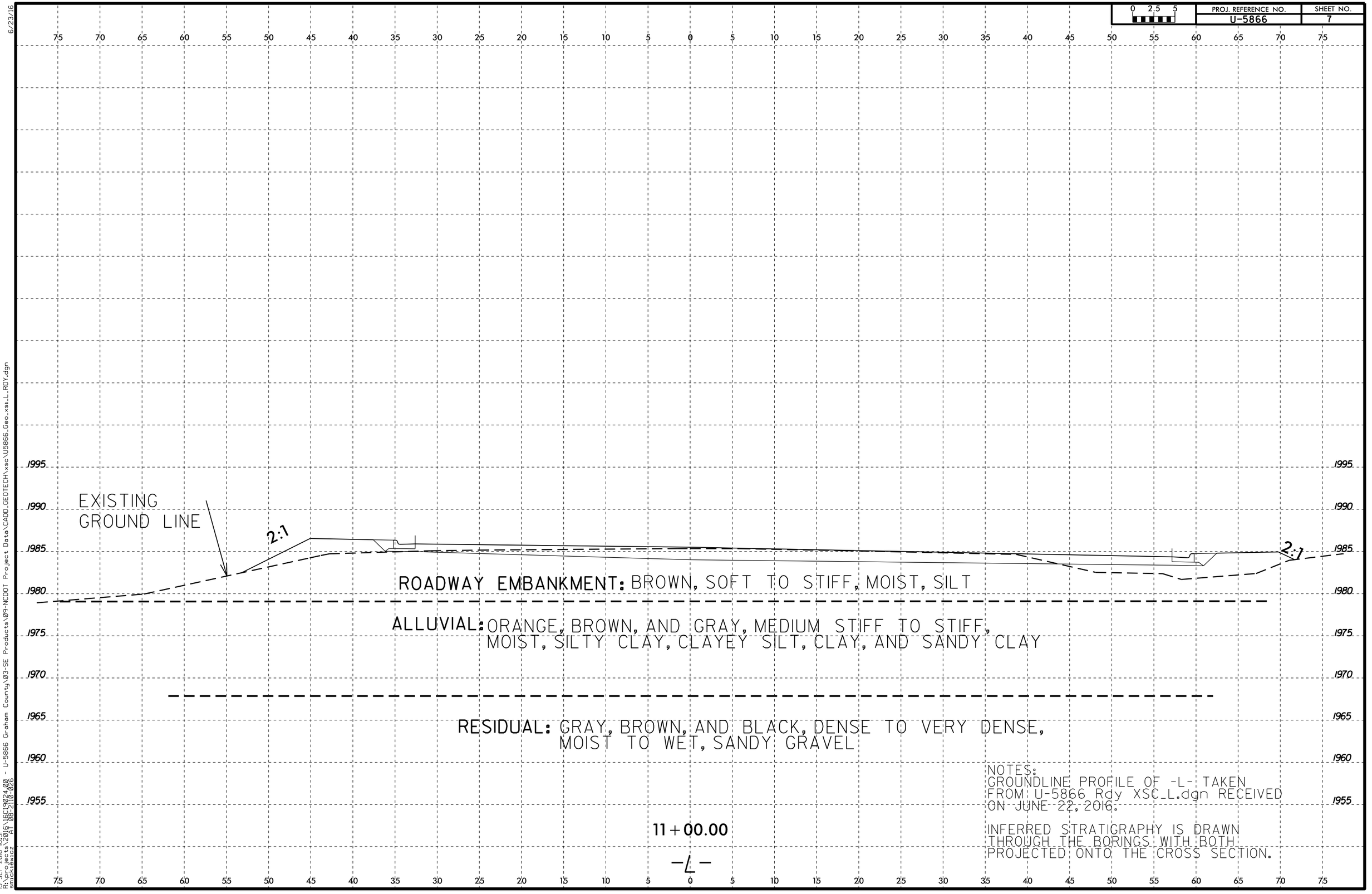


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	14+48	1' LT	1.0-2.5	A-5	47	9	12	26	38	24	100	94	68	33.8	----
SS-2	15+47	1' LT	1.0-2.5	A-7-5	47	17	6	22	40	32	92	88	72	33.8	----
SS-3	23+00	CL	1.0-2.5	A-5	39	9	5	29	40	28	100	98	76	23.2	----
SS-4	27+00	CL	1.0-2.5	A-7-6	48	17	2	27	41	30	100	99	80	30.2	----
SS-5	29+00	CL	1.0-2.5	A-6	35	12	9	29	29	33	93	89	66	9.0	----
SS-6	31+00	CL	1.0-2.5	A-7-5	41	17	3	23	36	38	100	99	81	20.0	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866_Rdy_pfl.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

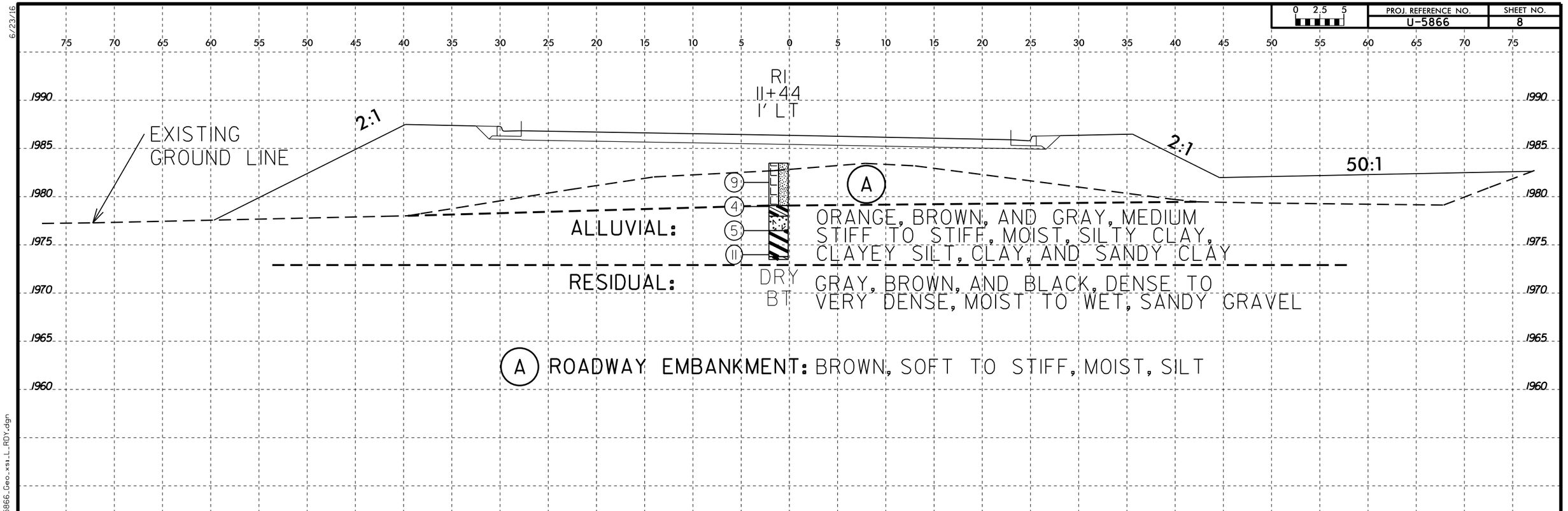


NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	8



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

11+50.00
-L-

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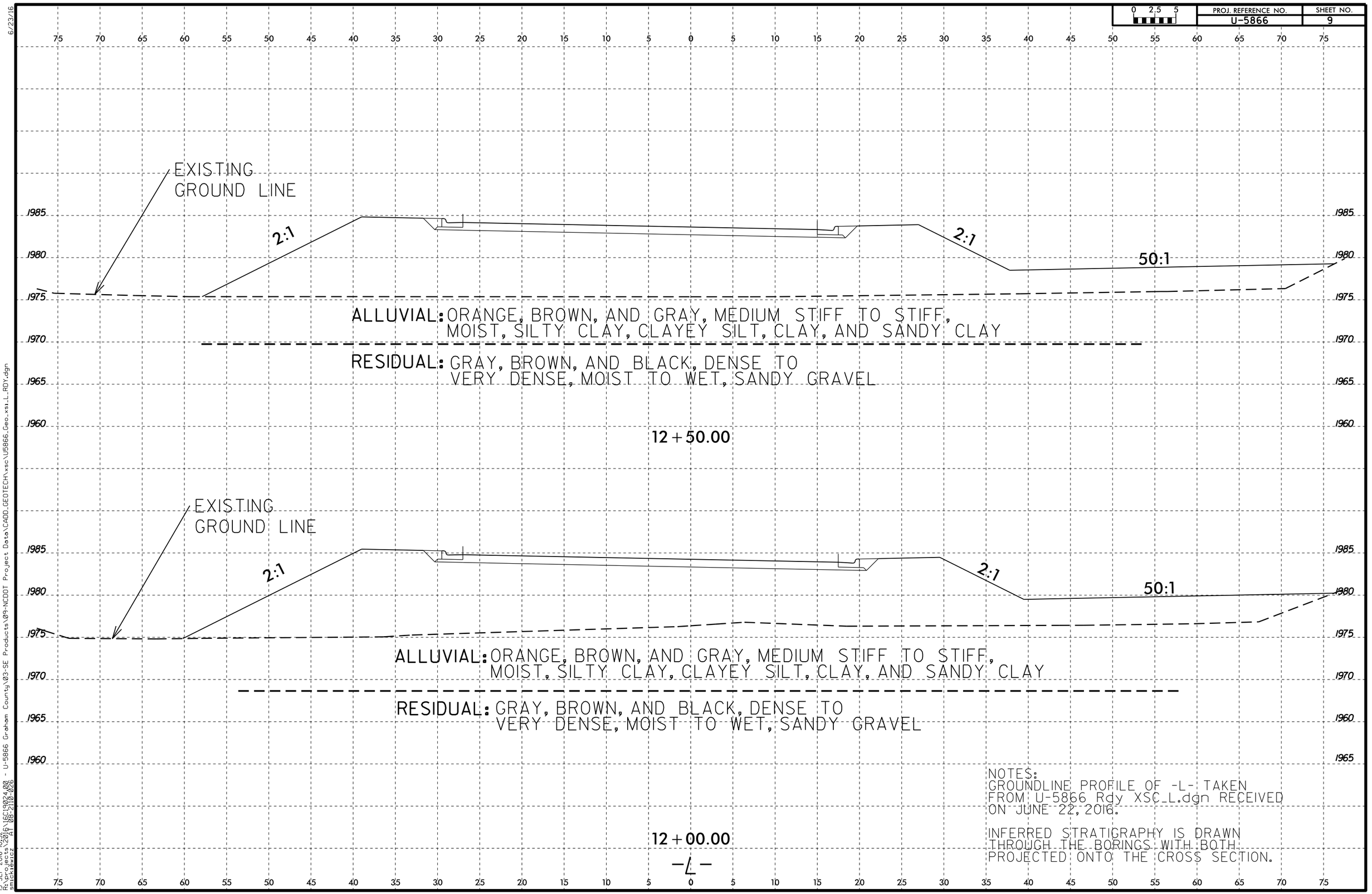
smckiewicz AT 08-2100-026

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	9



NOTES:
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INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

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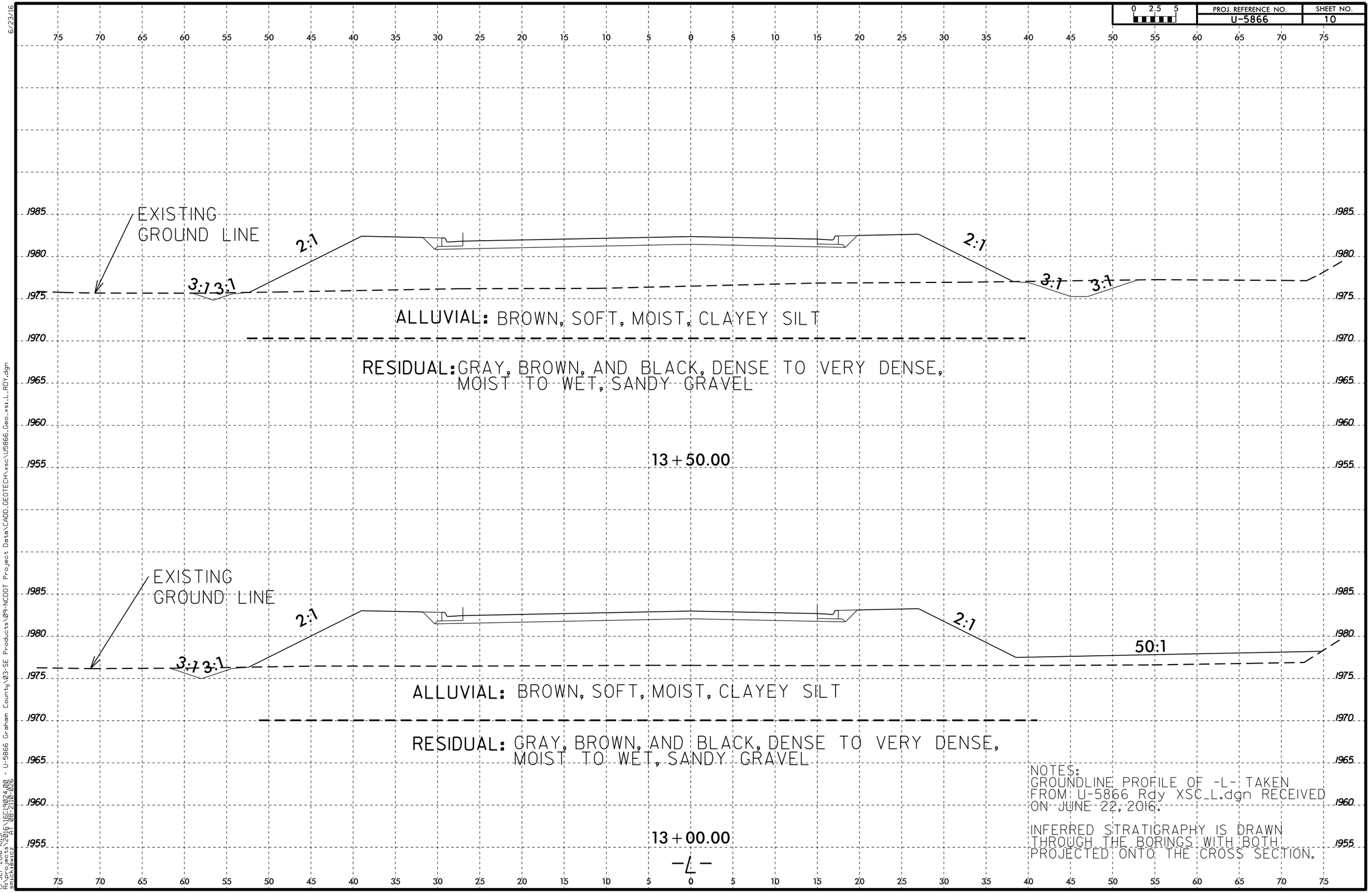

NOTES:
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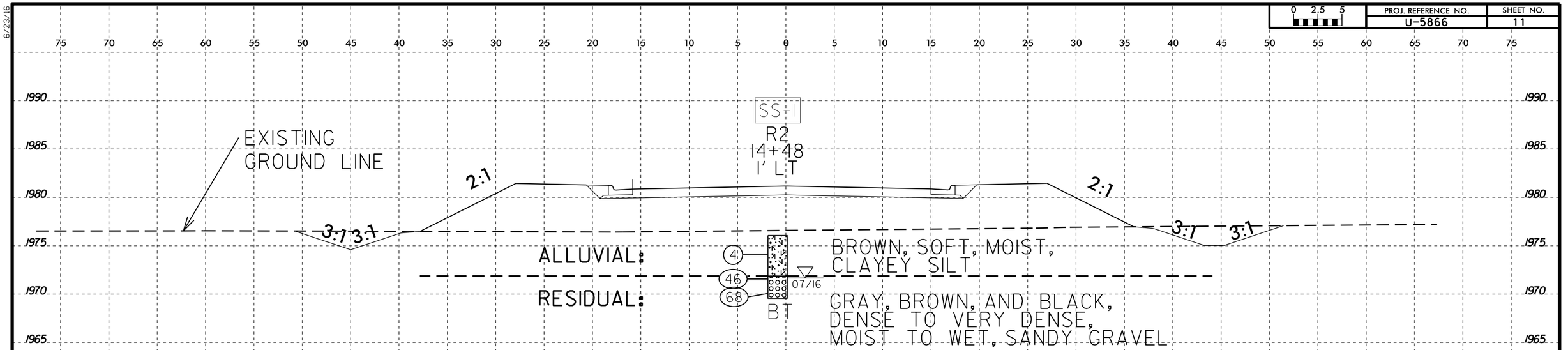
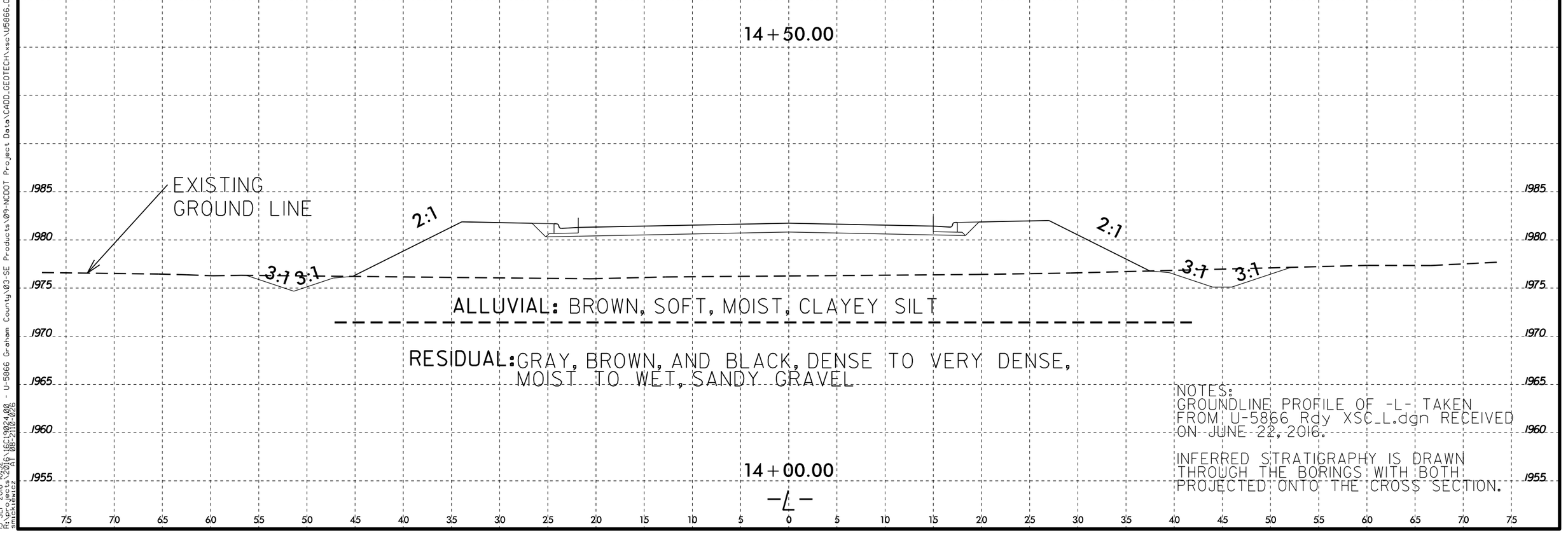


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	14+48	1' LT	1.0-2.5	A-5	47	9	12	26	38	24	100	94	68	33.8	----



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

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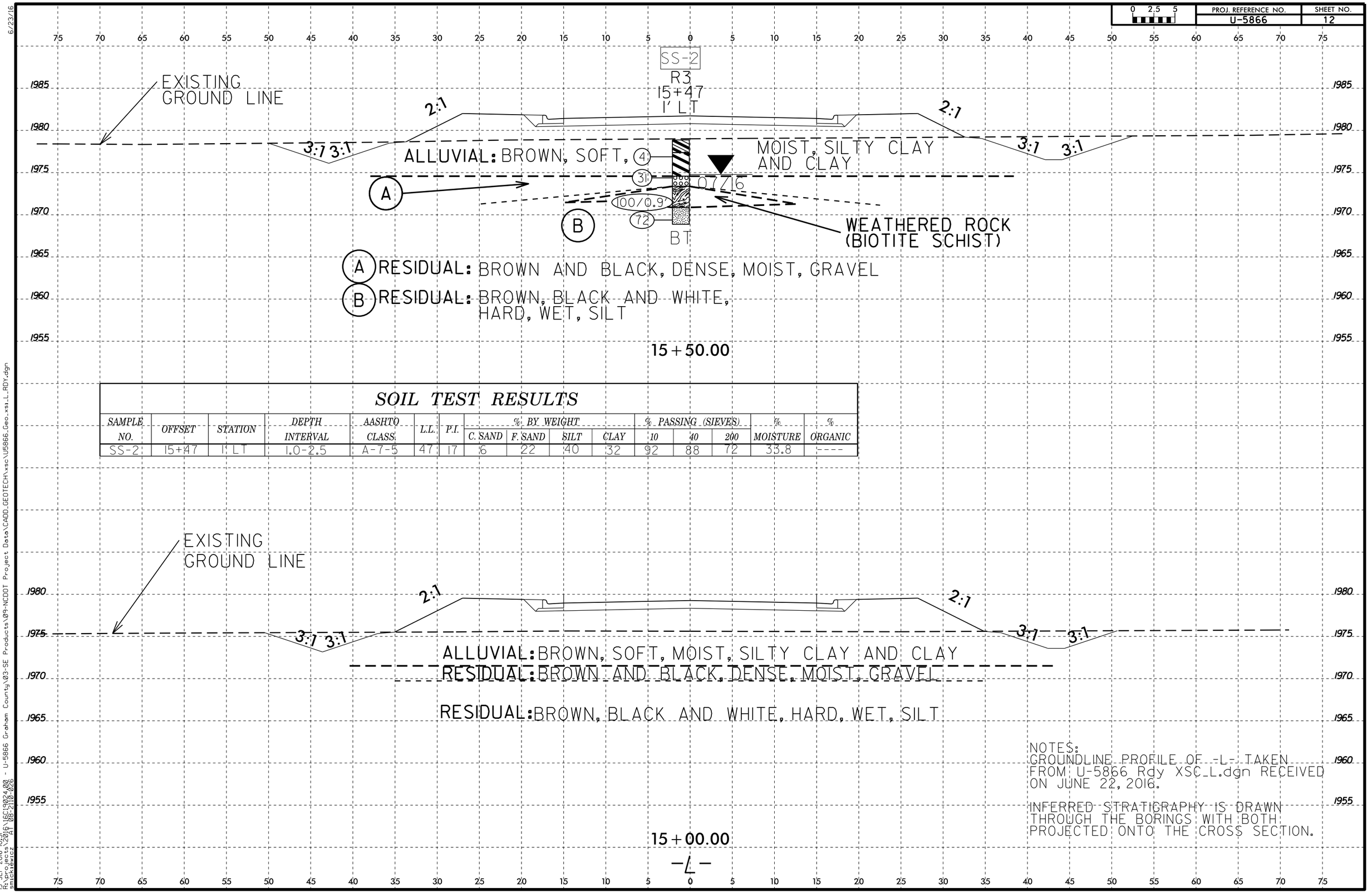


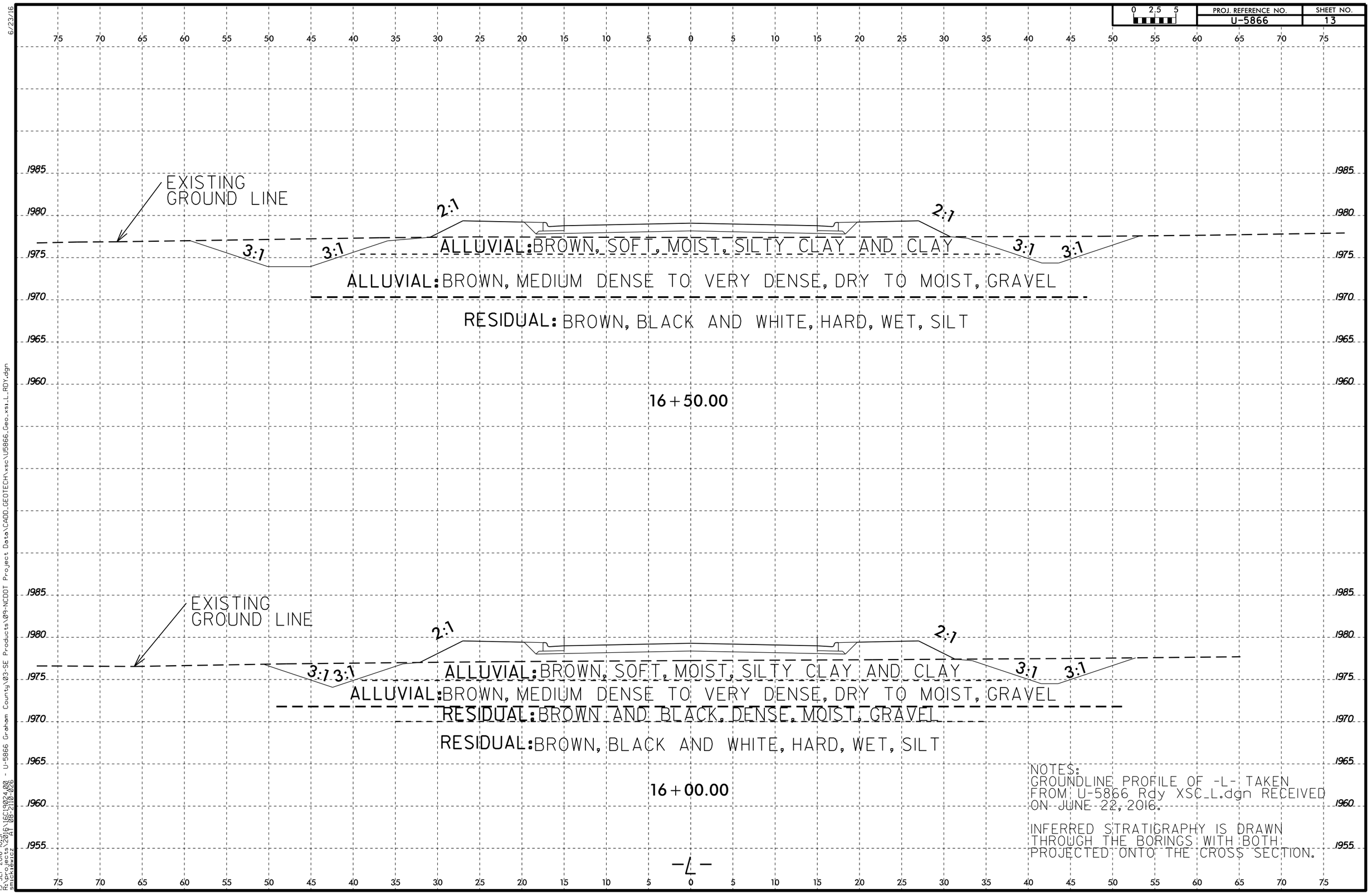
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-2	15+47	1' LT	1.0-2.5	A-7-5	47	17	6	22	40	32	92	88	72	33.8	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	13



NOTES:
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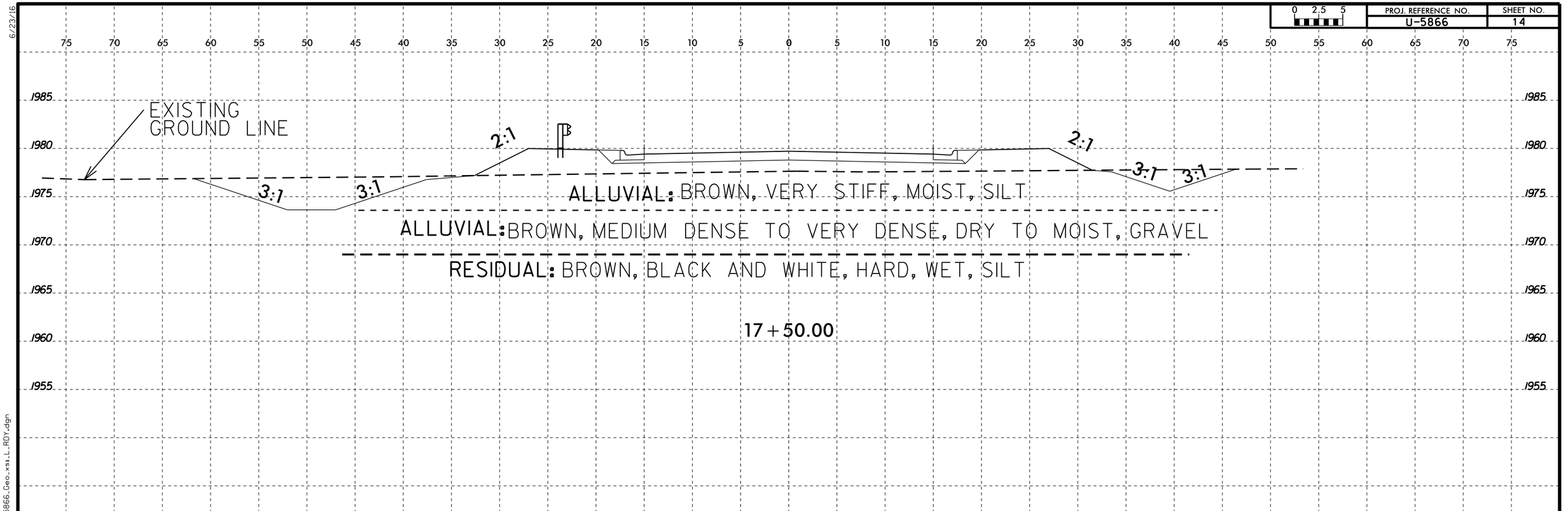
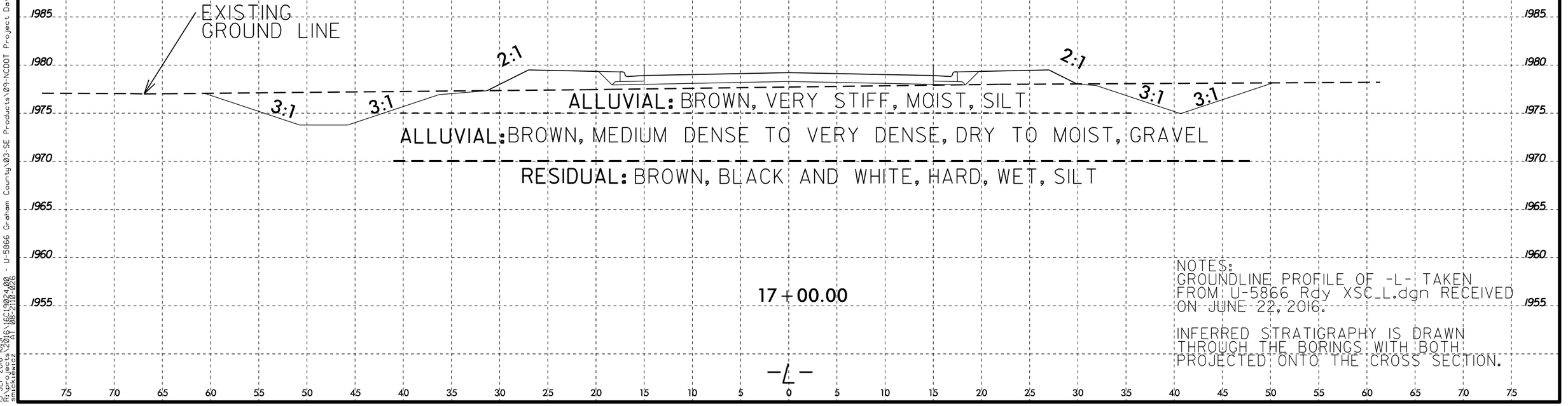
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5866	14

0 2.5 5





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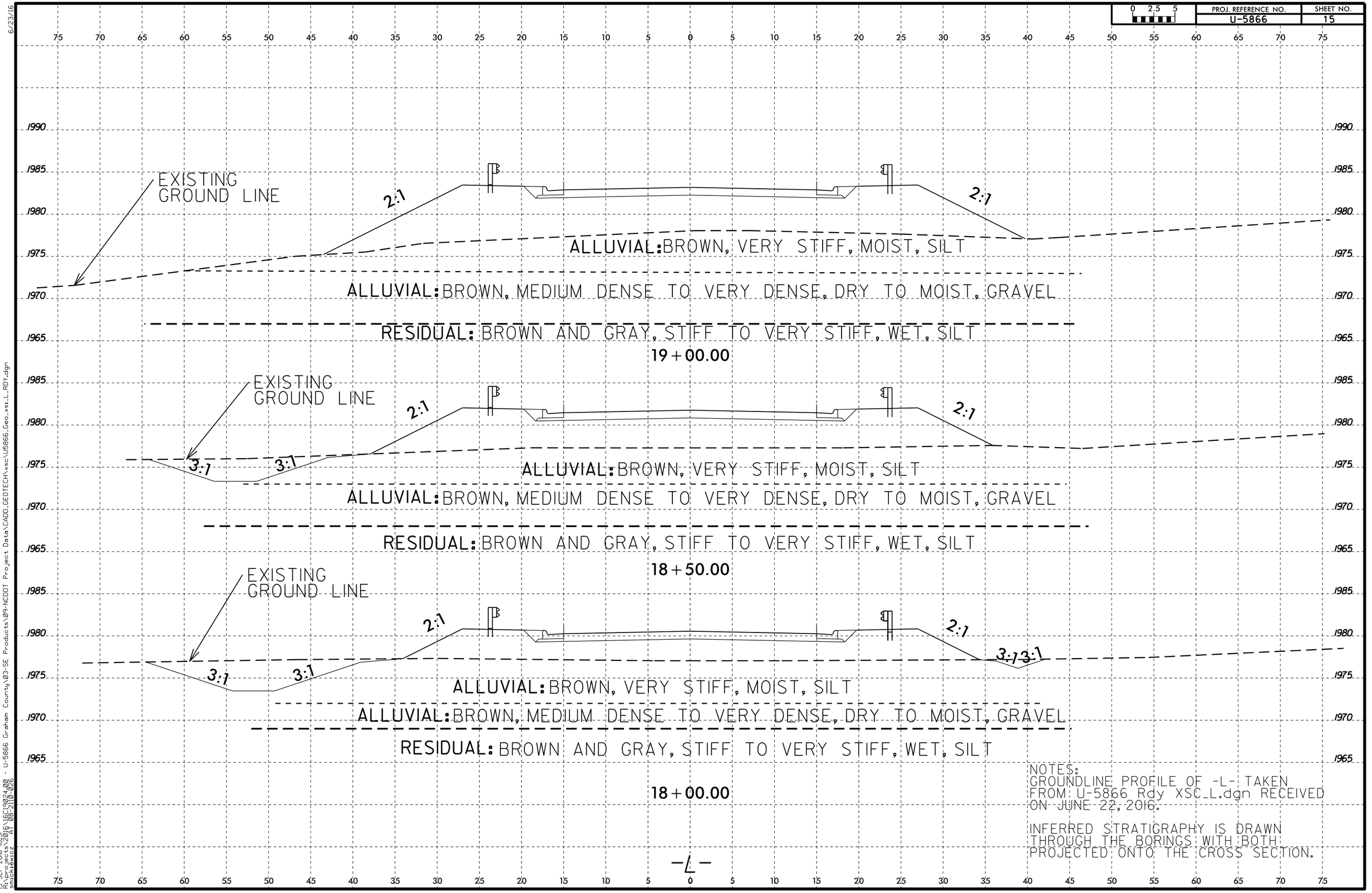

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INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

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smickiewicz AT 08-2110-026

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	17

EB2-A
21+41
23' LT

EB2-B
21+58
18' RT

EXISTING
GROUND LINE

2:1

2:1

3:1 3:1

ALLUVIAL: (5) (50) (32) (20) 08/16

ALLUVIAL: BROWN, MEDIUM STIFF, WHITE, ORANGE, AND MOIST TO WET, GRAVEL

(11) (8) (12) (17) (53) (48) 100/0.4' BT

RESIDUAL: GRAY AND BROWN, STIFF TO HARD, WET, SILT

WEATHERED ROCK
(BIOTITE SCHIST)

(7) 100/0.2' 08/16

MOIST, SILT
BROWN, DENSE TO VERY DENSE,
AND SILTY GRAVEL

(39) (13) (12) (16) (35) (36) (39) (31) 100/0.5' 100/0.3' 100/0.2' BT

21+50.00

-L-

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

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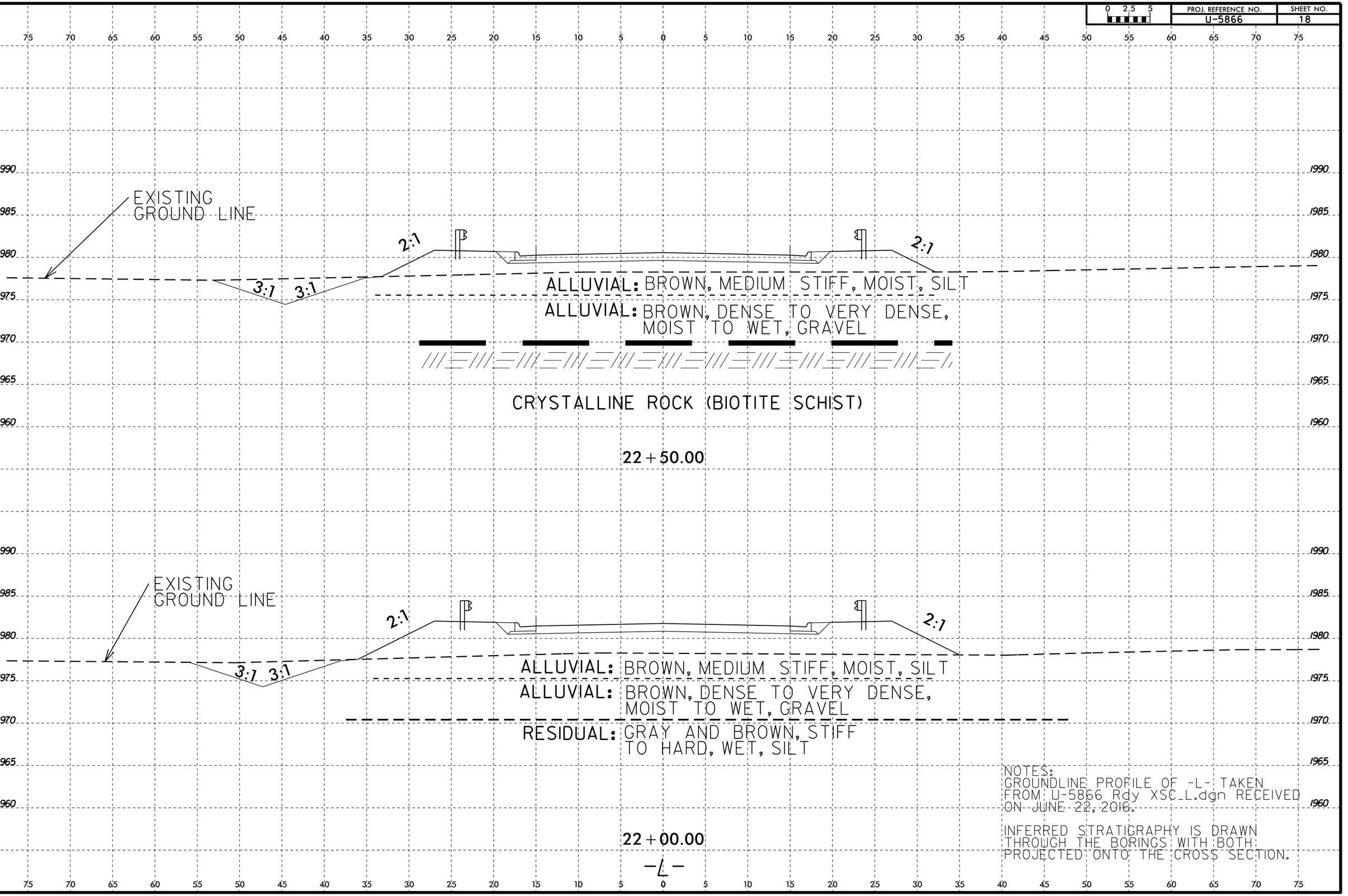
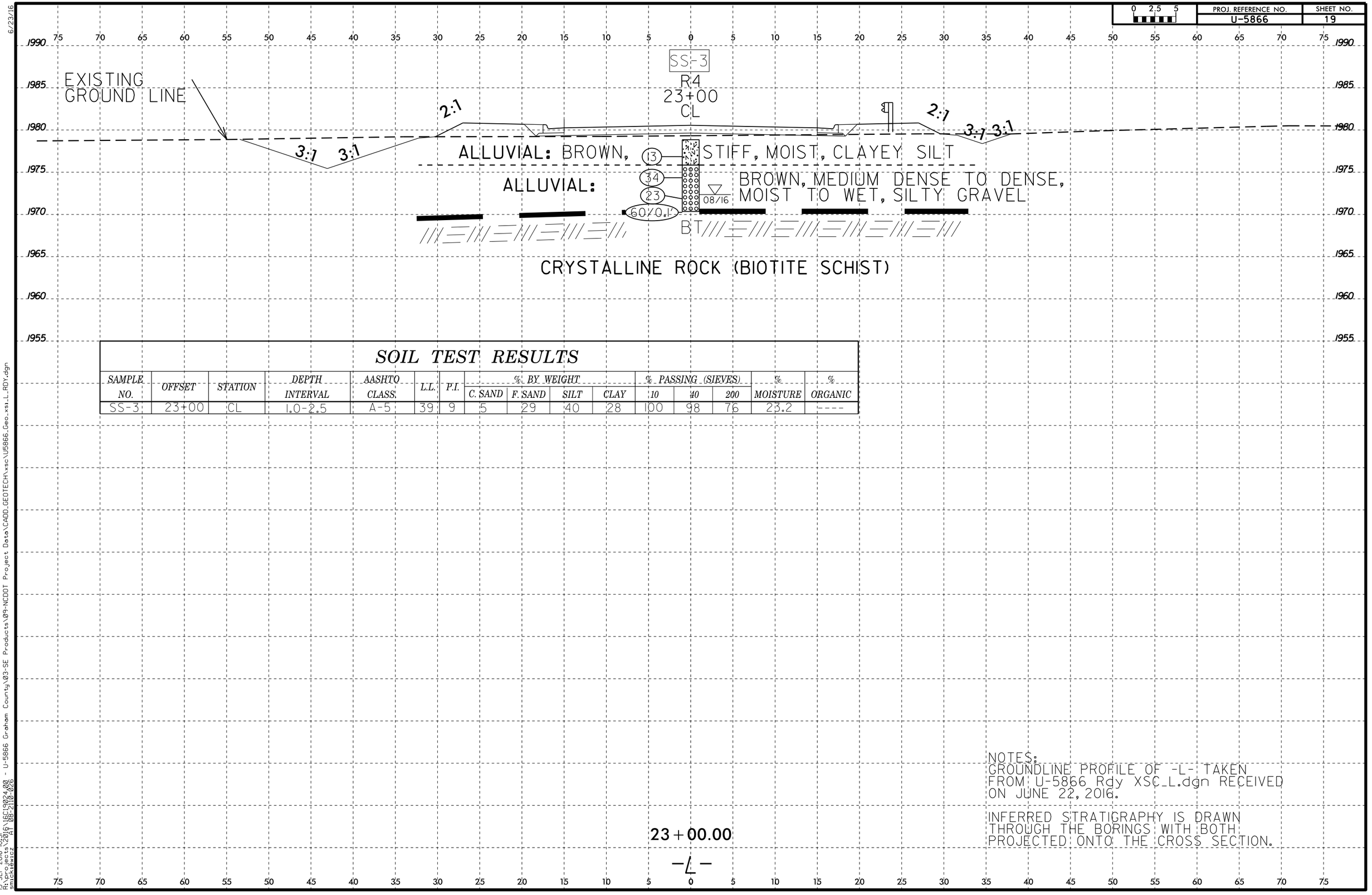
smiekiewicz AT 08-2100-026



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-3	23+00	CL	1.0-2.5	A-5	39	9	5	29	40	28	100	98	76	23.2	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

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smckiewicz AT 08-2100-026

PROJ. REFERENCE NO.	SHEET NO.
U-5866	20

0 2.5 5

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

1985 1980 1975 1970 1965

EXISTING GROUND LINE

3:1 3:1 2:1 2:1 3:1 3:1

ALLUVIAL: BROWN, SOFT, MOIST, SILT

ALLUVIAL: ORANGE AND BROWN, MEDIUM DENSE, MOIST TO WET, SILTY SAND AND SILTY GRAVEL

RESIDUAL: BROWN, MEDIUM STIFF, MOIST, SILT

24+50.00

EXISTING GROUND LINE

3:1 3:1 2:1 2:1 3:1 3:1

ALLUVIAL: BROWN, STIFF, MOIST, CLAYEY SILT

ALLUVIAL: BROWN, MEDIUM DENSE TO DENSE, MOIST TO WET, SILTY GRAVEL

RESIDUAL: BROWN, MEDIUM STIFF, MOIST, SILT

1960

24+00.00

EXISTING GROUND LINE

3:1 3:1 2:1 2:1 3:1 3:1

ALLUVIAL: BROWN, STIFF, MOIST, CLAYEY SILT

ALLUVIAL: BROWN, MEDIUM DENSE TO DENSE, MOIST TO WET, SILTY GRAVEL

CRYSTALLINE ROCK (BIOTITE SCHIST)

23+50.00

-L-

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

13-SEP-2016 10:31
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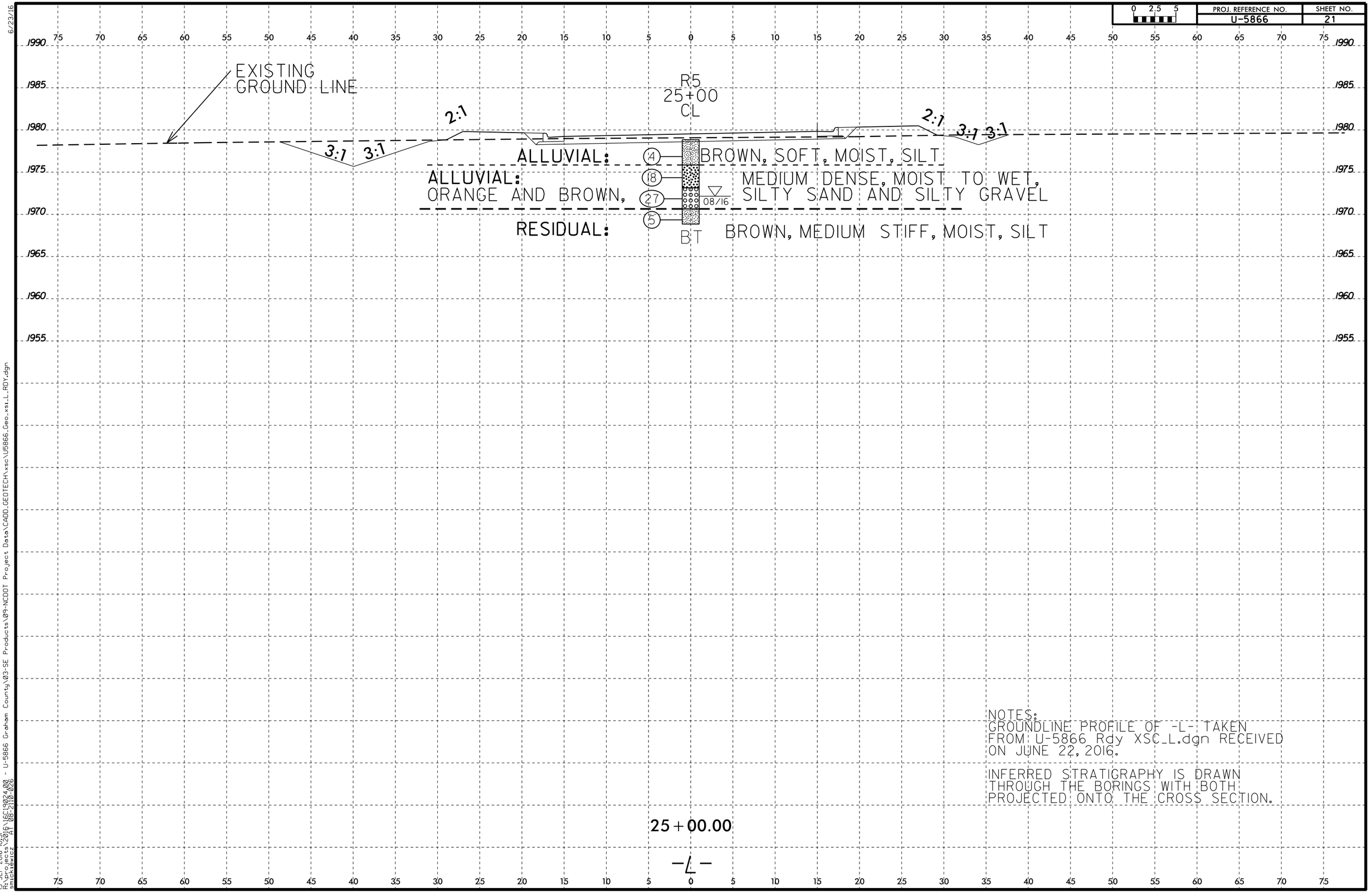
smckiewicz
AT 08-210-026

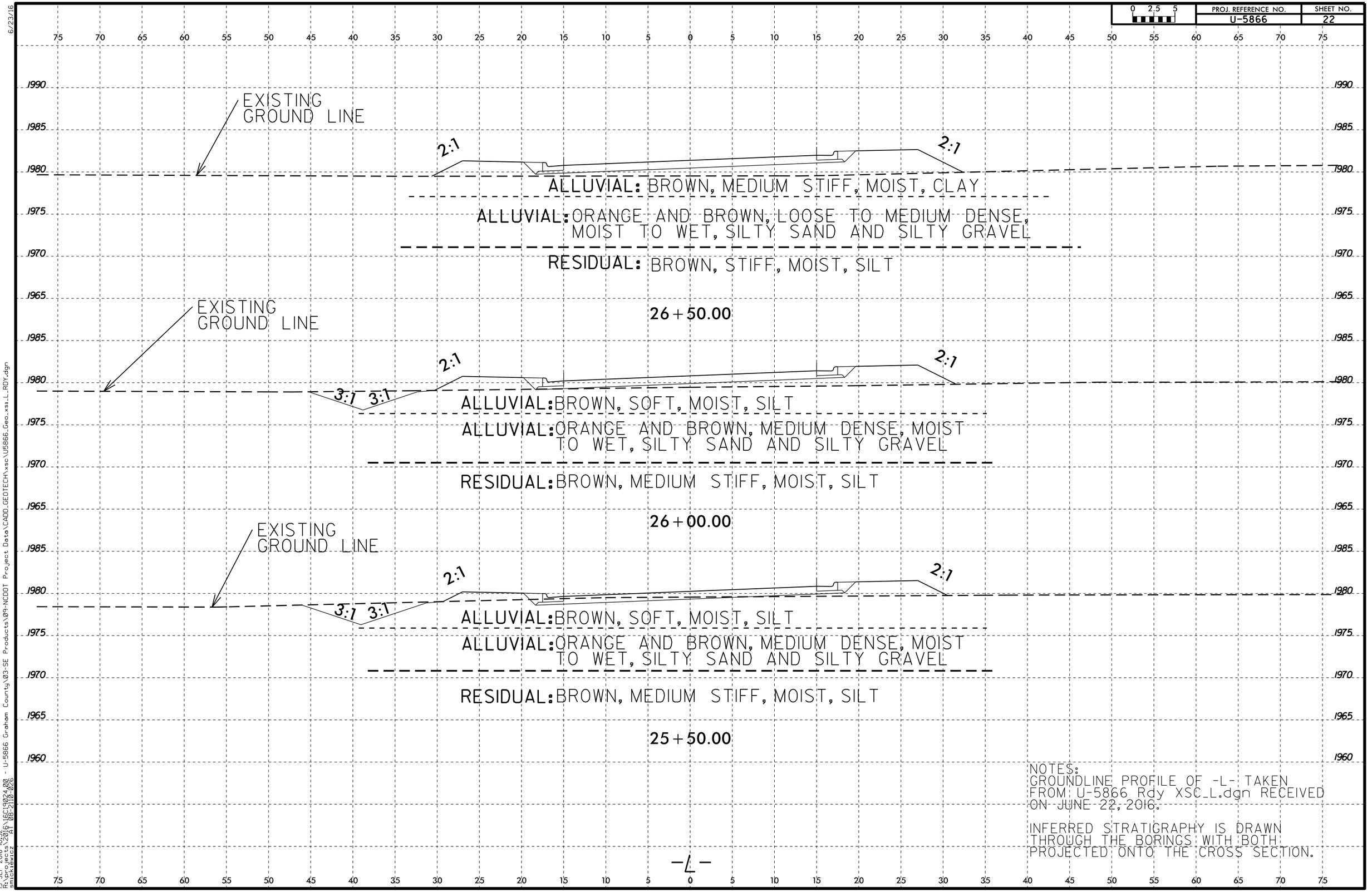


NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

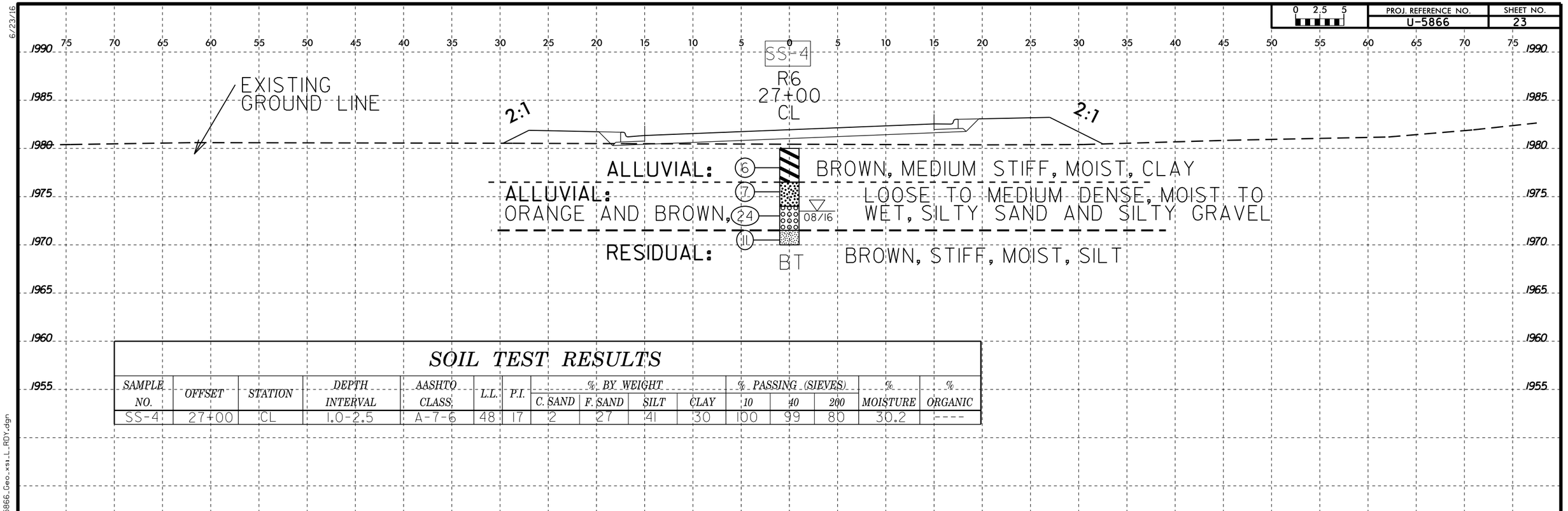
25+00.00

-L-



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



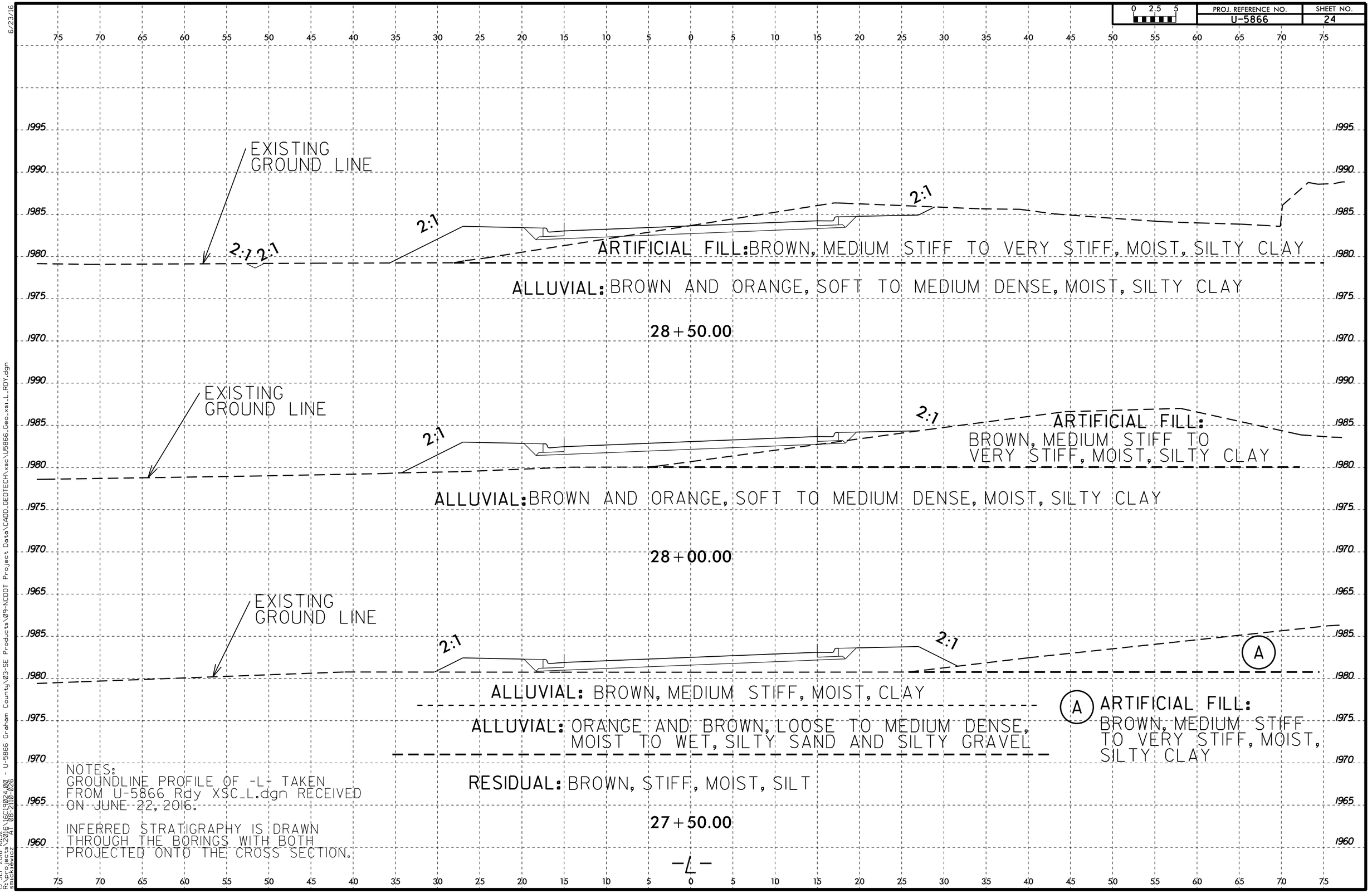
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-4	27+00	CL	1.0-2.5	A-7-6	48	17	2	27	41	30	100	99	80	30.2	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

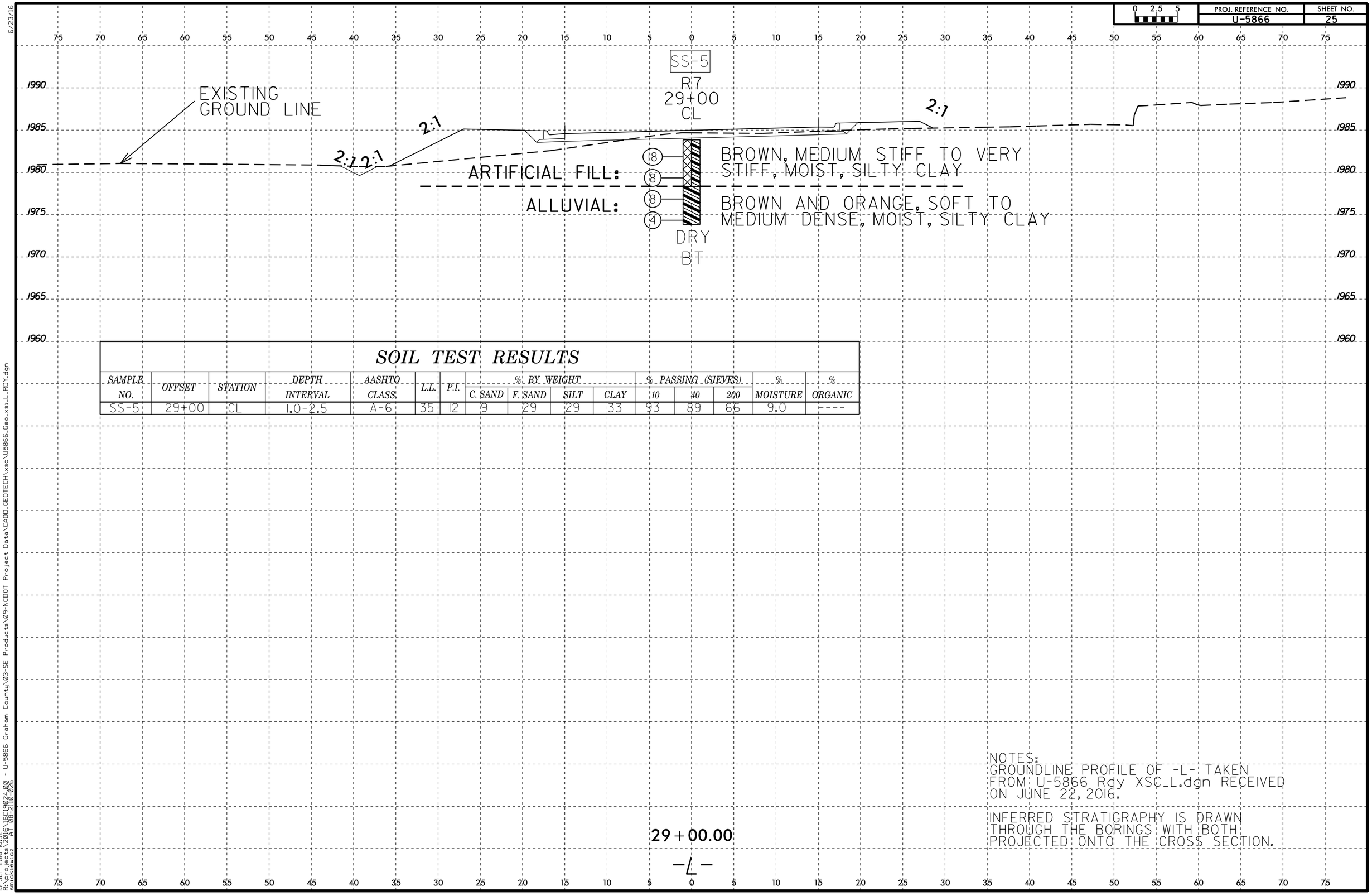
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

27+00.00
-L-



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-5	29+00	CL	1.0-2.5	A-6	35	12	9	29	29	33	93	89	66	9.0	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

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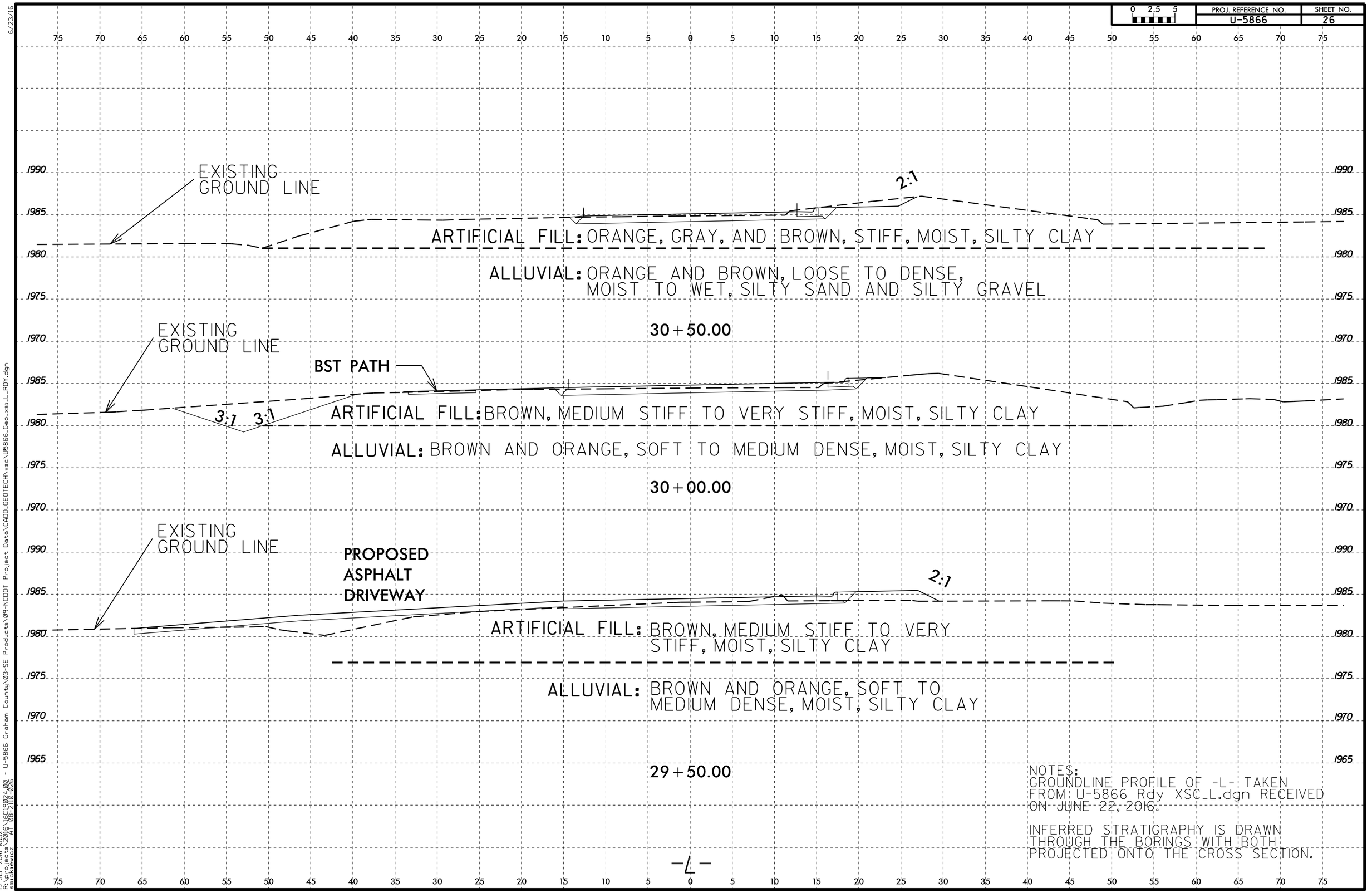
smckiewicz
AT 08-2100-026

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	26



NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM: U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

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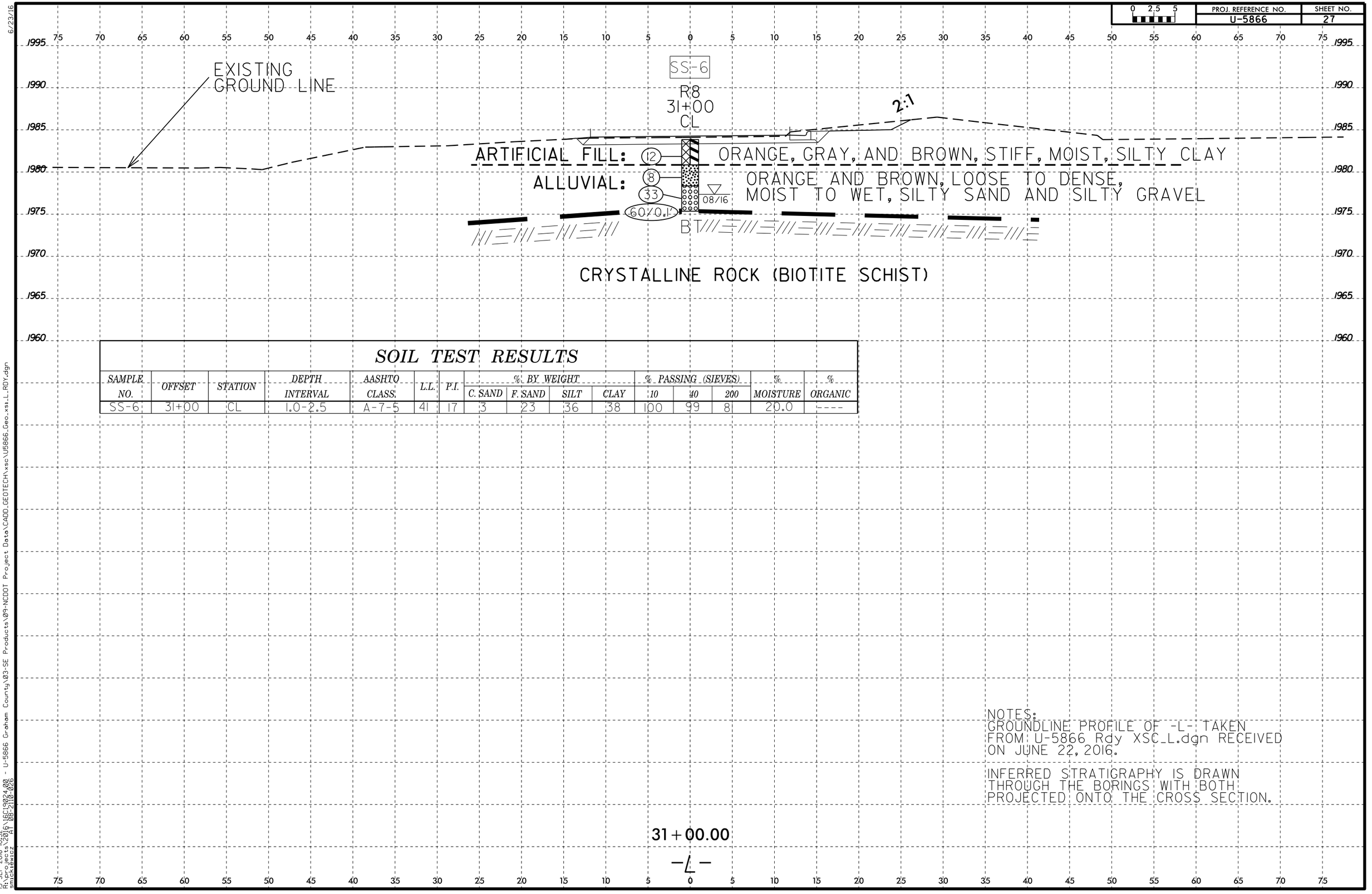
smckiewicz
AT 08-210-026



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-6	31+00	CL	1.0-2.5	A-7-5	41	17	3	23	36	38	100	99	81	20.0	----

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5866	28

EXISTING GROUND LINE

ARTIFICIAL FILL: ORANGE, GRAY, AND BROWN, STIFF, MOIST, SILTY CLAY

ALLUVIAL: ORANGE AND BROWN, LOOSE TO DENSE, MOIST TO WET, SILTY SAND AND SILTY GRAVEL

31+50.00

-L-

NOTES:
GROUNDLINE PROFILE OF -L- TAKEN FROM U-5866 Rdy XSC_L.dgn RECEIVED ON JUNE 22, 2016.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

6/23/16

13-SEP-2016 10:32
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smckiewicz AT 08-2100-026

PROJECT REFERENCE NO.	SHEET NO.
U–5866	29

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
SOIL TEST RESULTS

REFERENCE: U–5866

PROJECT: 46390

NEW ACCESS ROAD AND BRDIGE OVER CHEOAH RIVER

SOIL TEST RESULTS

BORING NO.	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL (FEET)	AASHTO CLASS.	LIQUID LIMIT	PLASTICITY INDEX	% BY WEIGHT					% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								GRAVEL	C.SAND	F.SAND	SILT	CLAY	10	40	200		
R2	SS-1	14+48	1' LT	1.0-2.5	A-5	47	9	0	12	26	38	24	100	94	68	33.8	-
R3	SS-2	15+47	1' LT	1.0-2.5	A-7-5	47	17	0	6	22	40	32	92	88	72	33.8	-
R4	SS-3	23+00	CL	1.0-2.5	A-5	39	9	0	5	29	38	28	100	98	76	23.2	-
R6	SS-4	27+00	CL	1.0-2.5	A-7-6	48	17	0	2	27	41	30	100	99	80	30.2	-
R7	SS-5	29+00	CL	1.0-2.5	A-6	35	12	0	9	29	29	33	93	89	66	9.0	-
R8	SS-6	31+00	CL	1.0-2.5	A-7-5	41	17	0	3	23	36	38	100	99	81	20.0	-