

REFERENCE: B-3186/B-5898

PROJECT: 38332/48030

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

| | | | |
|-------|-----------------------------|-----------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | B-3816/B-5898 | 1 | 66 |

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| -YIRT- | 10+00.00-44+31.29 | 6, 7 & 9 | 14 |
| -YILT- | 10+00.00-33+16.69 | 6 & 9 | |

CROSS SECTIONS

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ROADWAY SUBSURFACE INVESTIGATION

COUNTY HAYWOOD
PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT
SMOKY MOUNTAIN HWY) FROM WEST OF NC
209 (CRABTREE RD.) TO EAST OF RUSS AVE.

INVENTORY

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

C. SWAFFORD

R. DUGGER

N. YACOBI

GEOTECHNOLOGY, INC.

INVESTIGATED BY C. SWAFFORD

DRAWN BY T. LYNN

CHECKED BY K. BUSSEY

SUBMITTED BY HDR

DATE NOVEMBER 2021

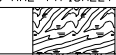





























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Kenneth R. Bussey, Jr. 11/22/21
SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| SOIL DESCRIPTION | | | | | | | | | | GRADATION | | | | | | | | | | ROCK DESCRIPTION | | | | | | | | | | TERMS AND DEFINITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--|------|-------|-------|--|--|--|---|----------------------------|--|--|---|--|--|------|---|--|--|--|--|------------|---|---|--|--|--|--|--|--|--|--|---|------|---------|------|-----------|-----------|-------------------|---------------------|--|------|--|----------------------------|--------------------------------------|-------------------|----------------------|---|--------------------|-------------|---|-----------------------|------------------|------------------------------------|----------------------|-------------------|--|---|--|------------------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i> | | | | | | | | | | 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. | | | | | | | | | | 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: | | | | | | | | | | 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 (ROD) - 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 (IN 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 (SROD) - 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL LEGEND AND AASHTO CLASSIFICATION | | | | | | | | | | ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. | | | | | | | | | | WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. | | | | | | | | | | CRSTALLINE 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. | | | | | | | | | | COMPRESSIONIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50 | | | | | | | | | | NON-CRSTALLINE ROCK (NCR)  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PERCENTAGE OF MATERIAL | | | | | | | | | | ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10% | | | | | | | | | | SILT - CLAY SOILS 3 - 5% 5 - 12% 12 - 20% > 20% | | | | | | | | | | OTHER MATERIAL TRACE 1 - 10% LITTLE 10 - 20% SOME 20 - 35% HIGHLY 35% AND ABOVE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUND WATER | | | | | | | | | |  WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  STATIC WATER LEVEL AFTER 24 HOURS  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  SPRING OR SEEP | | | | | | | | | | WEATHERING | | | | | | | | | | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (IV 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> VERY SEVERE (IV 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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i> 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONSISTENCY OR DENSENESS | | | | | | | | | | MISCELLANEOUS SYMBOLS | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | RECOMMENDATION SYMBOLS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </table> | | | | | | | | | | PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | 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 |  ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION  SOIL SYMBOL  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT  INFERRED SOIL BOUNDARY  INFERRED ROCK LINE  ALLUVIAL SOIL BOUNDARY  DIP & DIP DIRECTION OF ROCK STRUCTURES  TEST BORING  AUGER BORING  CORE BORING  MONITORING WELL  PIEZOMETER INSTALLATION  SLOPE INDICATOR INSTALLATION  CONE PENETROMETER TEST  SOUNDING ROD  TEST BORING WITH CORE  SPT N-VALUE | | | | | | | | | | 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 GROUDED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED 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 FINGER NAIL. | | | | | | | | | |  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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | 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 | | | | | | | | | | ABBREVIATIONS | | | | | | | | | | SOIL MOISTURE - CORRELATION OF TERMS | | | | | | | | | | EQUIPMENT USED ON SUBJECT PROJECT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table> | | | | | | | | | | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE 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 % - UNIT WEIGHT %g - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO | | | | | | | | | | <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> | | | | | | | | | | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PLASTIC RANGE (PI) | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | DRILL UNITS: <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 <input checked="" type="checkbox"/> CME-550X <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-75 <input type="checkbox"/> _____ <input type="checkbox"/> _____ ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT <input type="checkbox"/> _____ <input type="checkbox"/> _____ HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____ <input type="checkbox"/> -N _____ HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST | | | | | | | | | | | | | | | | | | | | | | | |
| U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTIC RANGE (PI) | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OM - OPTIMUM MOISTURE | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTICITY | | | | | | | | | | FRACURE SPACING | | | | | | | | | | BEDDING | | | | | | | | | | NOTES: BORING ELEVATIONS OBTAINED USING b3186_br0022_r4047_Mer ged.1-12-21.tin FIAD - FILLED IMMEDIATELY AFTER DRILLING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <th>NON PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table> | | | | | | | | | | NON PLASTIC | PLASTICITY INDEX (PI) | DRY STRENGTH | SLIGHTLY PLASTIC | 0-5 | VERY LOW | MODERATELY PLASTIC | 6-15 | SLIGHT | HIGHLY PLASTIC | 16-25 | MEDIUM | | 26 OR MORE | HIGH | <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> | | | | | | | | | | TERM | SPACING | TERM | THICKNESS | VERY WIDE | MORE THAN 10 FEET | VERY THICKLY BEDDED | 4 FEET | WIDE | 3 TO 10 FEET | THICKLY BEDDED | 1.5 - 4 FEET | MODERATELY CLOSE | 1 TO 3 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | CLOSE | 0.16 TO 1 FOOT | VERY THINLY BEDDED | 0.03 - 0.16 FEET | VERY CLOSE | LESS THAN 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. FRIBLE 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. | | | | | | | | | | BENCH MARK: N/A ELEVATION: FEET | | | | | | | | | |
| NON PLASTIC | PLASTICITY INDEX (PI) | DRY STRENGTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SLIGHTLY PLASTIC | 0-5 | VERY LOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODERATELY PLASTIC | 6-15 | SLIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HIGHLY PLASTIC | 16-25 | MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26 OR MORE | HIGH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TERM | SPACING | TERM | THICKNESS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY WIDE | MORE THAN 10 FEET | VERY THICKLY BEDDED | 4 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WIDE | 3 TO 10 FEET | THICKLY BEDDED | 1.5 - 4 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODERATELY CLOSE | 1 TO 3 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CLOSE | 0.16 TO 1 FOOT | VERY THINLY BEDDED | 0.03 - 0.16 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VERY CLOSE | LESS THAN 0.16 FEET | THICKLY LAMINATED | 0.008 - 0.03 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | THINLY LAMINATED | < 0.008 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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. | | | | | | | | | | DATE: 8-15-14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

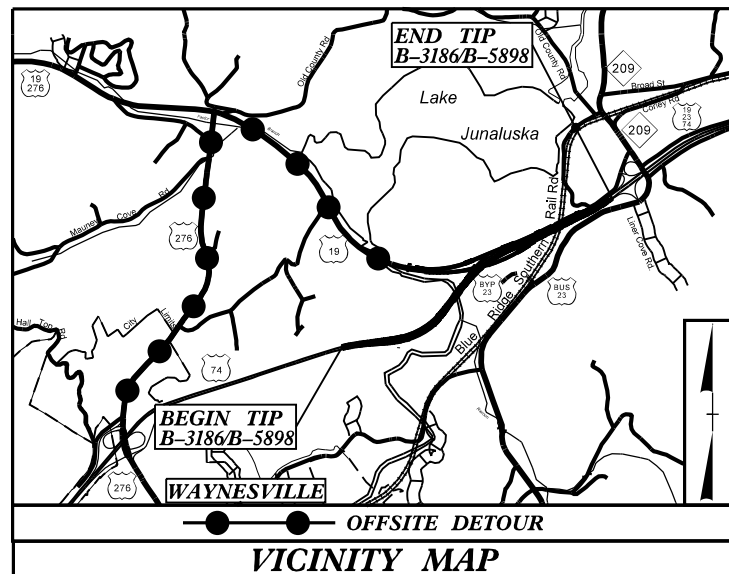
09/08/99

TIP PROJECT: B-3186 / B-5898

CONTRACT: C204684

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
USER: TL\YNN
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DATE: 10/22/2021
TIME: 3:47:35 PM

See Sheet 1-A For Conventional Symbols



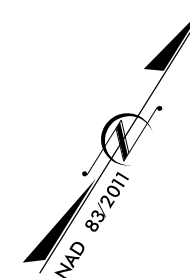
90% PLANS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

HAYWOOD COUNTY

**LOCATION: US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY)
FROM WEST OF NC 209(CRABTREE RD.) TO EAST OF RUSS AVE.
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES
AND UTILITIES.**

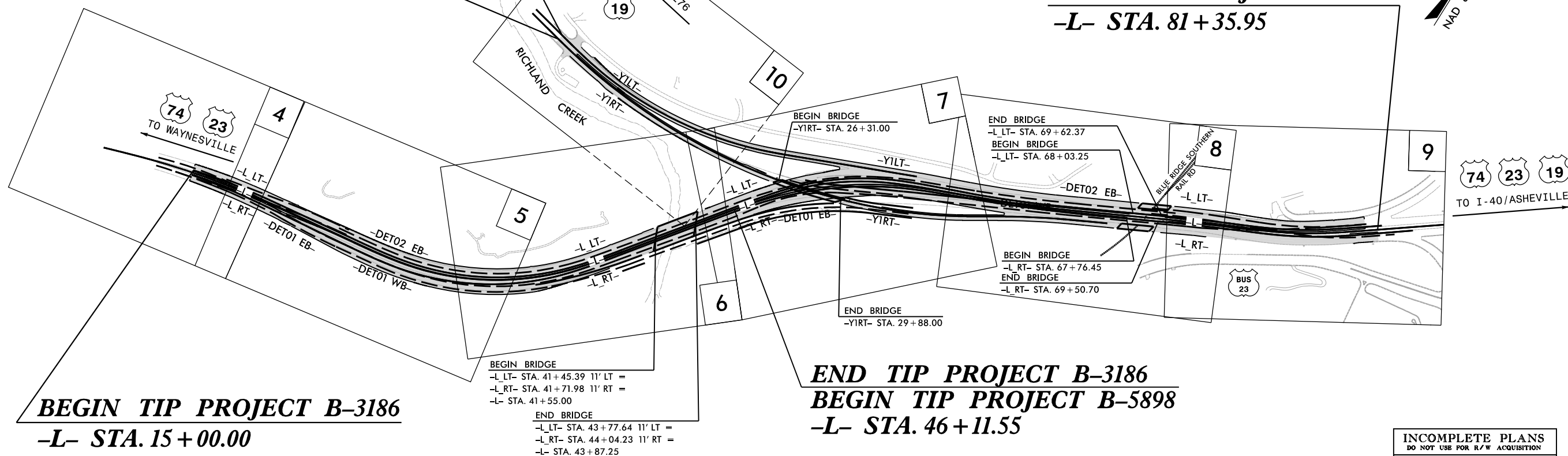
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C. | B-3186 / B-5898 | 3 | 66 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 38332.1.FS.1 | BRNHP-0023(32) | P.E. | |
| 48030.1.FS.1 | BRSTP-0019(49) | P.E. | |
| 38332.2.1 | N/A | RW/UTILITY | |
| 48030.2.1 | N/A | RW/UTILITY | |



**BEGIN CONSTRUCTION
-YIRT- STA. 12 + 00.00**

**BEGIN CONSTRUCTION
-YILT- STA. 11 + 99.83**

**END TIP PROJECT B-5898
-L- STA. 81 + 35.95**



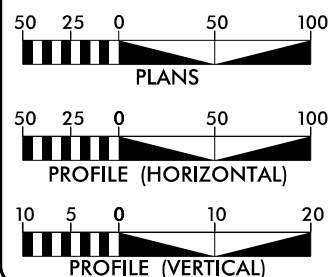
**BEGIN TIP PROJECT B-3186
-L- STA. 15 + 00.00**

**END TIP PROJECT B-3186
BEGIN TIP PROJECT B-5898
-L- STA. 46 + 11.55**

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

THIS IS A CONTROLLED-ACCESS PROJECT WITH
ACCESS BEING LIMITED TO INTERCHANGES

GRAPHIC SCALES



DESIGN DATA

ADT 2022 = 47,300
 ADT 2042 = 59,400
 K = 8 %
 D = 55 %
 T = 5 % *
 V = 65 MPH
 * TTST = 2% DUAL 3%
 FUNC CLASS = FREEWAY
 STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3186 = 0.545 miles
 TOTAL STRUCTURES TIP PROJECT B-3186 = 0.044 miles
 TOTAL LENGTH TIP PROJECT B-3186 = 0.589 miles
 LENGTH ROADWAY TIP PROJECT B-5898 = 0.636 miles
 TOTAL STRUCTURES TIP PROJECT B-5898 = 0.033 miles
 TOTAL LENGTH TIP PROJECT B-5898 = 0.669 miles
 (LENGTHS BASED ON L_RT ALIGNMENT)

Prepared in the Office of:
HDR
 HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 8, 2021

LETTING DATE:
MARCH 15, 2022

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

HENRY W. BARE
PROJECT DESIGN ENGINEER

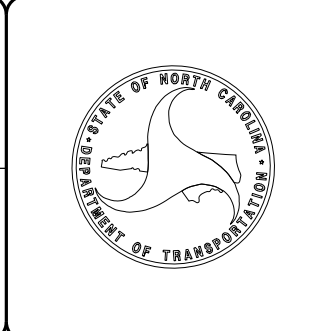
GARRETT HIGDON
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



November 3, 2021

STATE PROJECT: B-3186/B-5898
 FEDERAL PROJECT: N/A
 COUNTY: HAYWOOD
 DESCRIPTION: US 23/US 74/US 19 (Great Smoky Mountain Hwy.) from West of NC 209 (Crabtree Rd.) to East of Russ Ave.
 SUBJECT: Geotechnical Inventory Report

Project Description

The project area lies in the town of Lake Junaluska, NC between Highway 276 and NC 209. This project consists of upgrading US 74 to a six-lane, median divided facility from east of the US 276 Interchange to the US 23 Business Interchange. Additionally, US 19 will be upgraded with full depth paved, 10-ft shoulders from east of Holston Village Road to the US 74 Interchange. In total, approximately 1.2 miles of roadway will be upgraded. Finally, a two-span bridge on US 19 over US 74/US 23, a three-span bridge on US 19/US 23/US 74 over Richland Creek, a dual, three-span bridges on US 19/US 23/US 74 over the Blue Ridge Southern Railroad, and nine retaining walls are included with this project, but are covered under separate reports.

The geotechnical field investigation was conducted from January 2021 to April 2021. Three drill rigs mounted on a rubber tracked all-terrain carrier and equipped with an automatic hammer (CME 55, CME 550X, and CME 75) were used to advance borings for the subsurface exploration. Hollow stem auger drilling procedures were used to advance borings to the required depths. Standard Penetration Tests were performed at approximately 2.5-foot to 5.0-foot intervals to termination in selected borings. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis.

The following alignments were explored. Subsurface profiles and/or cross sections of these alignments are included in this report.

| <u>Line</u> | <u>Stations (±)</u> |
|-------------|---------------------|
| -L- | 20+00 – 81+35.95 |
| -Y1RT- | 10+00 – 44+31.29 |
| -Y1LT- | 10+00 – 33+16.69 |

Areas of Special Geotechnical Interest

- 1) **Loose/Soft Soils:** Very soft or very loose soils were encountered during the investigation. Such soils (N-value < 4) could have the potential to cause embankment/subgrade and/or slope stability problems during construction. These soils were encountered along the following intervals:

| <u>Line</u> | <u>Station (±)</u> | <u>Offset (ft)</u> |
|-------------|--------------------|--------------------|
| -L- | 54+50 | RT |
| -L- | 57+00 – 59+50 | RT |
| -L- | 66+50 | RT |
| -Y1RT- | 20+00 | RT |
| -Y1RT- | 25+50 | RT |

- 2) **Highly Plastic Soils:** Highly plastic soils were encountered as part of the investigation. However, these soils were encountered at depths great enough to not adversely impact embankment/subgrade and/or slope stability. However, if encountered during construction, these soils have the potential to cause such problems.
- 3) **Organic Soils:** Though not encountered during the investigation, organic matter and wood debris could be present along the project limits, especially near streams and creeks.
- 4) **Artificial Fill:** Artificial fill was encountered at the following locations.

| <u>Line</u> | <u>Station (±)</u> | <u>Offset (ft)</u> |
|-------------|--------------------|--------------------|
| -L- | 38+00 – 41+00 | LT to RT |
| -L- | 44+50 – 46+50 | LT |

Several smaller areas of artificial fill may be present throughout the project corridor and are related to business developments, gravel, and soil driveways, as well as previous construction of utility lines.

- 5) **Crystalline Rock:** Crystalline rock was encountered within 6 feet of proposed grade at the following locations:

| <u>Line</u> | <u>Station (±)</u> | <u>Offset (ft)</u> |
|-------------|--------------------|--------------------|
| -L- | 32+00 | RT |
| -L- | 75+00 – 77+00 | LT to RT |
| -Y1RT- | 17+00 – 18+00 | LT to RT |

- 6) **Groundwater:** High groundwater was not encountered during the investigation. However, especially around streams and creeks, seasonal high ground water or the potential for groundwater related construction problems could be present.
- 7) **Ponds:** No ponds were found or identified on or within close proximity of right of way on this project. These were noted at the following locations:
- 8) **Water Wells:** Water wells were not found or identified within or in close proximity to the proposed right of way.

Physiography and Geology

The project is located in the Blue Ridge Physiographic Province. Land use along the project corridor consists of residential, agricultural, commercial businesses and woods. Geologically, the project is located within the Blue Ridge Belt. Bedrock generally consists of rocks from the Coweeta Group (**ZYbn**), consisting of migmatitic Biotite Gneiss interlayered and gradational with biotite-garnet gneiss and amphibolite, with intrusive metamorphosed gabbro and diorite.

Soil Properties

Soils encountered at the project site include roadway embankment, artificial fill, alluvial, residual, weathered metamorphic rock and crystalline metamorphic rock.

Roadway Embankment soils were mainly encountered along the existing sections of US 74 and US 19 and consisting of gray, red, and brown, very soft to very stiff silt and clay (A-4, A-5, A-6, A-7) and loose to medium dense, clayey and silty sand and gravel (A-2-6, A-2-4, A-3, A-1-b).

Artificial fill soils consist of brown, orange, and gray, very soft to stiff, silt and clay (A-4, A-6, A-7-6), and loose to medium dense, sand and gravel (A-3, A-1-b). The artificial fill is underlain by residual soils.

Alluvial deposits are located within the floodplains of Richland Creek and nearby streams within the project limits. These soils are black, gray, and brown, very soft to medium stiff, silt and clay (A-4, A-5, A-7), and very loose to dense, sand and gravel and silty sand (A-1-b, A-2-4, A-2-6, A-3).

Residual soils were encountered throughout the project. These soils consist primarily of red, tan, and brown, soft to hard silt and clay (A-4, A-5, A-7), and loose to very dense, silty and clayey sand (A-2-4, A-2-5, A-2-6, A-2-7, A-3).

Rock Properties

Weathered rock was encountered during the roadway investigation at elevations ranging from approximately 2638 to 2551 feet. It originates from the underlying metamorphic rock, specifically Gneiss.

Crystalline rock was encountered during the roadway investigation at elevations ranging from approximately 2653 to 2523 feet and consists of Gneiss. Refer to the "Areas of Special Geotechnical Interest" for areas of rock encountered within 6 feet of proposed grade.


Ground Water

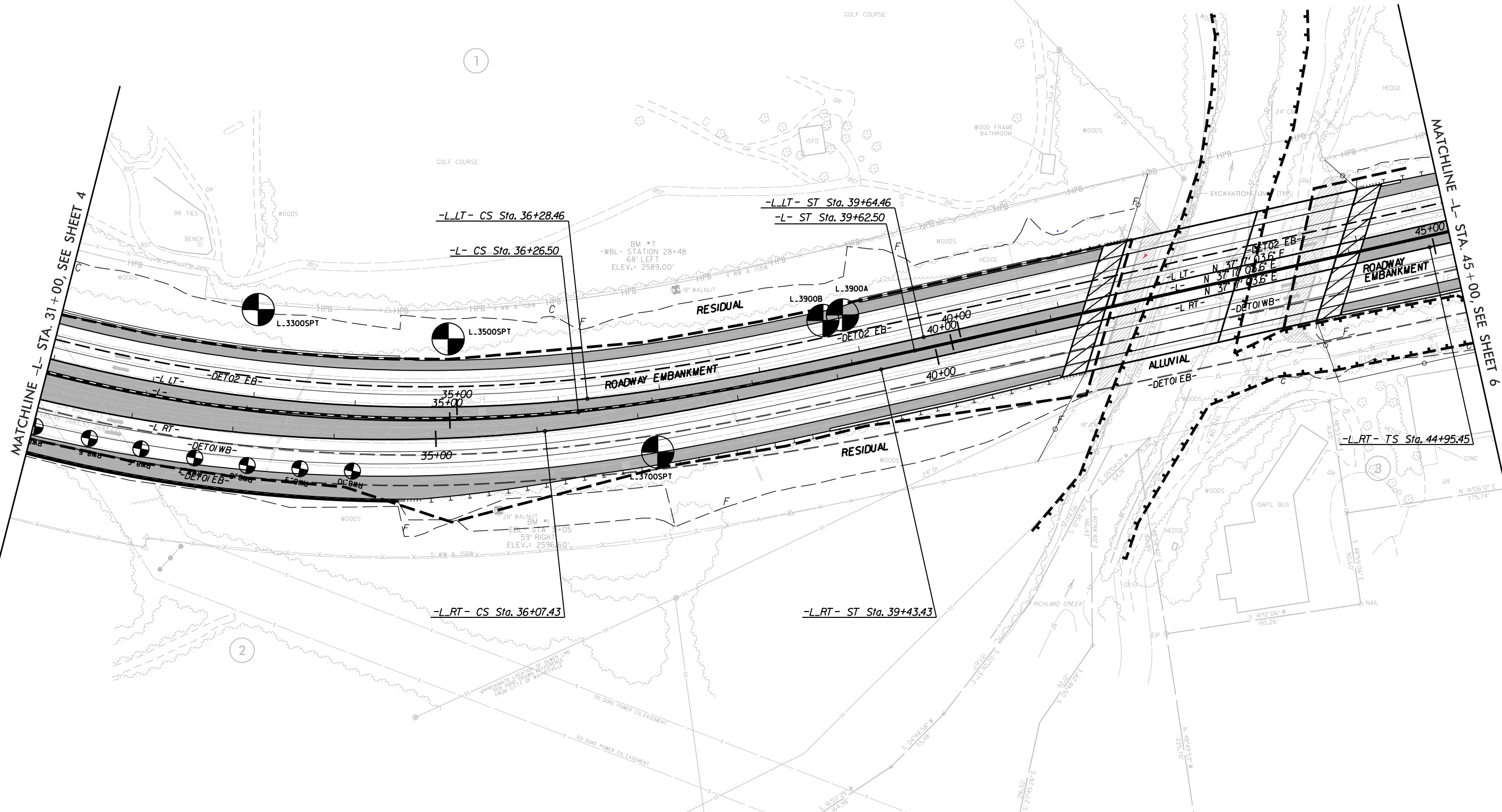
Groundwater was encountered in multiple borings and ranges in elevation from approximately 2620 to 2567 feet. Groundwater may fluctuate with seasonal precipitation.

Prepared By,
HDR Engineering, Inc., of the Carolinas




Kenneth R. Bussey, Jr., P.E.
Senior Geotechnical Engineer

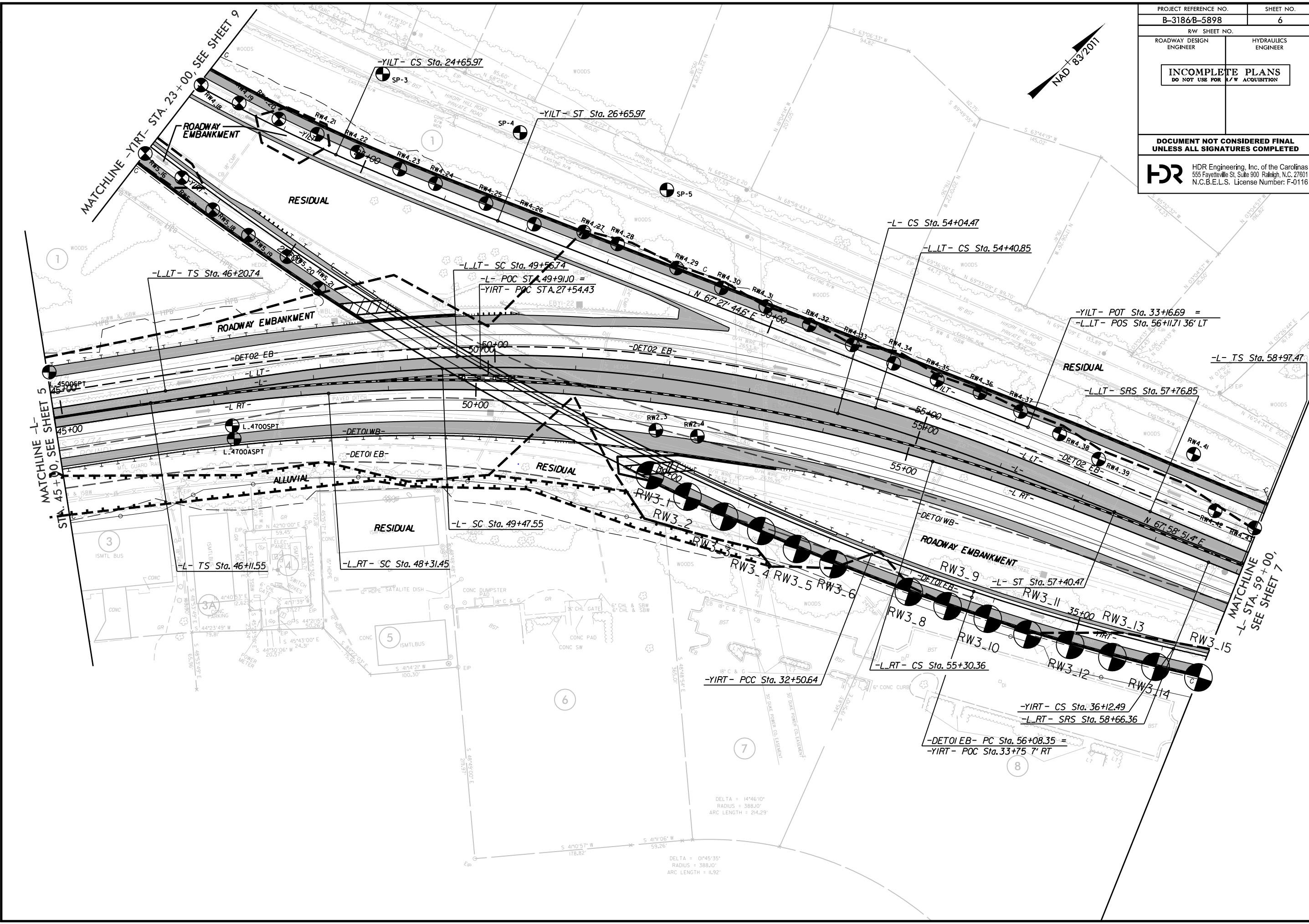
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| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
|  HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116 | |



REVISIONS

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| RW SHEET NO. | |
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| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
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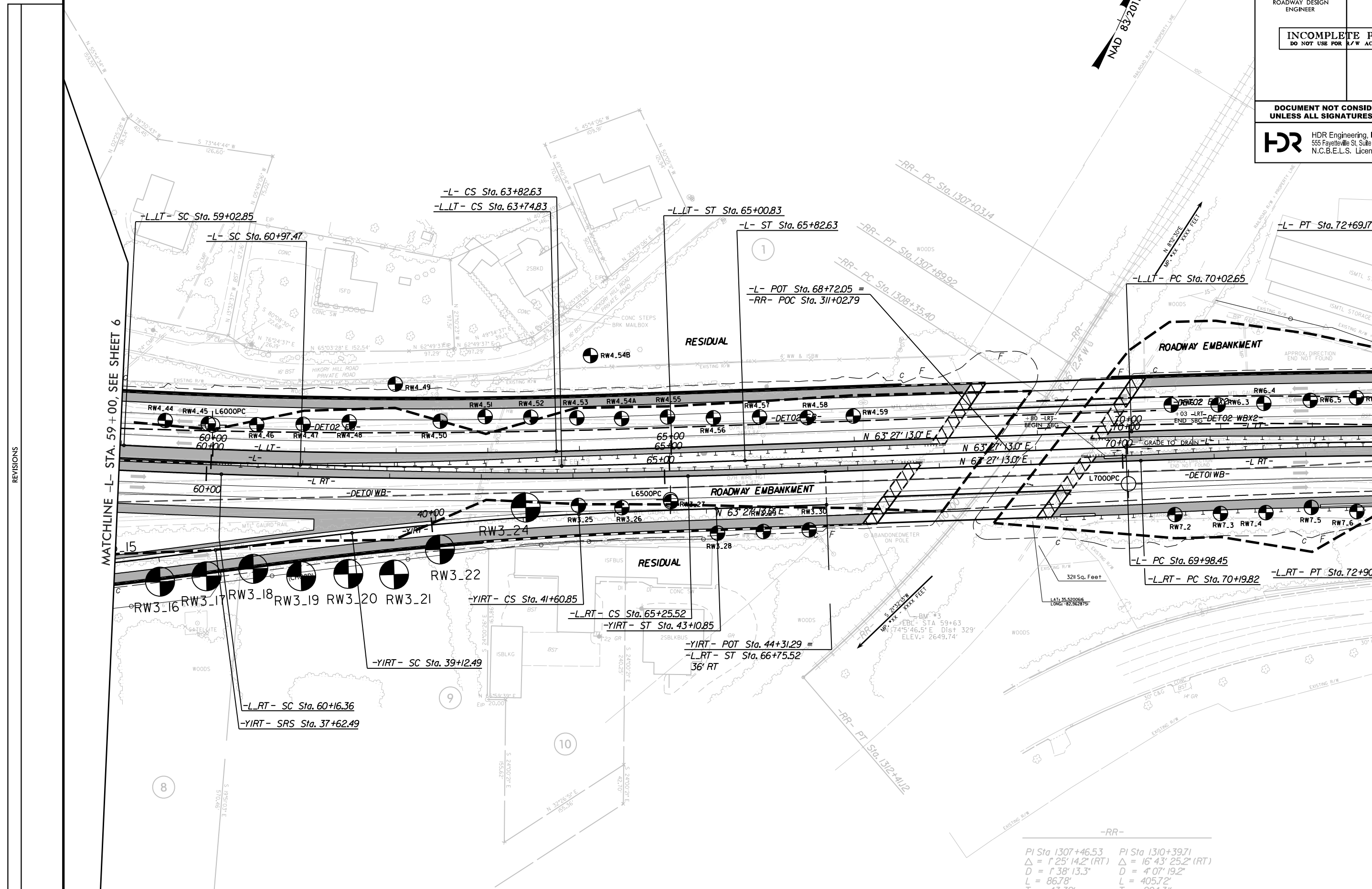
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RADIUS = 388.10'
ARC LENGTH = 244.29'

DELTA = 0°45'35"
RADIUS = 388.10'
ARC LENGTH = 81.92'

| | |
|---|-----------------------|
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| RW SHEET NO. | |
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| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
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MATCHLINE -L- STA. 59+00, SEE SHEET 6

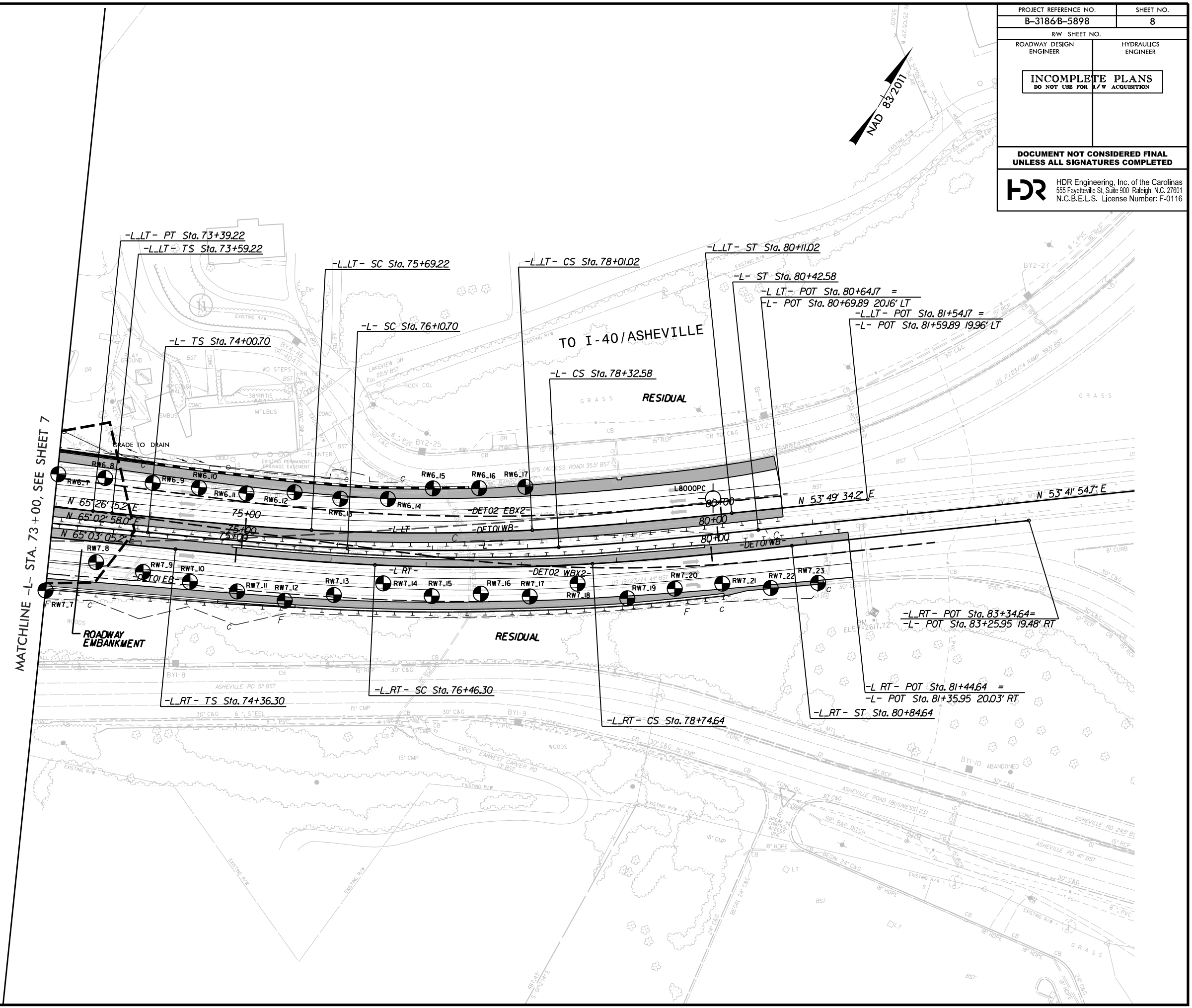
MATCHLINE -L- STA. 73+00, SEE SHEET 8

REVISIONS

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|-------------------------------|--------------------------------|
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| $\Delta = 1' 25' 14.2''$ (RT) | $\Delta = 16' 43' 25.2''$ (RT) |
| $D = 1' 38' 13.3''$ | $D = 4' 07' 19.2''$ |
| $L = 86.78'$ | $L = 405.72'$ |
| $T = 43.39'$ | $T = 204.31'$ |
| $R = 3,500.00'$ | $R = 1,390.00'$ |

| | |
|---|-----------------------|
| PROJECT REFERENCE NO. B-3186B-5898 | SHEET NO. 8 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
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MATCHLINE -L- STA. 73+00, SEE SHEET 7

REVISIONS

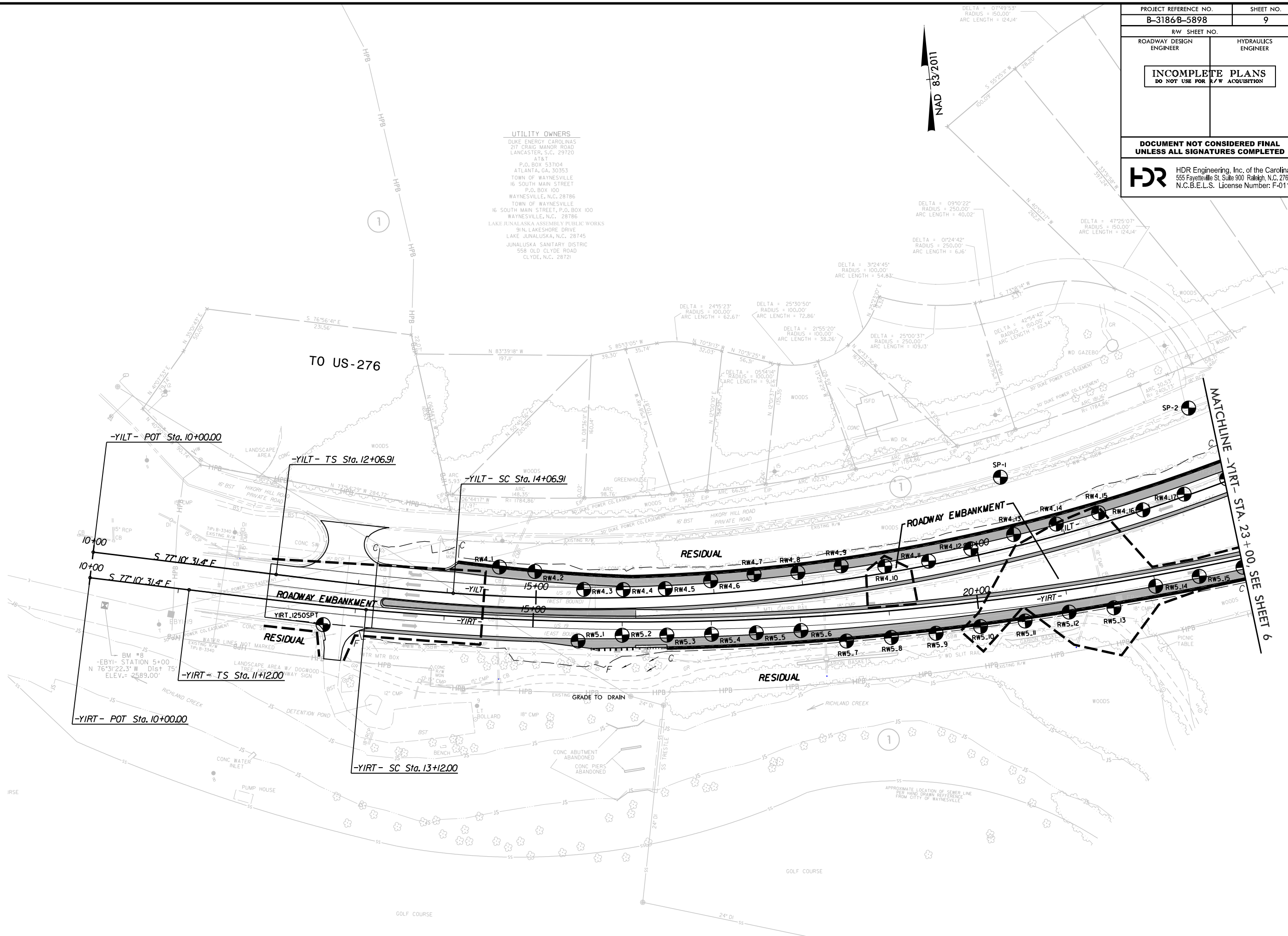
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| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
|  HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116 | |

UTILITY OWNERS
 DUKE ENERGY CAROLINAS
 217 CRAIG MANOR ROAD
 LANCASTER, S.C. 29720
 AT&T
 P.O. BOX 537104
 ATLANTA, GA. 30353
 TOWN OF WAYNESVILLE
 16 SOUTH MAIN STREET
 P.O. BOX 100
 WAYNESVILLE, N.C. 28786
 TOWN OF WAYNESVILLE
 16 SOUTH MAIN STREET, P.O. BOX 100
 WAYNESVILLE, N.C. 28786
 LAKE JUNALUSKA ASSEMBLY PUBLIC WORKS
 91 N. LAKESHORE DRIVE
 LAKE JUNALUSKA, N.C. 28745
 JUNALUSKA SANITARY DISTRICT
 558 OLD CLYDE ROAD
 CLYDE, N.C. 28721

NAD 83/2011



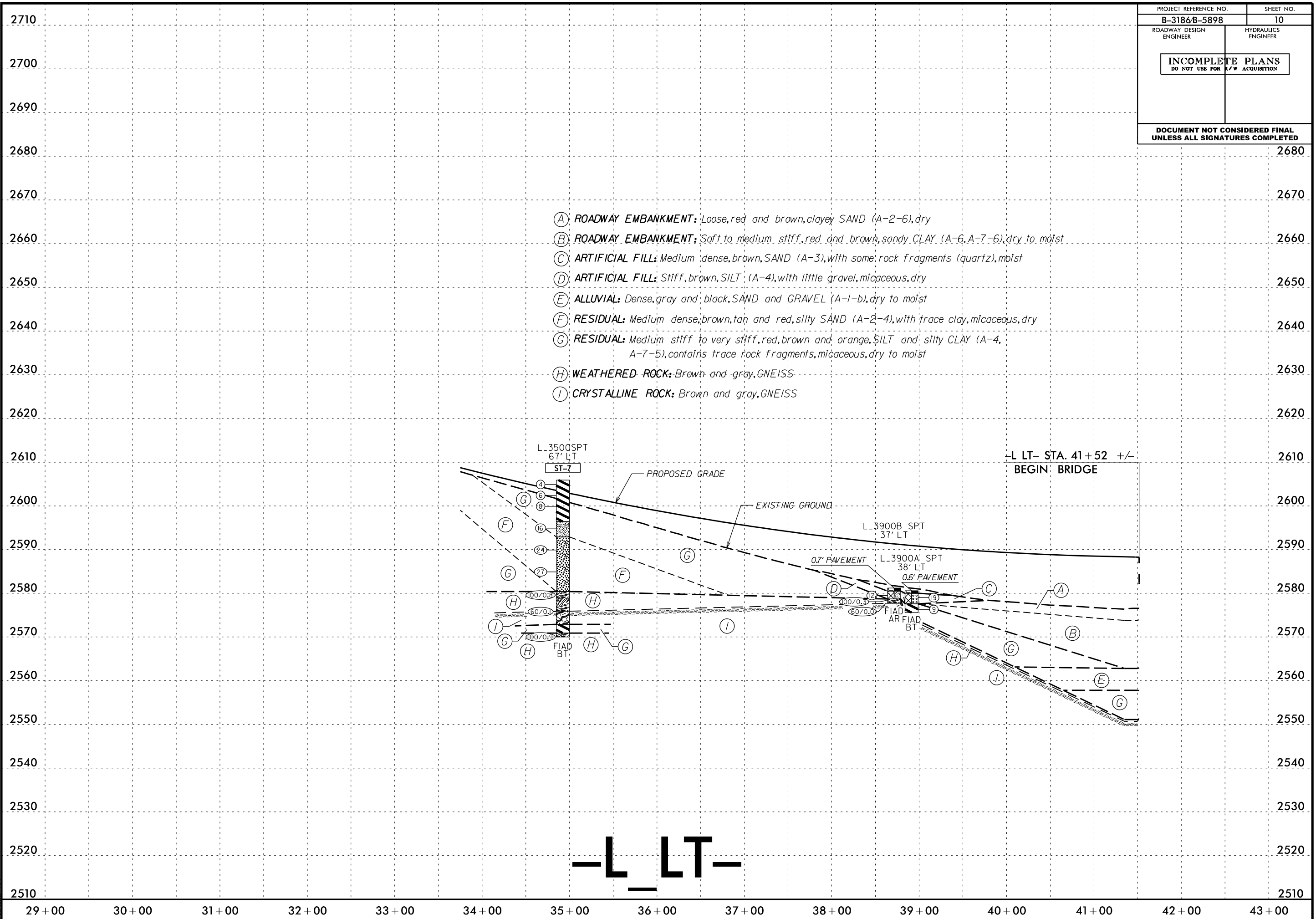
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| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
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| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |



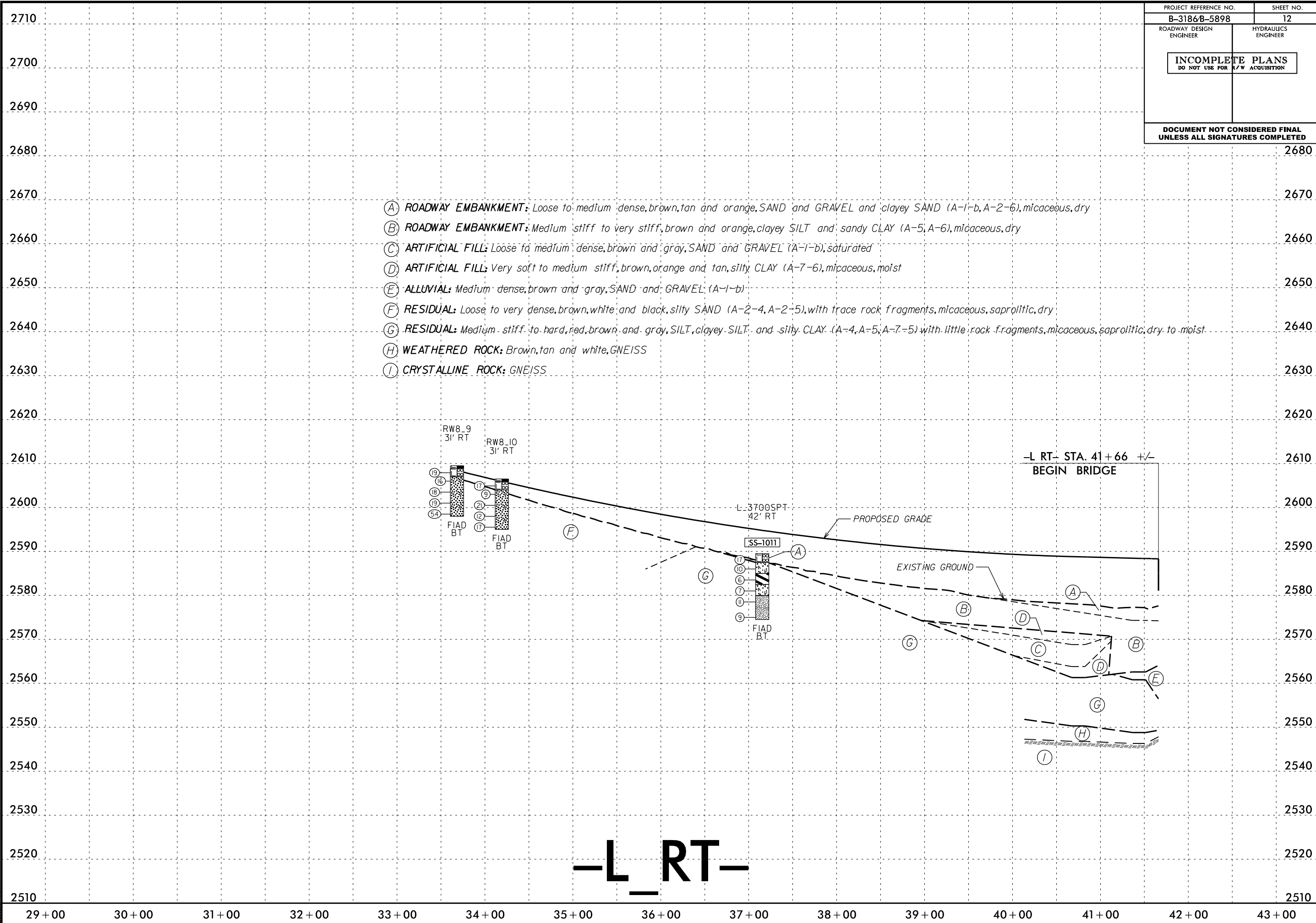
- (A) ROADWAY EMBANKMENT: Loose, red and brown, clayey SAND (A-2-6), dry
- (B) ROADWAY EMBANKMENT: Soft to medium stiff, red and brown, sandy CLAY (A-6, A-7-6), dry to moist
- (C) ARTIFICIAL FILL: Medium dense, brown, SAND (A-3), with some rock fragments (quartz), moist
- (D) ARTIFICIAL FILL: Stiff, brown, SILT (A-4), with little gravel, micaceous, dry
- (E) ALLUVIAL: Dense, gray and black, SAND and GRAVEL (A-1-b), dry to moist
- (F) RESIDUAL: Medium dense, brown, tan and red, silty SAND (A-2-4), with trace clay, micaceous, dry
- (G) RESIDUAL: Medium stiff to very stiff, red, brown and orange, SILT and silty CLAY (A-4, A-7-5), contains trace rock fragments, micaceous, dry to moist
- (H) WEATHERED ROCK: Brown and gray, GNEISS
- (I) CRYSTALLINE ROCK: Brown and gray, GNEISS

-L LT-

10/22/2021
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2:41:50 AM

5/14/99

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|---|------------------------|
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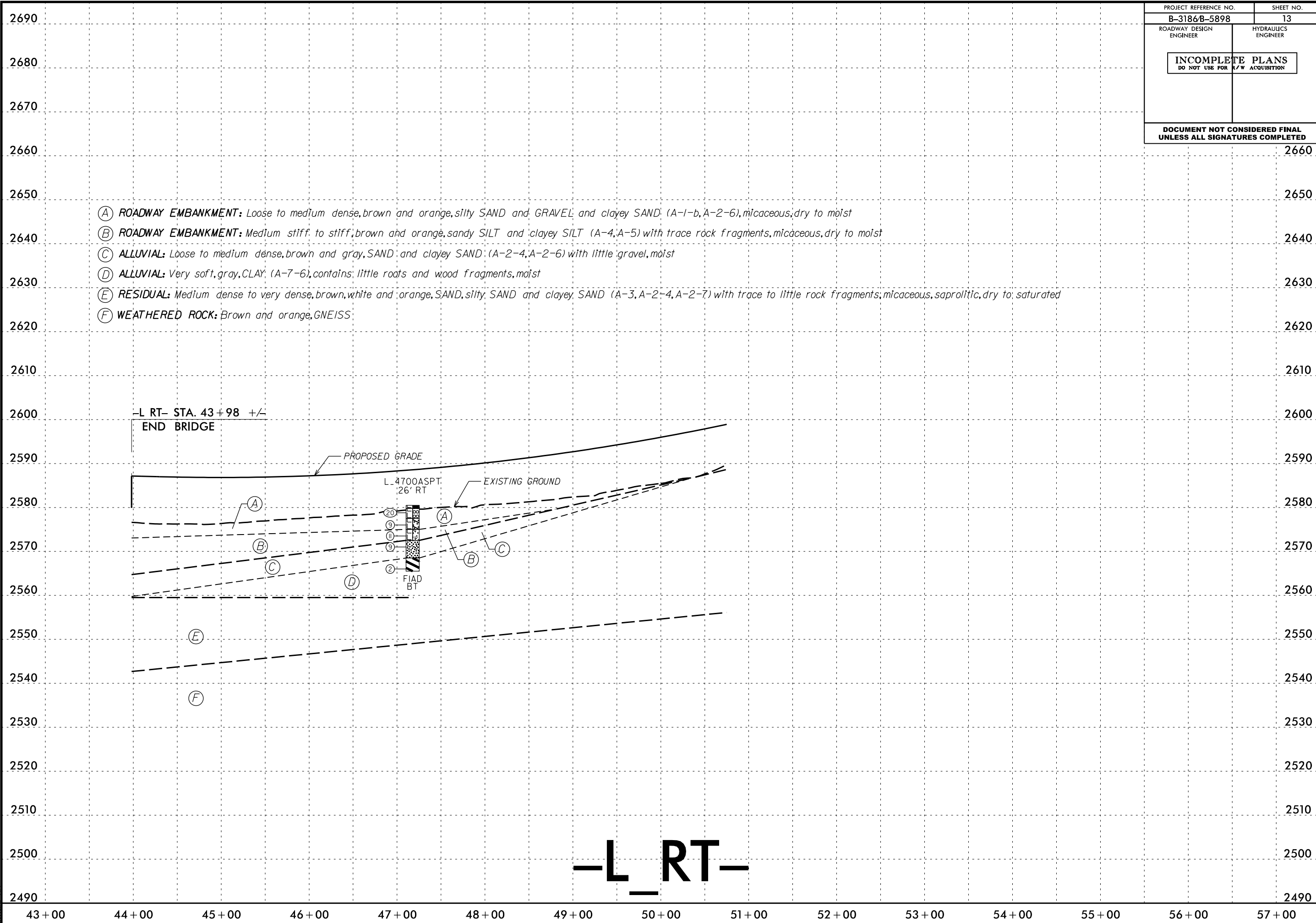


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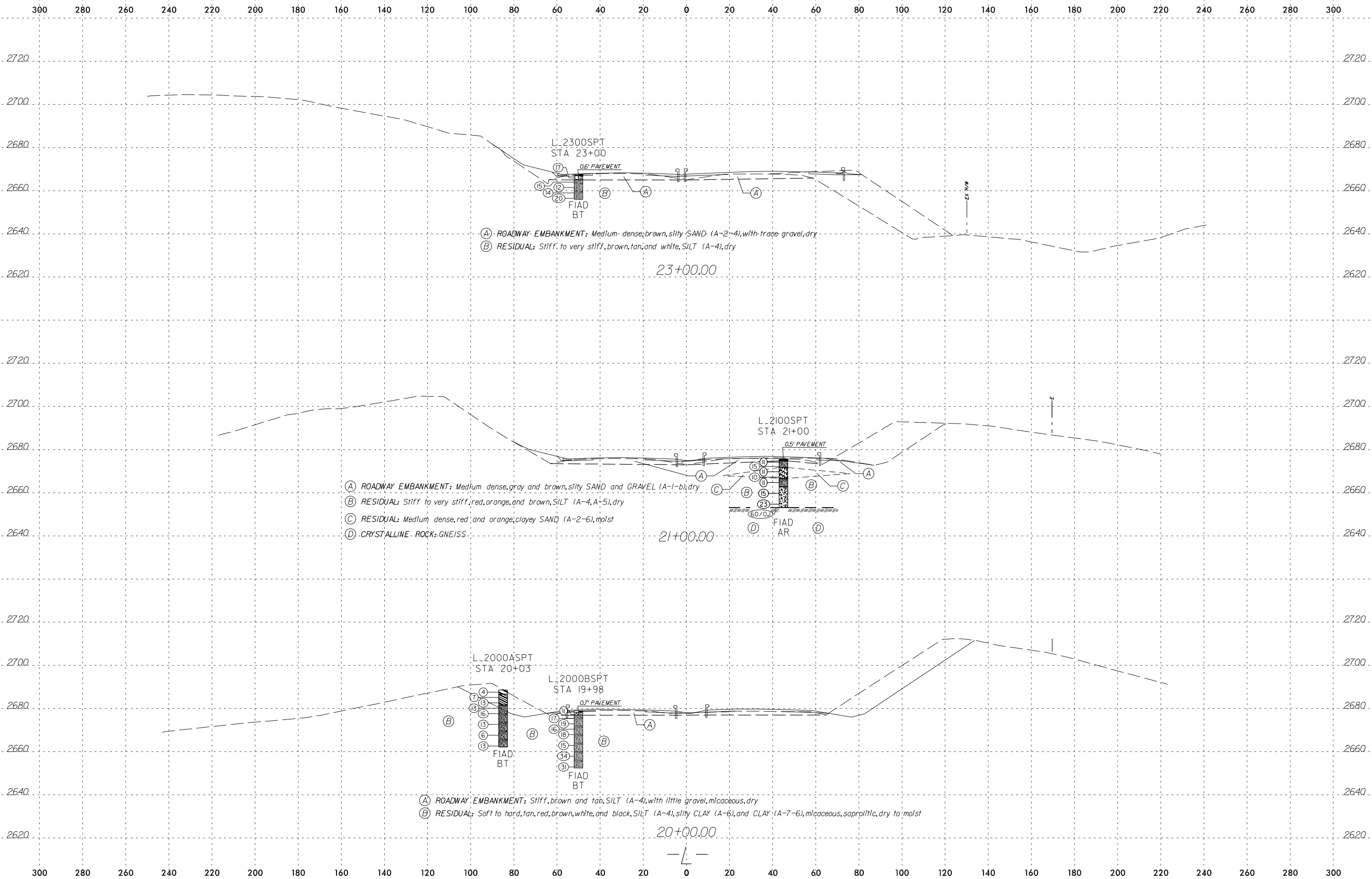
5/14/99

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| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
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| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |



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-L_RT-



L_2300SPT
STA 23+00
0.6' PAVEMENT
FIAD BT

- (A) ROADWAY EMBANKMENT: Medium dense, brown, silty SAND (A-2-4), with trace gravel, dry
- (B) RESIDUAL: Stiff, to very stiff, brown, tan, and white, SILT (A-4), dry

23+00.00

L_2100SPT
STA 21+00
0.5' PAVEMENT
FIAD AR

- (A) ROADWAY EMBANKMENT: Medium dense, gray and brown, silty SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff to very stiff, red, orange, and brown, SILT (A-4, A-5), dry
- (C) RESIDUAL: Medium dense, red and orange, clayey SAND (A-2-6), moist
- (D) CRYSTALLINE ROCK: GNEISS

21+00.00

L_2000ASPT
STA 20+03

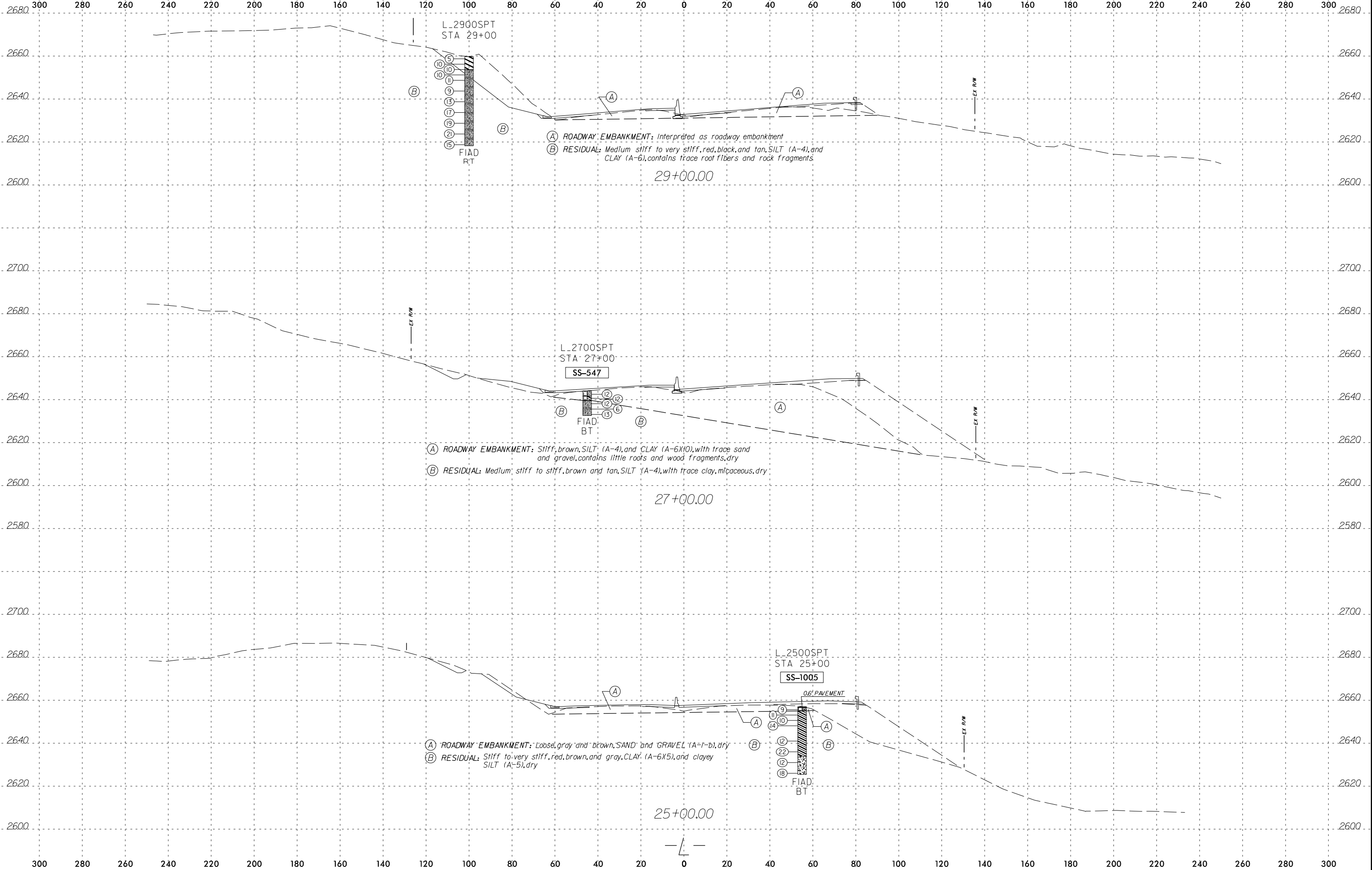
L_2000BSPT
STA 19+98

FIAD BT

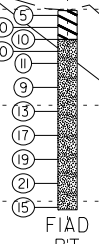
FIAD BT

- (A) ROADWAY EMBANKMENT: Stiff, brown and tan, SILT (A-4), with little gravel, micaceous, dry
- (B) RESIDUAL: Soft to hard, tan, red, brown, white, and black, SILT (A-4), silty CLAY (A-6), and CLAY (A-7-6), micaceous, saprolitic, dry to moist

20+00.00



L_2900SPT
STA 29+00

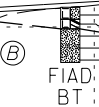


- (A) ROADWAY EMBANKMENT: Interpreted as roadway embankment
- (B) RESIDUAL: Medium stiff to very stiff, red, black, and tan, SILT (A-4), and CLAY (A-6), contains trace root fibers and rock fragments.

29+00.00

L_2700SPT
STA 27+00

SS-547

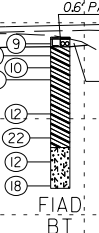


- (A) ROADWAY EMBANKMENT: Stiff, brown, SILT (A-4), and CLAY (A-6)(10), with trace sand and gravel, contains little roots and wood fragments, dry
- (B) RESIDUAL: Medium stiff to stiff, brown and tan, SILT (A-4), with trace clay, micaceous, dry

27+00.00

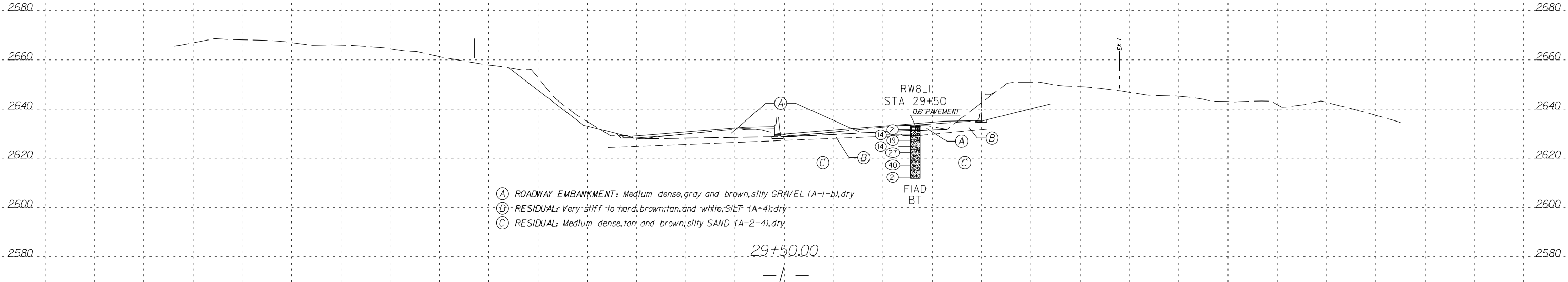
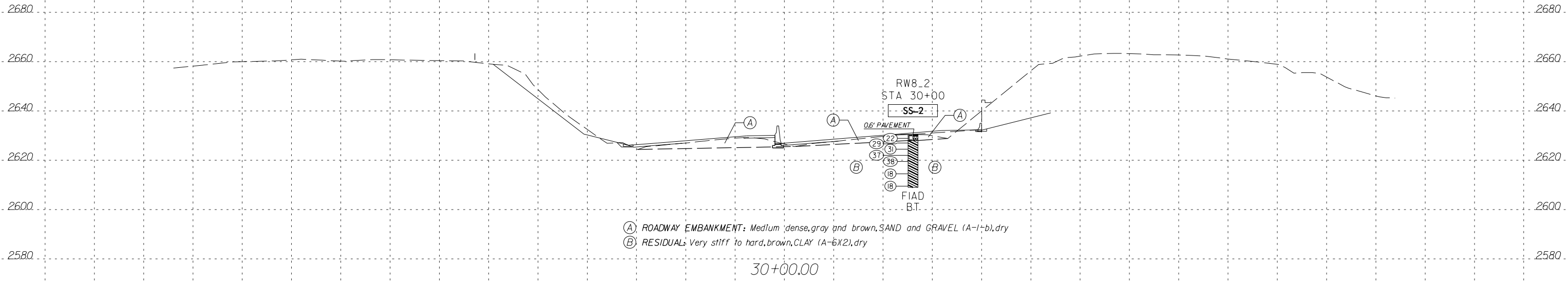
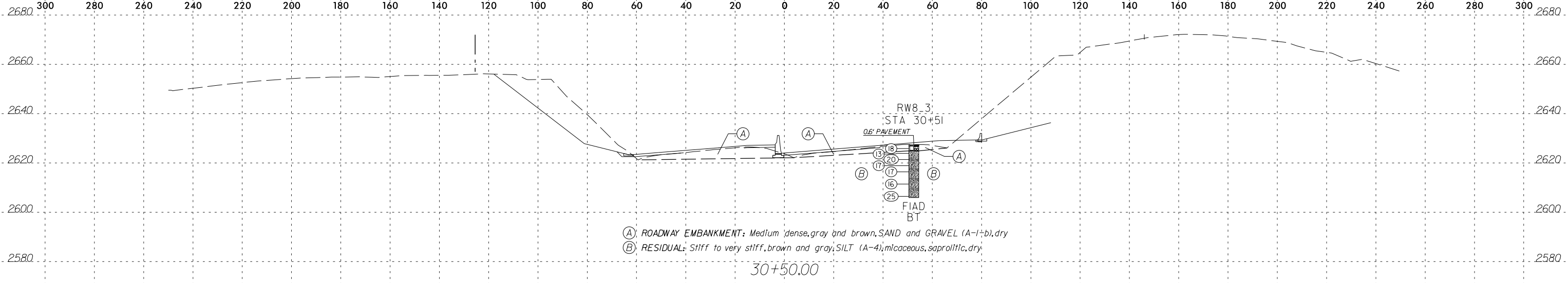
L_2500SPT
STA 25+00

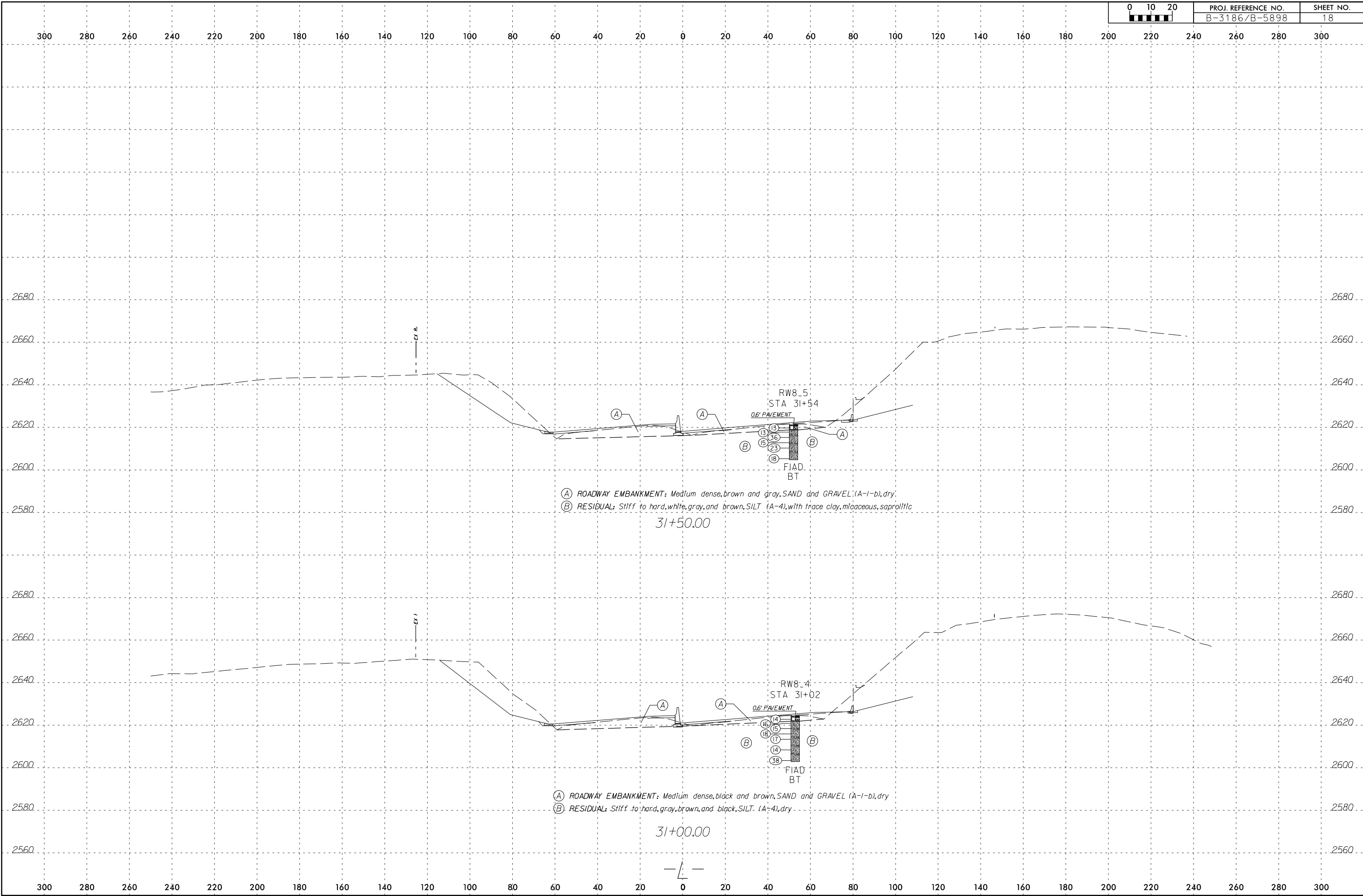
SS-1005

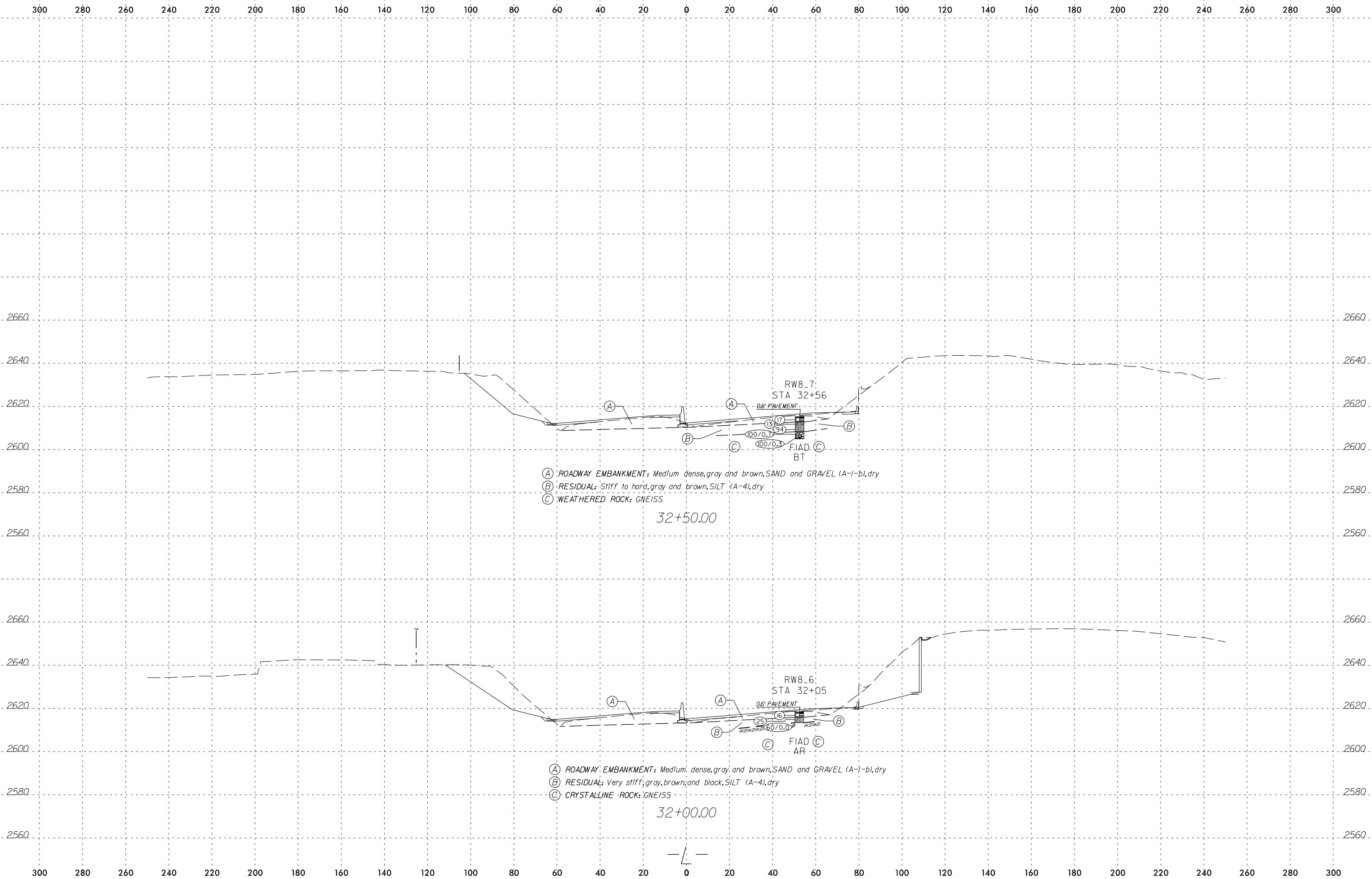


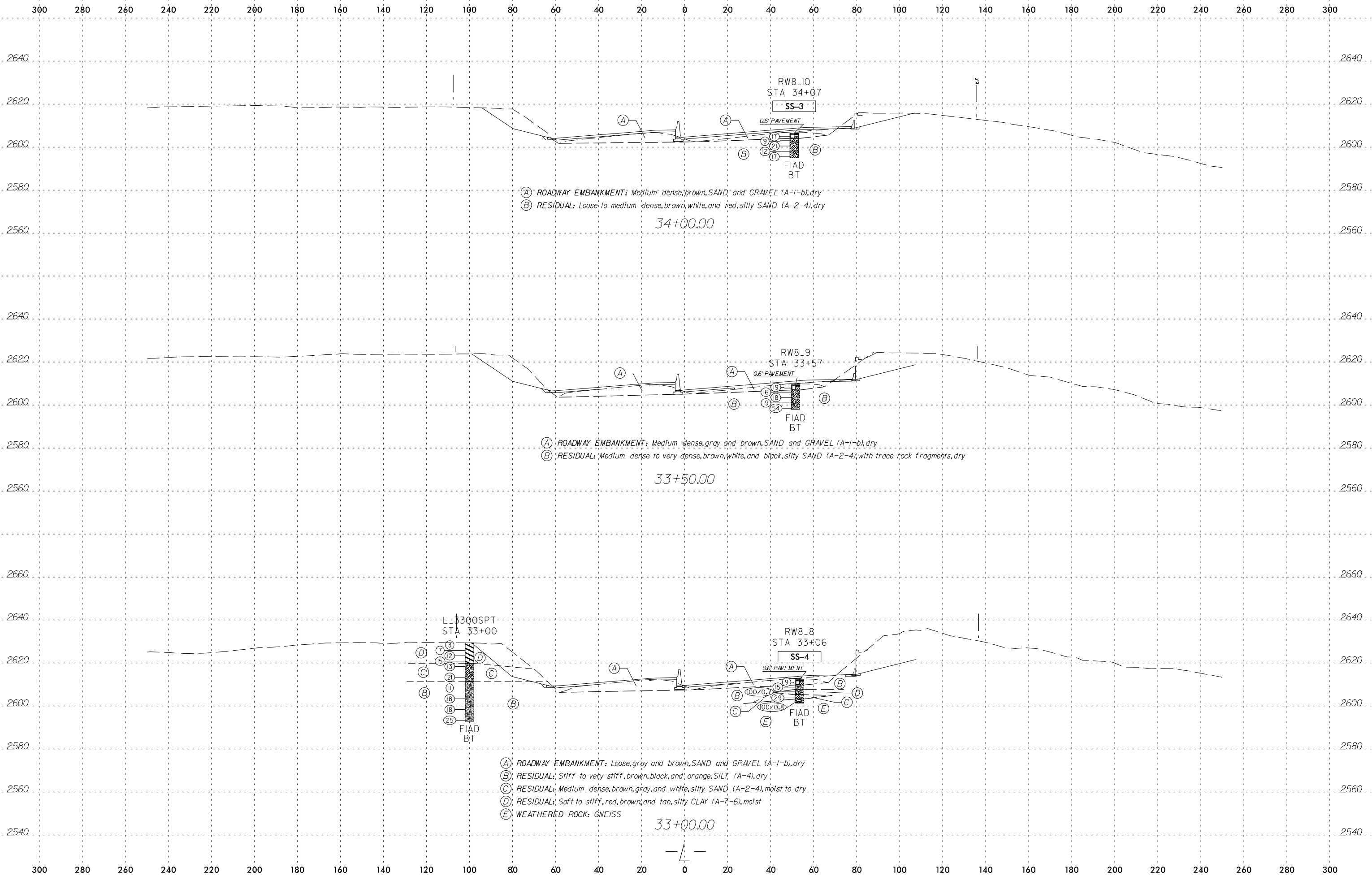
- (A) ROADWAY EMBANKMENT: Loose, gray and brown, SAND and GRAVEL (A-f-b), dry
- (B) RESIDUAL: Stiff to very stiff, red, brown, and gray, CLAY (A-6)(5), and clayey SILT (A-5), dry

25+00.00





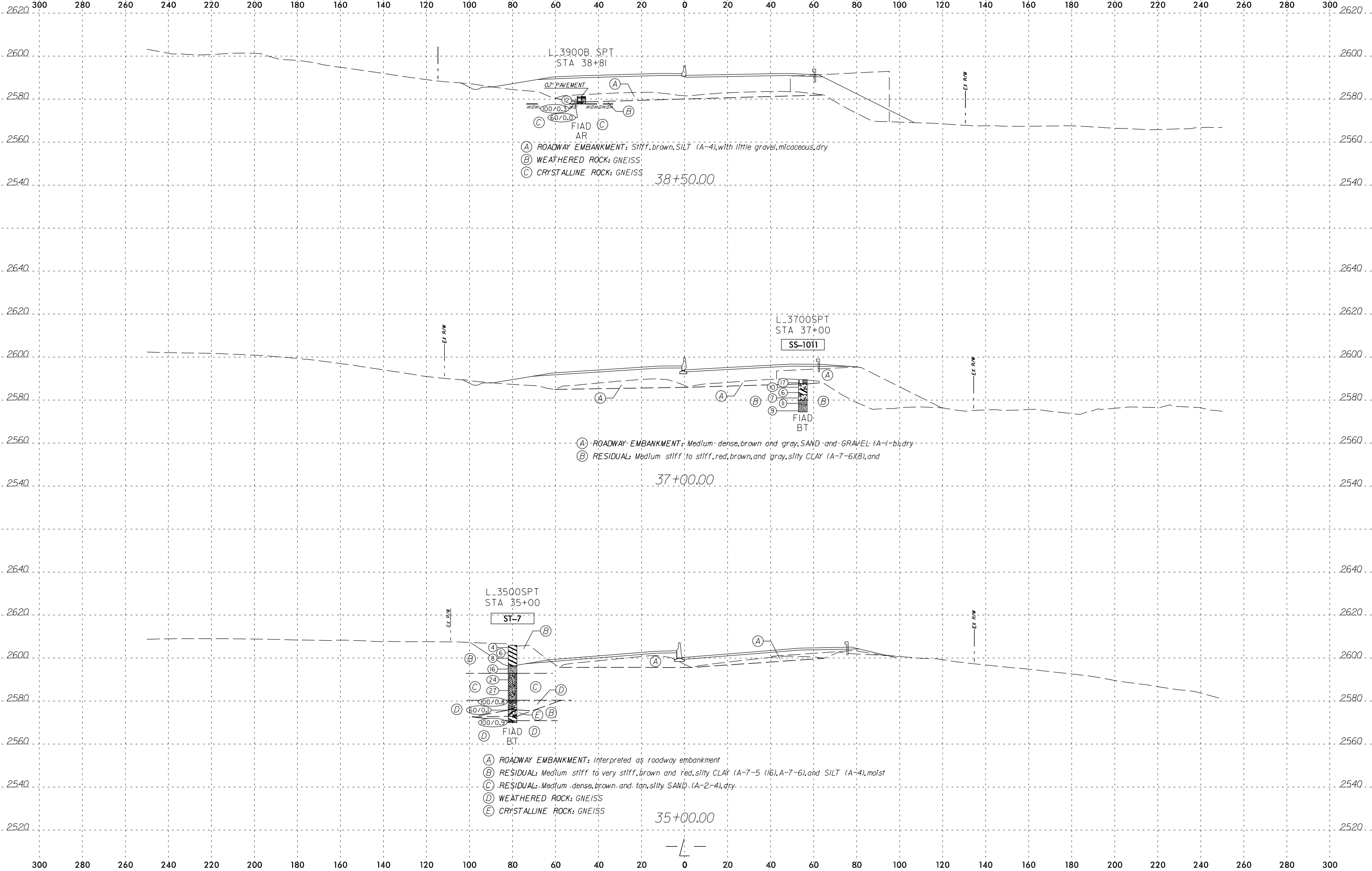




- (A) ROADWAY EMBANKMENT: Medium dense, brown, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Loose to medium dense, brown, white, and red, silty SAND (A-2-4), dry

- (A) ROADWAY EMBANKMENT: Medium dense, gray and brown, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium dense to very dense, brown, white, and black, silty SAND (A-2-4), with trace rock fragments, dry

- (A) ROADWAY EMBANKMENT: Loose, gray and brown, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff to very stiff, brown, black, and orange, SILT (A-4), dry
- (C) RESIDUAL: Medium dense, brown, gray, and white, silty SAND (A-2-4), moist to dry
- (D) RESIDUAL: Soft to stiff, red, brown, and tan, silty CLAY (A-7-6), moist
- (E) WEATHERED ROCK: GNEISS



L_3900B_SPT
STA 38+81

0.7\"/>

FIAD AR

(A) ROADWAY EMBANKMENT: Stiff, brown, SILT (A-4), with little gravel, micaceous, dry
 (B) WEATHERED ROCK: GNEISS
 (C) CRYSTALLINE ROCK: GNEISS

38+50.00

L_3700SPT
STA 37+00

SS-1011

FIAD BT

(A) ROADWAY EMBANKMENT: Medium dense, brown and gray, SAND and GRAVEL (A-1-b), dry
 (B) RESIDUAL: Medium stiff to stiff, red, brown, and gray, silty CLAY (A-7-6)(8), and

37+00.00

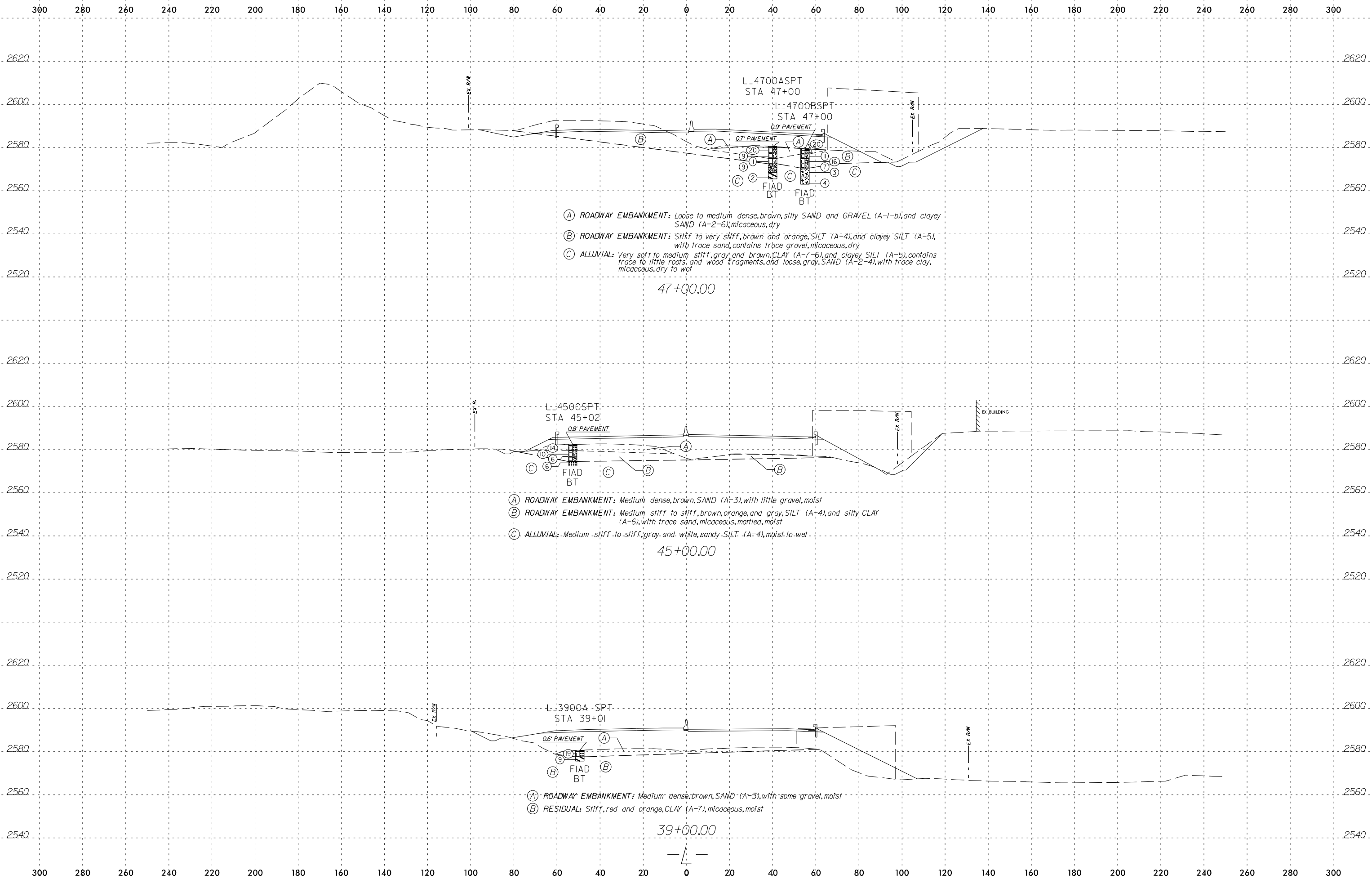
L_3500SPT
STA 35+00

ST-7

FIAD BT

(A) ROADWAY EMBANKMENT: Interpreted as roadway embankment
 (B) RESIDUAL: Medium stiff to very stiff, brown and red, silty CLAY (A-7-5 (16), A-7-6), and SILT (A-4), moist
 (C) RESIDUAL: Medium dense, brown, and tan, silty SAND (A-2-4), dry
 (D) WEATHERED ROCK: GNEISS
 (E) CRYSTALLINE ROCK: GNEISS

35+00.00



- (A) ROADWAY EMBANKMENT: Loose to medium dense, brown, silty SAND and GRAVEL (A-1-b), and clayey SAND (A-2-6), micaceous, dry
- (B) ROADWAY EMBANKMENT: Stiff to very stiff, brown and orange, SILT (A-4), and clayey SILT (A-5), with trace sand, contains trace gravel, micaceous, dry
- (C) ALLUVIAL: Very soft to medium stiff, gray and brown, CLAY (A-7-6), and clayey SILT (A-5), contains trace to little roots and wood fragments, and loose, gray, SAND (A-2-4), with trace clay, micaceous, dry to wet

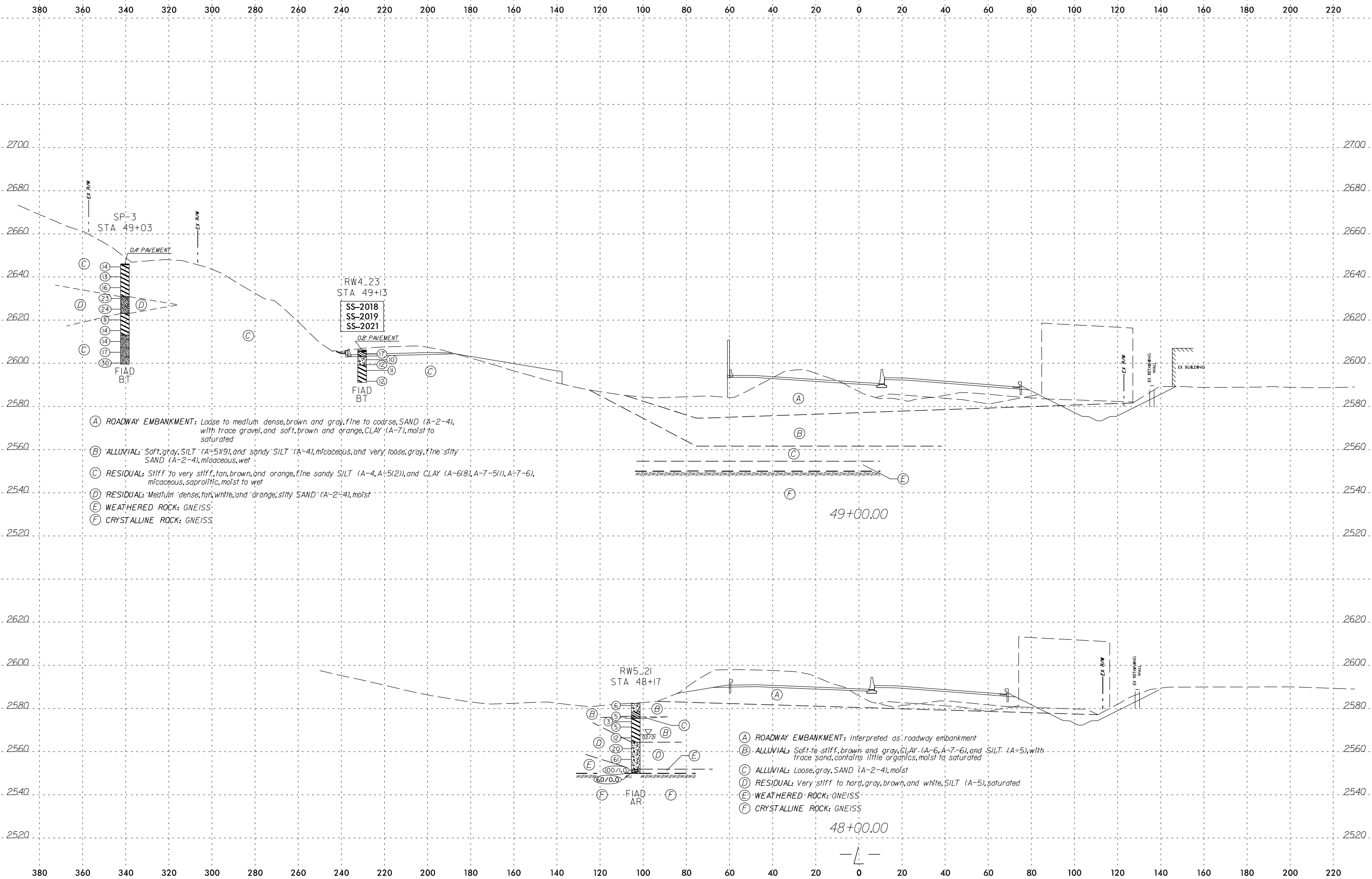
47+00.00

- (A) ROADWAY EMBANKMENT: Medium dense, brown, SAND (A-3), with little gravel, moist
- (B) ROADWAY EMBANKMENT: Medium stiff to stiff, brown, orange, and gray, SILT (A-4), and silty CLAY (A-6), with trace sand, micaceous, mottled, moist
- (C) ALLUVIAL: Medium stiff to stiff, gray and white, sandy, SILT (A-4), moist to wet

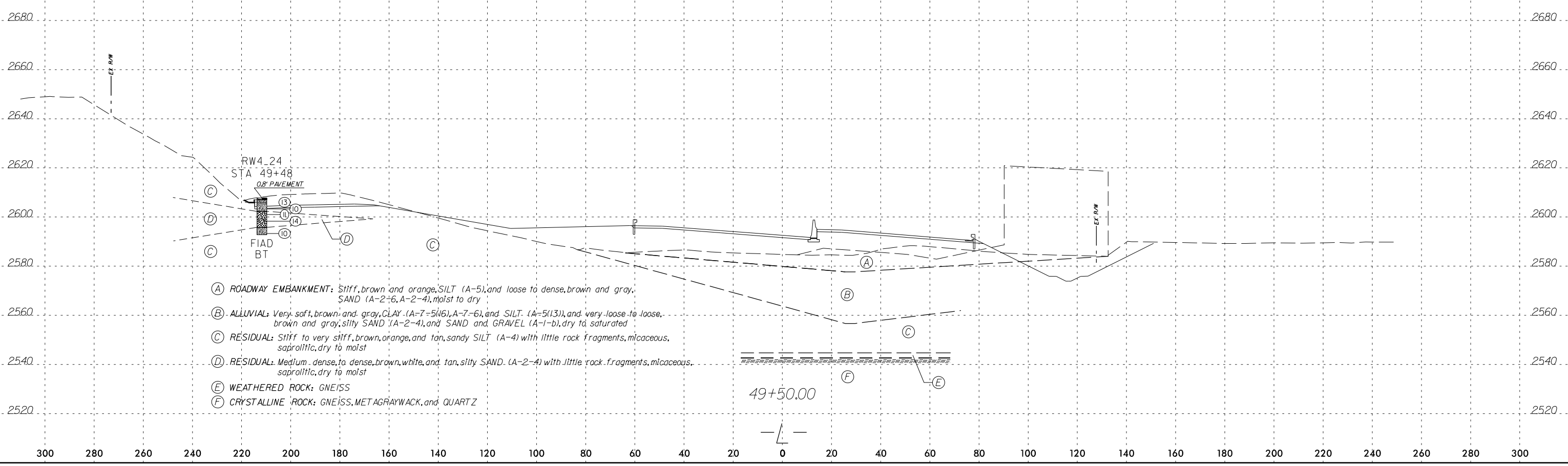
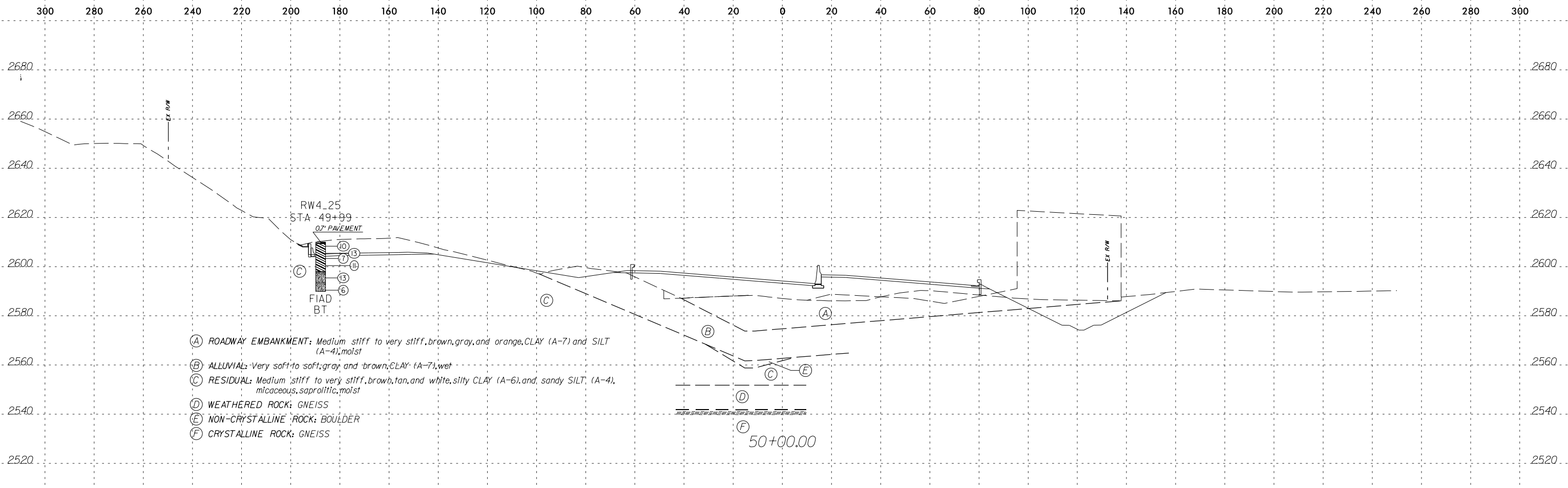
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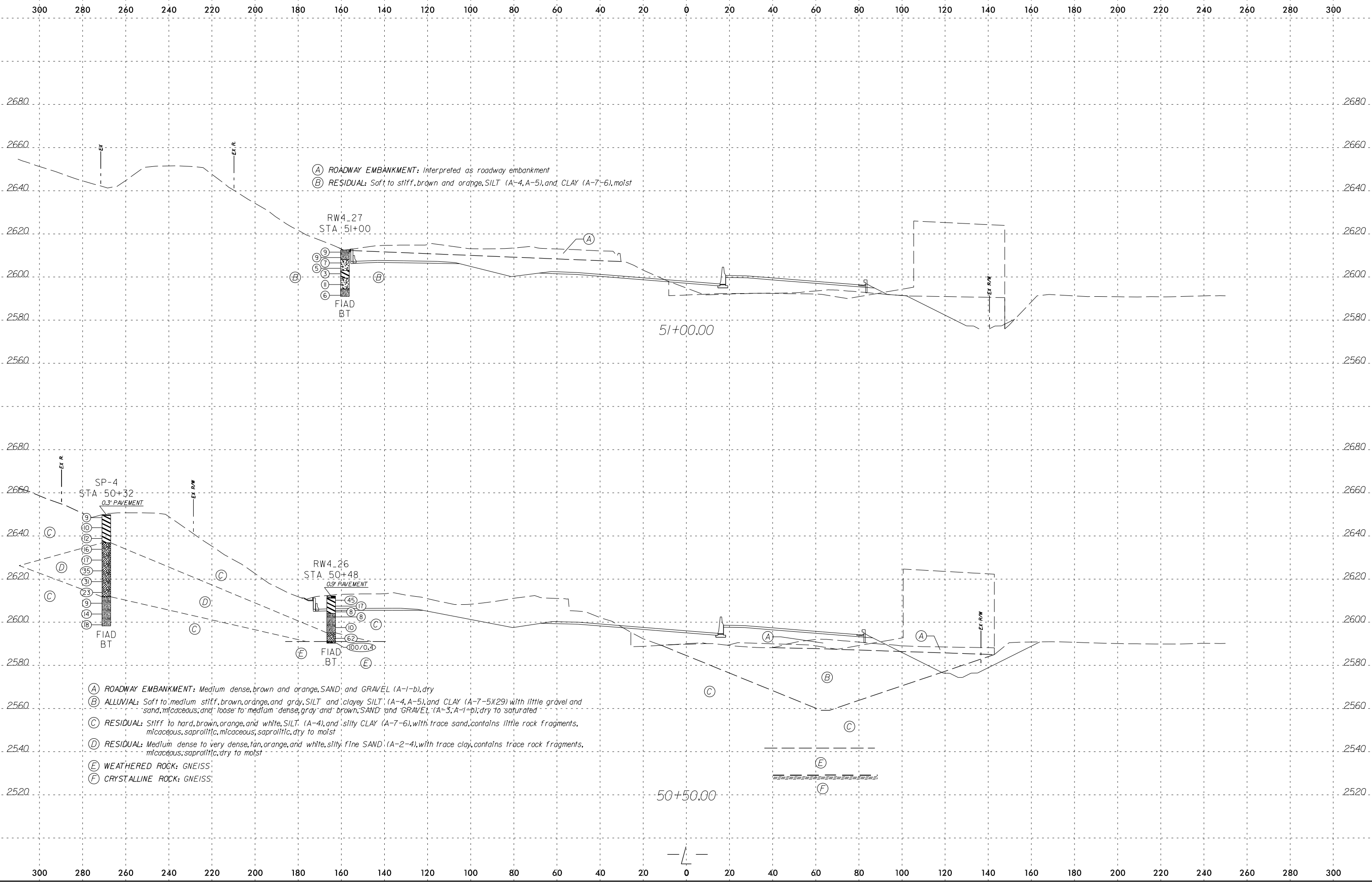
- (A) ROADWAY EMBANKMENT: Medium dense, brown, SAND (A-3), with some gravel, moist
- (B) RESIDUAL: Stiff, red and orange, CLAY (A-7), micaceous, moist

39+00.00



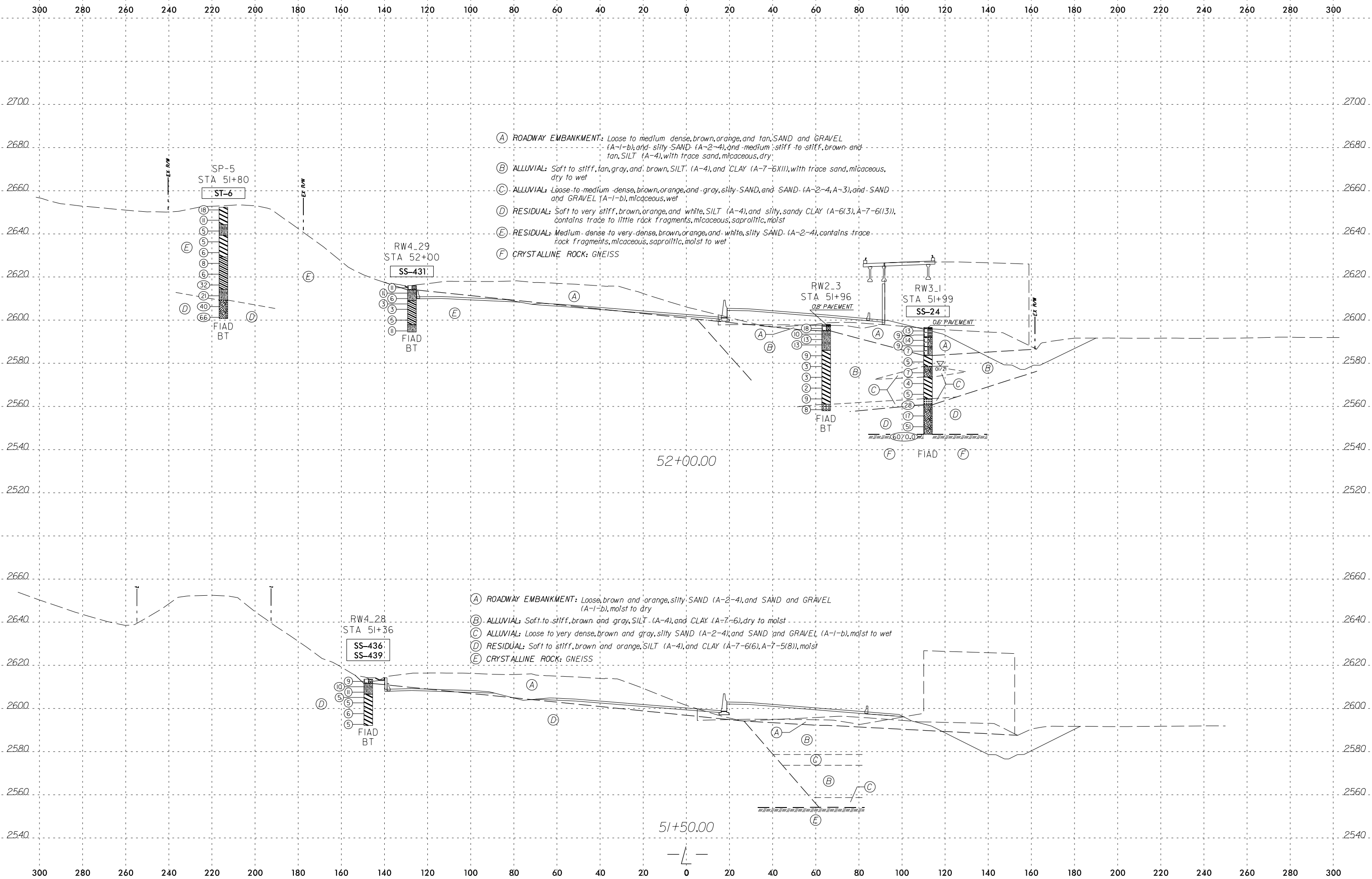
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B3186-B5898.RDY.XSI.L.dgn
BURNS&MCDONNELL

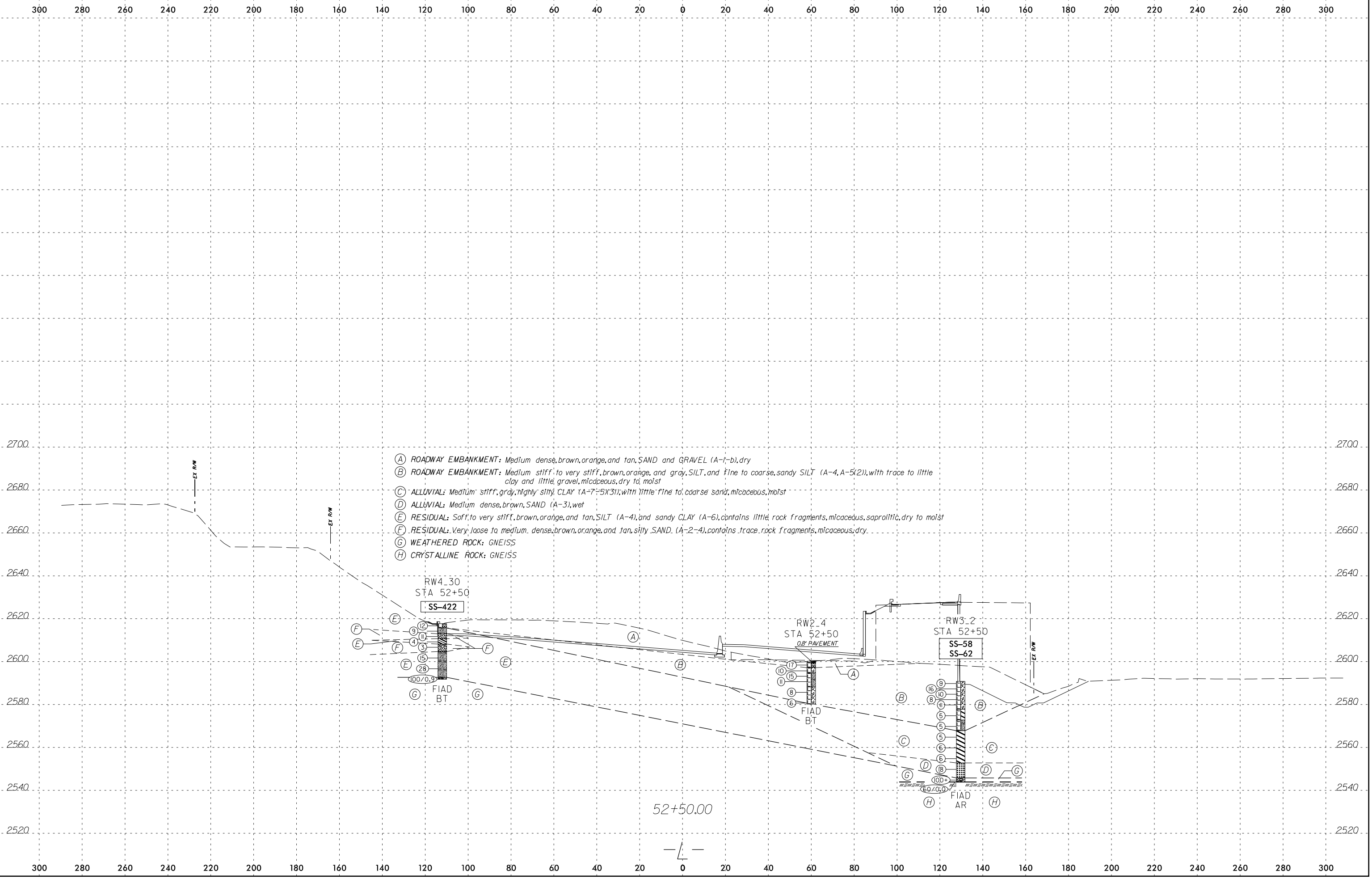




(A) ROADWAY EMBANKMENT: Interpreted as roadway embankment
 (B) RESIDUAL: Soft to stiff, brown and orange, SILT (A-4, A-5), and CLAY (A-7-6), moist

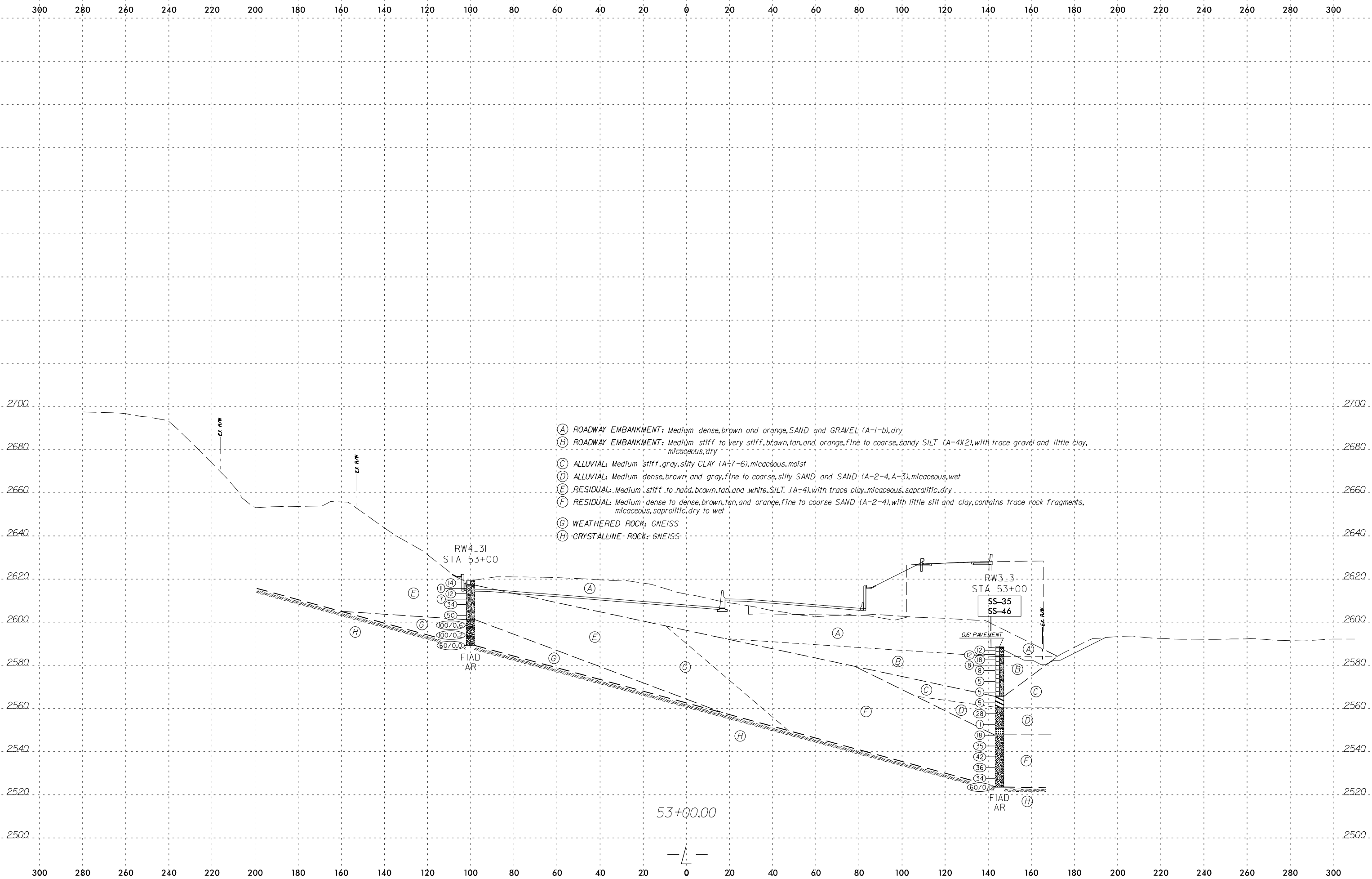
(A) ROADWAY EMBANKMENT: Medium dense, brown and orange, SAND and GRAVEL (A-1-b), dry
 (B) ALLUVIAL: Soft to medium stiff, brown, orange, and gray, SILT and clay SILT (A-4, A-5), and CLAY (A-7-5)(29) with little gravel and sand, micaceous, and loose to medium dense, gray and brown, SAND and GRAVEL (A-3, A-1-b), dry to saturated
 (C) RESIDUAL: Stiff to hard, brown, orange, and white, SILT (A-4), and silty CLAY (A-7-6), with trace sand, contains little rock fragments, micaceous, saprolitic, micaceous, saprolitic, dry to moist
 (D) RESIDUAL: Medium dense to very dense, tan, orange, and white, silty, fine SAND (A-2-4), with trace clay, contains trace rock fragments, micaceous, saprolitic, dry to moist
 (E) WEATHERED ROCK: GNEISS
 (F) CRYSTALLINE ROCK: GNEISS





- (A) ROADWAY EMBANKMENT: Medium dense, brown, orange, and tan, SAND and GRAVEL (A-1-b), dry
- (B) ROADWAY EMBANKMENT: Medium stiff to very stiff, brown, orange, and gray, SILT, and fine to coarse, sandy SILT (A-4, A-5(2)), with trace to little clay and little gravel, micaceous, dry to moist
- (C) ALLUVIAL: Medium stiff, gray, highly silty CLAY (A-7-5(3)), with little fine to coarse sand, micaceous, moist
- (D) ALLUVIAL: Medium dense, brown, SAND (A-3), wet
- (E) RESIDUAL: Soft to very stiff, brown, orange, and tan, SILT (A-4), and sandy CLAY (A-6), contains little rock fragments, micaceous, saprolitic, dry to moist
- (F) RESIDUAL: Very loose to medium dense, brown, orange, and tan, silty SAND (A-2-4), contains trace rock fragments, micaceous, dry
- (G) WEATHERED ROCK: GNEISS
- (H) CRYSTALLINE ROCK: GNEISS

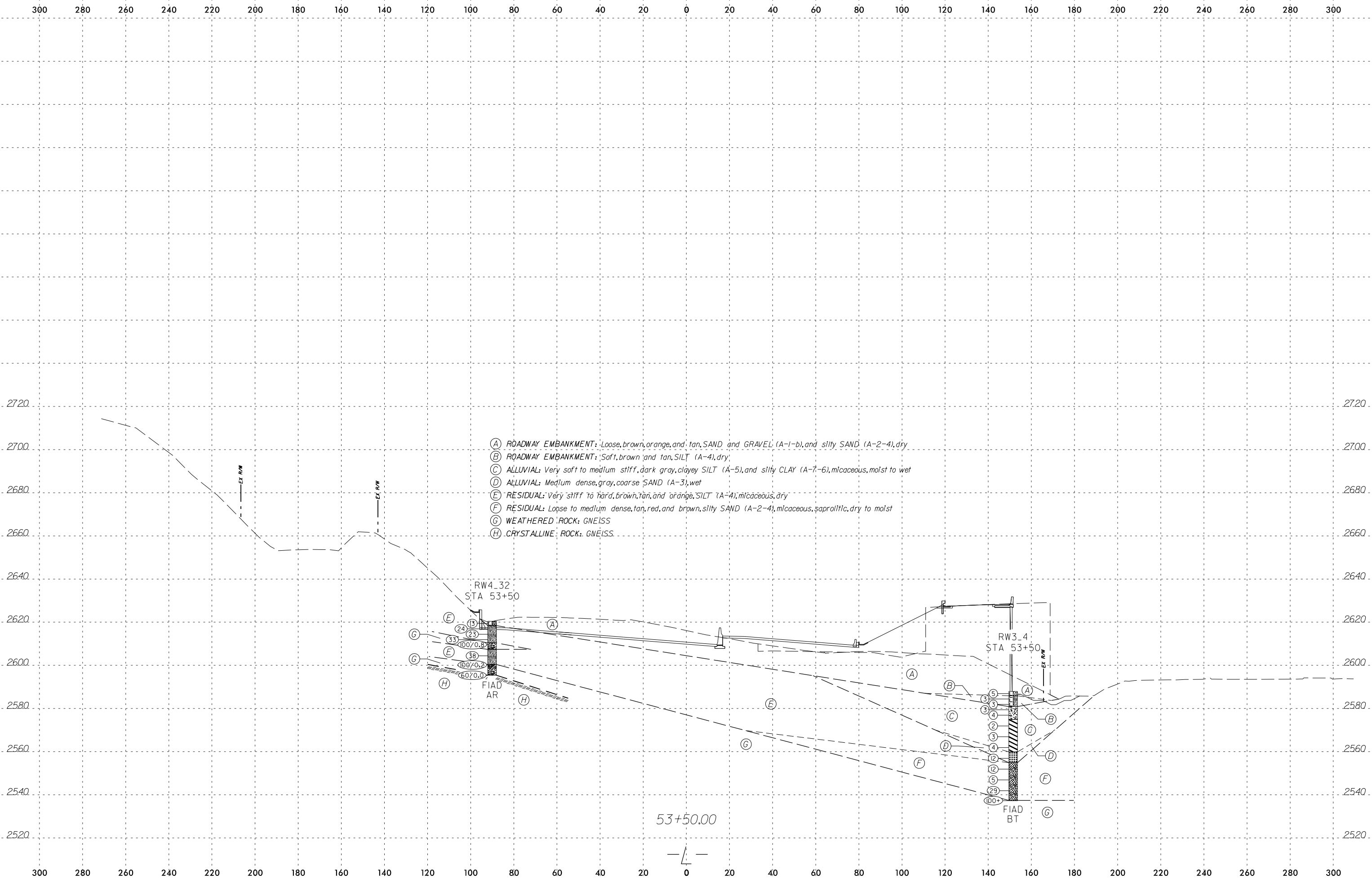
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- (A) ROADWAY EMBANKMENT: Medium dense, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) ROADWAY EMBANKMENT: Medium stiff to very stiff, brown, tan, and, orange, fine to coarse, sandy SILT (A-4X2), with trace gravel and little clay, micaceous, dry
- (C) ALLUVIAL: Medium stiff, gray, silty CLAY (A-7-6), micaceous, moist
- (D) ALLUVIAL: Medium dense, brown and gray, fine to coarse, silty SAND, and SAND (A-2-4, A-3), micaceous, wet
- (E) RESIDUAL: Medium stiff to hard, brown, tan, and white, SILT (A-4), with trace clay, micaceous, saprolitic, dry
- (F) RESIDUAL: Medium dense to dense, brown, tan, and orange, fine to coarse SAND (A-2-4), with little silt and clay, contains trace rock fragments, micaceous, saprolitic, dry to wet
- (G) WEATHERED ROCK: GNEISS
- (H) CRYSTALLINE ROCK: GNEISS

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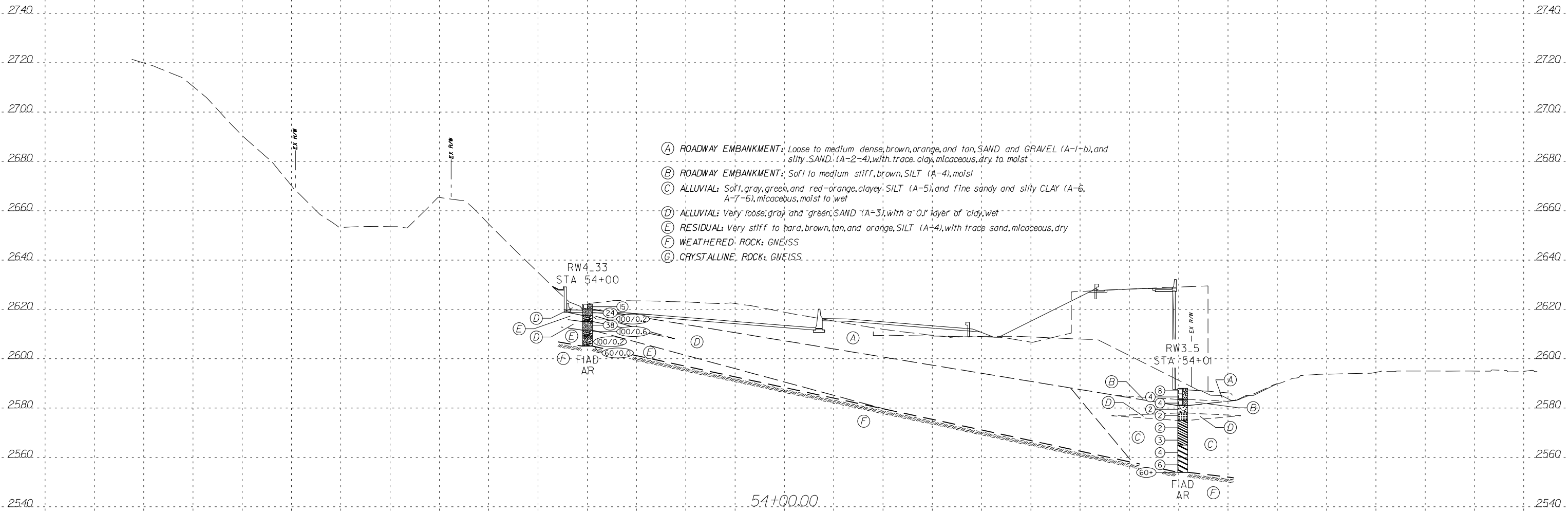
53+00.00



- (A) ROADWAY EMBANKMENT: Loose, brown, orange, and tan, SAND and GRAVEL (A-1-b), and silty SAND (A-2-4), dry
- (B) ROADWAY EMBANKMENT: Soft, brown and tan, SILT (A-4), dry
- (C) ALLUVIAL: Very soft to medium stiff, dark gray, clayey SILT (A-5), and silty CLAY (A-7-6), micaceous, moist to wet
- (D) ALLUVIAL: Medium dense, gray, coarse SAND (A-3), wet
- (E) RESIDUAL: Very stiff to hard, brown, tan, and orange, SILT (A-4), micaceous, dry
- (F) RESIDUAL: Loose to medium dense, tan, red, and brown, silty SAND (A-2-4), micaceous, saprolitic, dry to moist
- (G) WEATHERED ROCK: GNEISS
- (H) CRYSTALLINE ROCK: GNEISS

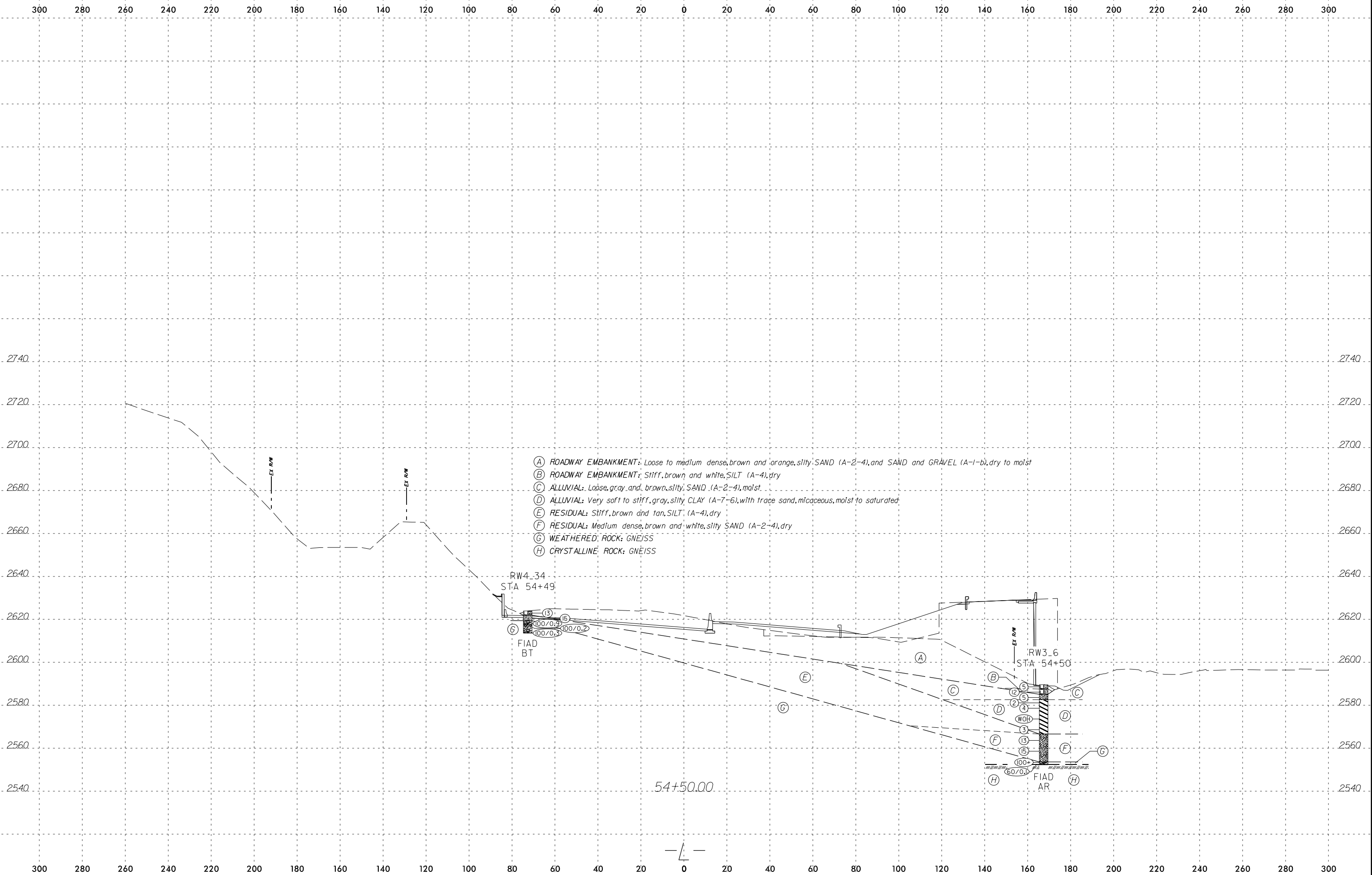


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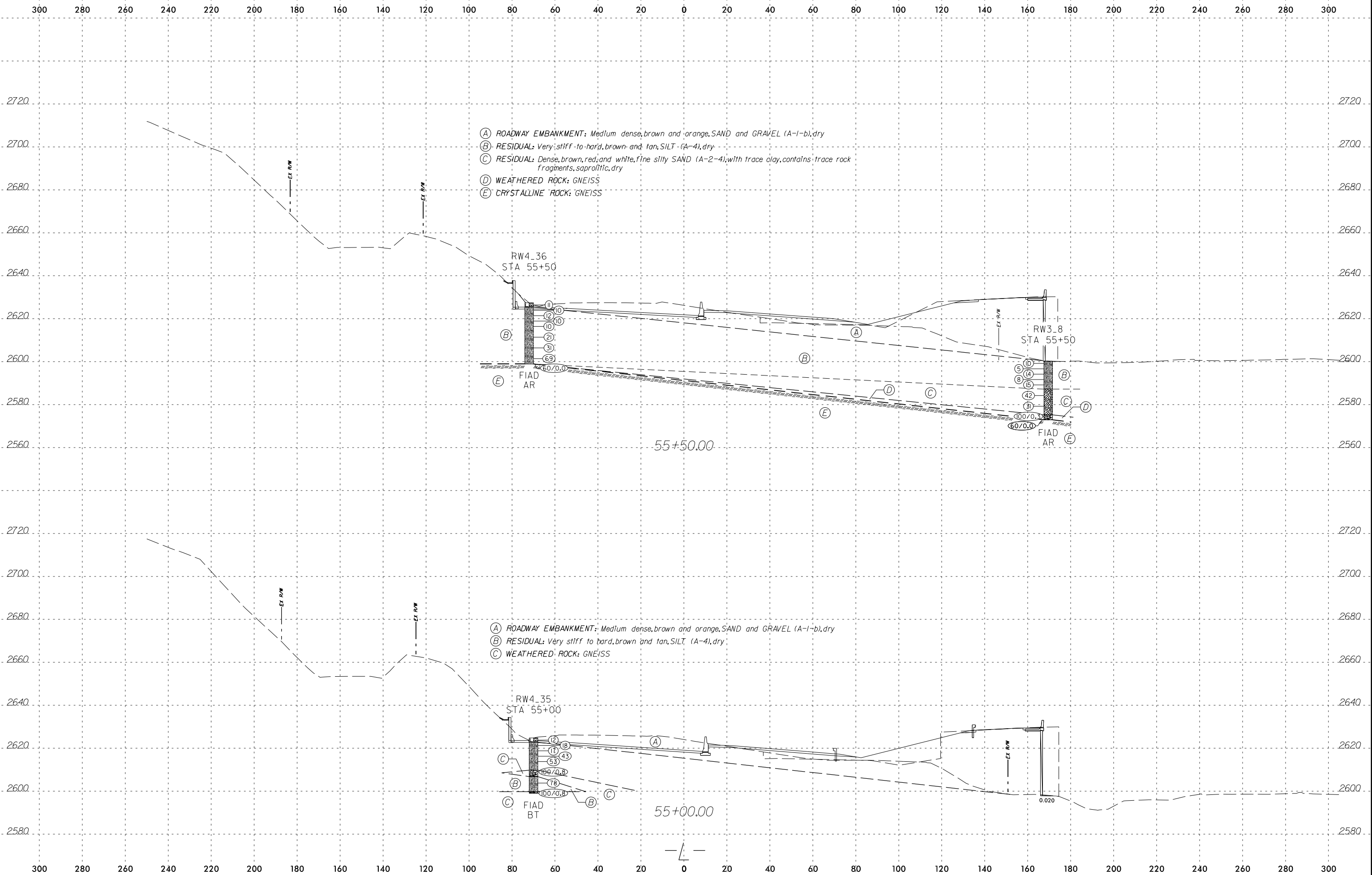


- (A) ROADWAY EMBANKMENT: Loose to medium dense, brown, orange, and tan, SAND and GRAVEL (A-1-b), and silty SAND, (A-2-4), with trace clay, micaceous, dry to moist
- (B) ROADWAY EMBANKMENT: Soft to medium stiff, brown, SILT (A-4), moist
- (C) ALLUVIAL: Soft, gray, green, and red-orange, clayey, SILT (A-5), and fine sandy and silty CLAY (A-6, A-7-6), micaceous, moist to wet
- (D) ALLUVIAL: Very loose, gray and green, SAND (A-3), with a "0.1" layer of clay, wet
- (E) RESIDUAL: Very stiff to hard, brown, tan, and orange, SILT (A-4), with trace sand, micaceous, dry
- (F) WEATHERED ROCK: GNEISS
- (G) CRYSTALLINE ROCK: GNEISS

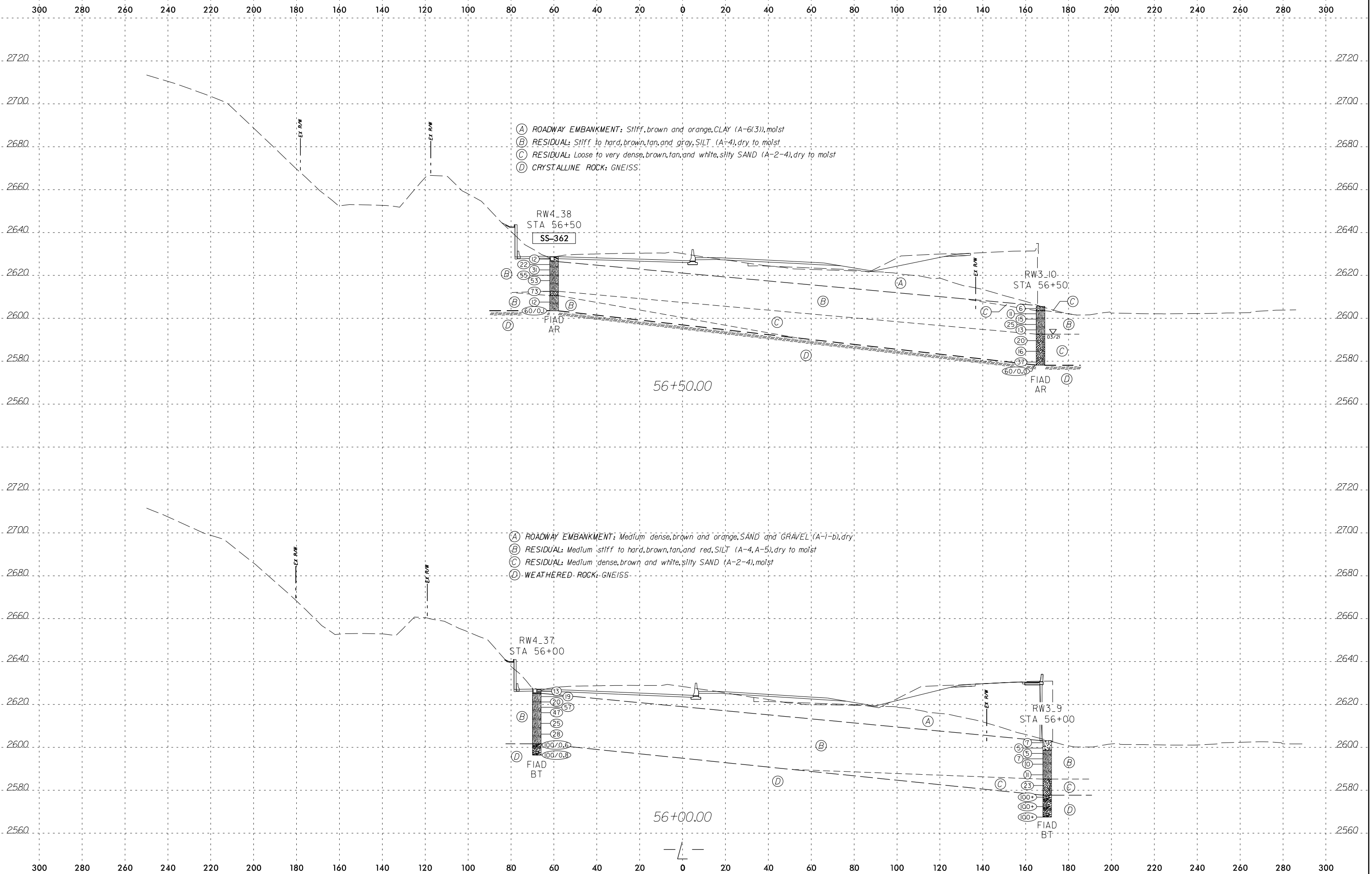
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- (A) ROADWAY EMBANKMENT: Loose to medium dense, brown and orange, silty SAND (A-2-4), and SAND and GRAVEL (A-1-b), dry to moist
- (B) ROADWAY EMBANKMENT: Stiff, brown and white, SILT (A-4), dry
- (C) ALLUVIAL: Loose, gray and brown, silty, SAND (A-2-4), moist
- (D) ALLUVIAL: Very soft to stiff, gray, silty CLAY (A-7-6), with trace sand, micaceous, moist to saturated
- (E) RESIDUAL: Stiff, brown and tan, SILT (A-4), dry
- (F) RESIDUAL: Medium dense, brown and white, silty SAND (A-2-4), dry
- (G) WEATHERED, ROCK: GNEISS
- (H) CRYSTALLINE, ROCK: GNEISS

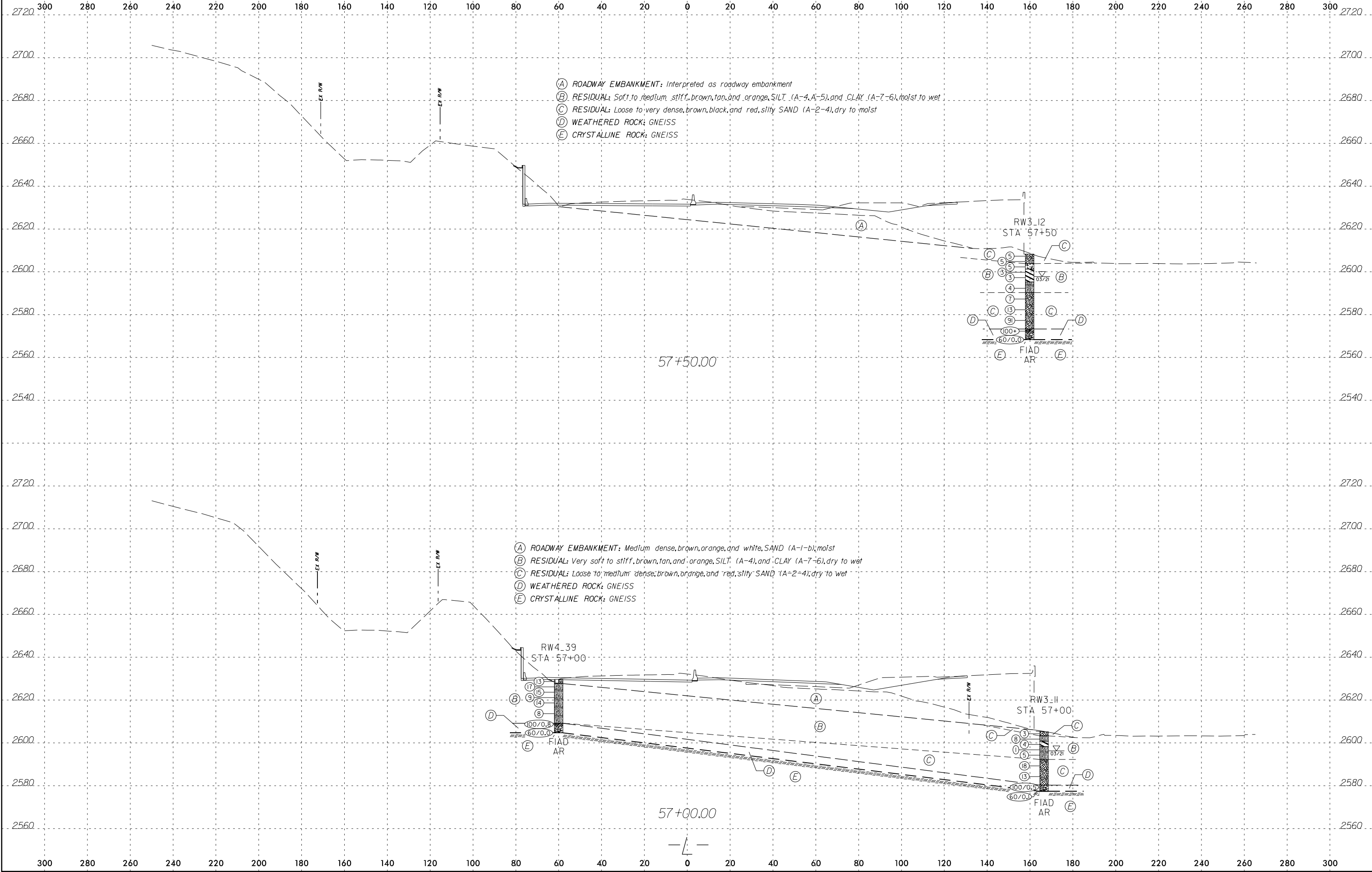


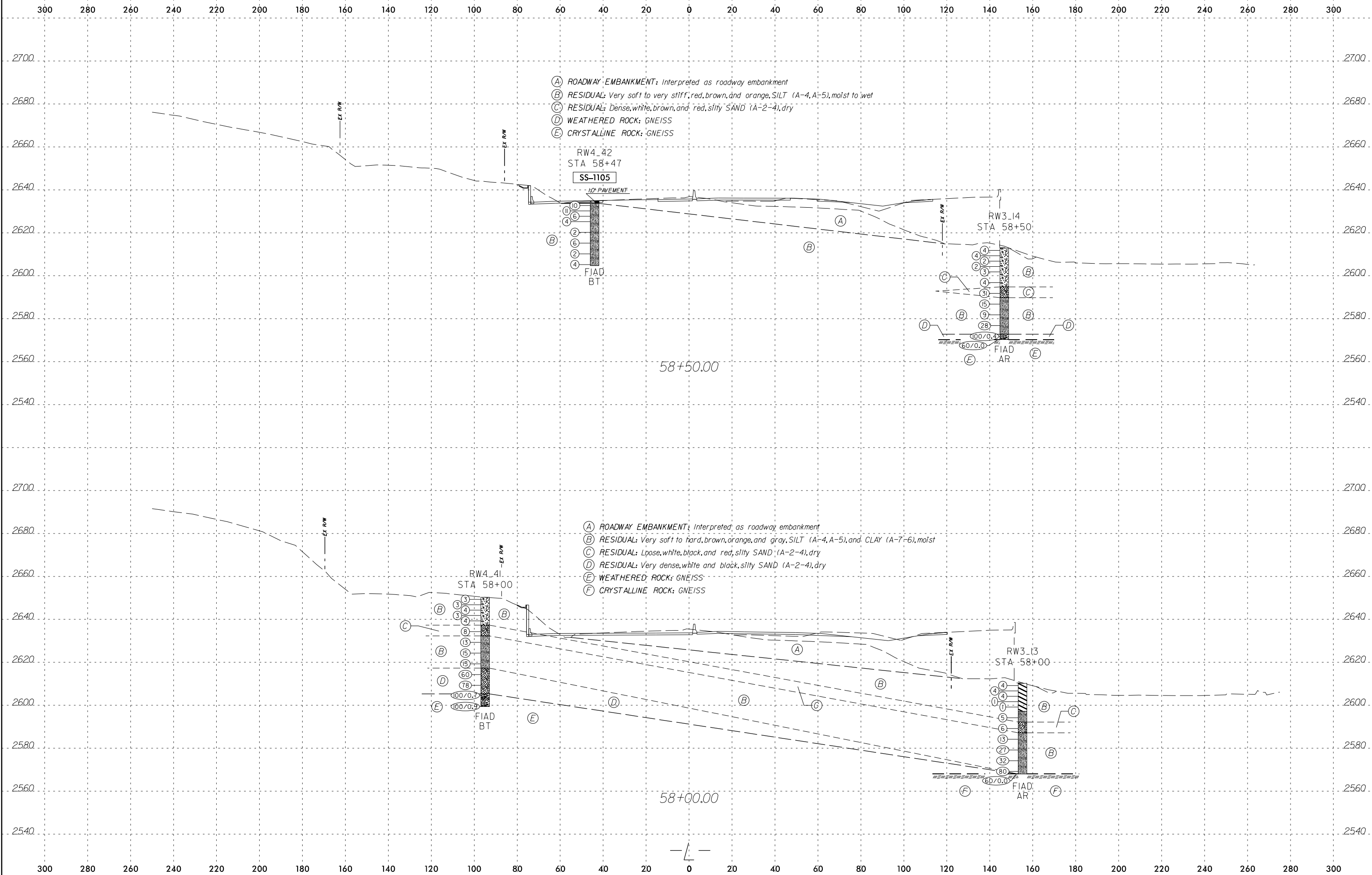
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- (A) ROADWAY EMBANKMENT: Stiff, brown and orange, CLAY (A-6(3)), moist
- (B) RESIDUAL: Stiff to hard, brown, tan, and gray, SILT (A-4), dry to moist
- (C) RESIDUAL: Loose to very dense, brown, tan, and white, silty SAND (A-2-4), dry to moist
- (D) CRYSTALLINE ROCK: GNEISS

- (A) ROADWAY EMBANKMENT: Medium dense, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium stiff to hard, brown, tan, and red, SILT (A-4, A-5), dry to moist
- (C) RESIDUAL: Medium dense, brown and white, silty SAND (A-2-4), moist
- (D) WEATHERED ROCK: GNEISS





- (A) ROADWAY EMBANKMENT: Interpreted as roadway embankment
- (B) RESIDUAL: Very soft to very stiff, red, brown, and orange, SILT (A-4, A-5), moist to wet
- (C) RESIDUAL: Dense, white, brown, and red, silty SAND (A-2-4), dry
- (D) WEATHERED ROCK: GNEISS
- (E) CRYSTALLINE ROCK: GNEISS

RW4_42
STA 58+47
SS-1105

10' PAVEMENT
FIAD
BT

RW3_14
STA 58+50

FIAD
AR

58+50.00

- (A) ROADWAY EMBANKMENT: Interpreted as roadway embankment
- (B) RESIDUAL: Very soft to hard, brown, orange, and gray, SILT (A-4, A-5), and CLAY (A-7-6), moist
- (C) RESIDUAL: Loose, white, black, and red, silty SAND (A-2-4), dry
- (D) RESIDUAL: Very dense, white and black, silty SAND (A-2-4), dry
- (E) WEATHERED ROCK: GNEISS
- (F) CRYSTALLINE ROCK: GNEISS

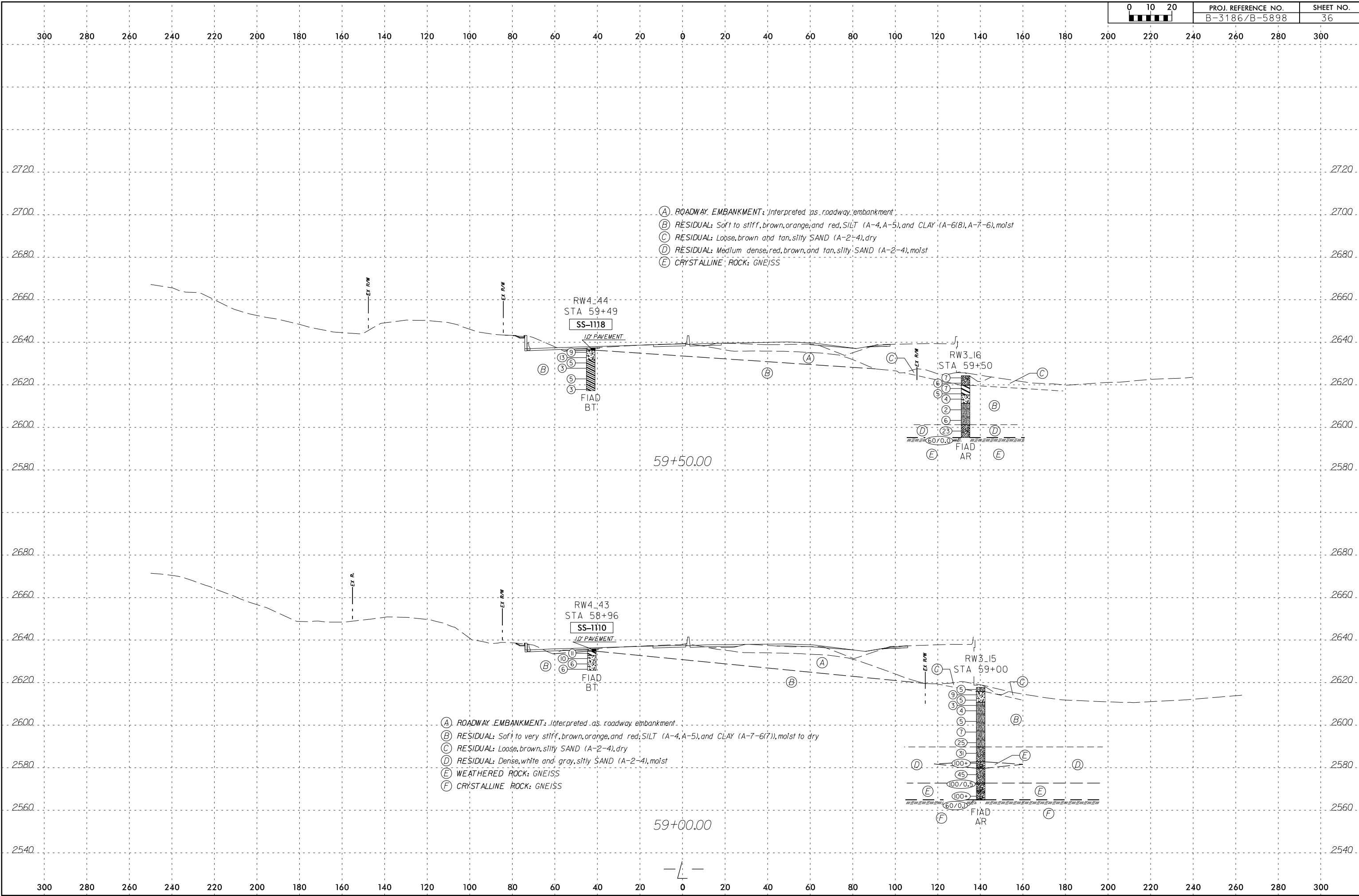
RW4_41
STA 58+00

FIAD
BT

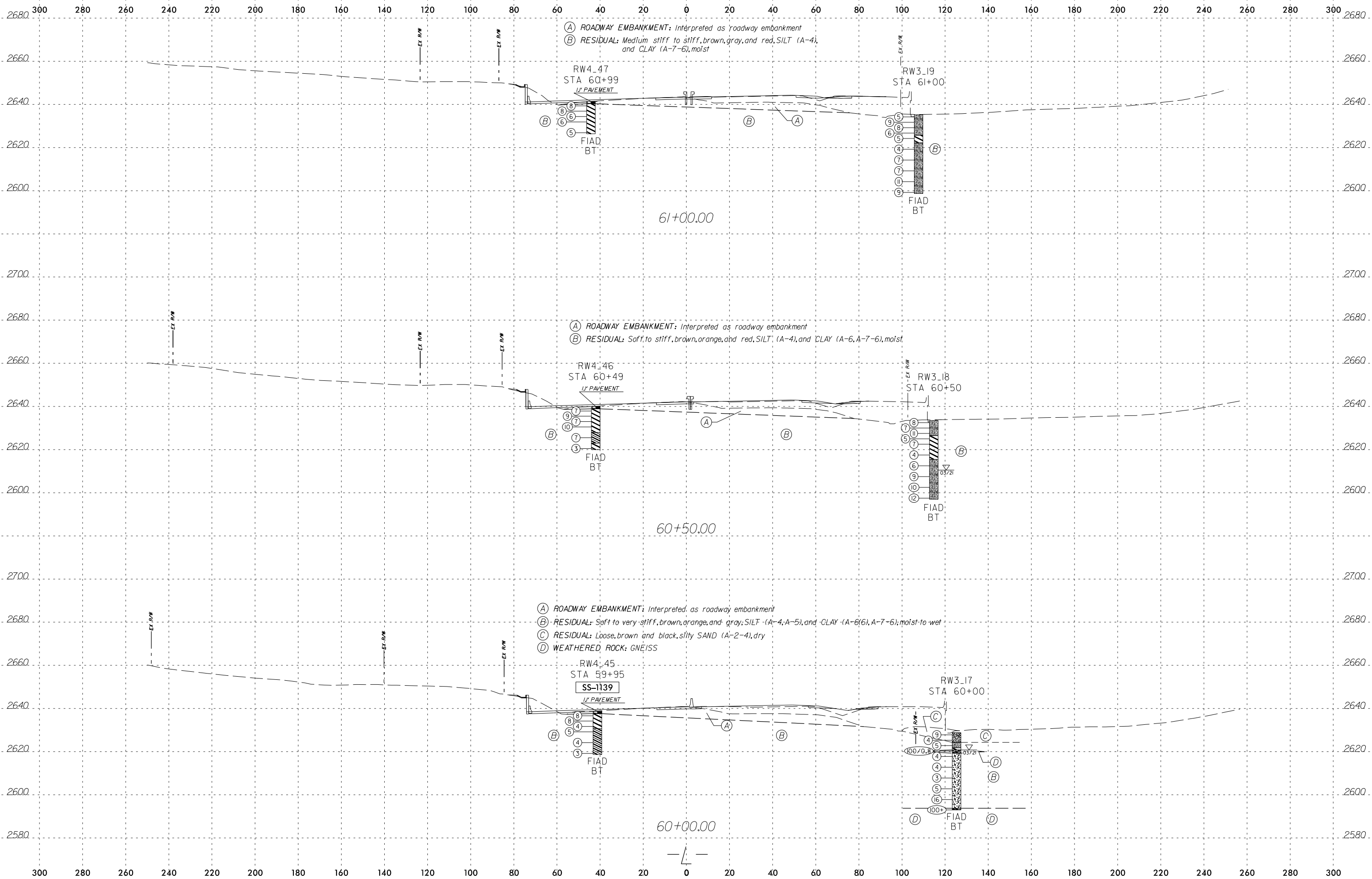
RW3_13
STA 58+00

FIAD
AR

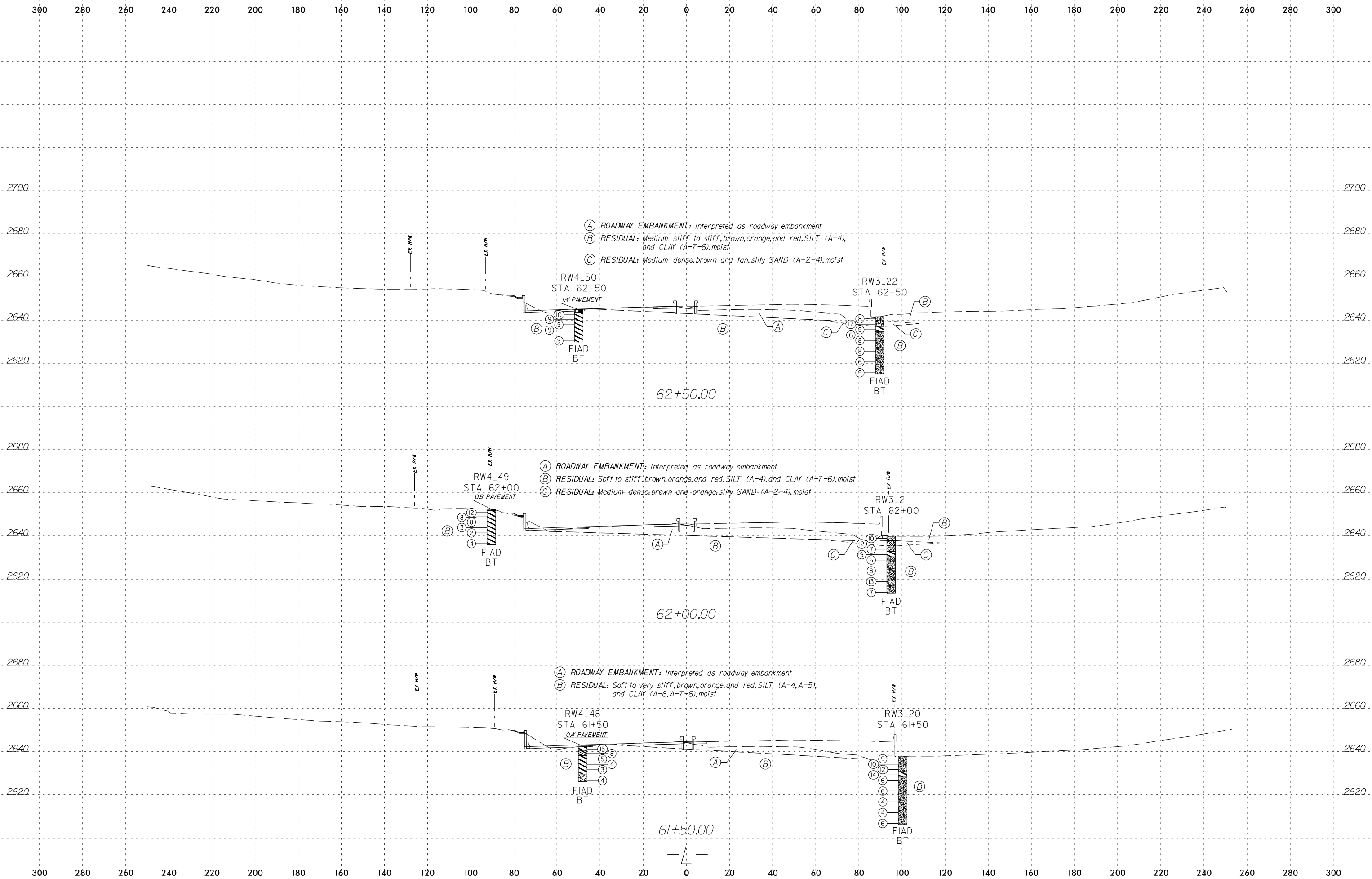
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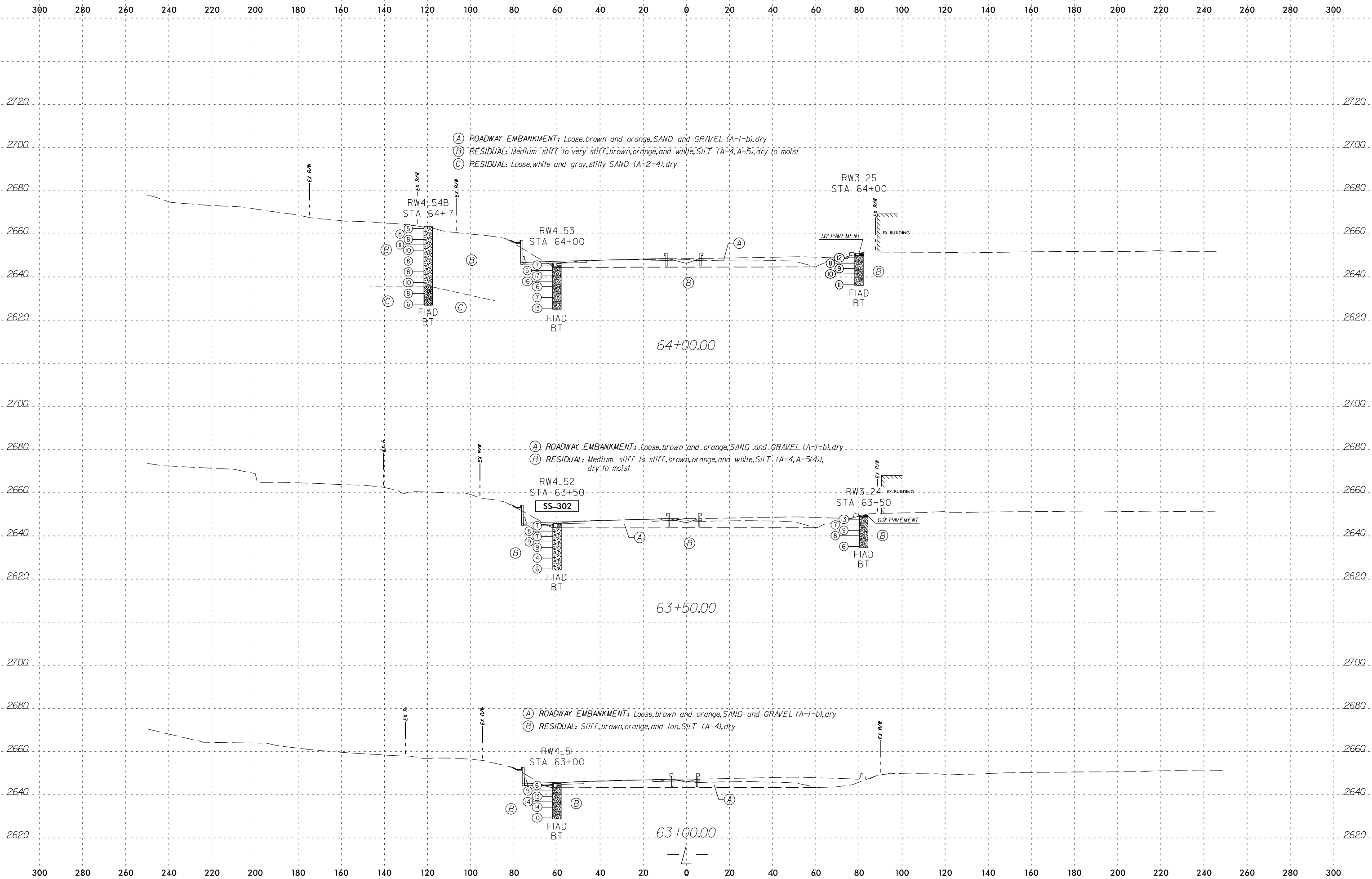
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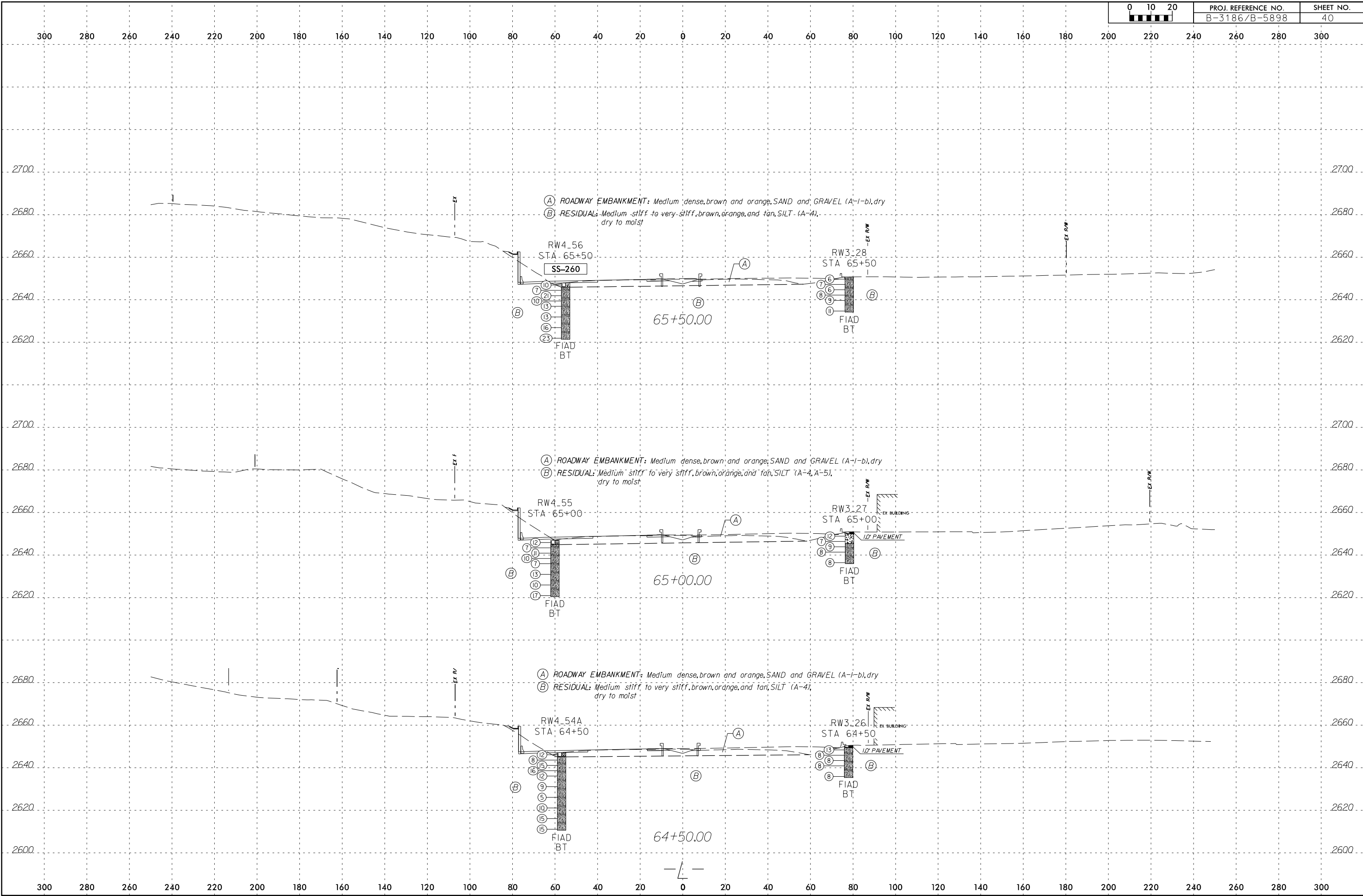
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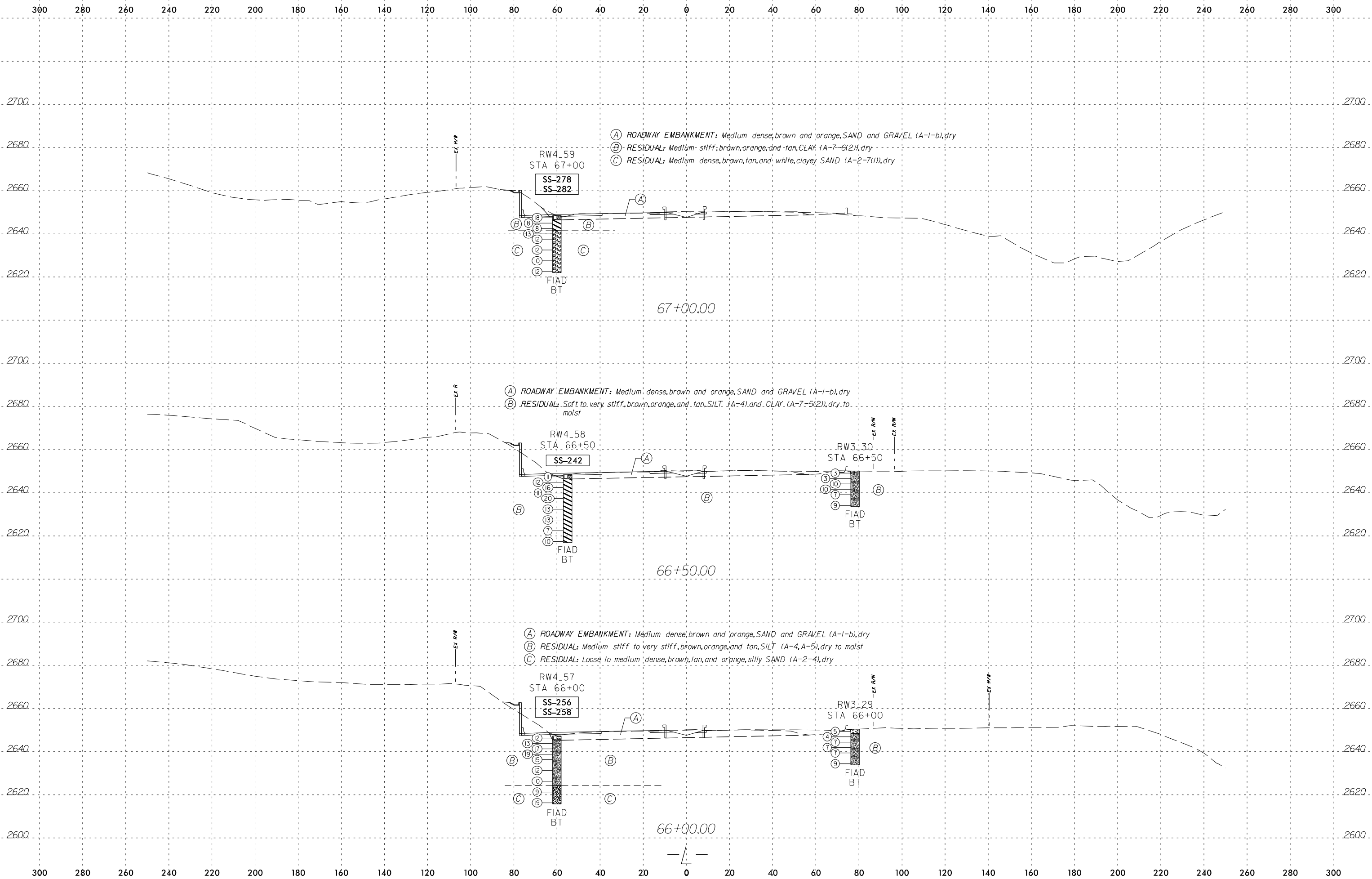


- (A) ROADWAY EMBANKMENT: Loose, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium stiff to very stiff, brown, orange, and white, SILT (A-4, A-5), dry to moist
- (C) RESIDUAL: Loose, white and gray, silty SAND (A-2-4), dry

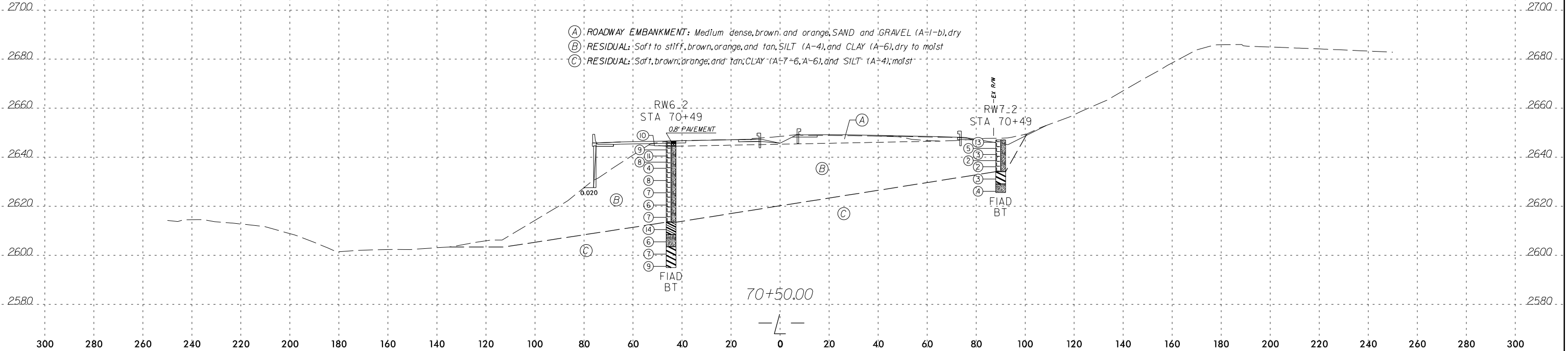
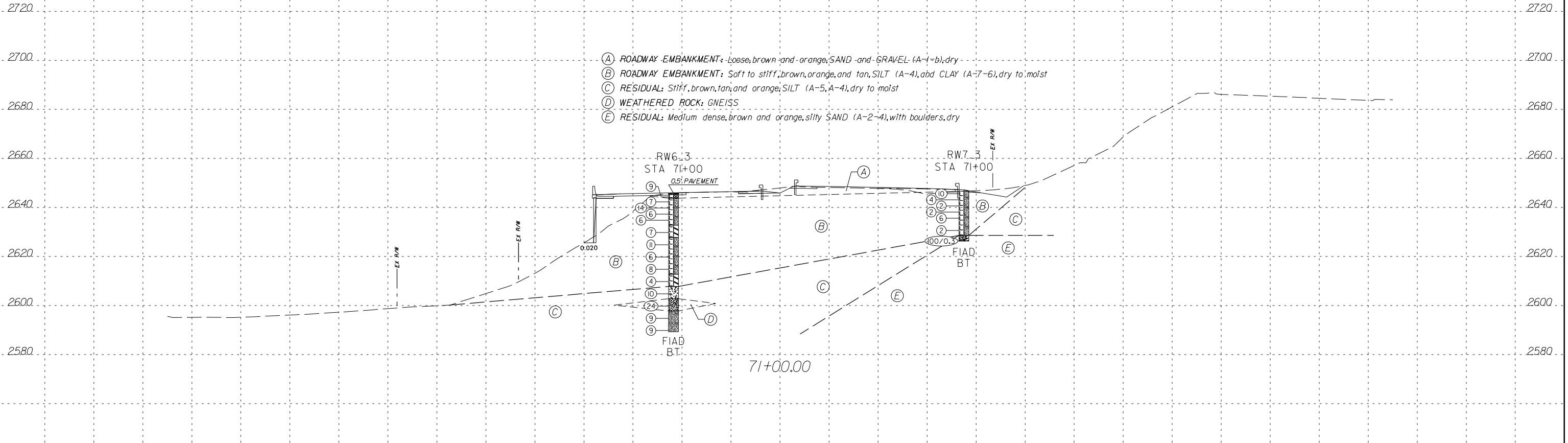
- (A) ROADWAY EMBANKMENT: Loose, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium stiff to stiff, brown, orange, and white, SILT (A-4, A-5(4)), dry, to moist

- (A) ROADWAY EMBANKMENT: Loose, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff, brown, orange, and tan, SILT (A-4), dry

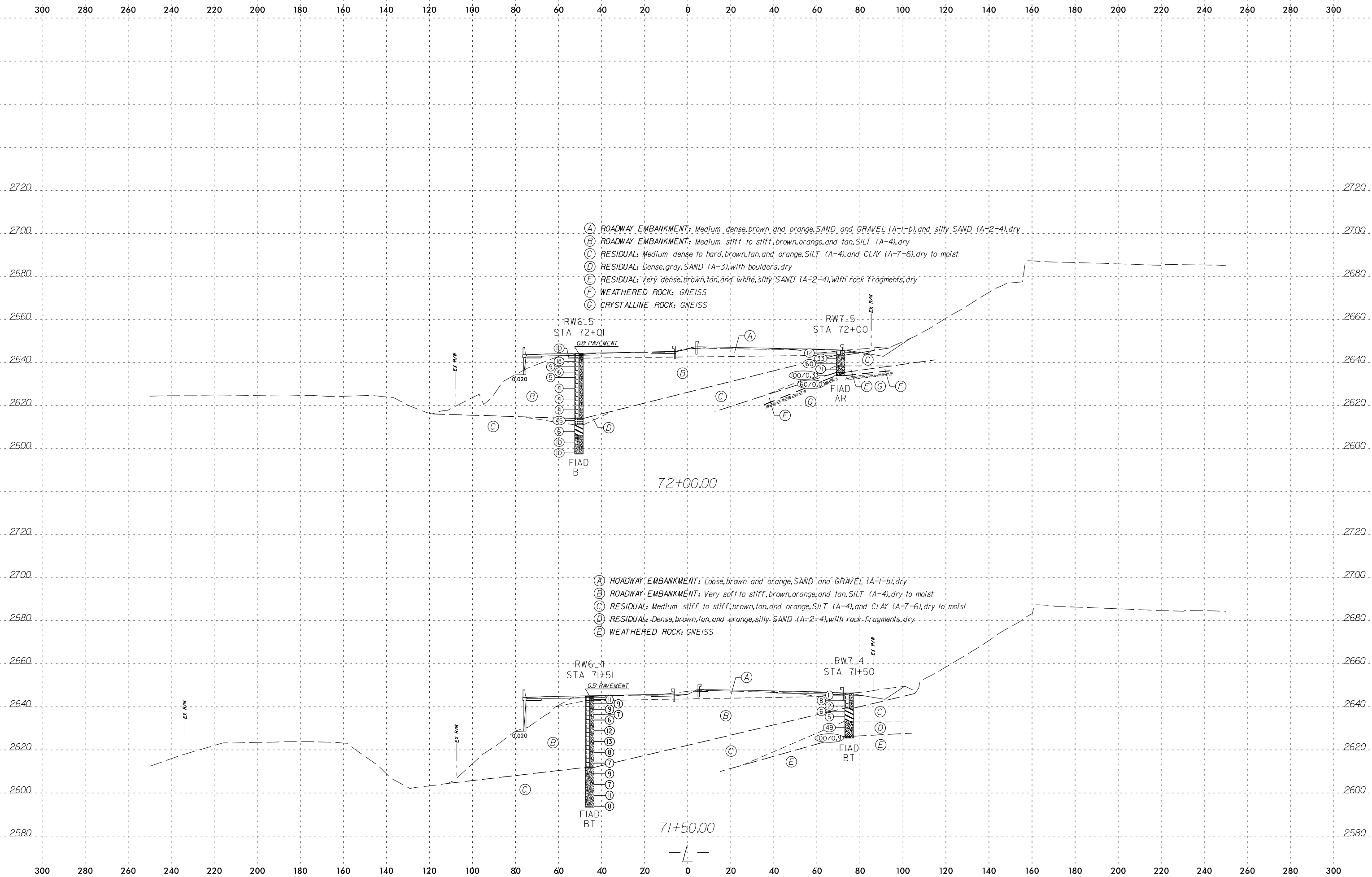




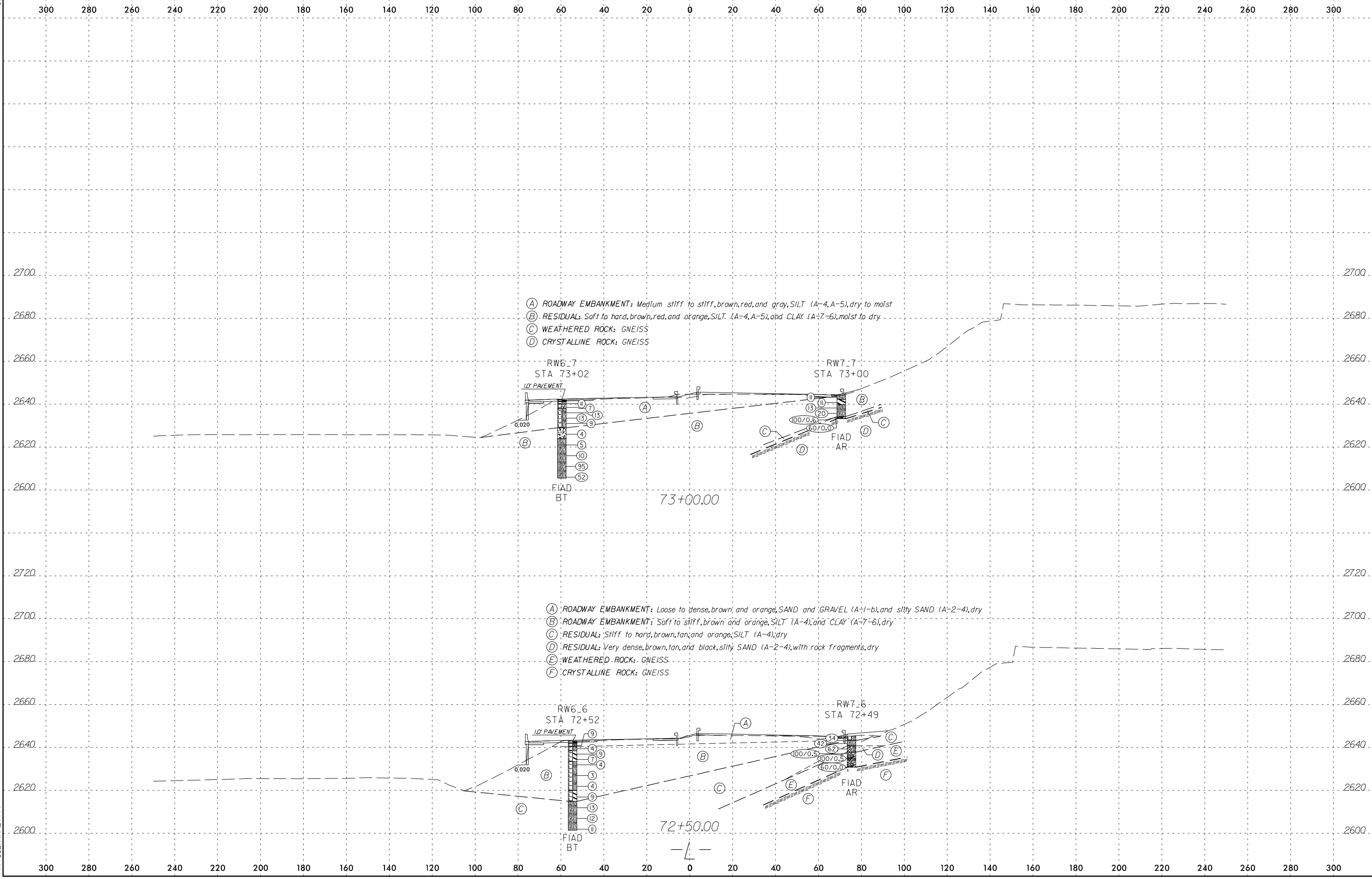
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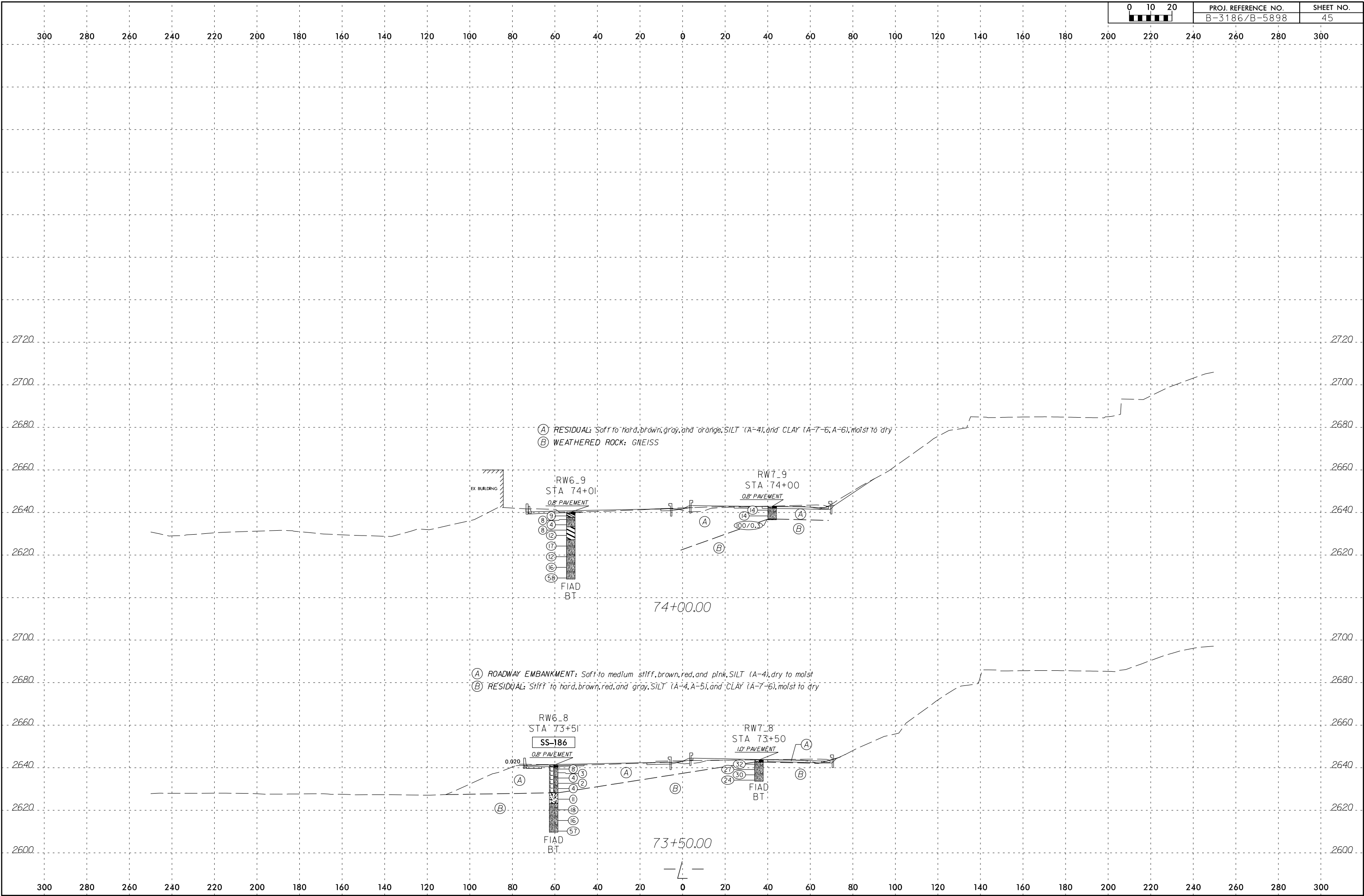


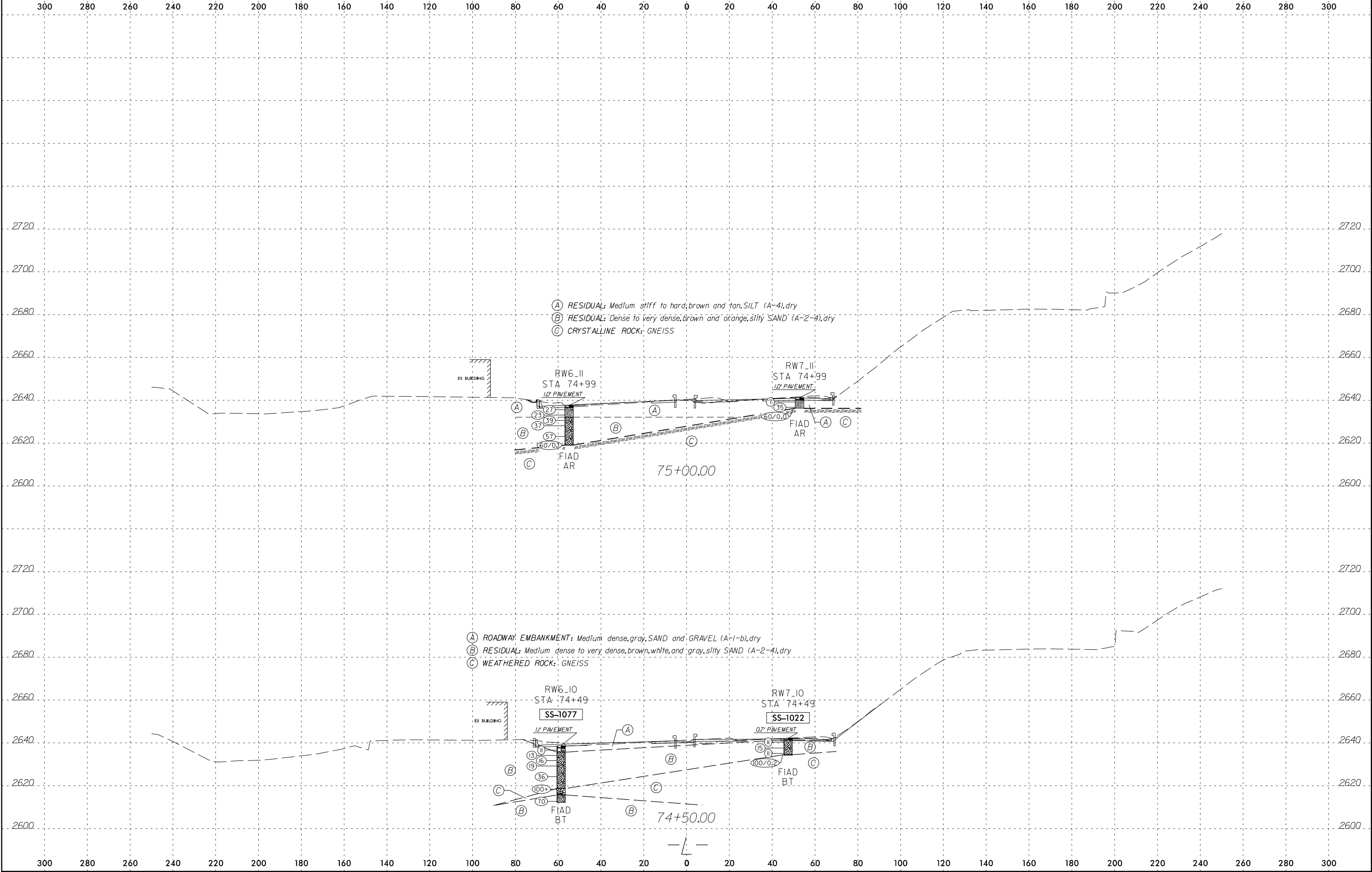
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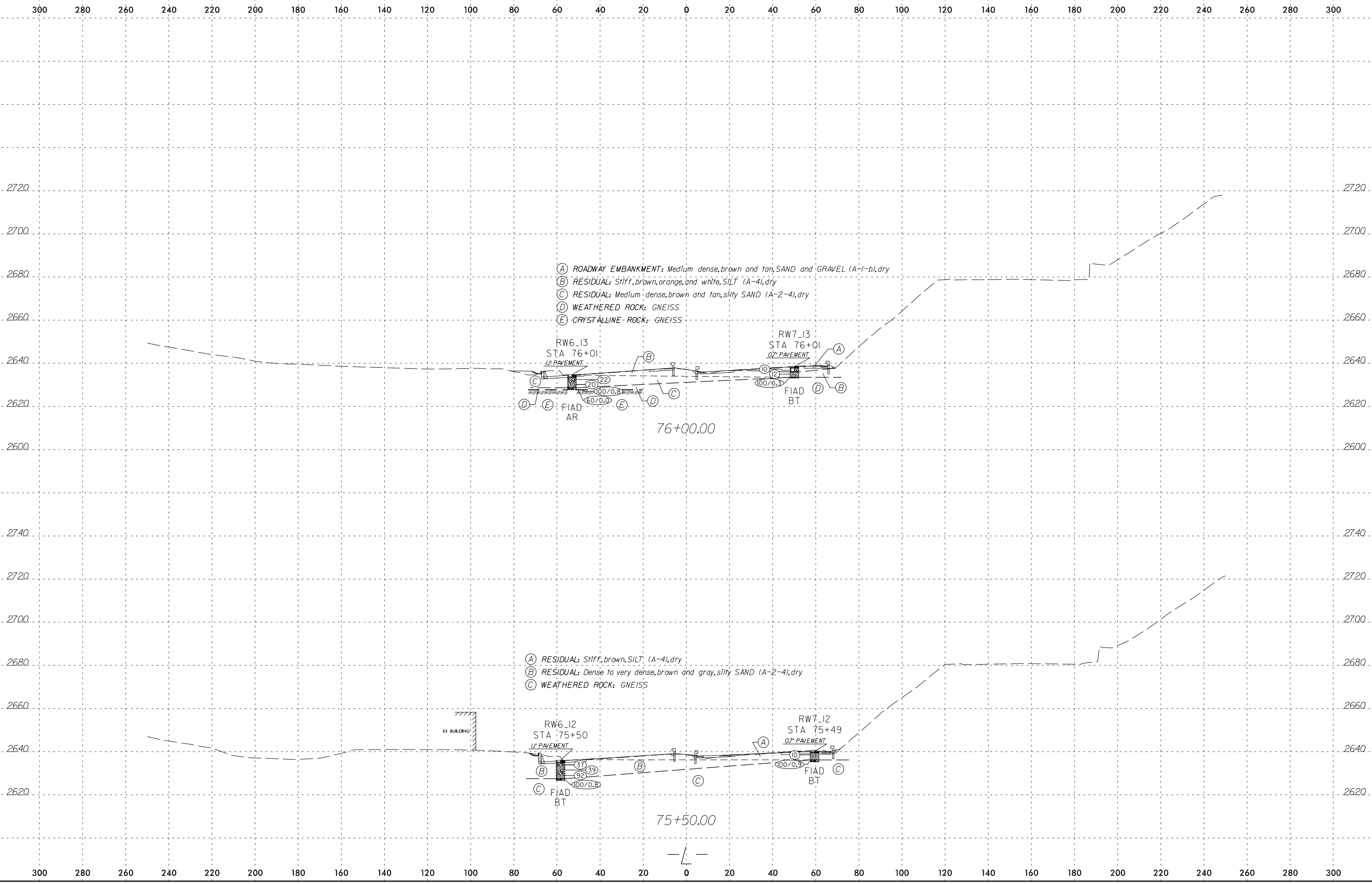


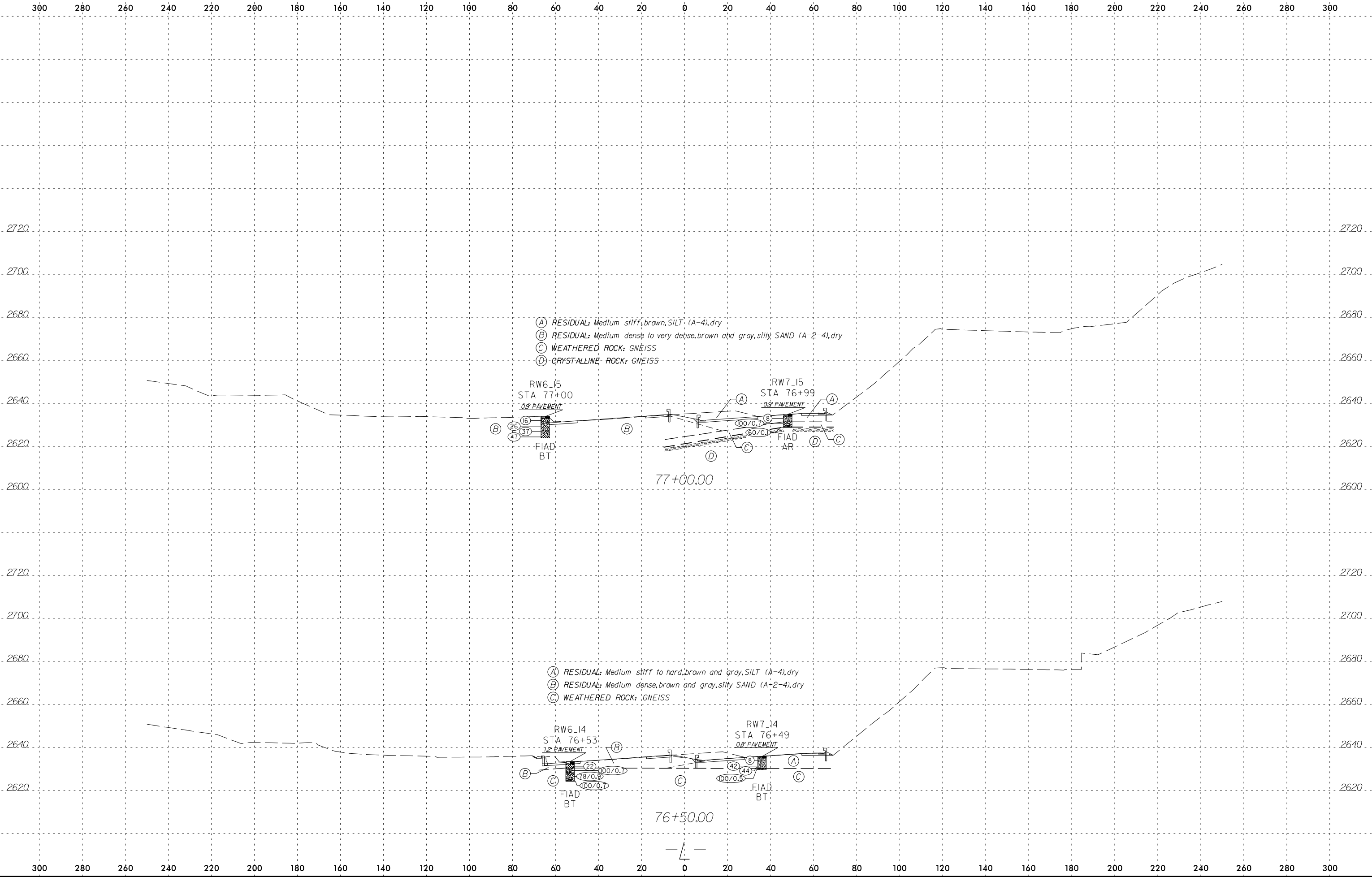
- (A) ROADWAY EMBANKMENT: Medium stiff to stiff, brown, red, and gray, SILT (A-4, A-5), dry to moist
- (B) RESIDUAL: Soft to hard, brown, red, and orange, SILT (A-4, A-5), and CLAY (A-7-6), moist to dry
- (C) WEATHERED ROCK: GNEISS
- (D) CRYSTALLINE ROCK: GNEISS

- (A) ROADWAY EMBANKMENT: Loose to dense, brown, and orange, SAND and GRAVEL (A-1-b), and silty SAND (A-2-4), dry
- (B) ROADWAY EMBANKMENT: Soft to stiff, brown and orange, SILT (A-4), and CLAY (A-7-6), dry
- (C) RESIDUAL: Stiff to hard, brown, tan, and orange, SILT (A-4), dry
- (D) RESIDUAL: Very dense, brown, tan, and black, silty SAND (A-2-4), with rock fragments, dry
- (E) WEATHERED ROCK: GNEISS
- (F) CRYSTALLINE ROCK: GNEISS



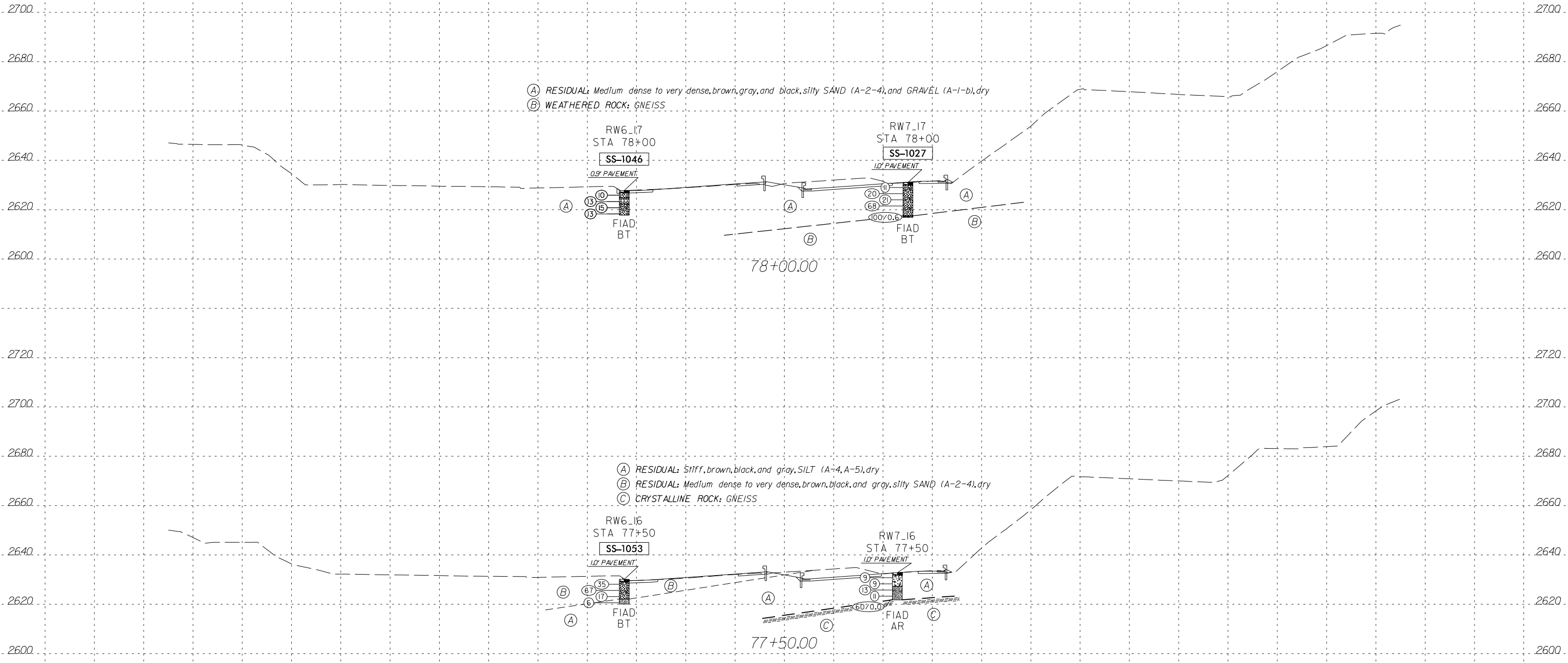








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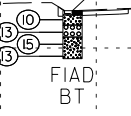


- (A) RESIDUAL: Medium dense to very dense, brown, gray, and black, silty SAND (A-2-4), and GRAVEL (A-1-b), dry
- (B) WEATHERED ROCK: GNEISS

RW6_17
STA 78+00

SS-1046

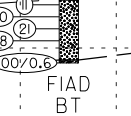
0.9' PAVEMENT



RW7_17
STA 78+00

SS-1027

1.0' PAVEMENT

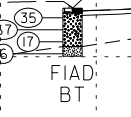


78+00.00

RW6_16
STA 77+50

SS-1053

1.0' PAVEMENT



RW7_16
STA 77+50

SS-1027

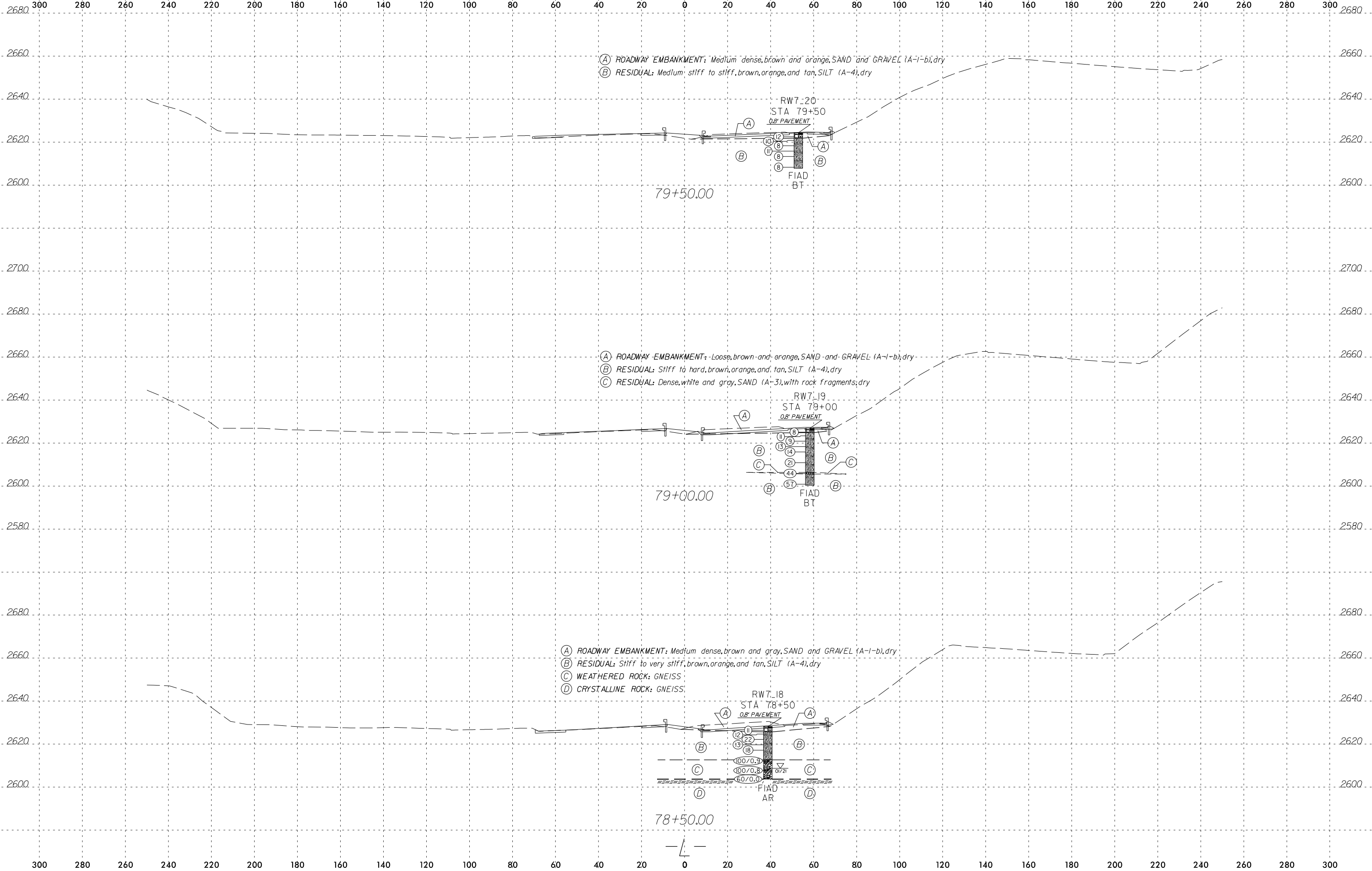
1.0' PAVEMENT



77+50.00

- (A) RESIDUAL: Stiff, brown, black, and gray, SILT (A-4, A-5), dry
- (B) RESIDUAL: Medium dense to very dense, brown, black, and gray, silty SAND (A-2-4), dry
- (C) CRYSTALLINE ROCK: GNEISS

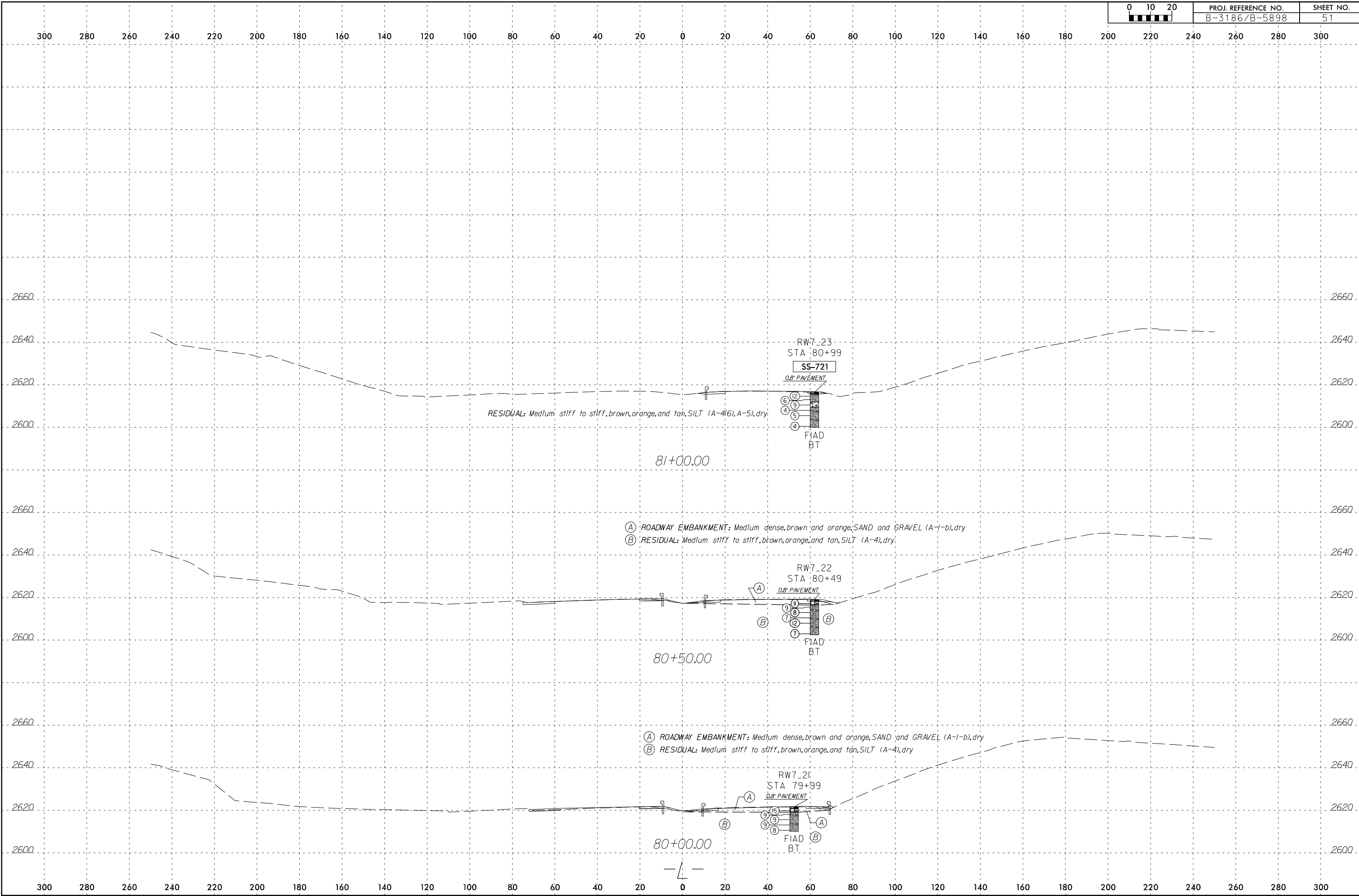
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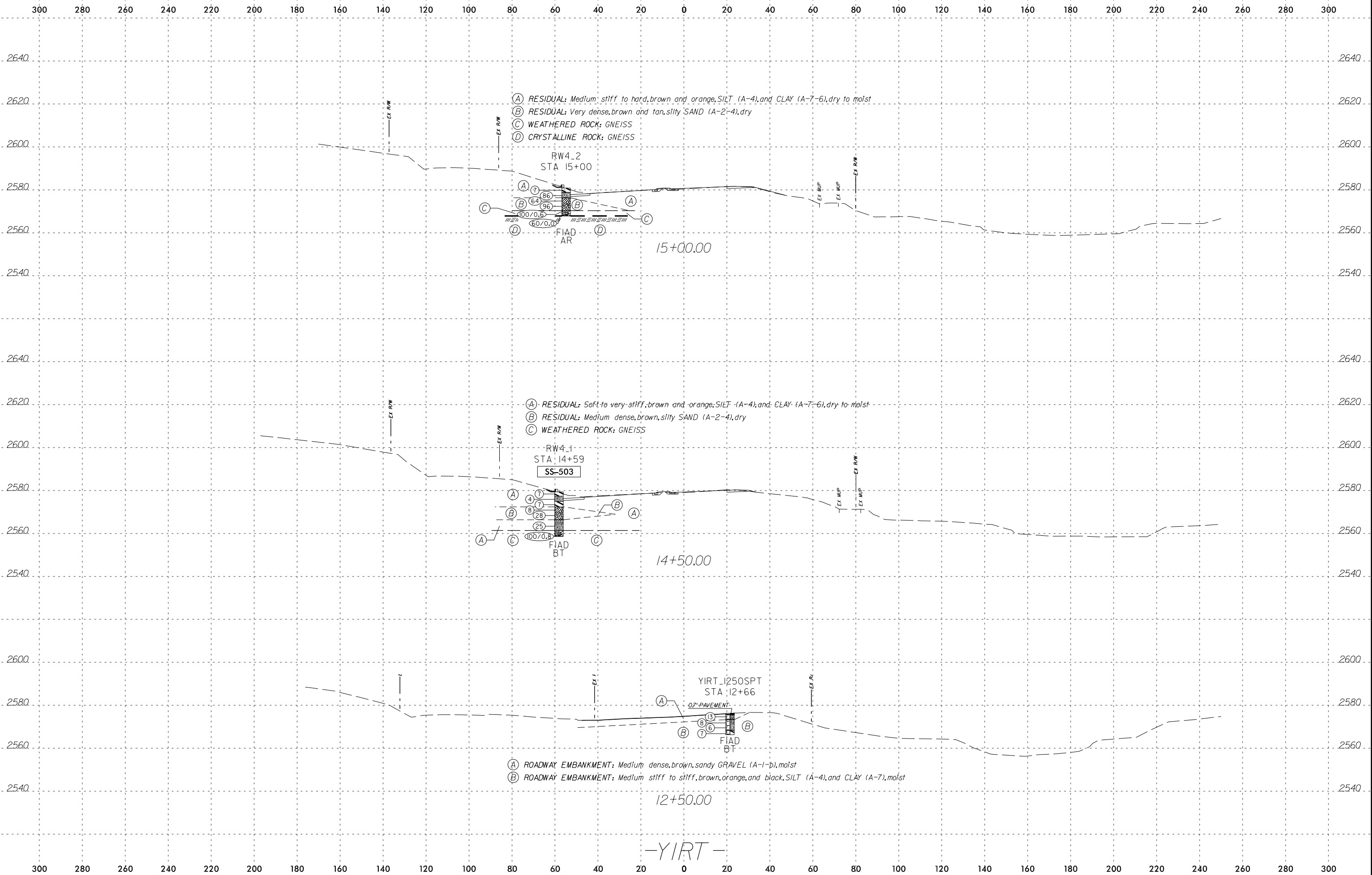


- (A) ROADWAY EMBANKMENT: Medium dense, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium stiff to stiff, brown, orange, and tan, SILT (A-4), dry

- (A) ROADWAY EMBANKMENT: Loose, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff to hard, brown, orange, and tan, SILT (A-4), dry
- (C) RESIDUAL: Dense, white and gray, SAND (A-3), with rock fragments, dry

- (A) ROADWAY EMBANKMENT: Medium dense, brown and gray, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff to very stiff, brown, orange, and tan, SILT (A-4), dry
- (C) WEATHERED ROCK: GNEISS
- (D) CRYSTALLINE ROCK: GNEISS

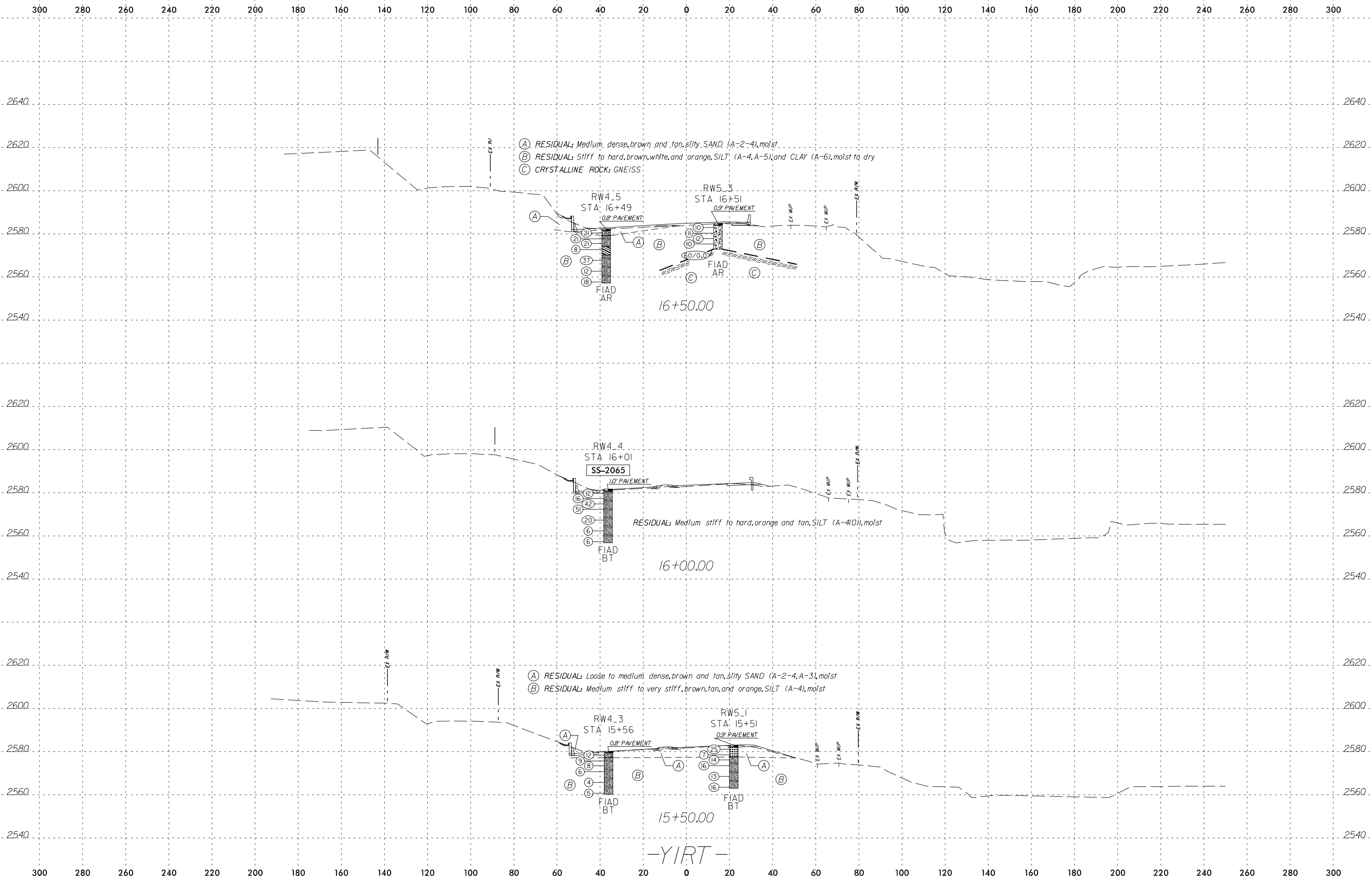




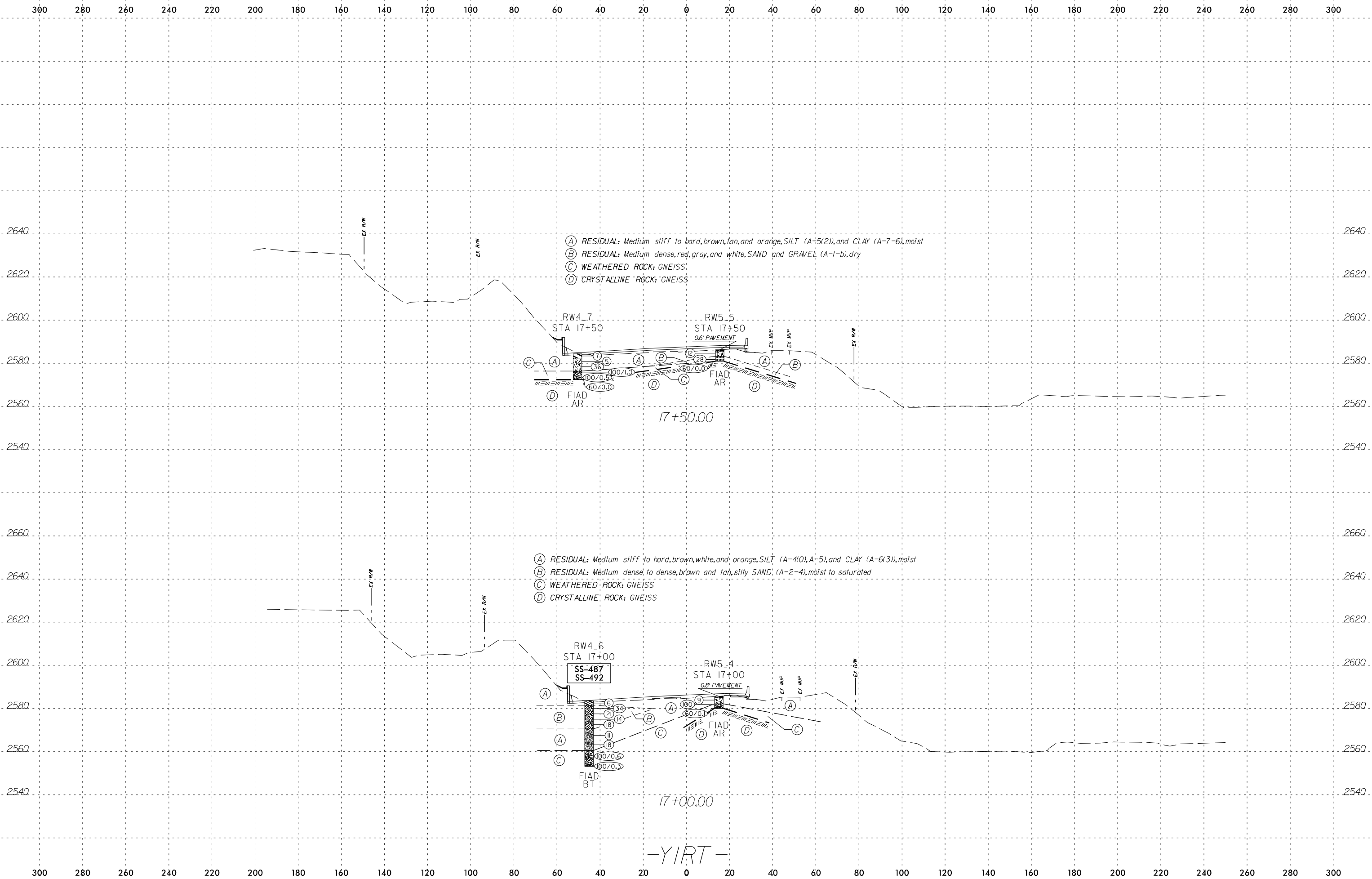
- (A) RESIDUAL: Medium, stiff to hard, brown and orange, SILT (A-4), and CLAY (A-7-6), dry to moist
- (B) RESIDUAL: Very dense, brown and tan, silty SAND (A-2-4), dry
- (C) WEATHERED ROCK: GNEISS
- (D) CRYSTALLINE ROCK: GNEISS

- (A) RESIDUAL: Soft to very stiff, brown and orange, SILT (A-4), and CLAY (A-7-6), dry to moist
- (B) RESIDUAL: Medium dense, brown, silty SAND (A-2-4), dry
- (C) WEATHERED ROCK: GNEISS

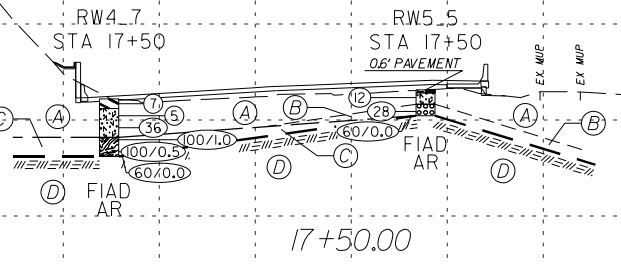
- (A) ROADWAY EMBANKMENT: Medium dense, brown, sandy GRAVEL (A-1-b), moist
- (B) ROADWAY EMBANKMENT: Medium stiff to stiff, brown, orange, and black, SILT (A-4), and CLAY (A-7), moist



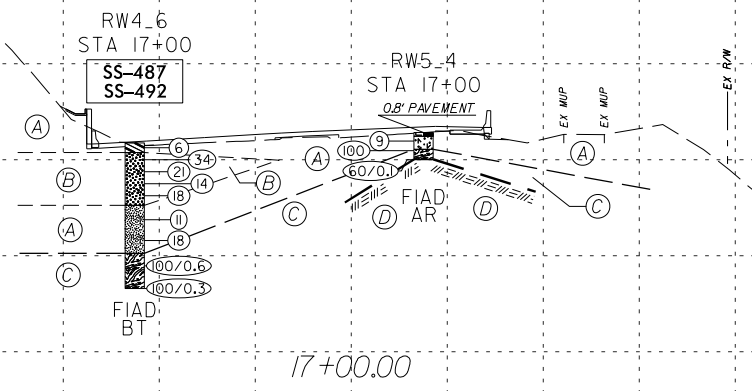
-YIRT-



- (A) RESIDUAL: Medium stiff to hard, brown, tan, and orange, SILT (A-5(2)), and CLAY (A-7-6), moist
- (B) RESIDUAL: Medium dense, red, gray, and white, SAND and GRAVEL (A-1-b), dry
- (C) WEATHERED ROCK: GNEISS
- (D) CRYSTALLINE ROCK: GNEISS

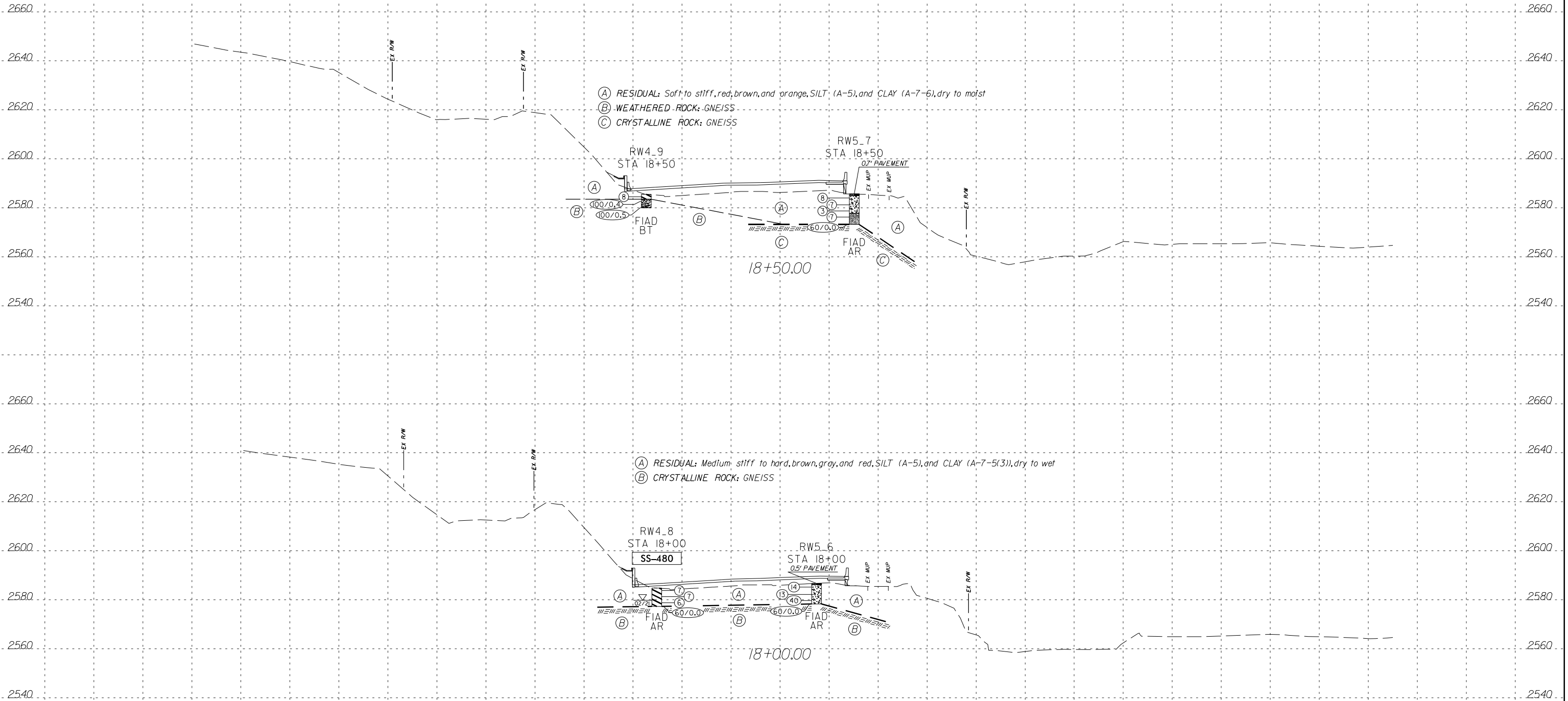


- (A) RESIDUAL: Medium stiff to hard, brown, white, and orange, SILT (A-4(0), A-5), and CLAY (A-6(3)), moist
- (B) RESIDUAL: Medium dense, to dense, brown and tan, silty SAND (A-2-4), moist to saturated
- (C) WEATHERED ROCK: GNEISS
- (D) CRYSTALLINE ROCK: GNEISS



-YIRT-

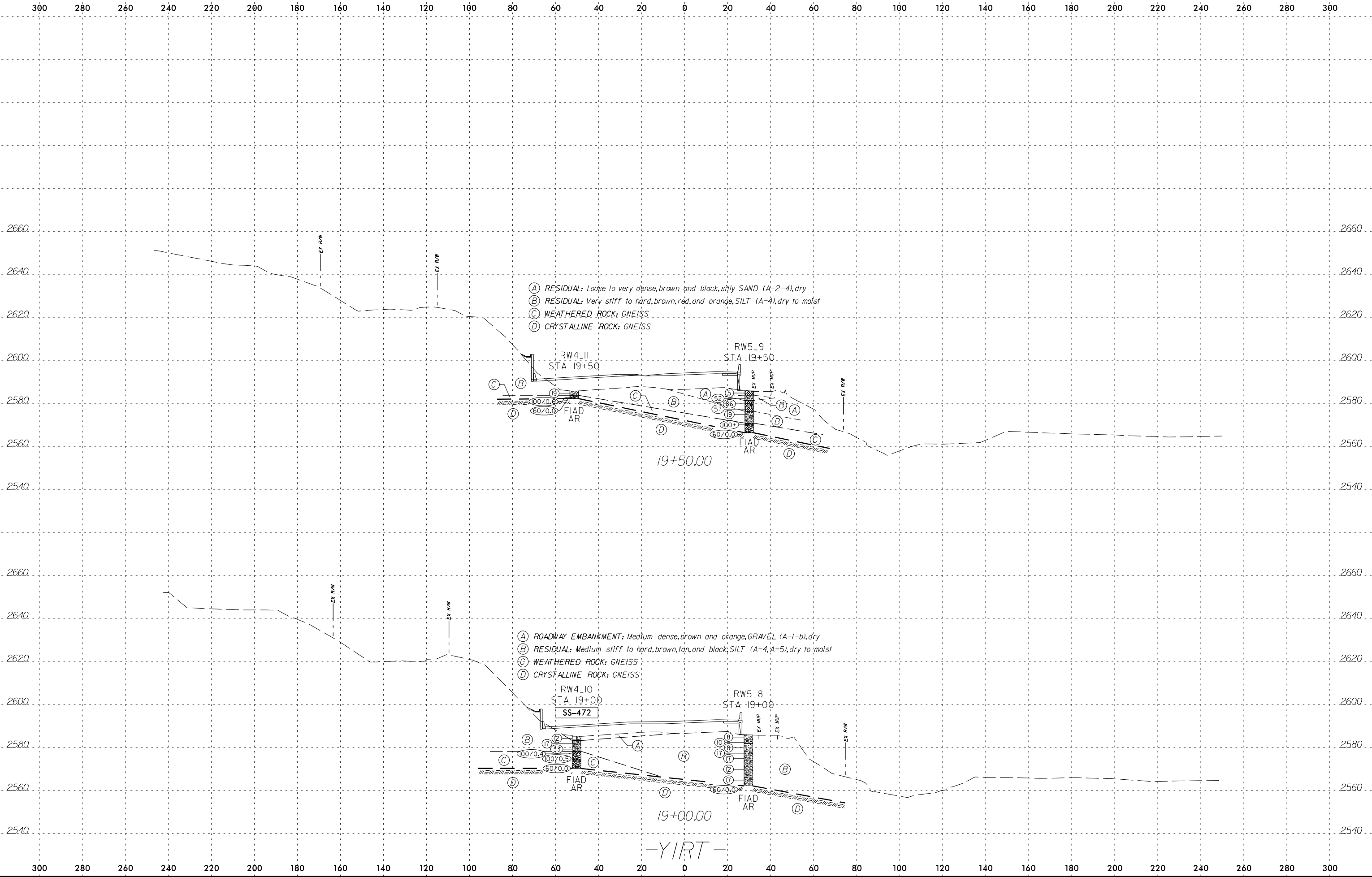
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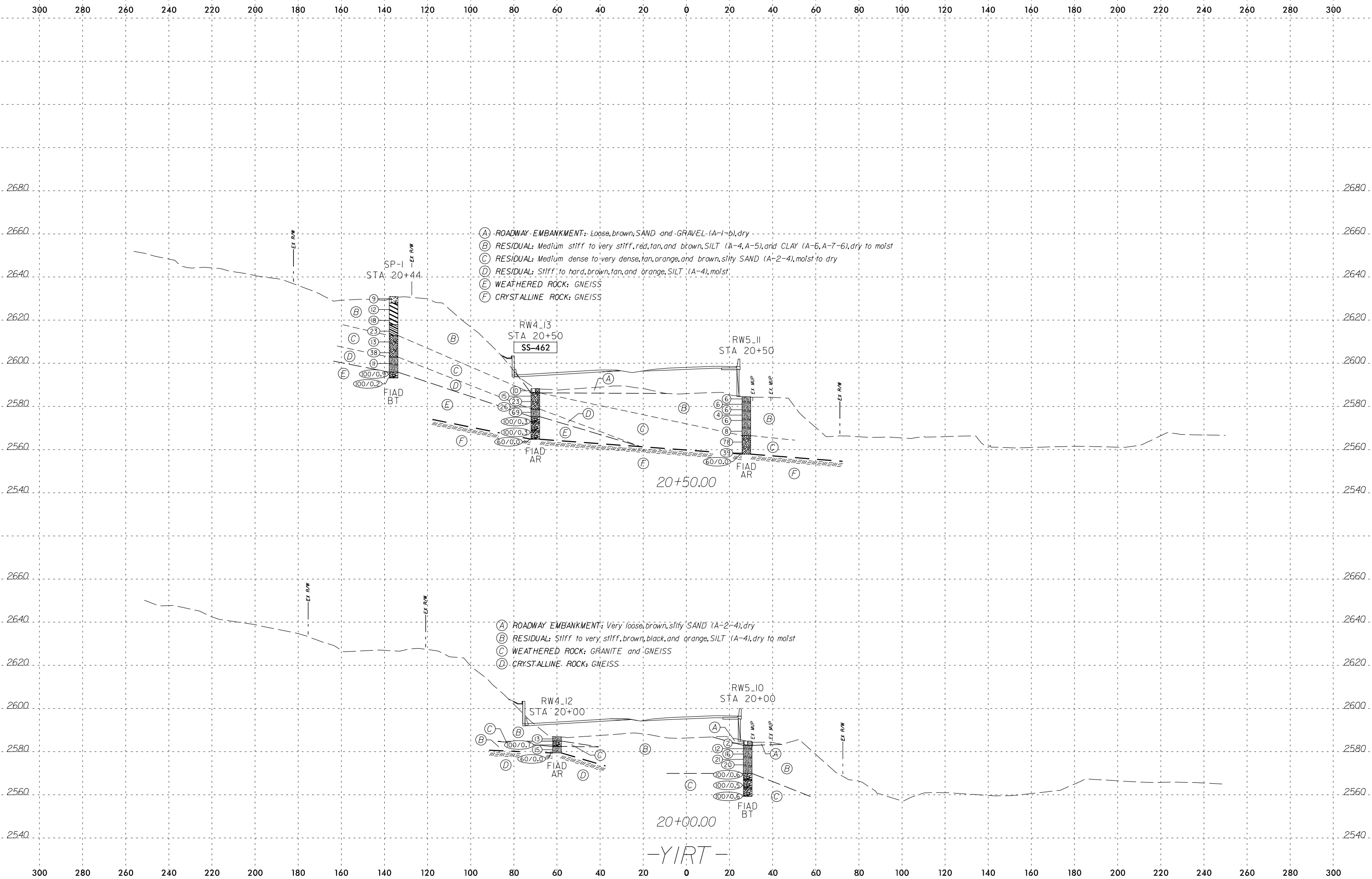
- (A) RESIDUAL: Soft to stiff, red, brown, and orange, SILT (A-5), and CLAY (A-7-6), dry to moist
- (B) WEATHERED ROCK: GNEISS
- (C) CRYSTALLINE ROCK: GNEISS

- (A) RESIDUAL: Medium, stiff to hard, brown, gray, and red, SILT (A-5), and CLAY (A-7-5(3)), dry to wet
- (B) CRYSTALLINE ROCK: GNEISS

-YIRT-

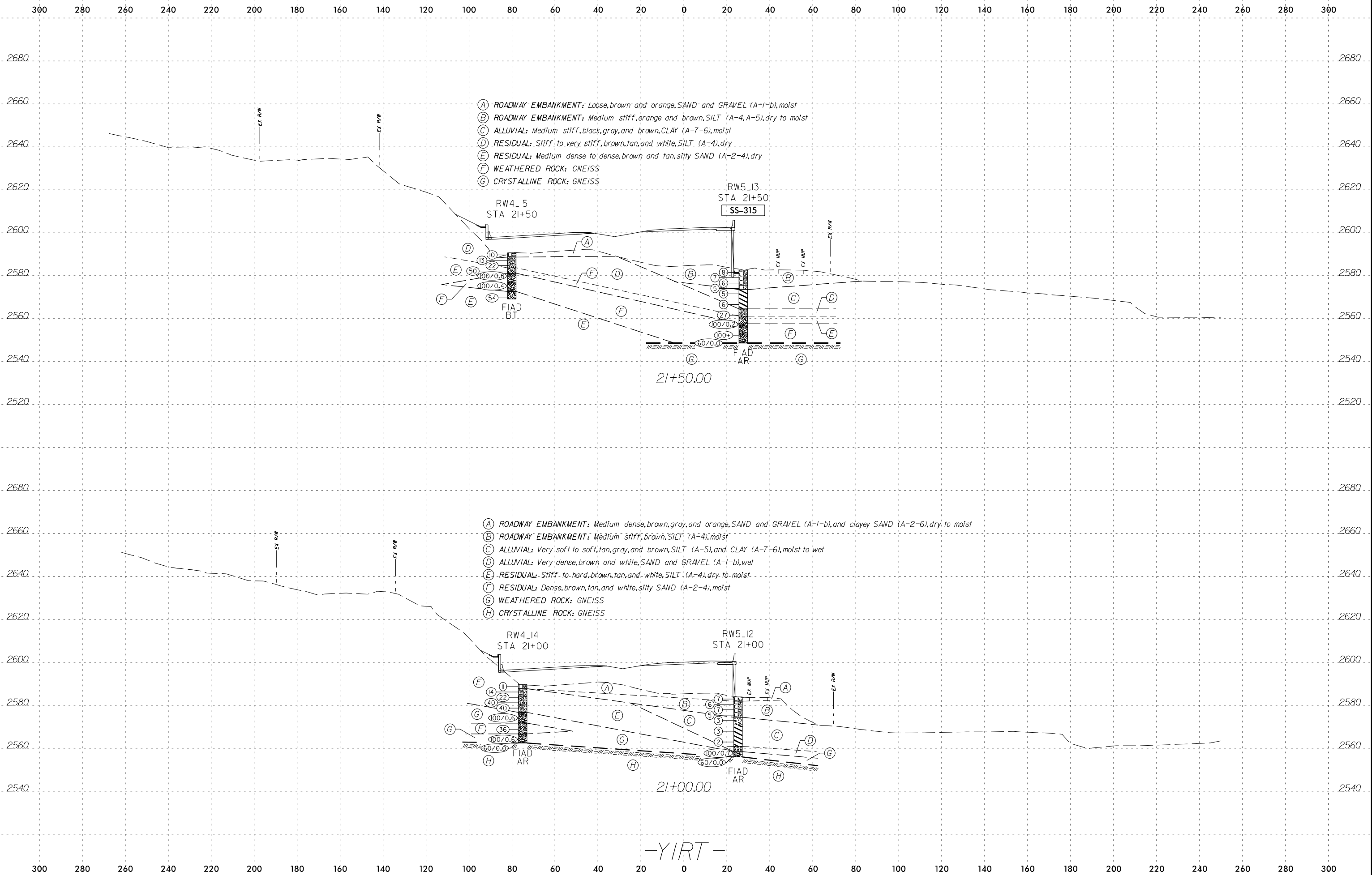


-YIRT-



- (A) ROADWAY EMBANKMENT: Loose, brown, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Medium stiff to very stiff, red, tan, and brown, SILT (A-4, A-5), and CLAY (A-6, A-7-6), dry to moist
- (C) RESIDUAL: Medium dense to very dense, tan, orange, and brown, silty SAND (A-2-4), moist to dry
- (D) RESIDUAL: Stiff to hard, brown, tan, and orange, SILT (A-4), moist
- (E) WEATHERED ROCK: GNEISS
- (F) CRYSTALLINE ROCK: GNEISS

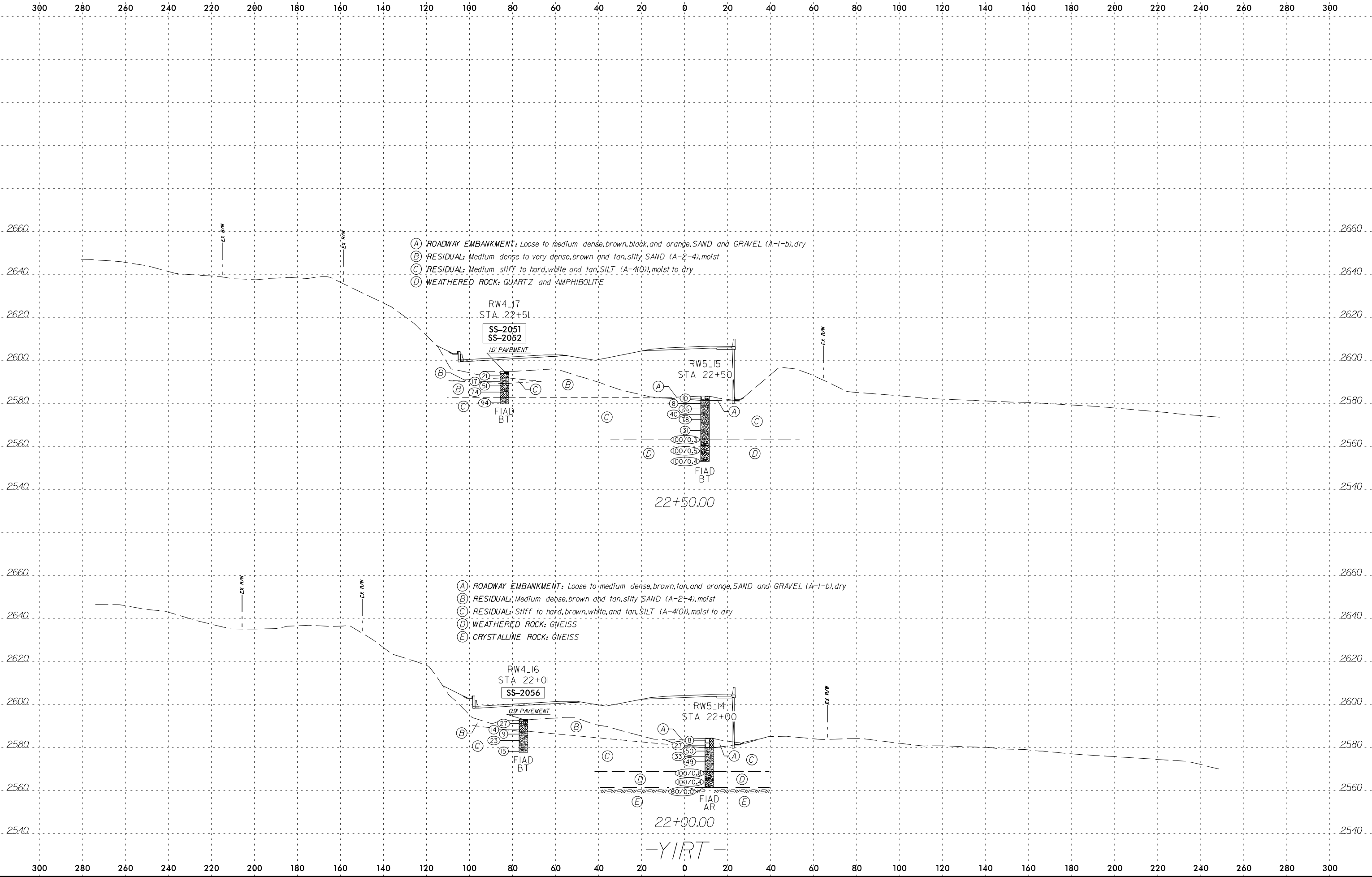
- (A) ROADWAY EMBANKMENT: Very loose, brown, silty SAND (A-2-4), dry
- (B) RESIDUAL: Stiff to very stiff, brown, black, and orange, SILT (A-4), dry to moist
- (C) WEATHERED ROCK: GRANITE and GNEISS
- (D) CRYSTALLINE ROCK: GNEISS

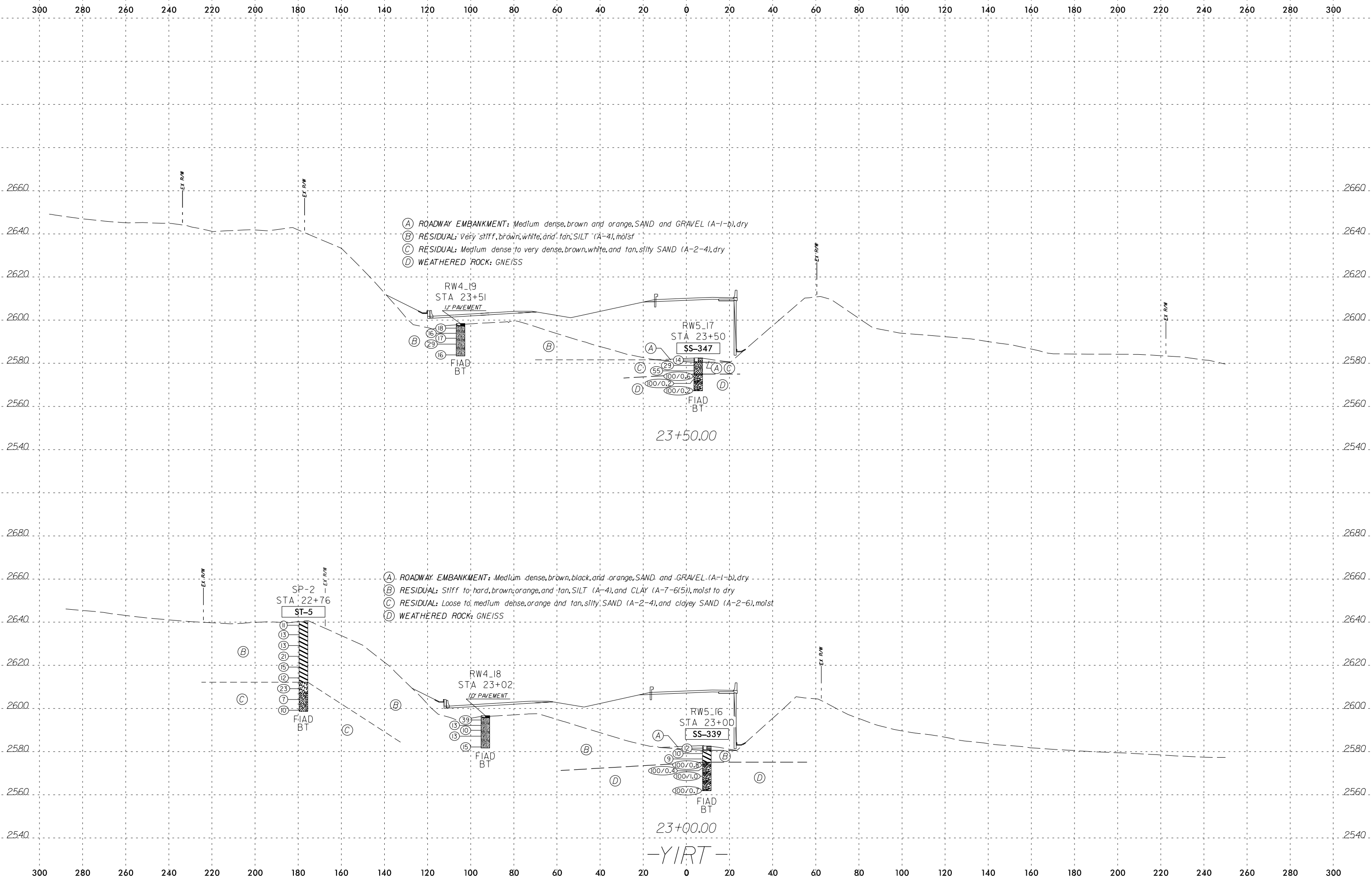


- (A) ROADWAY EMBANKMENT: Loose, brown and orange, SAND and GRAVEL (A-1-b), moist
- (B) ROADWAY EMBANKMENT: Medium stiff, orange and brown, SILT (A-4, A-5), dry to moist
- (C) ALLUVIAL: Medium stiff, black, gray, and brown, CLAY (A-7-6), moist
- (D) RESIDUAL: Stiff to very stiff, brown, tan, and white, SILT (A-4), dry
- (E) RESIDUAL: Medium dense to dense, brown and tan, silty SAND (A-2-4), dry
- (F) WEATHERED ROCK: GNEISS
- (G) CRYSTALLINE ROCK: GNEISS

- (A) ROADWAY EMBANKMENT: Medium dense, brown, gray, and orange, SAND and GRAVEL (A-1-b), and clayey SAND (A-2-6), dry to moist
- (B) ROADWAY EMBANKMENT: Medium stiff, brown, SILT (A-4), moist
- (C) ALLUVIAL: Very soft to soft, tan, gray, and brown, SILT (A-5), and CLAY (A-7-6), moist to wet
- (D) ALLUVIAL: Very dense, brown and white, SAND and GRAVEL (A-1-b), wet
- (E) RESIDUAL: Stiff to hard, brown, tan, and white, SILT (A-4), dry to moist
- (F) RESIDUAL: Dense, brown, tan, and white, silty SAND (A-2-4), moist
- (G) WEATHERED ROCK: GNEISS
- (H) CRYSTALLINE ROCK: GNEISS

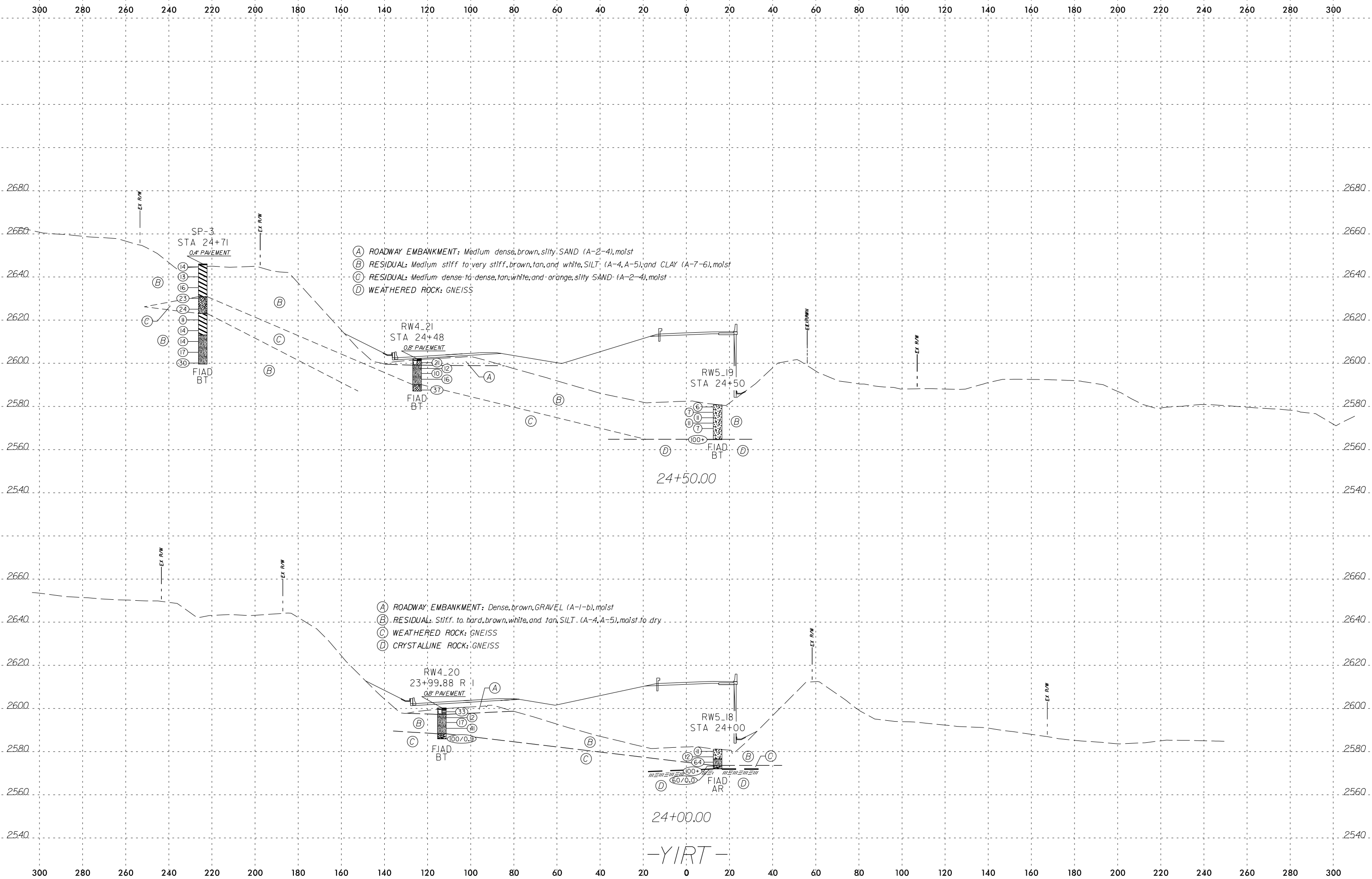
-YIRT-





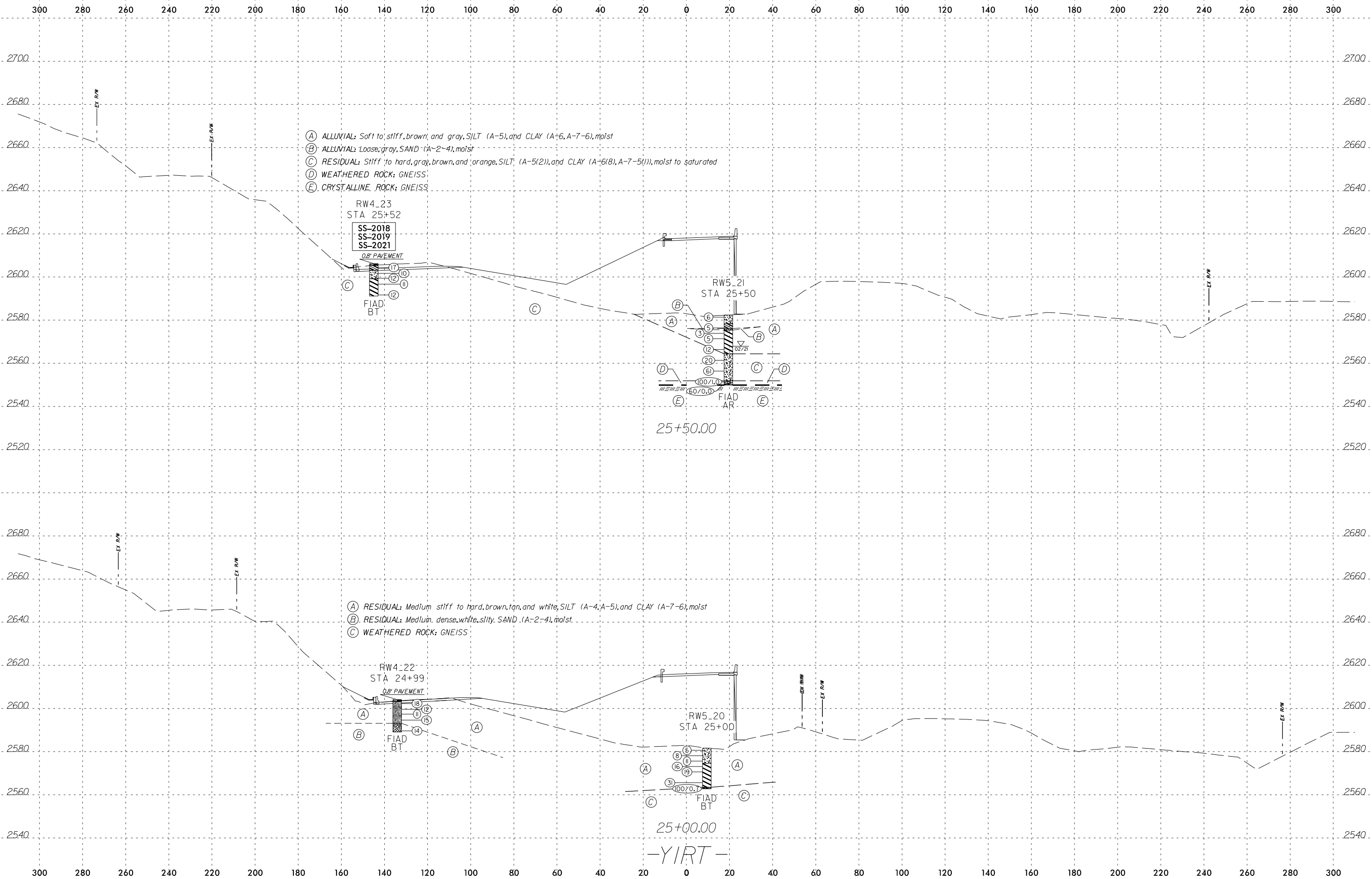
- (A) ROADWAY EMBANKMENT: Medium dense, brown and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Very stiff, brown, white, and tan, SILT (A-4), moist
- (C) RESIDUAL: Medium dense to very dense, brown, white, and tan, silty SAND (A-2-4), dry
- (D) WEATHERED ROCK: GNEISS

- (A) ROADWAY EMBANKMENT: Medium dense, brown, black, and orange, SAND and GRAVEL (A-1-b), dry
- (B) RESIDUAL: Stiff to hard, brown, orange, and tan, SILT (A-4), and CLAY (A-7-6(5)), moist to dry
- (C) RESIDUAL: Loose to medium dense, orange and tan, silty, SAND (A-2-4), and clayey SAND (A-2-6), moist
- (D) WEATHERED ROCK: GNEISS



1:45:26 PM
B3186-B5898_RDY_XSI_YIRT.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$

-YIRT-



- (A) ALLUVIAL: Soft to stiff, brown, and gray, SILT (A-5), and CLAY (A-6, A-7-6), moist
- (B) ALLUVIAL: Loose, gray, SAND (A-2-4), moist
- (C) RESIDUAL: Stiff to hard, gray, brown, and orange, SILT (A-5(2)), and CLAY (A-6(8), A-7-5(1)), moist to saturated
- (D) WEATHERED ROCK: GNEISS
- (E) CRYSTALLINE ROCK: GNEISS

RW4_23
STA 25+52
SS-2018
SS-2019
SS-2021

0.8' PAVEMENT
FIAD BT

RW5_21
STA 25+50

FIAD AR

25+50.00

- (A) RESIDUAL: Medium stiff to hard, brown, tan, and white, SILT (A-4, A-5), and CLAY (A-7-6), moist
- (B) RESIDUAL: Medium dense, white, silty, SAND (A-2-4), moist
- (C) WEATHERED ROCK: GNEISS

RW4_22
STA 24+99

0.8' PAVEMENT
FIAD BT

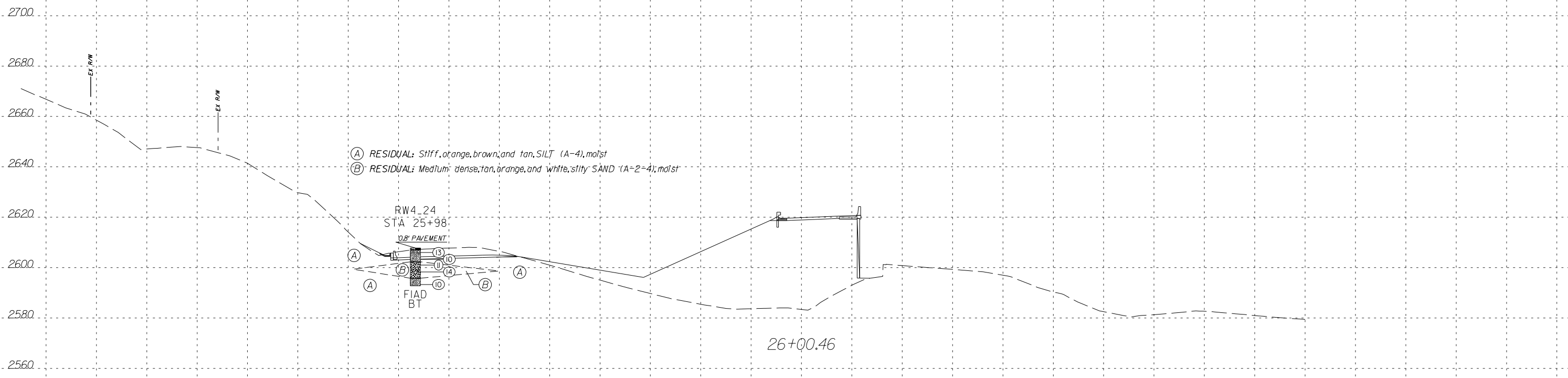
RW5_20
STA 25+00

FIAD BT

25+00.00

-YIRT-

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300



- (A) RESIDUAL: Stiff, orange, brown, and tan, SILT (A-4), moist
- (B) RESIDUAL: Medium dense, tan, orange, and white, silty SAND (A-2-4), moist

RW4_24
STA 25+98
OB PAVEMENT
FIAD
BT

26+00.46
-YIRT-

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 38332.1.FS1 | | TIP B-3186 / B-5898 | | COUNTY HAYWOOD | | GEOLOGIST N. Yacobi | | | | | | | | | |
|--|-----------------|---------------------|------------|--------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|--|--|
| SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to 26+13 | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. RW5_2 | | STATION 16+54 | | OFFSET 16 ft LT | | ALIGNMENT -RW5- | | | | | | | | | |
| COLLAR ELEV. 2,583.8 ft | | TOTAL DEPTH 20.0 ft | | NORTHING 666,847 | | EASTING 818,249 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE GTC3277 CME-75 83% (09/15/2020) | | | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | |
| DRILLER K. Boone | | START DATE 02/13/21 | | COMP. DATE 02/13/21 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 2585 | | | | | | | | | | | | | | 2,583.8 GROUND SURFACE 0.0 | |
| | 2,583.0 | 0.8 | 2 | 4 | 6 | | | | | | | | D | 2,583.0 0.8' Pavement 0.8 | |
| 2580 | 2,580.3 | 3.5 | 5 | 6 | 7 | | | | | | | | D | 2,580.8 ROADWAY EMBANKMENT 3.0 | |
| | 2,577.8 | 6.0 | 4 | 7 | 10 | | | | | | | | D | 2,578.3 Loose to medium dense, red and brown, silty GRAVEL (A-1-b) 3.0 | |
| 2575 | 2,575.3 | 8.5 | 3 | 8 | 13 | | | | | | | | D | 2,578.3 RESIDUAL 5.5 | |
| | 2,572.8 | | | | | | | | | | | | D | Stiff, red and brown, SILT (A-4), micaceous / Very stiff, gray, clayey SILT (A-5), micaceous, saprolitic | |
| 2570 | 2,570.3 | 13.5 | 3 | 8 | 11 | | | | | | | | M | | |
| 2565 | 2,565.3 | 18.5 | 4 | 8 | 12 | | | | | | | | M | | |
| | | | | | | | | | | | | | | | 2,563.8 Boring Terminated at Elevation 2,563.8 ft in SILT 20.0 |

NCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 10/22/21


REVISIONS

-L- 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- 1005 | 55' RT | 25+00 | 15.0' - 16.5' | A-6 (5) | 38 | 13 | 29.4 | 21.7 | 36.0 | 12.9 | 99.3 | 80.2 | 53.9 | 17 | - |
| SS- 547 | 45' LT | 27+00 | 2.5' - 4.0' | A-6 (10) | 38 | 15 | 17.5 | 29.7 | 30.4 | 22.4 | 93.5 | 84.2 | 72.0 | 21 | - |
| SS- 2 | 52' RT | 30+00 | 2.5' - 4.0' | A-6 (2) | 34 | 13 | 33.6 | 31.1 | 30.2 | 5.1 | 96.0 | 76.0 | 41.0 | 15 | - |
| SS- 4 | 53' RT | 33+06 | 7.5' - 9.0' | A-2-4 (0) | 28 | 6 | 54.4 | 23.4 | 15.4 | 6.8 | 87.7 | 50.7 | 24.3 | 10 | - |
| SS- 3 | 51' RT | 34+07 | 2.5' - 4.0' | A-2-5 (0) | 44 | 7 | 54.2 | 24.3 | 14.6 | 6.9 | 95.1 | 55.9 | 25.7 | 26 | - |
| ST- 7 | 80' LT | 35+00 | 3.5' - 5.5' | A-7-5 (16) | 53 | 19 | 12.4 | 12.2 | 15.6 | 59.8 | 99.1 | 91.7 | 75.0 | 34 | - |
| SS- 1011 | 55' RT | 37+00 | 5.0' - 6.5' | A-7-5 (8) | 49 | 17 | 23.9 | 20.6 | 42.7 | 12.8 | 90.6 | 76.4 | 54.6 | 28 | - |
| SS- 2018 | 230' LT | 49+13 | 0.8' - 2.3' | A-6 (8) | 38 | 15 | 13.9 | 20.3 | 29.7 | 36.1 | 91.2 | 83.0 | 63.9 | 13 | - |
| SS- 2019 | 230' LT | 49+13 | 3.5' - 5.0' | A-5 (2) | 45 | 6 | 23.5 | 31.4 | 38.6 | 6.5 | 92.9 | 77.9 | 49.7 | 12 | - |
| SS- 2021 | 230' LT | 49+13 | 8.5' - 10.0' | A-7-5 (1) | 48 | 14 | 33.9 | 28.3 | 28.5 | 9.3 | 83.1 | 62.6 | 36.8 | 24 | - |
| SS- 436 | 147' LT | 51+36 | 7.5' - 9.0' | A-7-5 (8) | 55 | 20 | 24.0 | 23.4 | 34.3 | 18.3 | 87.8 | 73.7 | 50.2 | 27 | - |
| SS- 439 | 147' LT | 51+36 | 20.0' - 21.5' | A-7-6 (6) | 44 | 18 | 23.0 | 32.0 | 20.6 | 34.4 | 97.8 | 84.3 | 49.3 | 24 | - |
| ST- 6 | 214' LT | 51+80 | 18.0' - 20.0' | A-7-6 (13) | 50 | 25 | 24.5 | 14.8 | 15.4 | 45.3 | 97.2 | 80.0 | 59.4 | 25 | - |
| SS- 431 | 127' LT | 52+00 | 15.0' - 16.5' | A-6 (3) | 40 | 11 | 34.3 | 21.8 | 22.1 | 21.8 | 96.4 | 71.7 | 46.6 | 18 | - |
| SS- 24 | 112' RT | 51+99 | 15.0' - 16.1' | A-7-6 (11) | 47 | 23 | 20.8 | 20.5 | 23.6 | 35.1 | 92.0 | 79.1 | 58.5 | 26 | - |
| SS- 422 | 112' LT | 52+50 | 10.0' - 11.5' | A-2-4(0) | 33 | 9 | 47.9 | 18.0 | 20.2 | 13.8 | 88.9 | 54.7 | 33.4 | 17 | - |
| SS- 58 | 130' RT | 52+50 | 7.5' - 9.0' | A-5 (2) | 44 | 10 | 26.6 | 29.4 | 23.9 | 20.1 | 88.8 | 73.7 | 44.4 | 28 | - |
| SS- 62 | 130' RT | 52+50 | 25.0' - 26.5' | A-7-5(31) | 82 | 33 | 16.9 | 8.5 | 58.4 | 16.2 | 100 | 87.0 | 77.1 | 71 | - |
| SS- 35 | 145' RT | 53+00 | 10.0' - 11.5' | A-4 (2) | 38 | 9 | 27.5 | 26.8 | 24.5 | 21.2 | 94.3 | 76.9 | 48.8 | 25 | - |
| SS- 46 | 145' RT | 53+00 | 55.0' - 56.5' | A-2-4(0) | 32 | NP | 47.6 | 32.0 | 9.7 | 10.7 | 98.9 | 67.6 | 26.2 | 18 | - |
| SS- 362 | 60' LT | 56+50 | 0.0' - 1.5' | A-6 (3) | 36 | 14 | 20.9 | 24.3 | 28.8 | 26.0 | 78.9 | 68.2 | 46.9 | 14 | - |
| SS- 1105 | 44' LT | 58+47 | 8.5' - 10.0' | A-4 (4) | 40 | 9 | 17.8 | 28.7 | 36.5 | 17.0 | 99.3 | 88.9 | 59.4 | 29 | - |
| SS- 1110 | 43' LT | 58+96 | 1.0' - 2.5' | A-7-6 (7) | 46 | 16 | 21.9 | 23.4 | 26.4 | 28.3 | 92.4 | 78.2 | 55.1 | 10 | - |
| SS- 1118 | 43' LT | 59+49 | 13.5' - 15.0' | A-6 (8) | 38 | 15 | 15.7 | 24.8 | 46.0 | 13.5 | 98.6 | 89.3 | 63.5 | 28 | - |
| SS- 1139 | 41' LT | 59+95 | 8.5' - 10.0' | A-6 (6) | 34 | 13 | 13.3 | 30.8 | 33.9 | 22.0 | 100.0 | 92.9 | 62.1 | 22 | - |
| SS- 302 | 60' LT | 63+50 | 2.5' - 4.0' | A-5 (4) | 46 | 5 | 10.9 | 29.7 | 45.7 | 13.7 | 95.0 | 89.1 | 64.5 | 26 | - |
| SS- 260 | 55' RT | 65+50 | 0.0' - 1.5' | A-5 (5) | 47 | 10 | 20.1 | 25.6 | 23.3 | 31.0 | 92.1 | 80.0 | 54.9 | 17 | - |
| SS- 256 | 60' LT | 66+00 | 15.0' - 16.5' | A-4 (1) | 38 | 10 | 41.6 | 22.4 | 25.9 | 10.1 | 98.2 | 65.9 | 40.0 | 12 | - |
| SS- 258 | 60' LT | 66+00 | 25.0' - 26.5' | A-2-5(0) | 42 | 10 | 47.2 | 26.8 | 24.5 | 1.5 | 92.0 | 60.9 | 28.4 | 34 | - |
| SS- 242 | 55' LT | 66+50 | 7.5' - 9.0' | A-7-5 (2) | 52 | 13 | 33.8 | 32.5 | 25.1 | 8.6 | 98.6 | 76.8 | 39.8 | 28 | - |
| SS- 278 | 60' LT | 67+00 | 5.0' - 6.5' | A-7-6 (2) | 42 | 13 | 21.7 | 44.4 | 31.8 | 2.1 | 100.0 | 91.3 | 42.2 | 22 | - |
| SS- 282 | 60' LT | 67+00 | 20.0' - 21.5' | A-2-7 (1) | 53 | 16 | 38.6 | 36.2 | 22.5 | 2.7 | 95.9 | 73.1 | 29.7 | 18 | - |
| SS- 186 | 61' LT | 73+51 | 7.5' - 9.0' | A-4(0) | 32 | 4 | 22.9 | 33.3 | 30.7 | 13.1 | 97.7 | 84.3 | 50.7 | 21 | - |
| SS- 1077 | 59' LT | 74+49 | 8.5' - 10.0' | A-2-4(0) | 35 | 8 | 44.0 | 27.6 | 20.9 | 7.5 | 97.4 | 66.1 | 34.0 | 16 | - |
| SS- 1022 | 47' RT | 74+49 | 3.5' - 5.0' | A-2-4(0) | 31 | 9 | 35.4 | 28.0 | 18.9 | 17.7 | 75.8 | 59.9 | 32.7 | 10 | - |
| SS- 1053 | 65' LT | 77+50 | 8.5' - 10.0' | A-4 (1) | 39 | 10 | 39.1 | 23.4 | 19.6 | 17.9 | 96.5 | 69.9 | 41.0 | 30 | - |
| SS- 1046 | 65' LT | 78+00 | 0.9' - 2.4' | A-2-4(0) | 39 | 9 | 21.0 | 45.2 | 20.8 | 13.0 | 80.7 | 74.1 | 33.9 | 15 | - |
| SS- 1027 | 50' RT | 78+00 | 8.5' - 10.0' | A-2-4(0) | 29 | NP | 44.1 | 34.2 | 12.7 | 9.0 | 95.3 | 68.2 | 26.8 | 8 | - |
| SS- 721 | 62' RT | 80+99 | 10.0' - 11.5' | A-4 (6) | 40 | 10 | 14.7 | 31.3 | 51.1 | 2.9 | 98.8 | 90.7 | 63.1 | 38 | - |

-Y1RT- 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- 503 | 58' LT | 14+59 | 2.5' - 4.0' | A-4(0) | 36 | 4 | 30.1 | 31.9 | 21.0 | 17.0 | 88.4 | 70.9 | 39.3 | 27 | - |
| SS- 2065 | 36' LT | 16+01 | 1.0' - 2.5' | A-4(0) | 31 | 9 | 33.4 | 31.2 | 33.9 | 1.5 | 87.3 | 68.3 | 36.8 | 16 | - |
| SS- 487 | 45' LT | 17+00 | 0.0' - 1.5' | A-6 (3) | 39 | 14 | 23.2 | 23.9 | 27.6 | 25.3 | 79.8 | 67.3 | 45.9 | 20 | - |
| SS- 492 | 45' LT | 16+94 | 15.0' - 16.5' | A-4 | 35 | 7 | 34.3 | 25.0 | 26.4 | 14.3 | 83.0 | 62.5 | 38.6 | 21 | - |
| SS- 480 | 50' LT | 18+00 | 2.5- 4.0' | A-7-5 (3) | 46 | 14 | 27.2 | 32.8 | 28.2 | 11.8 | 94.9 | 79.7 | 44.6 | 31 | - |
| SS- 472 | 50' LT | 19+00 | 0.0' - 1.5' | A-2-6 | 33 | 12 | 37.6 | 26.4 | 13.9 | 22.1 | 57.5 | 41.8 | 23.5 | 9 | - |

| | |
|---|------------------------|
| PROJECT REFERENCE NO. B-3186B-5898 | SHEET NO. 65 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
|  HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116 | |

REVISIONS

-Y1RT- SOIL TEST RESULTS

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT | | | | % PASSING (SIEVES) | | | % MOISTURE | % ORGANIC |
|------------|---------|---------|----------------|---------------|------|------|-------------|------|------|------|--------------------|------|------|------------|-----------|
| | | | | | | | | | | | | | | | |
| SS- 462 | 70' LT | 20+50 | 2.5' - 4.0' | A-2-4 | 40 | 9 | 44.0 | 25.3 | 19.7 | 11.0 | 94.6 | 62.5 | 34.0 | 11 | - |
| SS- 315 | 28' RT | 21+50 | 2.5' - 4.0' | A-4 (1) | 38 | 8 | 28.5 | 29.9 | 34.3 | 7.3 | 94.2 | 75.9 | 45.9 | 21 | - |
| SS- 2056 | 75' LT | 22+01 | 8.8' - 10.3' | A-4 | 31 | NP | 34.8 | 27.9 | 34.3 | 3.0 | 98.2 | 73.2 | 42.6 | 19 | - |
| SS- 2051 | 84' LT | 22+51 | 8.6' - 10.1' | A-2-4 | 32 | NP | 37.1 | 25.9 | 33.1 | 3.9 | 59.6 | 43.3 | 25.7 | 8 | - |
| SS- 2052 | 84' LT | 22+51 | 13.6' - 15.1' | A-4 | 31 | NP | 39.5 | 22.7 | 34.4 | 3.4 | 98.5 | 70.5 | 41.7 | 13 | - |
| ST- 5 | 178' LT | 22+76 | 35.0' - 37.0' | A-2-4(0) | NP | NP | 51.7 | 20.6 | 16.5 | 11.2 | 98.2 | 65.2 | 28.2 | 42 | - |
| SS- 339 | 9' RT | 23+00 | 2.5' - 4.0' | A-7-6 (5) | 45 | 16 | 12.2 | 49.5 | 29.5 | 8.8 | 100.0 | 95.7 | 49.2 | 25 | - |
| SS- 347 | 5' RT | 23+50 | 5.0' - 6.5' | A-2-4 | 34 | 8 | 39.8 | 31.4 | 18.9 | 9.9 | 96.5 | 70.5 | 33.6 | 11 | - |
| SS- 2018 | 145' LT | 25+52 | 0.8' - 2.3' | A-6 (8) | 38 | 15 | 13.9 | 20.3 | 29.7 | 36.1 | 91.2 | 83.0 | 63.9 | 13 | - |
| SS- 2019 | 145' LT | 25+52 | 3.5' - 5.0' | A-5 (2) | 45 | 6 | 23.5 | 31.4 | 38.6 | 6.5 | 92.9 | 77.9 | 49.7 | 12 | - |
| SS- 2021 | 145' LT | 25+52 | 8.5' - 10.0' | A-7-5 (1) | 48 | 14 | 33.9 | 28.3 | 28.5 | 9.3 | 83.1 | 62.6 | 36.8 | 24 | - |

| | |
|---|------------------------|
| PROJECT REFERENCE NO. B-3186B-5898 | SHEET NO. 66 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION | |
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | |
| HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116 | |