CONTRACT: C202594 ID: R-2100B

NOTE: SEE SHEET 1A 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

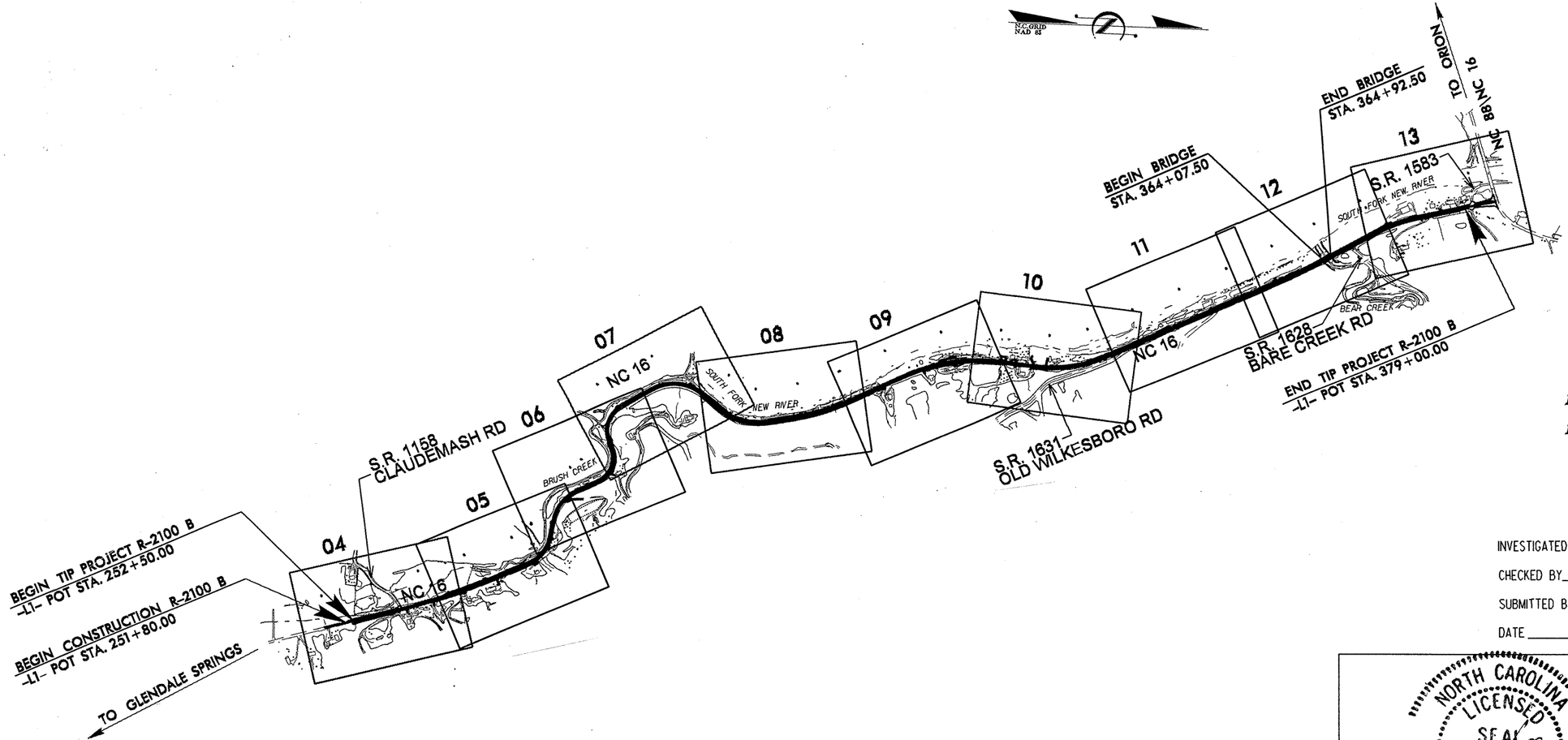
ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. R-2100B F.A. PROJ. STP - 16 (1)

COUNTY ASHE

PROJECT DESCRIPTION NC 16 FROM SOUTHEAST OF SR 1158 TO SOUTHEAST OF NC 88

INVENTORY



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2100B	1	228

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34369.1.1	STP - 16 (1)	PE
34369.2.4	STP - 0016 (4)	R/W & UTILITIES
34369.3.5	STP - 0016(44)	CONSTR.

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PERSONNEL

R. A. SCHRANK

M. M. HAGER

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F & R ENGINEERING

F & H ENGINEERING

INVESTIGATED BY L. L. ACKER

CHECKED BY W. D. FRYE

SUBMITTED BY W. D. FRYE

DATE 5/31/06

NORTH CAROLINA LICENSED SEAL 10 GEOLOGIST LOUIS L. ACKER 05/31/06

DRAWN BY: J. T. WILLIAMS

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NOTE - 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.

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	2

OF 223

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 TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. 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
LIQUID LIMIT PLASTIC INDEX	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 A 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	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	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.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 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
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [X] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
[X] AUTOMATIC [X] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N_____
- [ ] -H_____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS 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 GROVED 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 FEET
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 THE 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, 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: BM #3 -BL- 61+90.54 75.30 LT

ELEVATION: 2688.62 FT.

NOTES:

REVISED 02/23/06

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

Rock Swell: 25%

3/288

PROJECT: R-2100B

COUNTY: ASHE

DATE 2/22/2010

SHEET 1 OF 2 SHEETS

Traffic Phase 1, Left of -L1-

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. +15%	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
-L1-	252+00.00	280+00.00	736	0			736	821			821	944	208	0	0		0
-L1-	280+00.00	310+00.00	591	0			591	293			293	337		0	254		254
-L1-	310+00.00	340+00.00	273	0			273	6,550			6,550	7,533	7,260	0			0
-L1-	340+00.00	364+07.50	511	0			511	638			638	734	223	0	0		0
-L1-	364+92.50	382+05.13	273	0			273	926			926	1,065	792	0	0		0
Traffic Phase 1 LT PROJECT SUBTOTAL			2,384	0	0	0	2,384	9,228	0	0	9,228	10,612	8,482	0	254		254

Traffic Phase 2, Right of -L1-

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. +15%	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
-L1-	252+00.00	280+00.00	5,116	2,620			2,496	401	321		0	321		2,299	2,496		4,795
-L1-	280+00.00	310+00.00	8,867	3,612			5,255	982	786		0	786		2,826	5,255		8,081
-L1-	310+00.00	340+00.00	5,752	39			5,713	532	39		483	595		0	5,157		5,157
-L1-	340+00.00	364+07.50	2,369	518			1,851	217	174		0	174		344	1,851		2,195
-L1-	364+92.50	382+05.13	1,405	56			1,349	216	56		146	224		0	1,181		1,181
Traffic Phase 2 RT PROJECT SUBTOTAL			23,509	6,845	0	0	16,664	2,348	1,375	0	629	2,099	0	5,470	15,940		21,410

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on Subsurface Data provided by the Geotechnical Engineering Unit.

Quantites are approximate only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid.

3(A) / 288

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

Rock Swell: 25%

PROJECT: R-2100B
Summary of All Phases

COUNTY: ASHE

DATE 2/22/2010

Phasing Subtotals	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. +15%	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
Subtotal, Phase 1, Left Side of -L1-	2,384	0			2,384	9,228	0		9,228	10,612	8,482	0	254		254
Subtotal, Phase 2, Right Side of -L1-	23,509	6,845			16,664	2,348	1,375		629	2,099	0	5,470	15,940		21,410
PROJECT SUBTOTAL	25,893	6,845	0	0	19,048	11,576	1,375	0	9,857	12,711	8,482	5,470	16,194	0	21,664
PHASE 1, SUITABLE WASTE IN LIEU OF BORROW											-254		-254		-254
SHOULDER MATERIAL						+2,200			+2,200	+2,530	+2,530				
LOSS DUE TO CLEARING AND GRUBBING	-750				-750								-750		-750
PROJECT TOTAL	25,143	6,845			18,298	13,776	1,375		12,057	15,241	10,758	5,470	15,190		20,660
ADJUST FOR ROCK SWELL												+1,368			+1,368
5% TO REPLACE TOPSOIL ON BORROW PIT											+538				
GRAND TOTAL	25,143	6,845			18,298	13,776	1,375		12,057	15,241	11,296	6,838	15,190		22,028
SAY	25,800										11,600				

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on Subsurface Data provided by the Geotechnical Engineering Unit.

Quantites are approximate only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid.

DDE = 1,050 CY
Contingency Undercut = 1,500 CY
Pavement Structure Volume = 5,000 CY

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 31, 2006

STATE PROJECT: 34369.1.1
TIP NO: R-2100B
F.A. NO: STP-16 (1)
COUNTY: Ashe

DESCRIPTION: NC 16 from Southeast of SR 1158 to Southeast of NC 88

SUBJECT: Geotechnical Report - Inventory

Site Description

This project is located in eastern Ashe County approximately 4 miles east of the county seat at the town of Jefferson. The project consists of widening the existing NC 88 from two 10-foot travel lanes with narrow shoulders to two 12-foot travel lanes with 8-foot shoulders. Preliminary plans call for the construction of approximately 2.4 miles of retaining walls, primarily for the purpose of minimizing the impact of widening on the South Fork of the New River, a federally designated Wild and Scenic River. The river runs parallel with NC 88 for most of the length of the project.

Design and construction is to be carried out on alignment -L1- which lies on or close to the centerline of the existing highway. The project begins at Station 252+50 and ends at Station 379+00. No -Y- lines or detour alignments are indicated.

The project begins in the valley of Brush Creek, a tributary to the New River. The Creek flows along the Left Side in a floodplain about 200 feet wide that is fenced as pastureland. Residential sites interspersed with wood lots lie along the Right Side, where the land slopes gently down towards the road at about 15 degrees.

The valley becomes narrower and slopes become steeper at about Station 275+00 as Brush Creek increases in gradient on its approach to the river. The curving highway in this segment is bordered by rock cuts at the base of forested slopes on the Right Side and by the creek channel flowing on rock on the Left Side.

MAILING ADDRESS:
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1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
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WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

Brush Creek empties into the New River on the Left Side of Station 298+00. The highway follows the bank of the river from that point to the end of the project. The river flows close by the Left Side, at or near the base of the existing roadway embankment as far as Station 318+00. The Right Side in that segment is bordered by a steep, heavily forested slope with intermittent rock cuts.

The highway beyond Station 318+00 is bordered on the Right Side by a mixed terrain of steep, forested slopes interspersed with gentler slopes and small valley re-entrants. The foot of the slope and the river floodplain, which is about 100 to 200 feet wide, lie along the Left Side. House sites and a few small commercial establishments are distributed intermittently along both sides of this segment. The highway intersects SR 1631 (Old Wilkesboro Road) at Station 342+00, and SR 1628 (Bare Creek Road) at Station 367+00. Bare Creek crosses beneath the highway in a concrete culvert at Station 364+50.

Methods

Geotechnical studies for this project were initially done in June and August, 1993, when a DOT drilling crew investigated the entire length of R-2100, including the A, B and C segments. Some 35 borings were made at that time on R-2100B. That investigation was followed by a drilling program for proposed retaining walls. Some 123 borings were made for wall foundation investigations in that effort, which was carried out from November, 1993 to January, 1994 by the contractor Froeling and Robertson, Inc., of Raleigh, N. C. The majority of those walls had been proposed for the fill side.

The most recent field investigation was carried out from July to September, 2005, by the contractor Florence and Hutcheson, Inc, of Paducah, Kentucky, and by a DOT drilling crew. That latest investigation was made in response to a major increase in proposed retaining walls on the cut side, as well as for some additions and changes to the fill side retaining walls. Borings were made to investigate foundation materials as well as materials in the wall envelopes, and some additional borings were made in other areas for proposed cuts and fills. Some 96 borings were made in that phase of the investigation.

Equipment used in those investigations included CME 550 all-terrain, power drilling machines and CME 45 track-mounted and skid-mounted machines. Solid augers, 8-inch hollow-stem augers, NW and NX rotary casing advancers, and NQ and NX wireline diamond bit coring tools were used in the various investigations. Most drilling incorporated Standard Penetration Tests (SPT's). Soil samples from boring made by the DOT and by Florence and Hutcheson were submitted to a DOT laboratory for quality testing.

The 2005 investigation included rock slope stability analyses using fracture and joint orientation readings from existing rock cuts. Orientations were plotted on an equal area net and analyzed for plane, wedge and toppling failures in areas of proposed rock cuts, and in areas where steepened rock cuts may be proposed as alternatives to some of the retaining walls.

Areas of Special Geotechnical Interest

Hard Rock Above Grade

Hard rock will be encountered above grade on large segments of this roadway. All encounters with hard rock above grade will be on the Right Side, where it will impact proposed cuts or proposed retaining walls and wall envelopes. Hard rock will be encountered at the following stations of -L1- on the Right Side:

254+50 to 255+50
260+50 to 261+00
276+00 to 278+50
287+50 to 290+00
293+50 to 296+00
297+50 to 299+00
304+50 to 305+50
306+50 to 309+50
310+50 to 316+50
344+00 to 345+00
355+00 to 364+00
366+00 to 367+00
369+00 to 372+00

Wet Cut in Rock

Water is seeping or flowing over the surface of existing rock cuts in some segments of the roadway. The wet condition should be expected to continue in new cuts or retaining wall envelopes in those segments, which are as follows:

276+00 to 278+50
293+50 to 296+00
306+50 to 308+00
311+00 to 315+00
361+50 to 364+00

Scour Undercutting Embankment

Brush Creek is scouring and undercutting the roadway embankment at Stations 285+00 to 286+00. Collapse of the roadway shoulder does not appear to be imminent; however, the embankment at that location could eventually be undercut to the point of collapse unless preventive measures are taken.

Water Wells

Wells providing household or small commercial water supplies are found at the following approximate locations:

258+50, 65 RT

262+70, 155 RT
318+50, 180 RT
324+80, 90 RT
331+20, 40 LT
332+00, 130 RT
332+25, 125 LT
336+10, 40 LT
350 +40, 75 LT
374+20, 80 LT
374+45, 50 RT
378+40, 70 LT

Household Springs

Springs providing household water supplies are found at the following approximate locations:

267+25, 180 RT
285+60, 175 RT
335+50, 65 RT
374+80, 70 RT

Other Springs and Seeps

Springs and seeps not serving water supply purposes are found at the following approximate locations:

277+00, 45 RT
269+75, 40 RT
280+00, 60 RT
293+65, 60 RT
296+60, 100 RT
302+10, 40 RT
312+80, 100 RT

Wet Areas

Water is standing or flowing on the ground surface of the existing roadway shoulder, as well as in the ditch, on the Right Side in the following segments of -L1-:

269+75 to 270+50
290+50 to 292+00
360+00 to 364+00

Static Ground Water Within Six Feet of Grade

The static ground water level lies within six feet of proposed grade at the following approximate location, in addition to those wet areas given above:

268+50
283+00 to 283+50
315+00 to 316+50
325+50 to 326+00

Streams Crossing -L-

Streams of various size cross -L1- at the following approximate locations:

258+00	small or seasonal flow
260+25	small or seasonal flow
272+00	small or seasonal flow
267+00	small, in underground pipe 200 feet from spring behind house
277+25	small, see springs above
280+15	small, see springs above
286+60	perennial stream
297+00	small or seasonal flow
318+05	perennial stream
322+15	perennial stream
330+60	perennial stream
333+20	small, from underground drainage box on Right Side
345+00	perennial stream
364+50	Bare Creek, bold stream in a concrete box culvert

Rock Quarry

A small rock quarry, now abandoned, is located on the Right Side, at Station 363+50. The mouth of the quarry is beside the ditch line and the headwall is approximately 100 feet Right.

Soil and Rock Materials

A great variety of soil and rock materials are to be encountered on this project. Material occurring in significant amounts comprise artificial fill, colluvium, alluvium, saprolite, weathered rock and hard rock, in addition to the existing roadway embankments.

Colluvial soils are abundant on slopes on the Right Side where the highway follows the bank of the New River, especially in intervals on the long, heavily forested slopes from Station 300+00 to 315+00 and from Station 350+00 to 355+00. Colluvial soils have also been found underlying roadway embankments in some areas on the Left Side between the highway and the river bank. Most colluvial accumulations are 10 feet or less in thickness, and never more than 15 feet. Colluvial soils are dark brown to yellow-brown, moist to wet, soft to medium stiff, clayey or sandy silt or loose silty sand with variable amounts of gravel, cobbles and boulders (A-4, A-5, A-2-4, A-1-b). Colluvial soils tend to be bouldery back station from 316+00, and more silty forward from there.

Some of the poorly consolidated soils that were found underlying embankments along the New River are of ambiguous origin, and may be alluvial river soils rather than colluvial

soils. Those sites lie at the interface between base-of-slope and edge-of-floodplain. They have been interpreted as colluvial because of poor sorting, a lack of rounded clasts and a general appearance similar to colluvium higher on the slopes.

Alluvial soils are found on the flood plains of Brush Creek and the New River, at ground surface and underlying roadway embankments. Alluvial soils are also found as flood plain terrace remnants on the Right Side near the end of the project.

The alluvial soils on the Brush Creek flood plain comprise about 4 to 9 feet of moist to wet, brown to gray, soft sandy silt, loose silty sand , and basal sandy gravel (A-4, A-5, A-2-4, and A-1-b). Alluvial soils in the narrow part of the Brush Creek valley up station from 275+00 tend to be thicker accumulations than the soils back station from there, and they vary from nearly all soft silt at one site to all bouldery gravel at other sites.

Alluvial soils of the New River flood plain are relatively thin accumulations back station from about 350+00, about 2 to 6 feet of soft, sandy silt or loose silty sand (A-4, A-2-4). Forward of there the alluvium is a little thicker and more variable, comprising 6 to 8 feet of soft to very soft clay and clayey silt; loose, silty sand; and/or a few feet of sandy gravel (A-7, A-4, A-2-4, A-1-b).

Alluvial terrace soils are found on the Right Side from Station 377+00 to the end of the project. They comprise 12 to 15 feet of orange sandy silt, silty sand and sandy gravel with cobbles and boulders (A-4, A-5, A-1-b). Many of the cobbles and boulders are severely weathered, indicating that these deposits are old and do not represent a Recent flood plain. The alluvial beds are buried beneath 5 to 6 feet of surficial, fine colluvial soil.

Residual soils, chiefly saprolite, are highly variable in their occurrence over the length of this project. Saprolite is usually present overlying weathered rock from the beginning of the project up to about Station 288+00. It is found in that area as a layer from a few feet up to about 14 feet in thickness, consisting of brown to orange-brown, micaceous medium-dense to very dense silty sand and medium-stiff to hard sandy silt (A-2-4, A-4, A-5).

Saprolite is not usually present in the segment from Station 288+00 to Station 316+50. Saprolite was found in only 2 out of more than 60 borings made in that area, where weathered rock or hard rock is at the surface or covered directly by colluvium or fill.

Saprolite is abundant beyond Station 316+50. It is composed chiefly of brown to orange-brown, medium-dense to very dense, micaceous silty sand (A-2-4) in a layer 5 feet to more than 20 feet thick overlying weathered rock. The composition can be medium-stiff to hard sandy silt (A-4) in a few places.

Fine soils dominate the residual beds up station from 374+00, in response to a change in the parent lithology. Saprolite and structureless residual soils in that area are composed chiefly of bright orange to yellow, soft to medium-stiff, clayey silt (A-5) with liquid limits around 60 and plastic indices of NP to 3. Those soft soils may be interlayered with beds of stiff, sandy silt or dense, silty sand saprolite (A-4, A-2-4). Residual soil thickness

approaches 20 feet in that area, and the residual soils may be overlain by surficial fine colluvial soil or by alluvial terrace beds.

Artificial fills occur at various sites on the Right Side where soils from home site excavations have been placed on slopes above the existing ditchline. Some of those fill slopes are at angles approaching 40 degrees, and some will impact retaining wall envelopes. Artificial fill soils are brown, orange-brown, or red-brown, soft, sandy silt and loose, silty sand. Some artificial fills contain suspended gravel, cobbles or boulders (A-4, A-2-4, A-1-b).

Roadway embankment soils vary from brown, soft sandy silt or loose silty sand with a few suspended gravels and cobbles to a mix of loose boulders, cobbles and gravel with interstitial sand and silt (A-4, A-5, A2-4, A-1-b). The coarser embankment soils are found between Stations 275+00 and 316+00. Most embankments are between 5 and 10 feet thick, with the maximum around 12 to 14 feet.

Weathered rock appears as brown to gray-brown, friable, micaceous, sandy, severely weathered mica gneiss. The weathered rock layer is seldom more that 5 feet thick overlying hard rock.

Hard rock is abundant on this project from Station 275+00 to 316+00 and from Station 343+00 to 372+00. Virtually all the rock from the beginning of the project to Station 368+00 is mica gneiss metasandstone with very infrequent interbeds of mica schist; the only exception being a bed of amphibolite between Station 304+50 and 305+50. Those lithologies are all part of the Ashe metamorphic suite, unit Zatm on the Geologic Map of North Carolina (1985).

The rock has a massive appearance in most outcrops, although on close inspection it is composed of laminated or very thinly bedded darker and lighter bands that may be highly contorted. The layering and the metamorphic foliation are generally parallel, but the foliation at most outcrops is not very strongly expressed. They generally dip less than 20 degrees in various directions in the first half of the project up to Station 311+00. Beyond Station 311+00 the layering and foliation dip consistently to the southeast at angles between 50 and 90 degrees. Where slightly to moderately weathered, and where blasted, the rock breaks into angular blocks.

The hard rock from Station 368+00 to the end of the project is amphibolite and greenish gray, moderately hard, massive to foliated mafic and ultramafic rock composed of fine chlorite, talc and feldspar. Those lithologies are seen in Right Side cuts from Station 368+ 50 to 372+00. They correspond to unit PzZu - serpentinite, soapstone, and other altered ultramafic rock - on the Geologic Map of North Carolina, 1985. The change in bedrock lithology coincides with the change in residual soils from predominantly mica-sand-silt soils developed on the mica gneiss terrain to clay-silt soils on the mafic terrain.

Geotechnical Descriptive Analysis

The project will be described in segments in accord with changes in topography and subsurface conditions as follows:

Stations 252+50 to 268+00

The roadway in this segment lies at the transition from base-of-slope to floodplain in the valley of Brush Creek. The terrain on the Right Side alternates between existing cuts 15 to 25 feet high and gently sloping residential lots. The Left Side is bordered by the flood plain.

Preliminary plans call for retaining walls on the Right Side at the base of most of the existing cuts, and for a retaining wall on the Left Side where the channel of Brush Creek lies near the base of the existing embankment slope. Where retaining walls are not called for, Right Side cuts will be about 5 feet deep and Left Side fills about 5 feet high.

Residual soils comprise about 5 to 12 feet of silty sand saprolite (A-2-4) overlying weathered rock hard mica gneiss. A boring at a high point 100 feet Right of Station 262+50 penetrated 40 feet of saprolite. A few small rock outcrops are exposed in cuts around Stations 255+00 and 260+50.

Residual materials from Station 253+00 to Station 256+00 are overlain by artificial fill (A-4) from a driveway cut higher on the slope. The fill slope adjacent to the highway is at angles approaching 40 degrees.

Alluvial soils of the Brush Creek floodplain, on the Left Side, comprise 3 to 12 feet of soft sandy silt and loose silty sand, with or without basal sand and gravel (A-4, A-2-4, A-1-b). These alluvial soils overlie weathered rock or hard rock.

Stations 268+00 to 271+00

This short segment lies between a steep slope on the Right Side and a steep embankment slope beside Brush Creek on the Left Side. Plans call for retaining walls on both sides of the road.

Natural soils on the Right Side slope above the road comprise 3 to 5 feet of loose, silty to sandy colluvium (A-2-4, A-4) that overlies weathered rock in most places. Saprolite, where present, consists of a few feet of sandy silt. The weathered rock layer is 3.5 feet or less in thickness grading to hard rock. Artificial fill (A-1-b) has been placed in a layer up to 10 feet thick over the natural soils. The slope on the fill adjacent to the highway is about 38 degrees.

Water is flowing from a spring located approximately 40 feet Right of 269+75. It accumulates as standing water in the ditch and in saturated ground on the shoulder between the spring and a drainage pipe at Station 270+50.

The existing roadway embankment, composed of silty sand, gravel and boulders, is about 10 feet high on the Left Side, overlying a few feet of colluvium. Brush Creek flows against the base of the embankment in part of this segment.

Stations 271+00 to 275+00

This segment of the roadway is to be constructed on the existing embankment, with no significant additional fills or cuts. A retaining wall is to be constructed on the Left Side. The existing embankment is about 7 to 10 feet high, composed of silty sand, gravel, and boulders (A-1-b).

Stations 275+00 to 283+00

A Right Side cut is planned for this segment of the roadway. The maximun cut will be about 20 feet deep, leaving an exposed cut face about 40 feet high. Hard rock is abundant in the existing cut, especially in the high cut face between Stations 276+00 and 279+00, where rock is exposed beneath only a few feet of silty sand saprolite.

The rock is good quality mica gneiss grading with increasing mica content almost to schist. Foliation and layering are parallel and not well expressed, dipping 25 degrees or less and rolling through horizontal. Undulating or rough exfoliation joints dipping out of the cut at moderate angles are abundant in the upper 5 to 10 feet of rock, but they are generally not present below that. Most other joints are near vertical and more or less parallel with the cut face.

Hard rock in the existing cut dies out at about Station 280+00 and is not exposed beyond there. Borings from there to the end of this segment have found between 4 feet and 13 feet of silty sand saprolite (A-2-4) overlying thin weathered rock and hard rock.

Water is cascading over the existing rock cut at Station 277+00.

Stations 283+00 to 287+50

The project in this segment crosses a part of the Brush Creek flood plain on an existing embankment that is 5 to 10 feet high. Brush Creek flows close by the embankment on the Left Side. A small tributary stream meanders along the Right Side of the highway before crossing the road in a concrete culvert at Station 286+75. Plans call for a few feet of fill to be added to the embankment on the Right Side.

The existing embankment is composed of loose silty sand, gravel, and boulders. The embankment overlies 3 to 10 feet of alluvium that varies in composition from very loose to loose, silty sand and soft sandy silt to all loose, sandy gravel, cobbles and boulders (A-2-4, A-4, A-1-b).

Brush Creek is scouring and undermining the existing embankment on the Left Side between Stations 285+00 and 286+00.

Stations 287+50 to 290+00

This segment comprises a Right Side cut in hard rock. An existing cut at this site is to be extended approximately 15 feet Right, to result in a cut face about 35 feet high.

Hard rock in the existing cut is exposed from the base of the cut almost to the natural ground surface at the top of the cut, with negligible overburden. The lithology is mica gneiss, grading with increased mica content almost to schist. The layering and foliation are parallel and undulating about the horizontal, with maximum dips of about 25 degrees. There are very few foliation joints.

Nearly horizontal exfoliation joints are open in the upper 5 to 10 feet of the existing cut. Those are cut by steeply dipping cross joints, which break the rock into blocks 3 to 5 feet wide. The rock below 10 feet appears massive and sound, and where broken it tends to form large blocks 5 to 10 feet wide. The existing cut appears to be formed on two systems of southwest-dipping, persistent joints resulting in a stable, stepped cut face; however, a stereo-net analysis has indicated a potential for wedge failure on slopes of ¾:1 or steeper.

Stations 290+00 to 292+50

The existing roadway in this segment is constructed on about 8 feet of bouldery roadway embankment overlying about 6 feet of alluvium that varies from medium stiff sandy silt to all bouldery sand and gravel (A-4, A-1-b). Brush Creek flows close by the foot of the embankment on the Left Side, with hard rock exposed at places in the channel. Plans call for a retaining wall on the Left Side. Proposed cuts and fills are negligible.

There is a wet area on the Right Side from 290+50 to 292+00, between the road shoulder and the base of the natural slope, which is about 45 feet Right at its farthest point.

Stations 292+50 to 297+00

The project in this segment continues to follow Brush Creek on its approach to the New River, with an existing low cut in rock on the Right Side and the creek channel in rock on the Left Side. Plans call for extending the existing cut about 8 feet to the Right, resulting in a cut face that is 10 to 15 feet high; and constructing a retaining wall on the Left Side as far as Station 295+50.

The existing roadway on the Left Side is constructed on 6 to 10 feet of bouldery embankment overlying hard rock. The cut on the Right Side is in hard rock overlain by 2 to 4 feet of colluvium composed of medium-stiff sandy silt (A-4) with suspended cobbles and boulders.

The rock in this segment is composed of good to very good quality mica gneiss. Foliation and layering are parallel, and they dip less than 20 degrees undulating about the horizontal. There are very few foliation joints. Exfoliation joints are very gently dipping and spaced about 1 to 3 feet apart. Most other joints dip southwest or west towards the road, with the majority of those at very steep angles.

A small stream crosses the roadway near the end of this segment.

Stations 297+00 to 300+00

This segment lies beside the mouth of Brush Creek where the roadway turns to follow the bank of the New River. An existing cut face on the Right Side is about 25 feet high. The Left Side is an embankment slope about 15 feet high.

The existing Right Side cut is in hard rock overlain by a few feet of colluvium. Plans call for extending the cut about 12 feet Right, resulting in a cut face about 35 feet high. The rock is composed of fair to good quality mica gneiss. Much of the existing cut face is formed on rough or undulating joint surfaces that dip towards the road at moderate angles. Those are cut by a few steep cross joints.

Stations 300+00 to 303+00

This segment of the roadway runs along the bank of the New River at the base of a colluvial slope. Plans call for retaining walls on both sides of the road.

Borings on the Right Side, on the slope above the road, found 5 to 13 feet of colluvium composed of gravel, cobbles and boulders in a sandy silt matrix, overlying a thin layer of weathered rock grading to hard rock. Borings on the Left Side shoulder found as much as 14 feet of colluvium beneath 5 to 7 feet of embankment.

Stations 303+00 to 316+50

This long segment continues to follow the bank of the New River, with cuts in hard rock and colluvium on the Right Side and embankments 5 to 10 feet or more in height on the Left Side. Preliminary plans call for a retaining wall the full length of this segment on the Right Side and a shorter wall on the Left Side between Stations 306+50 and 311+00.

Hard rock is visible in existing cuts for most of this segment, the exceptions being intervals around Stations 303+00 to 304+00, 305+50 to 306+50 and 309+50 to 310+50. The lithology is mica gneiss, except for amphibolite between Stations 304+50 and 305+50.

The layering and foliation are parallel, dipping 20 degrees or less and undulating about the horizontal, up to Station 311+00. From that station onward the layering and foliation dip consistently to the southeast at angles between 50 and 90 degrees. Foliation joints are rare before Station 311+00. Foliation joints are common beyond Station 311+00 and they have the potential to contribute to wedge intersections dipping out of the slope.

Two principle joint sets, both striking northwest, parallel with the road, dominate the existing rock cuts. One set of rough or undulating joints dip out of the cut faces at angles between 25 and 50 degrees. A second set of rough joints dip southwest or northeast at angles of 70 to 90 degrees. Both sets can be persistent for tens of feet, and large areas of

the existing cut faces are formed on those joints. Spacing for both sets varies from about 1 foot to more than 5 feet.

Colluvium is present at the ground surface on slopes above the road throughout this segment. It has also been found in bore holes beneath the roadway embankment. It is composed of gravel, cobbles and boulders in a sandy silt matrix. It forms a layer that varies in thickness up to 10 feet overlying hard rock, but the colluvial cover is thin to negligible from about 312+00 to the end of the segment.

Stations 316+50 to 324+00

This segment of the project crosses two small valleys on the Right Side and a low hill between them. The New River and a narrow strip of floodplain are on the Left Side. The valleys on the Right are occupied by house sites, and the hill is a wooded lot with an abandoned house.

The existing Right Side cut slope is about 20 feet in maximum height, and the roadway embankment on the Left Side is 10 feet or less in height.

Plans call for extending the existing embankment about 5 feet to the Left and extending the Right Side ditch line as much as 17 feet Right. This will require 3 to 7 feet of new fill on the Left, and a new cut on the Right excavated to a depth of 10 feet, with a cut face 20 to 25 feet high.

Borings on the Left Side, on the flood plain near the base of the existing embankment, found only 3 to 5 feet of alluvial loose silty sand (A-2-4) or medium stiff sandy silt (A-4). The alluvium overlay a thin layer of saprolite and /or weathered rock, which graded quickly downward to hard rock. Borings on the Right Side in the area of the proposed cut found 12 feet to more than 18 feet of saprolite, composed of brown-orange to gray, moist, loose to dense, silty sand (A-2-4) and medium-stiff to stiff, sandy silt (A-4, A-5).

Stations 324+00 to 326+00

The roadway in this segment continues along the base of a slope beside the flood plain. A house and driveway occupy the slope above the road on the Right. The natural slope there has been covered with artificial fill from excavation of the house site. Plans call for constructing a retaining wall on the Right Side and extending the embankment on the Left Side. Relocation of a driveway on the Right Side will require an additional short retaining wall. Relocation of a driveway on the Left Side will require as much as 10 feet of new embankment fill on that side.

Residual materials in this segment comprise saprolite that varies in thickness from 0 to more that 25 feet, overlying a few feet of weathered rock that grades downward to hard mica gneiss. The saprolite is chiefly orange to brown, moist, micaceous silty sand (A-2-4), but the upper 3 to 5 feet may be orange sandy clayey silt (A-4, A-5).

Artificial fill on the Right Side slope above the road consists of orange to red-brown, soft sandy to clayey silt in a layer as much as 8 feet thick.

The residual soils on the Left Side are overlain by 3 to 5 feet of orange to brown, silty colluvium (A-4) and by about 8 feet of roadway embankment, which is composed of brown and orange, sandy clayey silt with a little gravel (A-4).

Stations 326+00 to 338+50

Gentle slopes and small valleys in this part of the project are covered with house sites and wood lots. A series of houses on the Left Side occupy the base of the natural slope between the existing roadway embankment and the New River flood plain farther left.

Construction in this part of the project will involve ditch line cuts of 5 feet or less on the Right Side and extension of the Left Side shoulder 5 feet farther Left. Relocation or re-grading of driveways on the Left Side will involve placement of up to 10 feet of new embankment.

Borings were made only in areas of the larger proposed cuts and fills, which are located near the beginning of this segment. Soils are similar to those in the previous segment, consisting of at least 5 feet or more of saprolite (A-2-4, A-4) on the Right Side and a few feet of saprolite or weathered rock at the natural ground surface on the Left Side, beyond the base of the existing roadway embankment. No boring were made in this segment beyond Station 330+50.

Stations 338+50 to 345+00

This segment contains the approaches to the intersection with SR 1630 (Old Wilkesboro Road). The segment is located at the base of a high, steep slope on the Right Side, that ends in a narrow ravine near Station 345+00. SR 1630 runs almost parallel with, and close by, NC 16 as it descends the slope on the Right Side on its approach to the intersection. The New River flows near the base of the highway embankment on the Left Side.

Plans call for a retaining wall between NC 16 and SR 1630 from Station 338+50 to Station 340+00. A retaining wall is also planned for the Left Side embankment from Station 339+50 to the end of this segment. A small cut all in hard rock will be required at Station 344+50, with a resulting cut face about 10 feet high.

The existing roadway embankment is 6 to 12 feet thick on the Left Side, consisting of brown, silty sand and sandy silt (A-2-4, A-4) with some embedded gravel, cobbles and boulders.

The natural soils in this segment consist of colluvium up to 12 feet thick overlying a few feet of saprolite or directly overlying weathered rock. Where the colluvium is thickest, beneath the roadway embankment on the Left Side from 340+00 to 341+50, it includes gravel, cobbles and boulders (A-1-b) increasing in abundance near the base of the stratum.

The colluvium is about 6 feet thick in the area of the proposed Right Side retaining wall. It is composed of dark brown sandy silt and silty sand (A-4, A-5, A-2-4). The saprolite is composed of 0 to 4 feet of brown silty sand (A-2-4), grading downward to a few feet, or less than a foot, of weathered rock. The hard rock line beneath the proposed retaining wall on the Right Side is about 4 to 10 feet below the ground surface.

At the Left Side retaining wall, the combined depth of poorly consolidated soils – embankment overlying colluvium – is 13 to 25 feet, overlying thin layers of saprolite and weathered rock or hard rock.

Stations 345+00 to 348+50

This segment lies at the base of a steep slope that is completely forested. The existing Right Side cut face is as high as 35 feet. The New River flood plain is about 100 feet wide at the base of the existing roadway embankment on the Left Side.

Cuts and fills in this short segment will be minimal. No subsurface investigation was done here, other than visual observation of the existing cut face. The rock line in the cut is about 10 to 15 feet below the natural ground surface. Materials above the rock line appear to be saprolite and weathered rock.

Stations 348+50 to 364+00

This long, straight segment continues along the base of a steep to moderate, forested slope. Existing Right Side cuts vary in height from a few feet to about 25 feet. The New River flood plain is about 150 feet wide at the base of the existing roadway embankment on the Left Side. The grassy floodplain is the site of a single commercial establishment, Zaloo's Canoes, with most of the flood plain used for canoe storage and customer parking.

Preliminary plans call for a retaining wall on the Right Side for the full length of this segment. Another retaining wall is proposed for the Left Side from Station 352+50 to 354+50, between the shoulder of the highway and a driveway at the base of the embankment.

The existing roadway embankment is about 6 to 12 feet high on the Left Side. Its composition varies from brown and orange, silty sand and sandy silt with a little gravel (A-4, A-2-4) to mostly gravel, cobbles and boulders with interstitial silt and sand (A-1-b).

The natural soils in this segment typically consist of colluvium overlying saprolite, which grades downward to a thin layer of weathered rock overlying hard mica gneiss.

The colluvial layer is about 6 to 12 feet thick at the natural ground surface on the Right Side and underlying the existing embankment on the Left Side. Its composition is dark brown, sandy silt and silty sand with variable amounts of gravel and cobbles (A-4, A-2-4, A-1-b). Colluvium occurs only intermittently on the Right Side beyond Station 355+00, as a surficial cover 5 feet or less in thickness.

Saprolite is found at the surface or underlying colluvium. It is composed consistently of brown, medium dense to dense, micaceous silty sand (A-2-4), but its thickness is highly variable. Saprolite is over 20 feet thick on the slope and underlying the roadway from the beginning of this segment up to about Station 350+00. Beyond Station 350+00, the saprolite thins to less than 10 feet, and beyond Station 355+00 its occurrence is only intermittent, in a layer never more than about 5 feet thick.

The transition from saprolite downward to hard rock is usually a thin, sometimes negligible, stratum of weathered rock never more than 3 feet thick.

Hard rock is exposed intermittently in existing cuts between Stations 354+00 and 362+00. The rock is composed of mica gneiss with, in some areas, thin interbeds of mica schist. Layering and foliation dip southeast at angles between 60 and 90 degrees. The rock is more or less weathered in those exposures and the rock quality varies from very poor to very good.

Fresh hard rock is continuous in a cut from Station 362+00 to the end of this segment. Layering and foliation dip southeast at angles between 80 and 90 degrees, in beds 1 to 3 feet thick. The cut face is dominated by two sets of rough joints that dip southwest, towards the road. One set dips 45 to 60 degrees and the other is almost vertical. Persistence is about 1 to 5 feet. A third joint set is nearly horizontal.

A small, abandoned rock quarry is located on the Right Side at Station 363+50. The quarry measures about 100 feet from the entrance beside the ditch line to the head wall, and less than 100 feet in width.

The Right Side shoulder is saturated, and water is standing in the ditch between Stations 360+00 and 364+00.

Stations 364+00 to 367+50

This segment begins at a concrete box culvert over Bare Creek and it ends at the intersection with SR 1628 (Bare Creek Road). The Left Side shoulder is to be extended about 5 feet Left with the addition of a few feet of new fill. A small cut is called for on the Right Side between Stations 366+00 and 367+00. The cut will be about 5 feet deep at the ditch line and it will expose a cut face about 10 to 15 feet high. Construction will also require extension of the culvert on both sides.

A boring on the Right Side above the existing cut found 3.5 feet of bouldery, residual soil directly overlying hard rock. A boring on the Left Side on the New River flood plain found 7 feet of alluvial silty sand with basal gravel overlying thin weathered rock and hard rock. The flood plain soil has been covered with 3 feet of artificial fill consisting of silty sand with gravel and cobbles.

Stations 367+50 to 375+50

This segment begins at the intersection of SR 1628 and ends at a driveway on the Right Side. Existing cuts on the Right Side are about 5 to 15 feet high, but the natural slope

comes to the ditch line at some points near the beginning of the segment. Hard rock is exposed intermittently in existing, low cuts between Stations 368+00 and 370+00, and continuously in a higher cut face between Stations 370+00 and 372+00. The slope above the cuts is forested and covered with numerous natural rock outcrops up to Station 371+00. Beyond that station the ground above the existing road cut is a grassy lawn with a driveway running parallel to the highway about 100 feet Right. The New River flood plain is about 150 feet wide on the Left Side, and a commercial building and parking area have been constructed on a few feet of artificial fill over the flood plain.

Preliminary plans call for a retaining wall on the Right Side between Stations 369+00 and 374+00. Some small cuts may be necessary ahead of the wall.

Construction on the Right Side can be expected to encounter considerable variation in the depth to rock line in this segment, as well as variation in the composition of the overlying residual material. For example, in the first part of the segment where natural outcrops are abundant, a boring between two outcrop areas penetrated 17 feet of interlayered saprolite and weathered rock before reaching the rock line. Again, after a very shallow rock line at the top of existing cuts around Stations 370+00 to 372+00, the rock line plunges at stations beyond there, and it was not encountered after penetrating 20 feet of saprolite in a boring at 374+00.

Residual soils fall into two groups. Saprolite composed of brown, micaceous, sandy silt to silty sand (A-4, A-2-4) is found in most of this segment as a stratum 0 to 10 feet thick at the ground surface or underlying a few feet of colluvium. Residual soils change at Station 374+00 to a thick stratum of orange clayey silt or silty clay (A-5, A-7) without relict structure, overlying or interbedded with brown, silty sand saprolite (A-2-4). The change to finer soil reflects a change in the lithology of the parent material from mica gneiss/metasandstone to mafic rock.

Colluvial soils are found as localized, discontinuous, surficial layers five feet or less in thickness composed of silty sand with highly variable amounts of gravel, cobbles and small boulders (A-4, A-2-4, A-1-b).

A few feet of artificial fill from the driveway cut has been placed on the steep slope above the existing Right Side ditch line between Stations 372+00 and 375+50. The material consists of soft clayey to sandy silt (A-4) with some suspended gravel.

Stations 375+50 to 379+00

This final short segment of the project lies at the base of a long, gentle slope on the Right Side that is in pasture. An existing Right Side cut face is about 15 feet high. The New River flood plain on the Left Side is about 200 feet wide, where there are 2 houses and a convenience store/service station. Construction on this segment consists of extending the existing cut a few feet farther Right.

Subsurface materials on this segment are very different from materials on the rest of the project. There is no rock line to be encountered in construction. Soils are predominantly

fine soils – clay and silt – including colluvial and alluvial terrace soils as well as residual soils.

A boring on the Right Side above the existing cut at Station 376+00 penetrated 21 feet of saprolite composed of orange, sandy clayey silt (A-5) with minor layers of silty, fine to coarse sand (A-2-4, A-1-b). Borings on the Right Side at Stations 377+00 and 378+00 found 5 to 7 feet of colluvium consisting of orange, medium stiff, clayey to sandy silt (A-4, A-5) overlying approximately 14 feet of alluvial terrace soils.

The alluvial terrace soils consist of orange loose, silty sand (A-2-4) and soft to medium stiff, sandy to clayey silt with suspended pebbles (A-5), overlying several feet of basal orange silty sand and gravel with cobbles and boulders (A-1-b). Many of the cobbles and boulders are completely weathered to the appearance and consistency of saprolite, indicating a very old age for this terrace deposit. There is no well defined terrace topography and no topographic change between the saprolite terrain and the alluvial terrace.

Respectfully submitted,

Louis L. Acker, LG
Project Geological Engineer

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	4
R/W SHEET NO.	OF 228
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EarthTech
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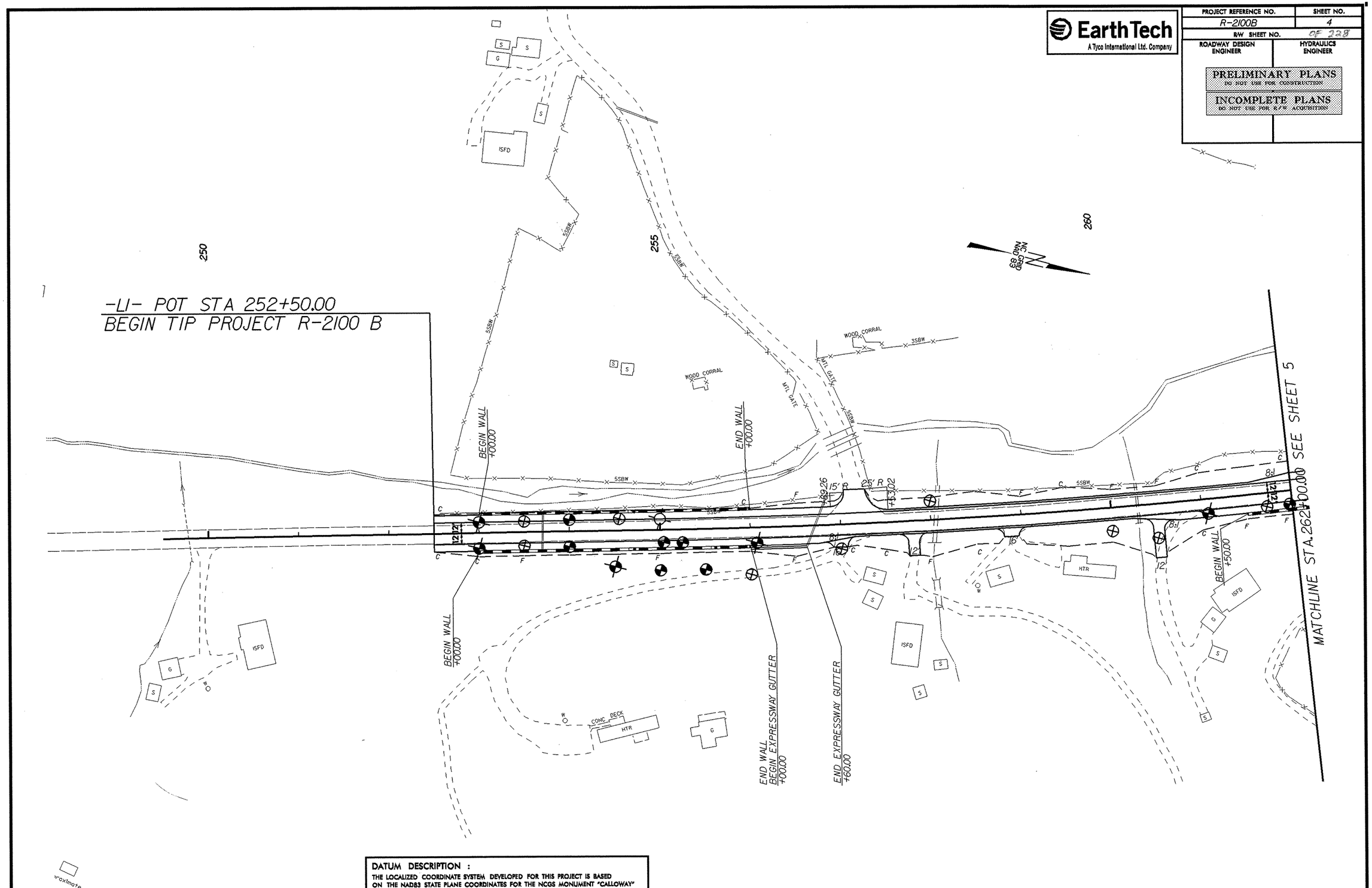
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



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THE AVERAGE COMBINED FACTOR USED ON THIS PROJECT GROUND TO GRID IS 0.99993295. ALL LINEAR DISTANCES ARE LOCALIZED HORIZONTAL DISTANCES.
THE VERICAL DATUM IS BASED ON MONUMENT "CALLOWAY" (ELEV.3652.88') (NAVD29)

FOR -L1- PROFILE SEE SHEET 14

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	5/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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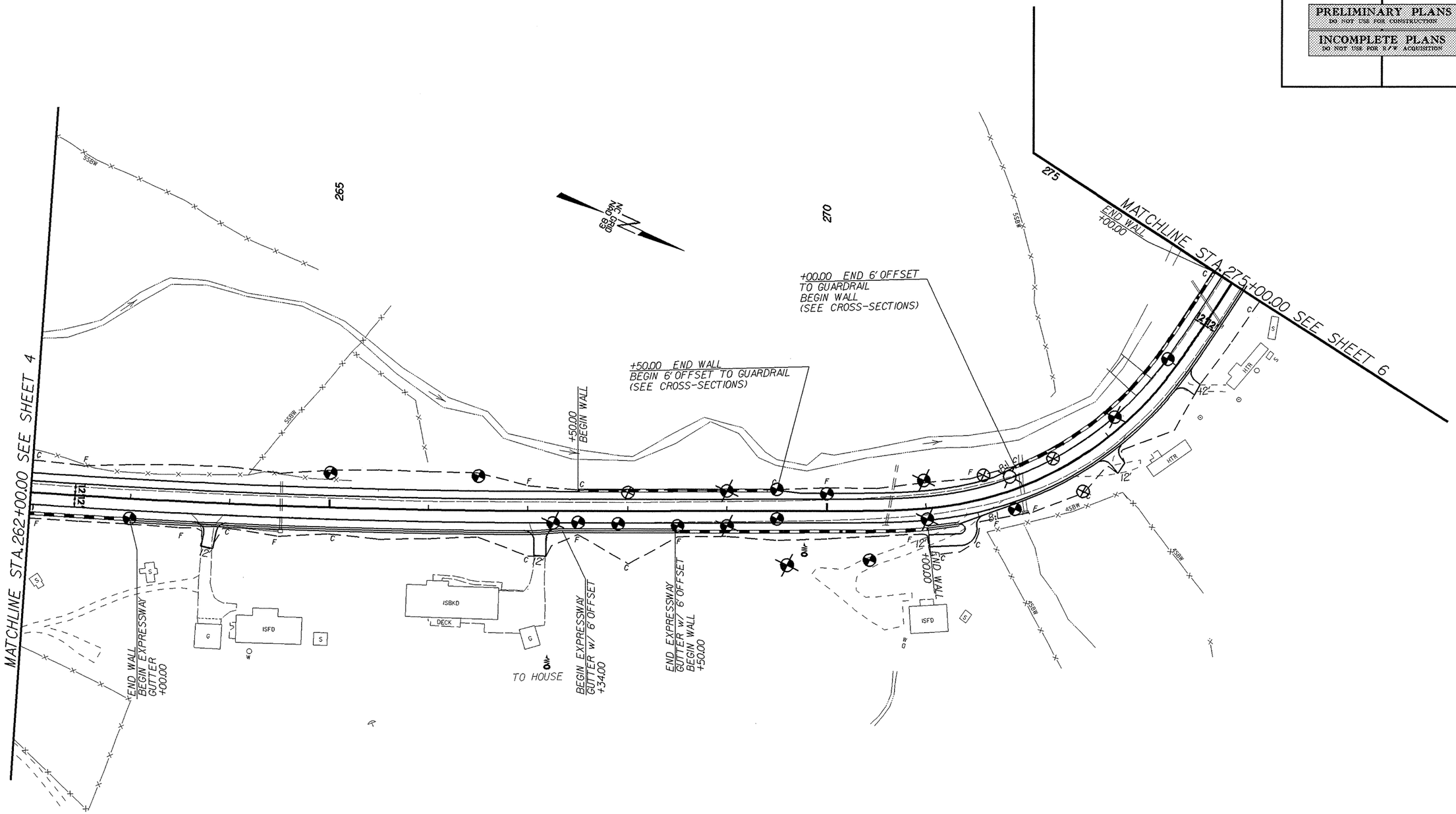

FOR -LI- PROFILE SEE SHEET 14

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	6/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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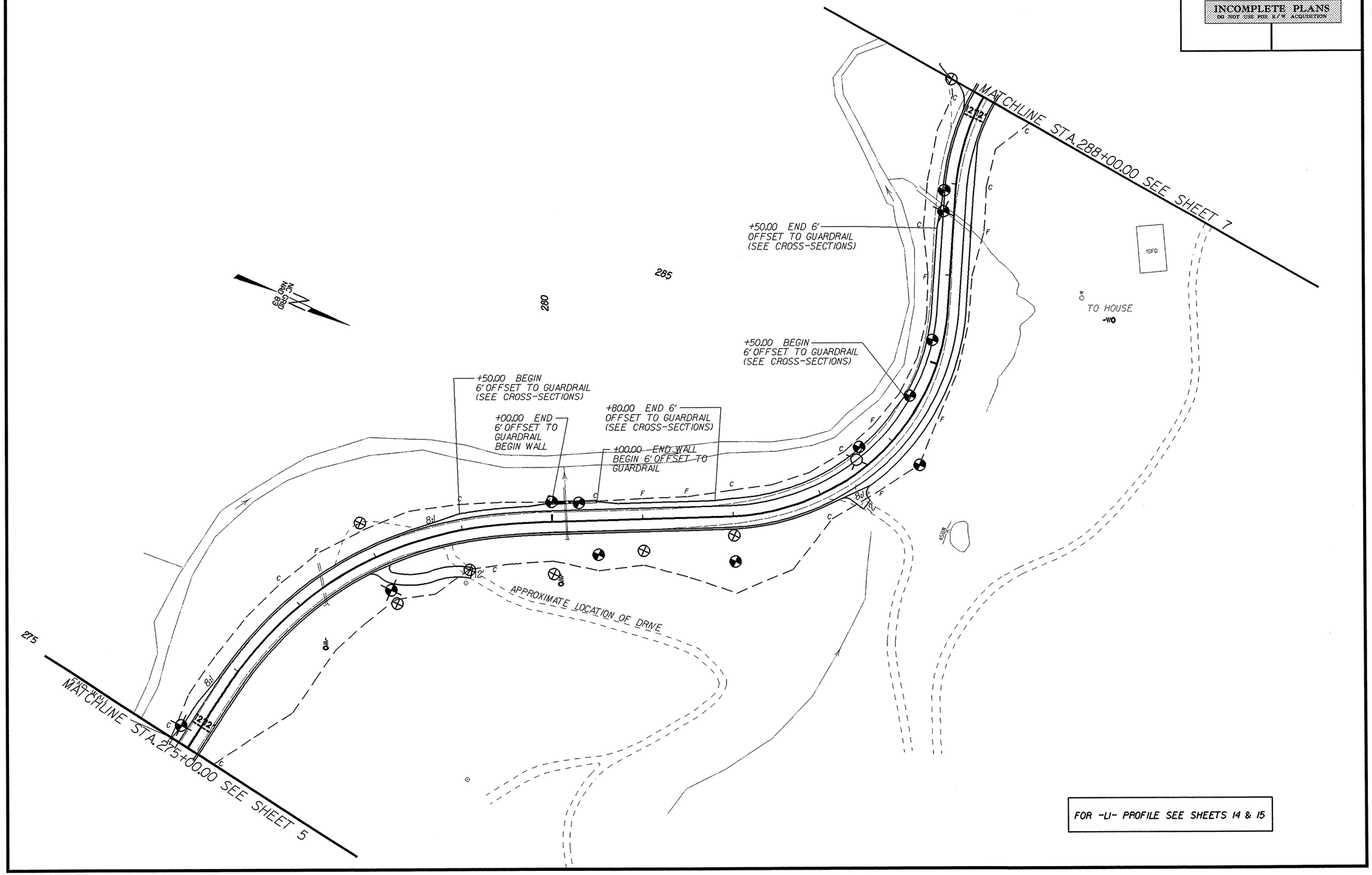

FOR -L1- PROFILE SEE SHEETS 14 & 15

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PROJECT REFERENCE NO.	SHEET NO.
R-2100B	7/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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290

295

300

NC GRID NAD 83

BEGIN WALL +50.00

END WALL +50.00

BEGIN WALL +00.00

BEGIN WALL +00.00

RIP RAP

RIP RAP

2.5' ROCK WALL

2.5' ROCK WALL

2' ROCK WALL

G DECK 2SFD DECK

MATCHLINE STA. 288+00.00 SEE SHEET 6

MATCHLINE PT A. 301+00.00 SEE SHEET 8

FOR -LI- PROFILE SEE SHEET 15

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PROJECT REFERENCE NO.	SHEET NO.
R-2100B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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INCOMPLETE PLANS
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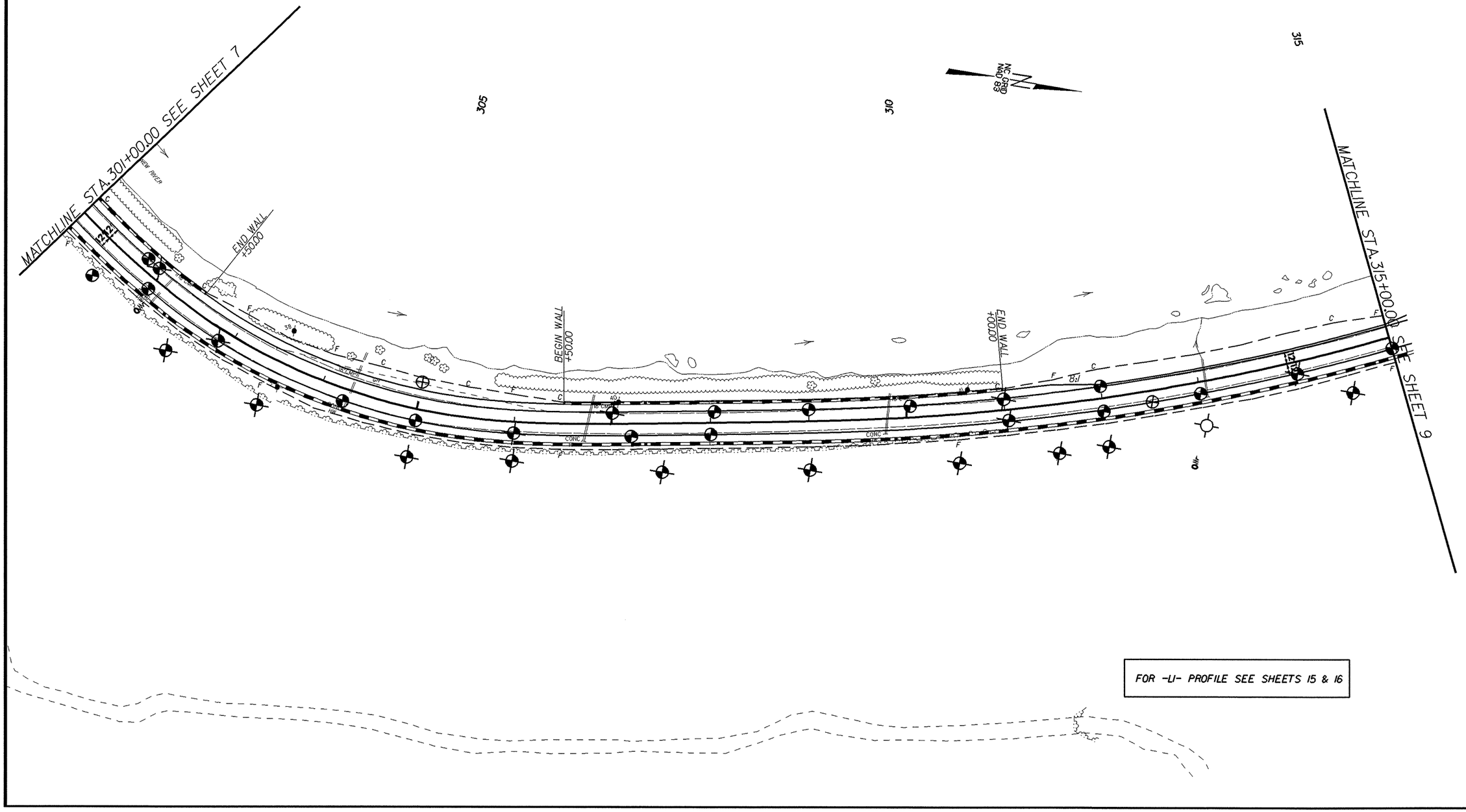

FOR -LI- PROFILE SEE SHEETS 15 & 16

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PROJECT REFERENCE NO.	SHEET NO.
R-2100B	9/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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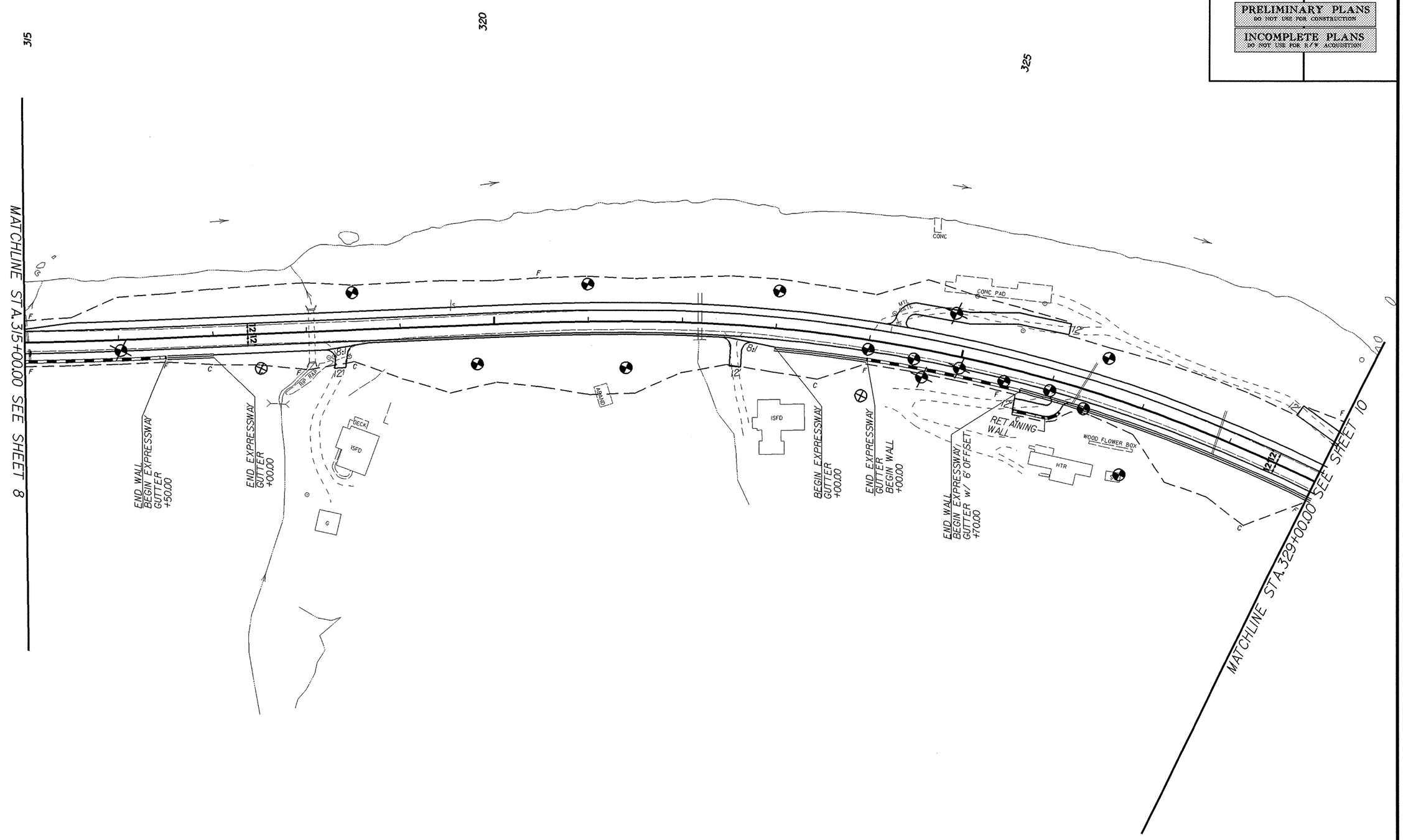

FOR -LI- PROFILE SEE SHEET 16

EarthTech
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PROJECT REFERENCE NO.	SHEET NO.
R-2100B	10/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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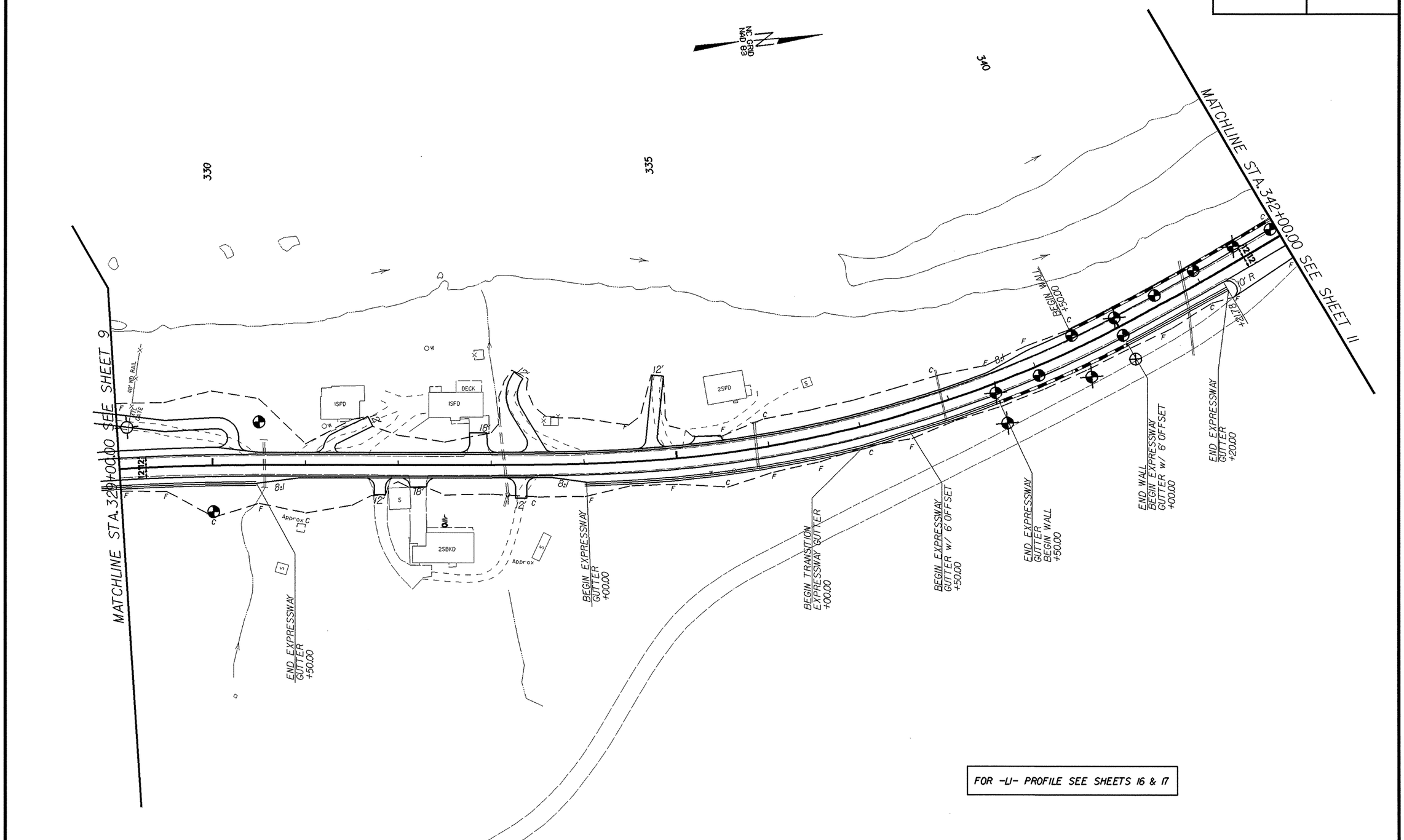

FOR -L1- PROFILE SEE SHEETS 16 & 17

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	11/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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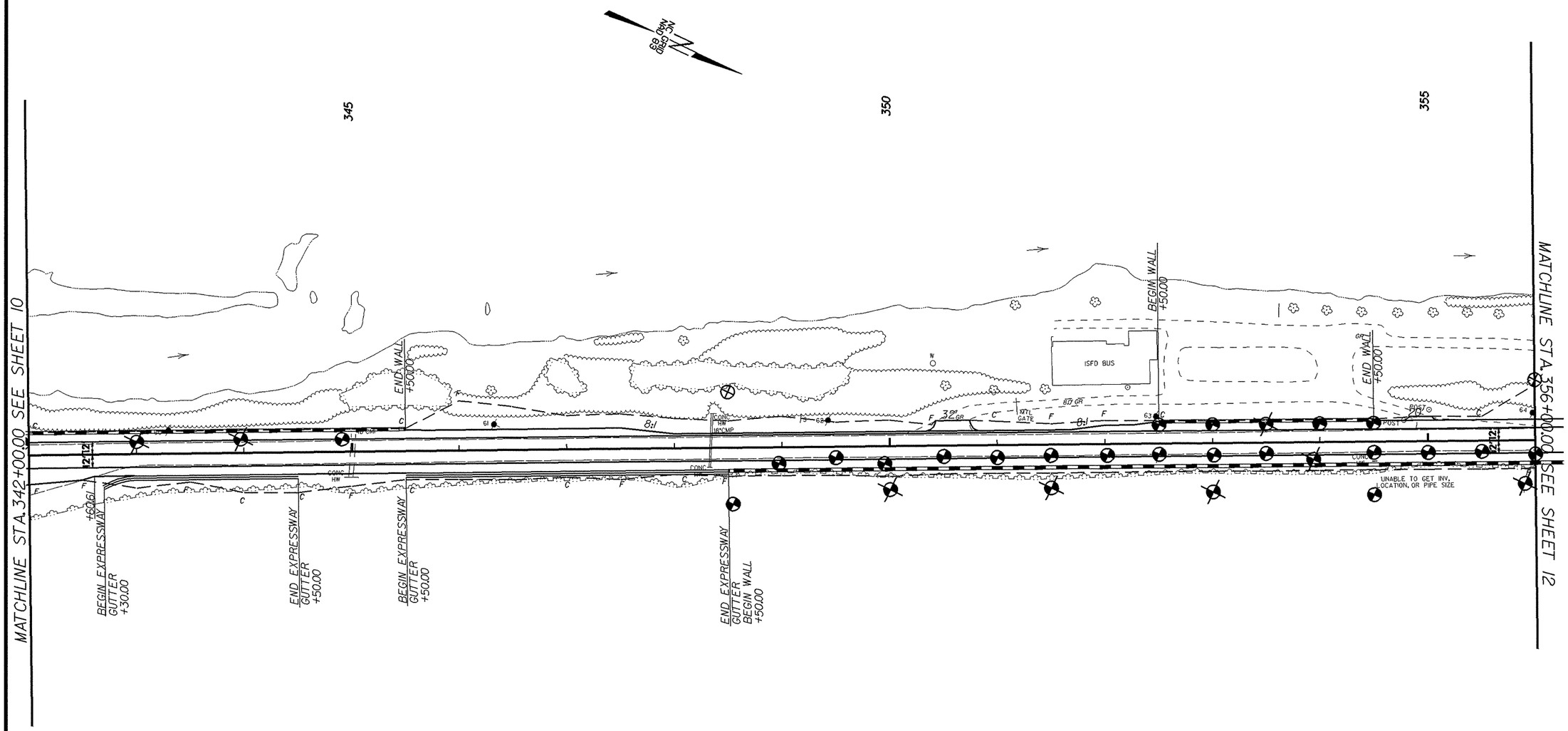

FOR -L1- PROFILE SEE SHEETS 17 & 18

PROJECT REFERENCE NO.	SHEET NO.
R-2100B	12/228
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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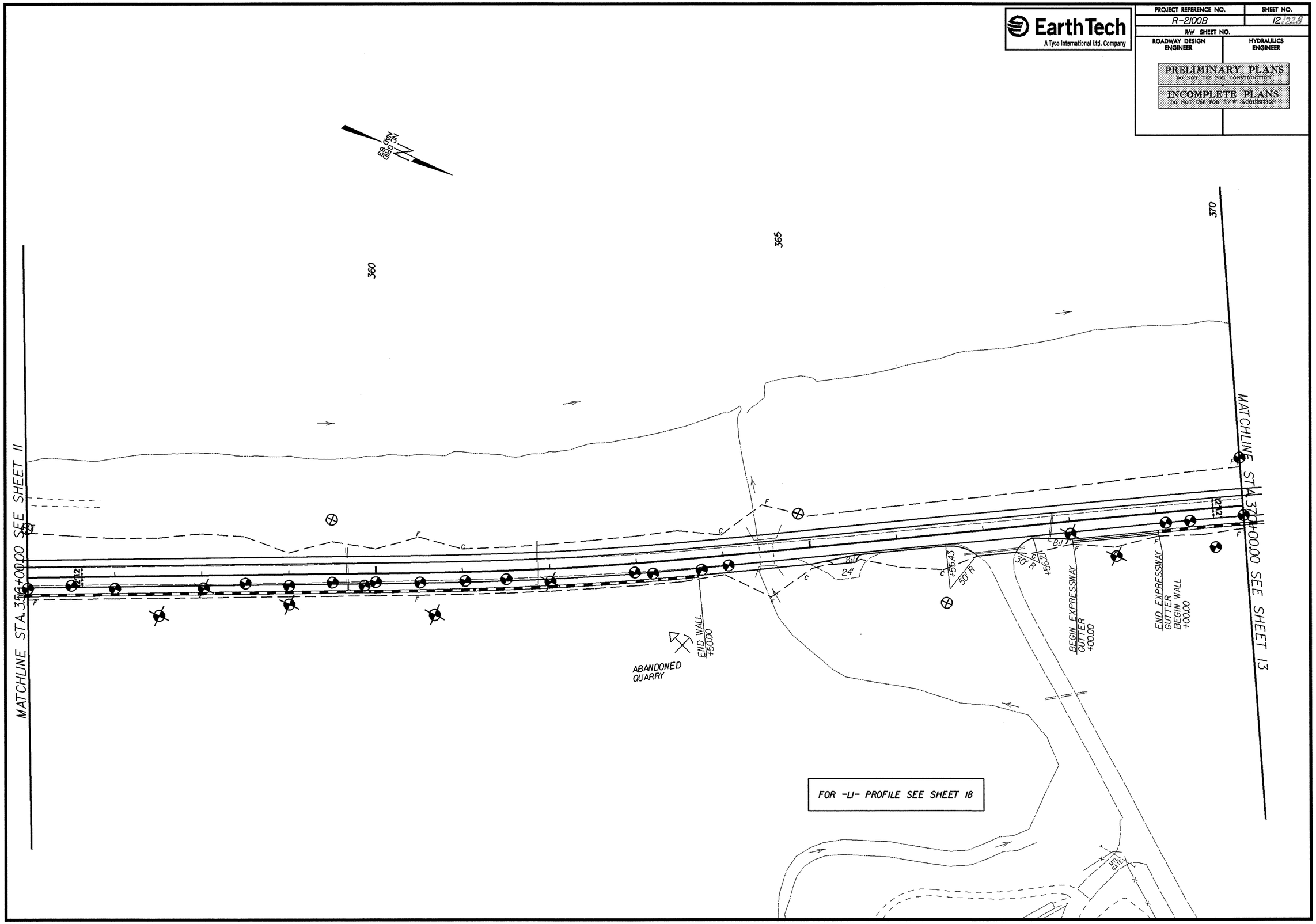

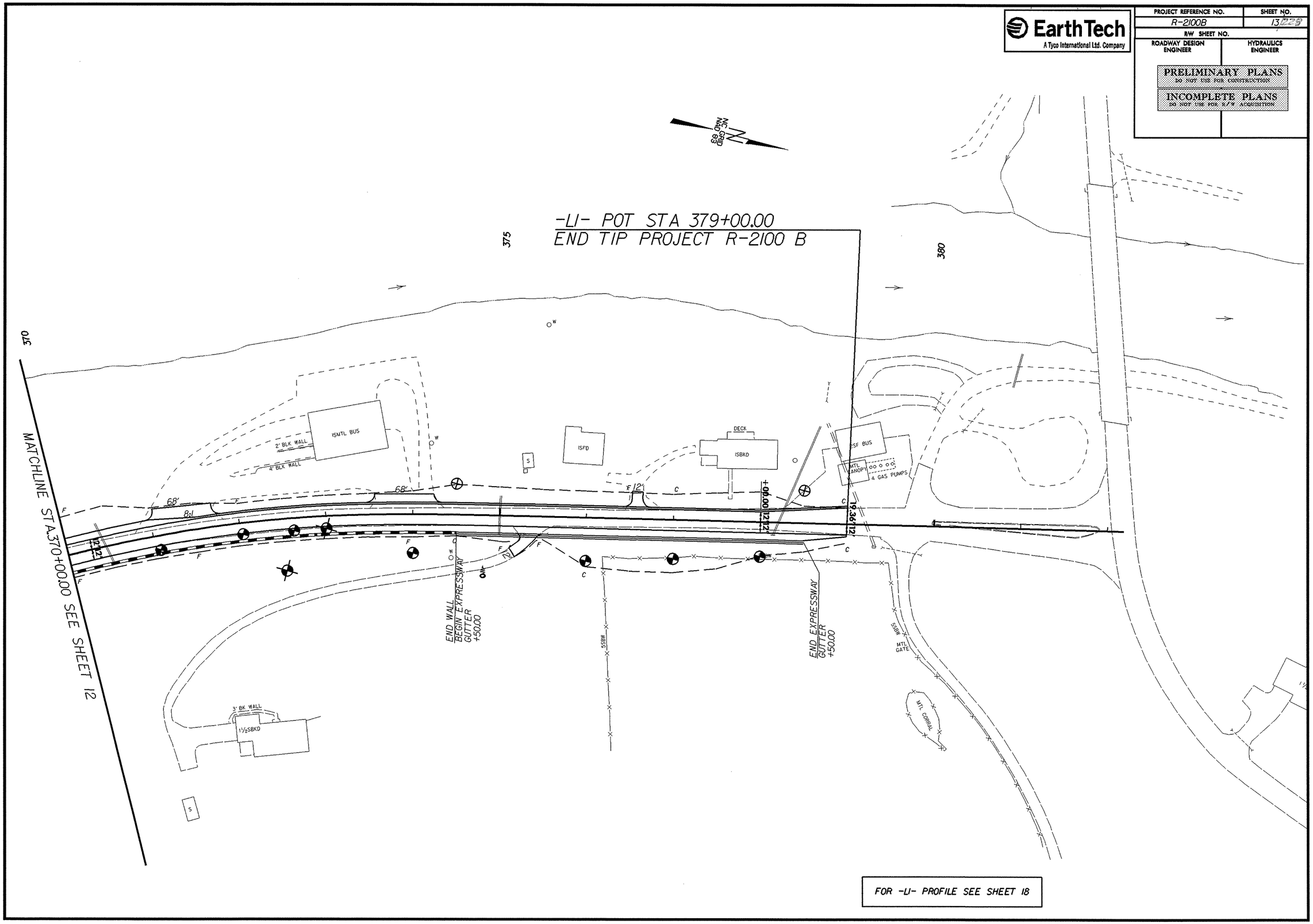

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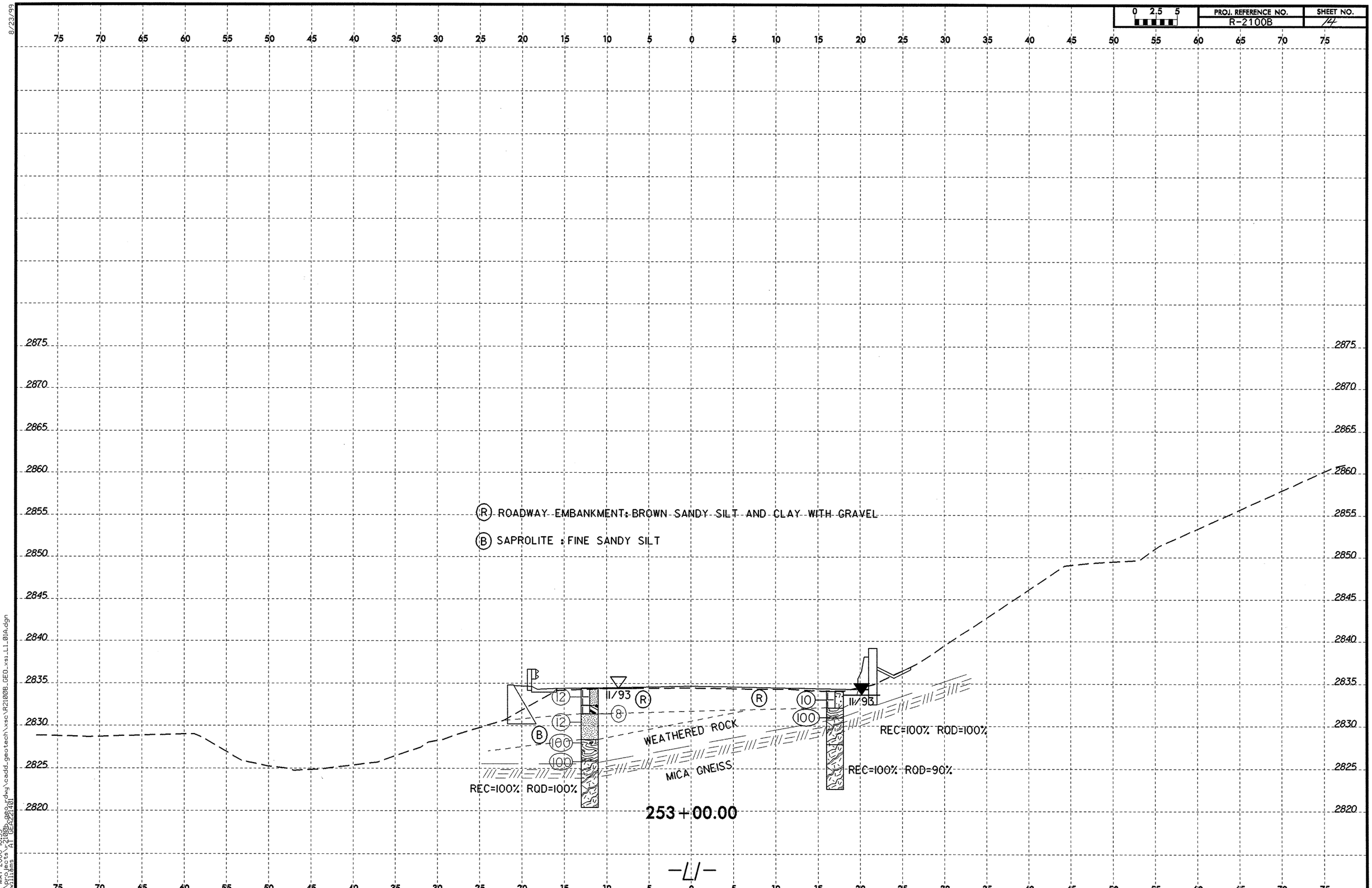
PROJECT REFERENCE NO.
R-2100B
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NC GRID NAD 83
-L1- POT STA 379+00.00
END TIP PROJECT R-2100 B
375
380
370
MATCHLINE STA.370+00.00 SEE SHEET 12
ISMTL BUS
2' BLK WALL
4' BLK WALL
ISFD
DECK
ISBKD
ESF BUS
MTL CANOPY
4 GAS PUMPS
68'
8:1
12'
+00.00
19.36'
END WALL
BEGIN EXPRESSWAY
GUTTER
+50.00
END EXPRESSWAY
GUTTER
+50.00
5SBW
MTL GATE
MTL CORRAL
3' BK WALL
1½SBKD
FOR -L1- PROFILE SEE SHEET 18



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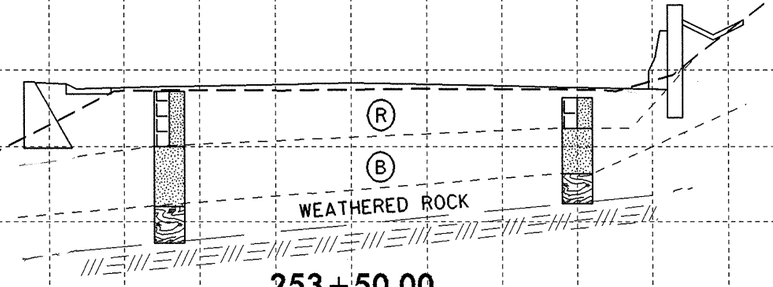
2885 2880 2875 2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820

Ⓡ ROADWAY EMBANKMENT: BROWN FINE SANDY SILT WITH A FEW COBBLES AND BOULDERS

Ⓑ SAPROLITE : FINE SANDY SILT



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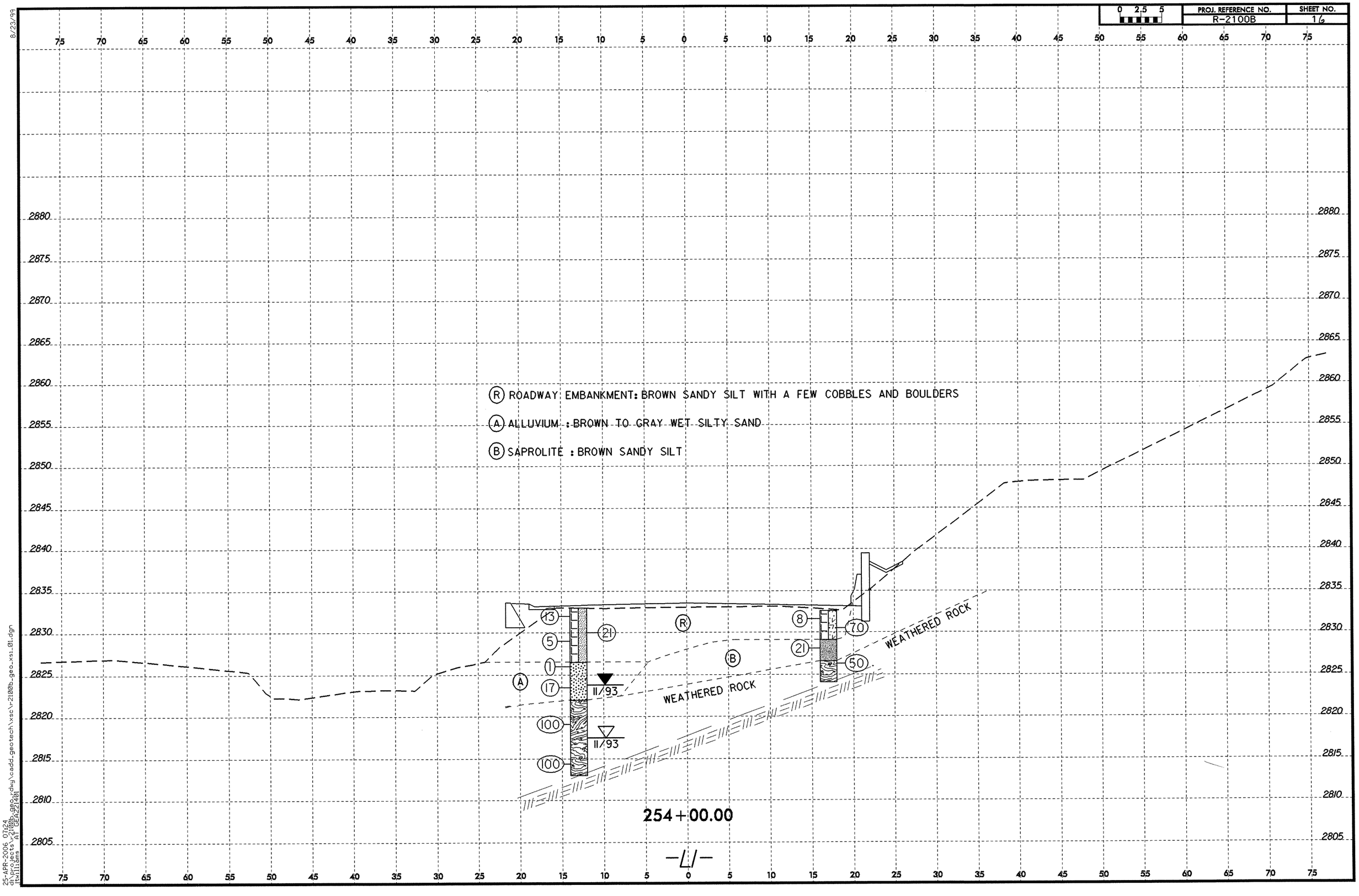

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PROJ. REFERENCE NO.
R-2100B
SHEET NO.
16
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH A FEW COBBLES AND BOULDERS
A ALLUVIUM : BROWN TO GRAY WET SILTY SAND
B SAPROLITE : BROWN SANDY SILT
WEATHERED ROCK
WEATHERED ROCK
11/93
11/93
254+00.00
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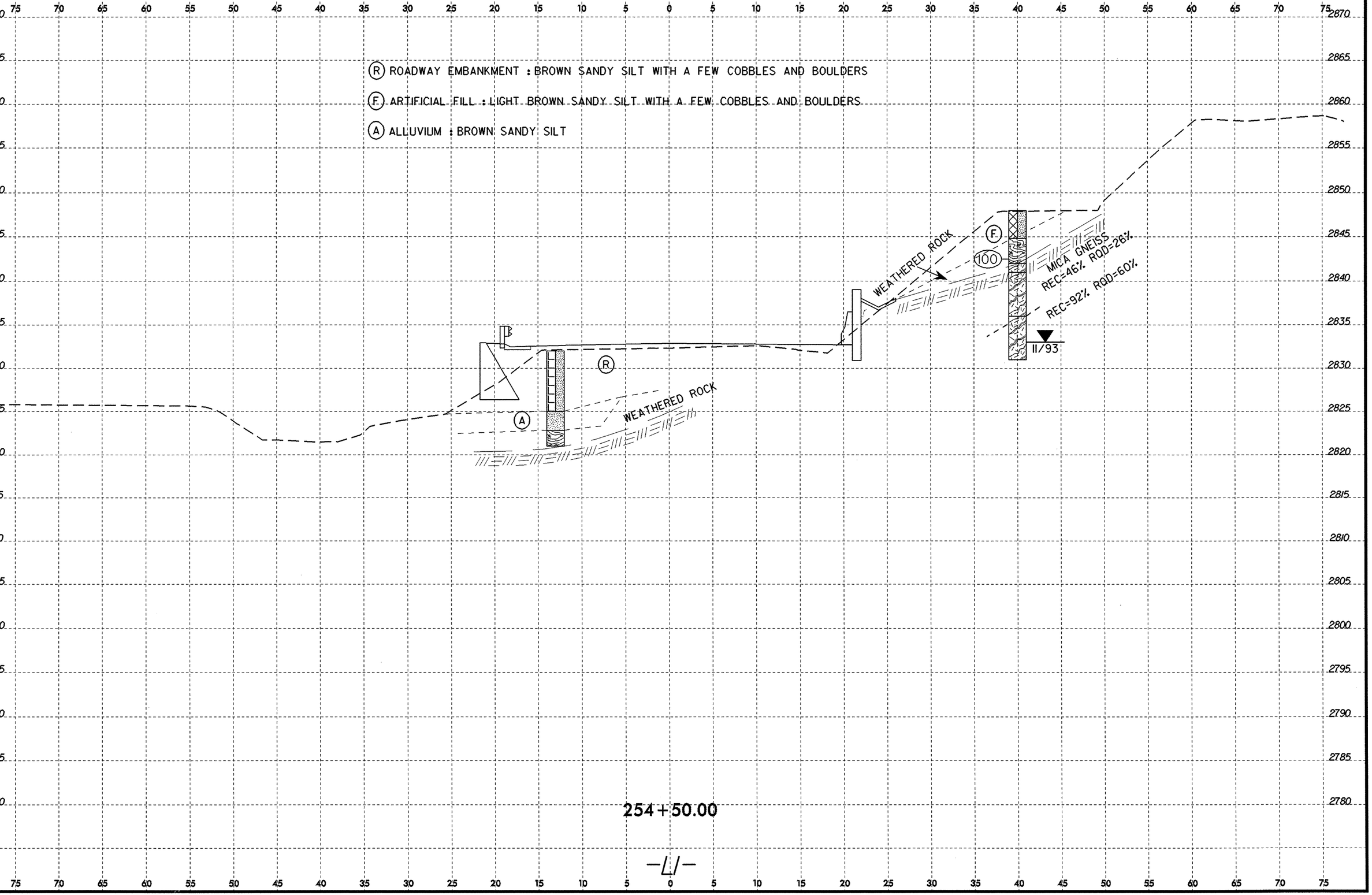

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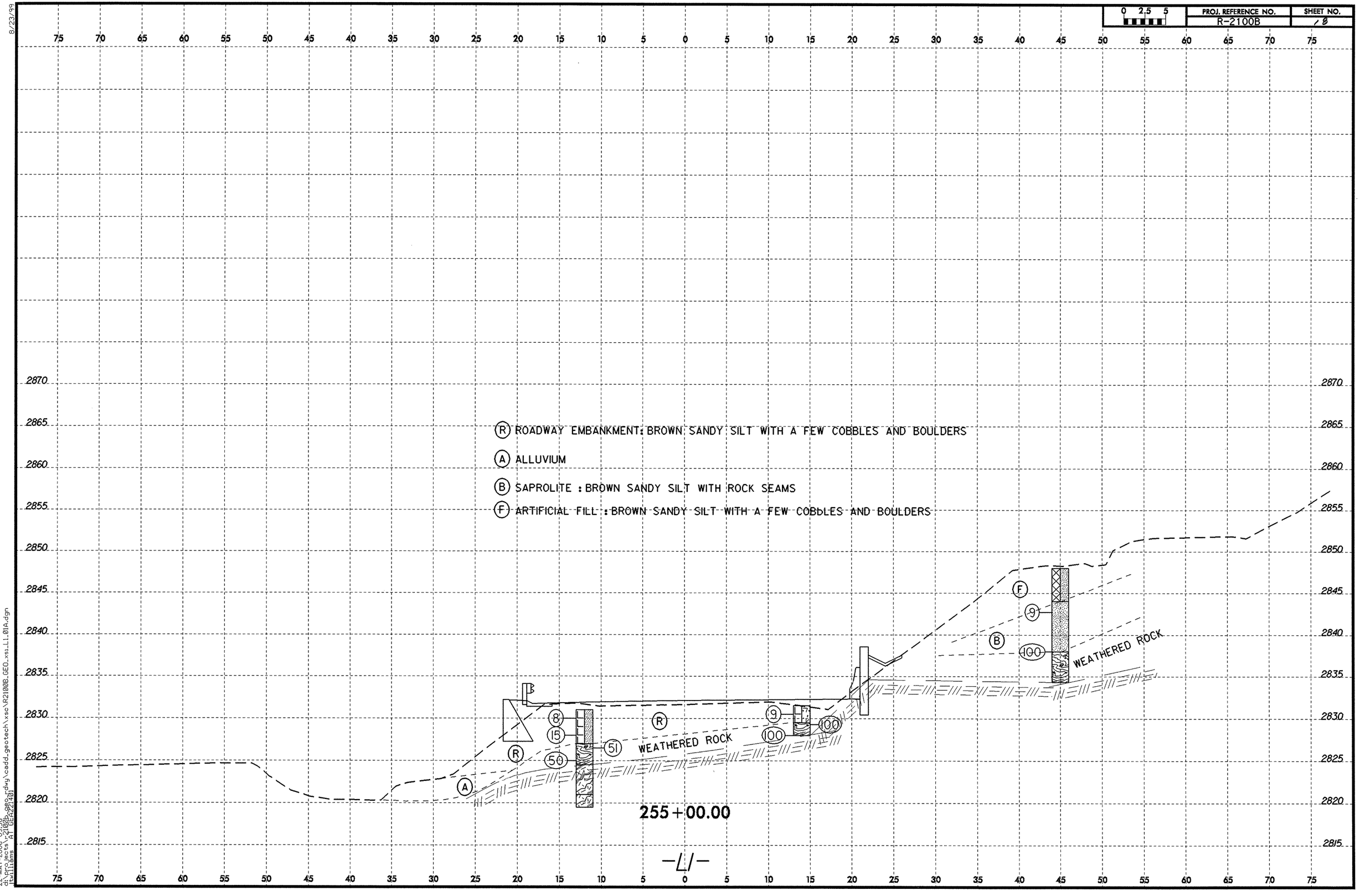

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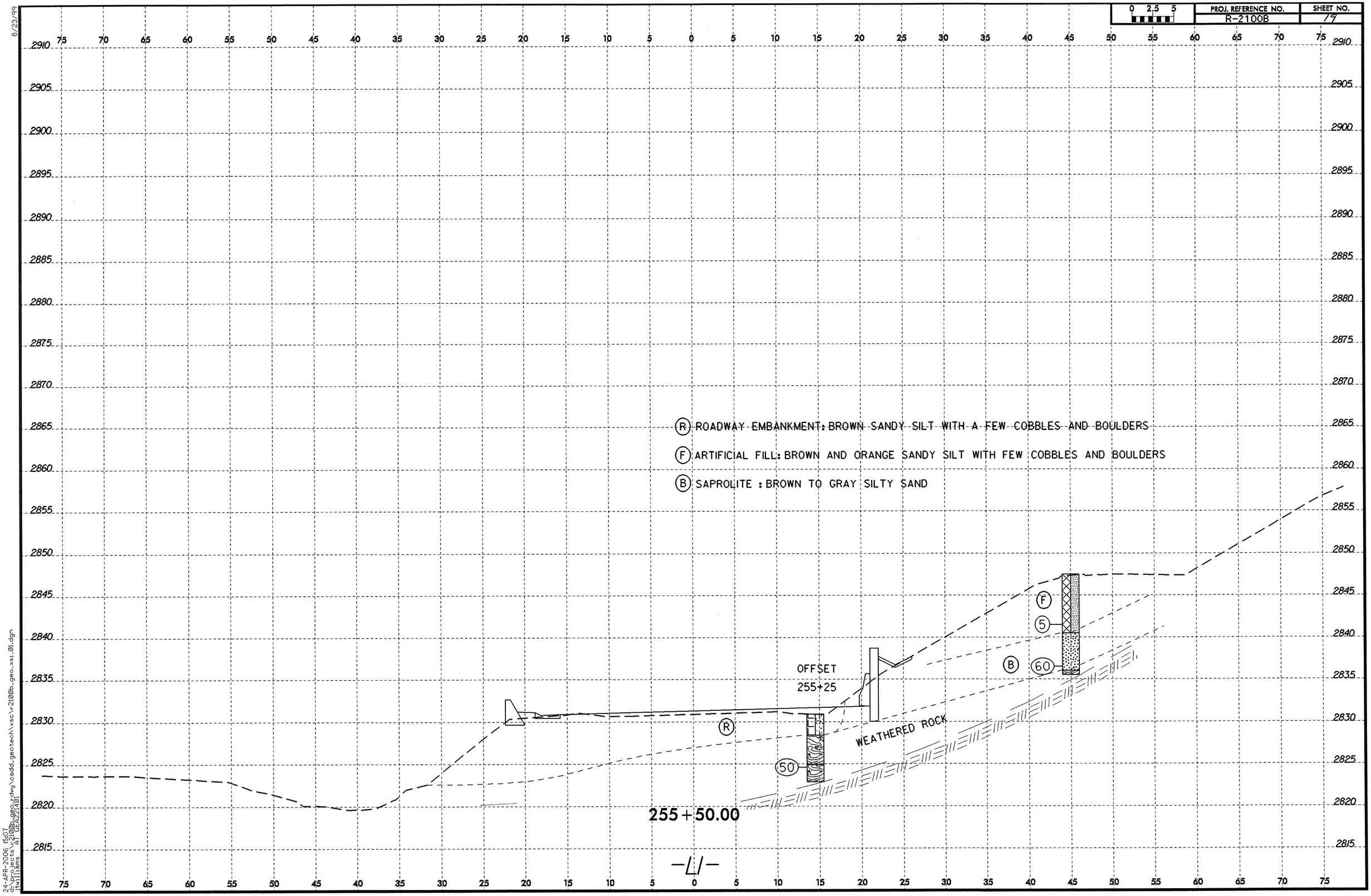

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19
0 2.5 5
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH A FEW COBBLES AND BOULDERS
F ARTIFICIAL FILL: BROWN AND ORANGE SANDY SILT WITH FEW COBBLES AND BOULDERS
B SAPROLITE : BROWN TO GRAY SILTY SAND
OFFSET
255+25
WEATHERED ROCK
255+50.00
-L1-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	20

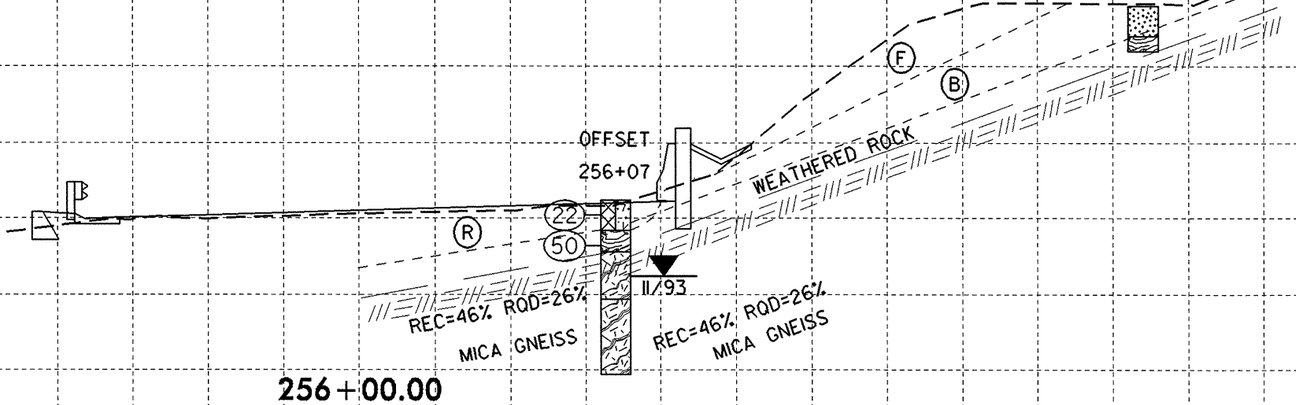
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2870
2865
2860
2855
2850
2845
2840
2835
2830
2825
2820
2815

(R) ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVELS

(F) ARTIFICIAL FILL

(B) SAPROLITE : BROWN MEDIUM DENSE SILTY SAND

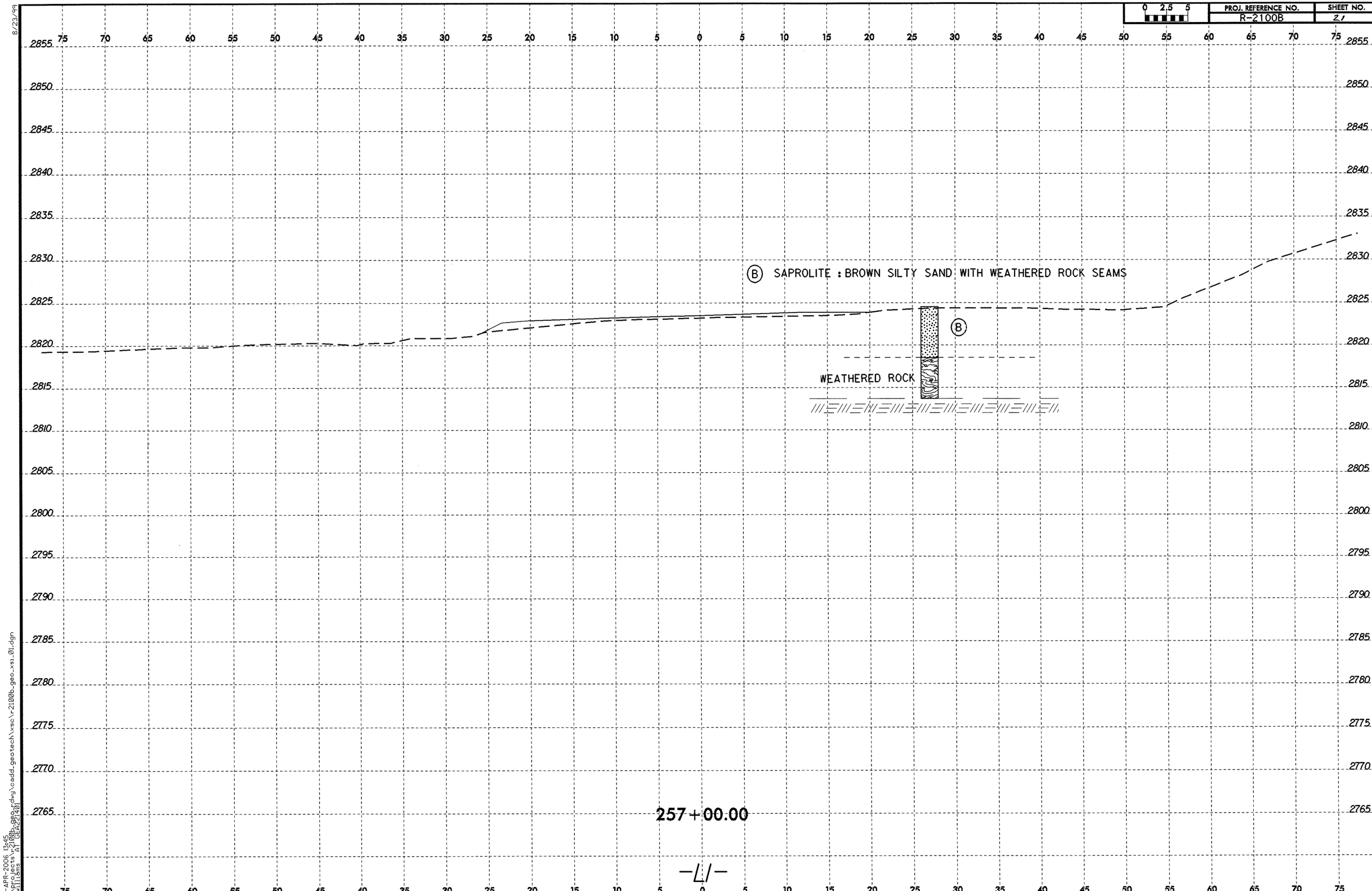


256+00.00

-L1-

26-MAY-2006 13:38
D:\Projects\R2100B_GEO_RDWY\CADD_GEOTECH\xsc\R2100B_GEO_xs_L1_01A.dgn
twilliams A1 GEA22140

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



8/23/99
24-APR-2006 13:45
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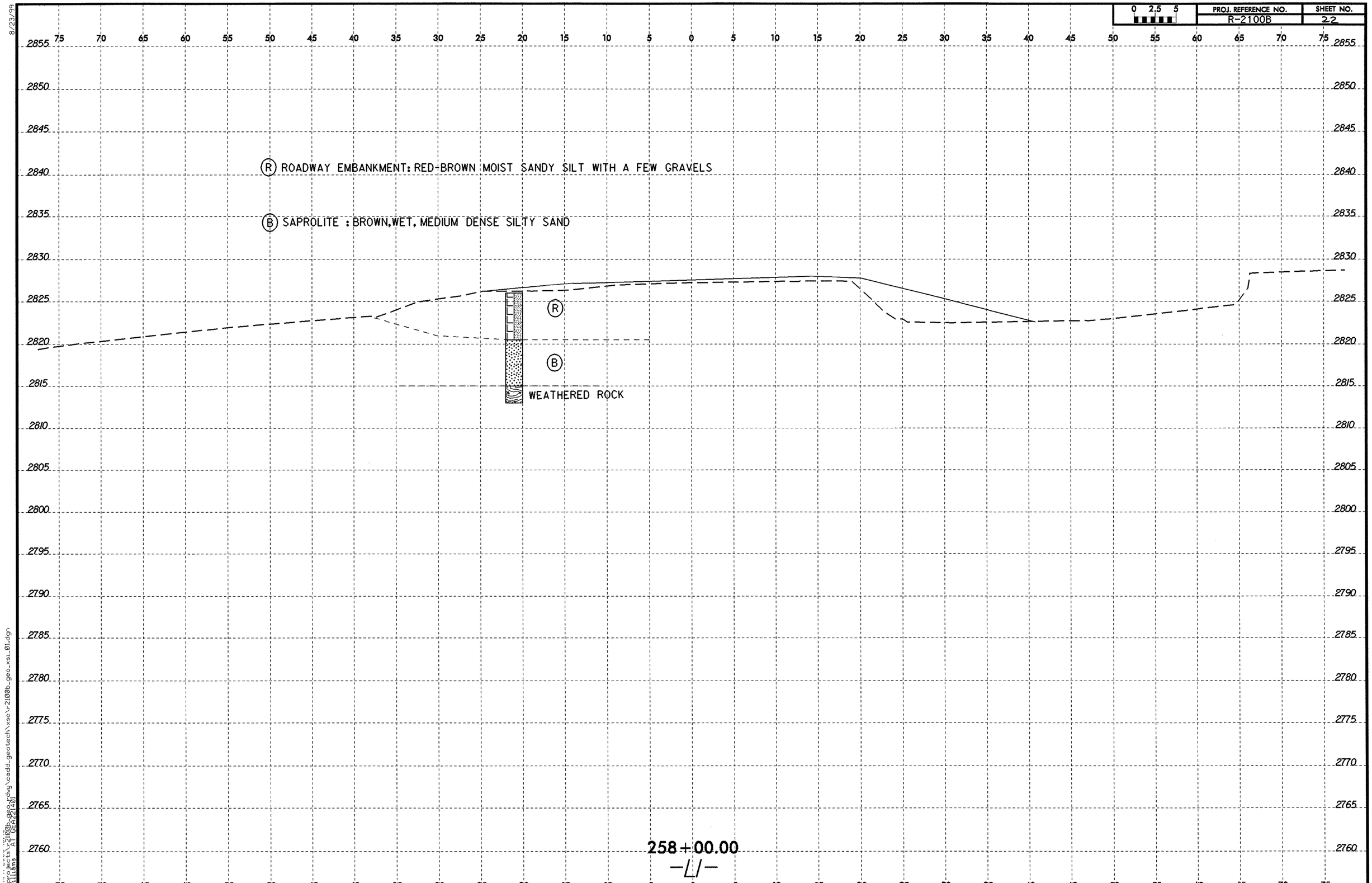
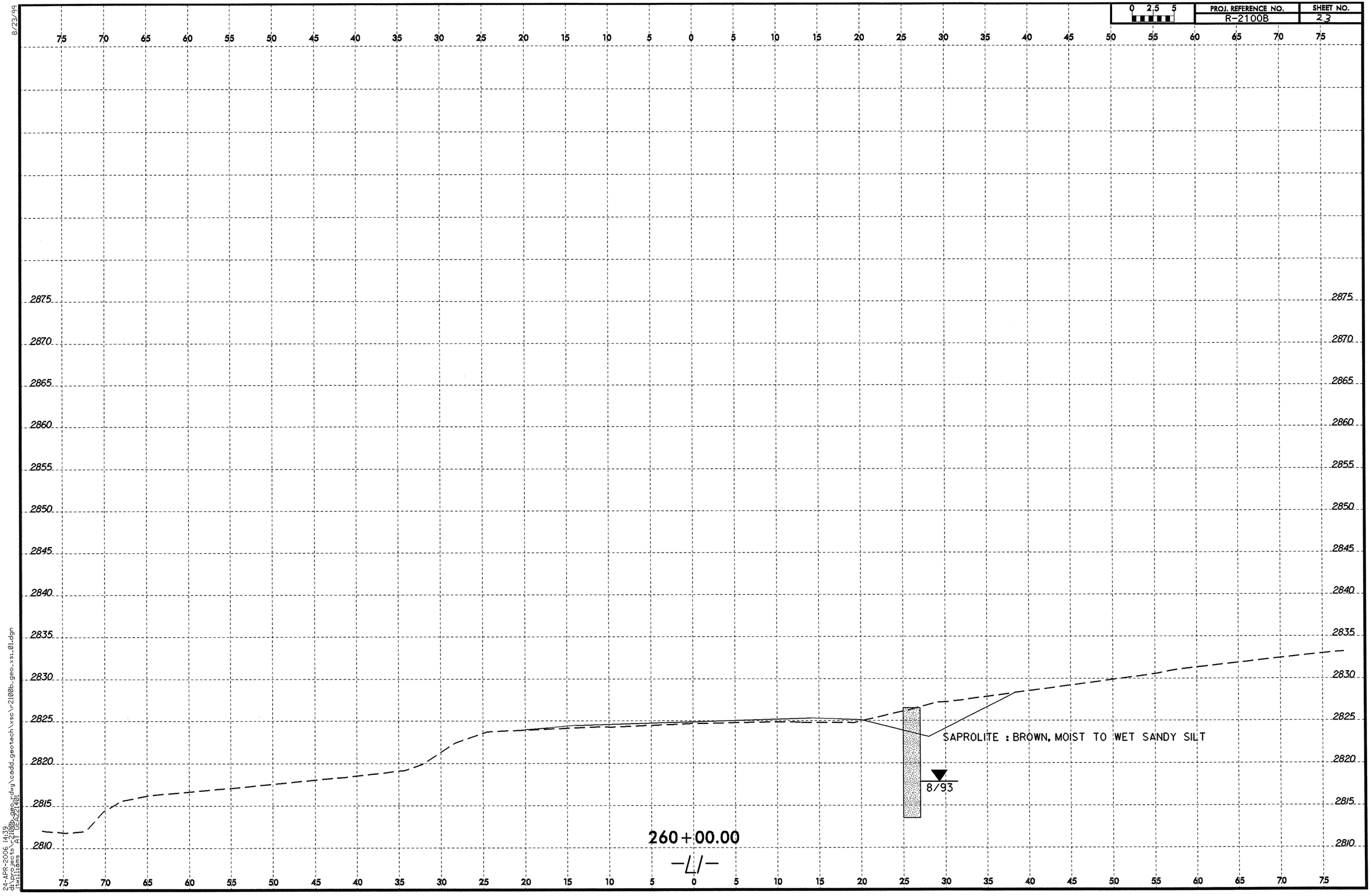
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
22
8/23/99
R ROADWAY EMBANKMENT: RED-BROWN MOIST SANDY SILT WITH A FEW GRAVELS
B SAPROLITE : BROWN, WET, MEDIUM DENSE SILTY SAND
R
B
WEATHERED ROCK
258+00.00
-L/-



8/23/99

24-APR-2006 14:39
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	24

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

2875 2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810

SAPROLITE : BROWN MEDIUM DENSE SANDY SILT

WEATHERED ROCK

260+50.00

-L/-

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

17-MAY-2006 09:55
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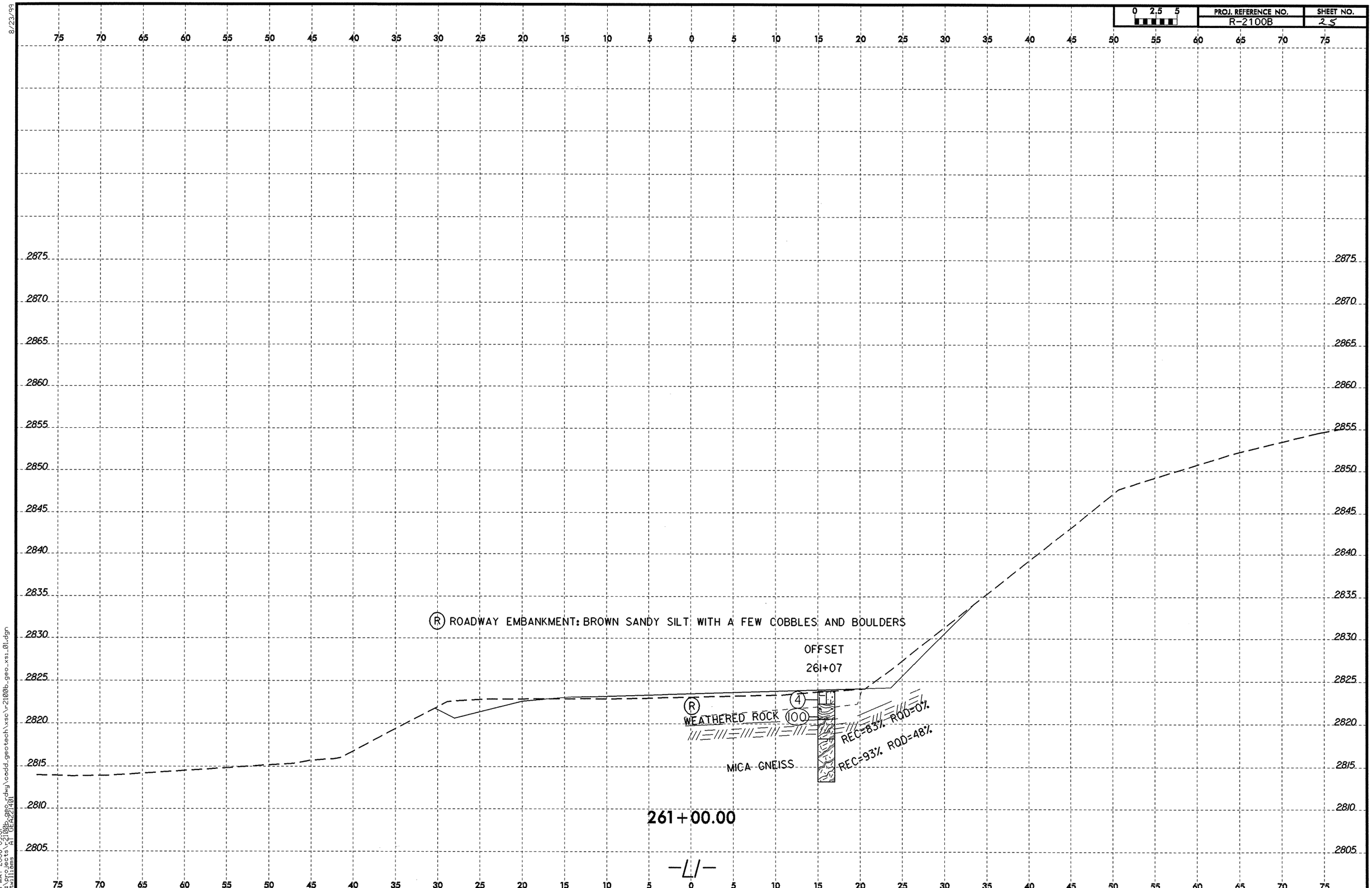
twilliams A1 DEA22140I



8/23/99

01-MAY-2006 09:01
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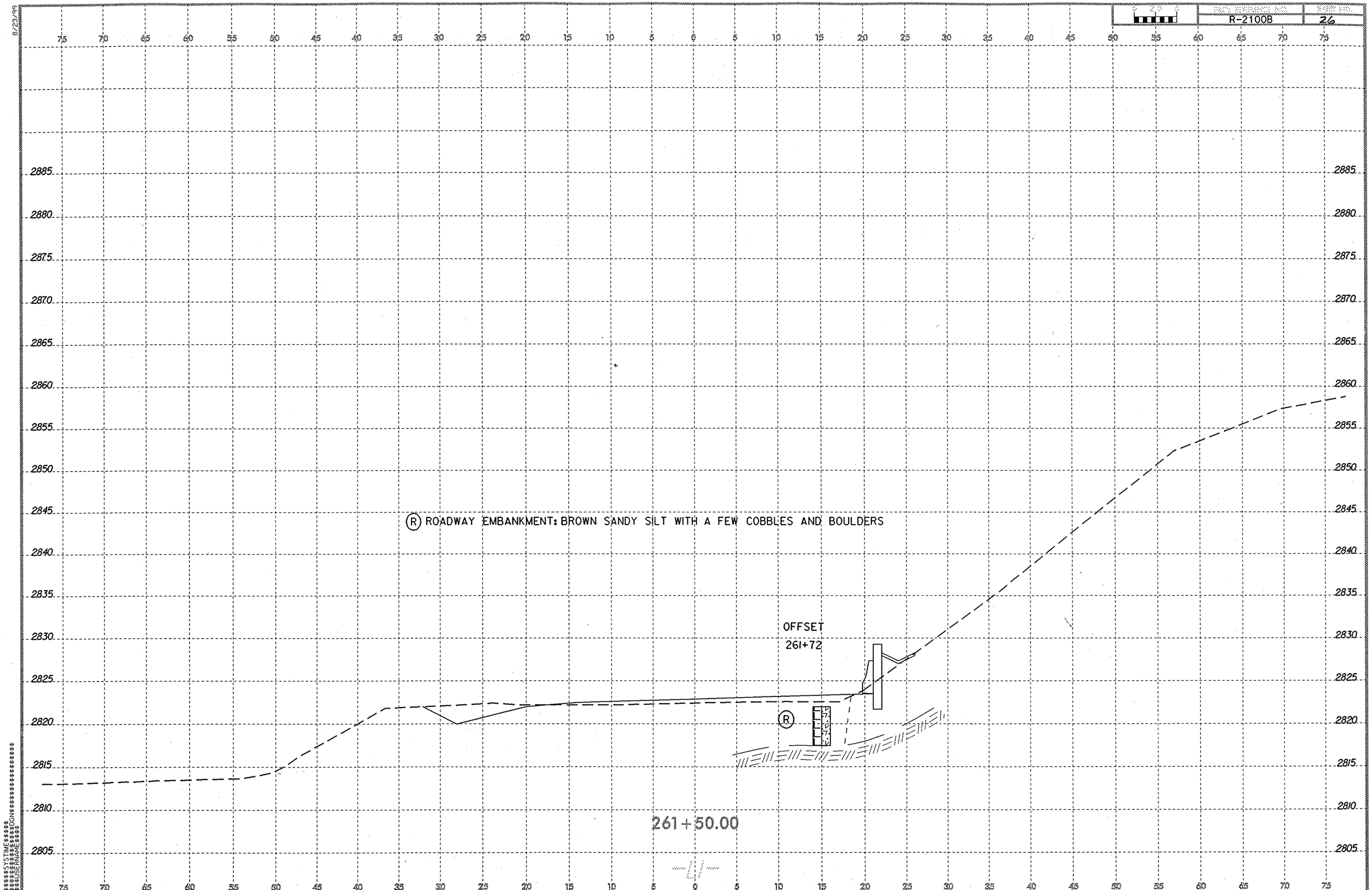
jtwilliams AT GEA221401


R-2100B
26
8/23/99
2885
2880
2875
2870
2865
2860
2855
2850
2845
2840
2835
2830
2825
2820
2815
2810
2805
(R) ROADWAY EMBANKMENT: BROWN SANDY SILT WITH A FEW COBBLES AND BOULDERS
OFFSET
261+72
(R)
261+50.00
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	27

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

2890 2885 2880 2875 2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810 2805

Ⓡ ROADWAY EMBANKMENT: BROWN SANDY SILT WITH A FEW COBBLES AND BOULDERS

Ⓡ 12 50 50

WEATHERED ROCK

262+00.00

-L1-

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

2890 2885 2880 2875 2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810 2805

24-APR-2006 15:17
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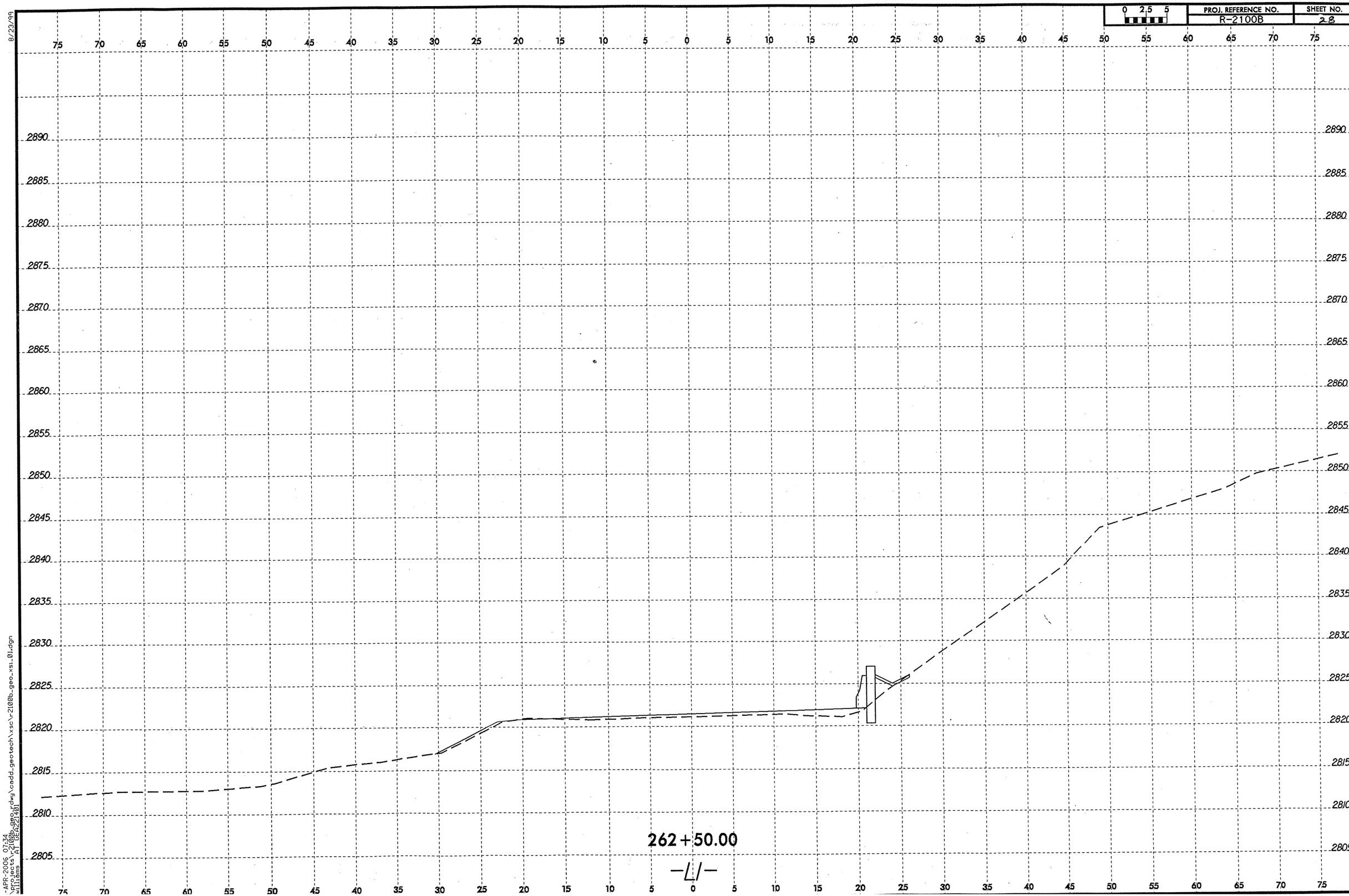
williams AT GEH221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
28
8/23/99
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
2890
2885
2880
2875
2870
2865
2860
2855
2850
2845
2840
2835
2830
2825
2820
2815
2810
2805
262+50.00
-L1-
-APR-2006 07:34
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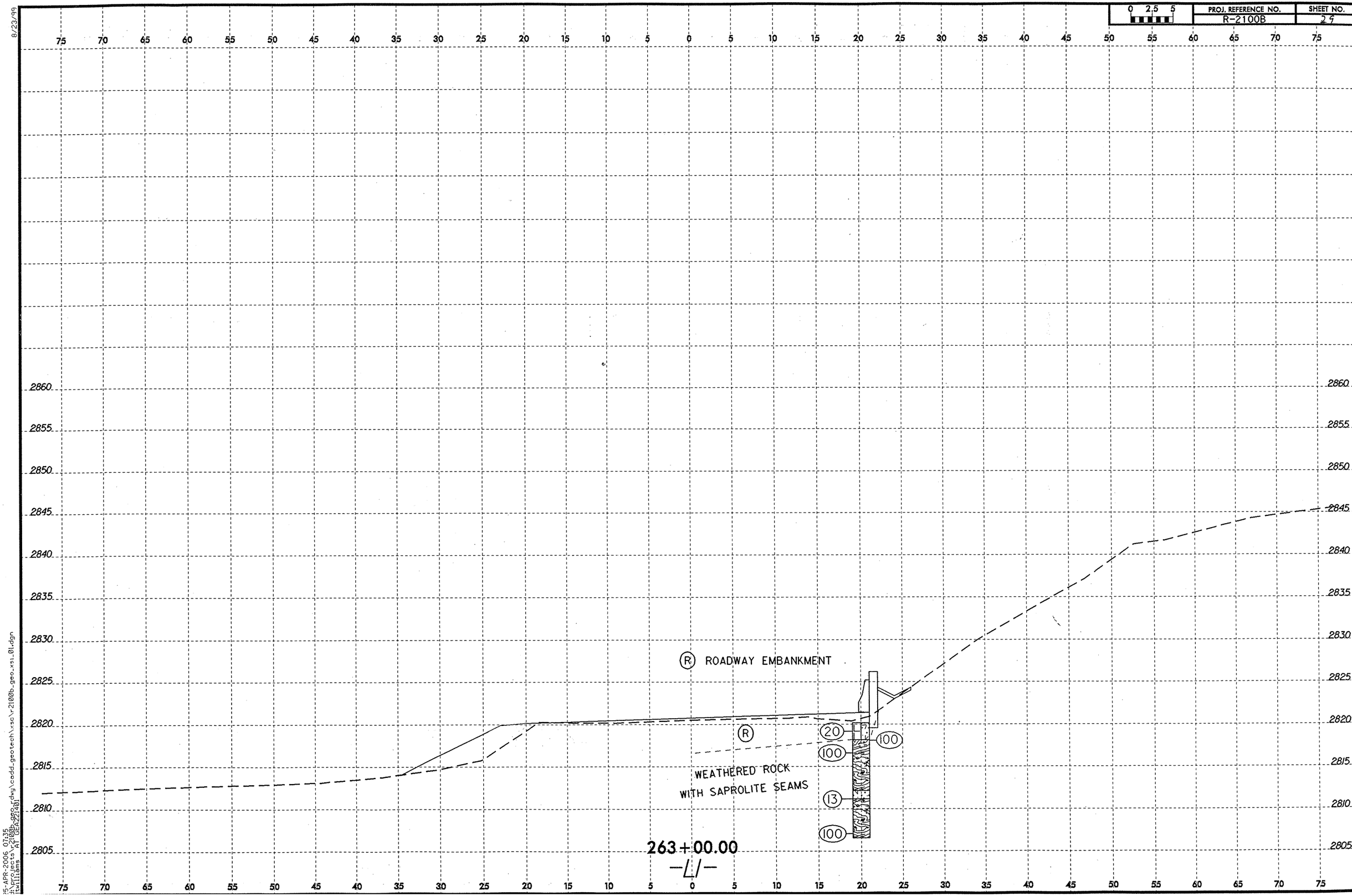
williams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
29
8/23/99
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
2860
2855
2850
2845
2840
2835
2830
2825
2820
2815
2810
2805
R ROADWAY EMBANKMENT
R
20
100
100
13
100
WEATHERED ROCK
WITH SAPROLITE SEAMS
263+00.00
-L/-
25-APR-2006 07:35
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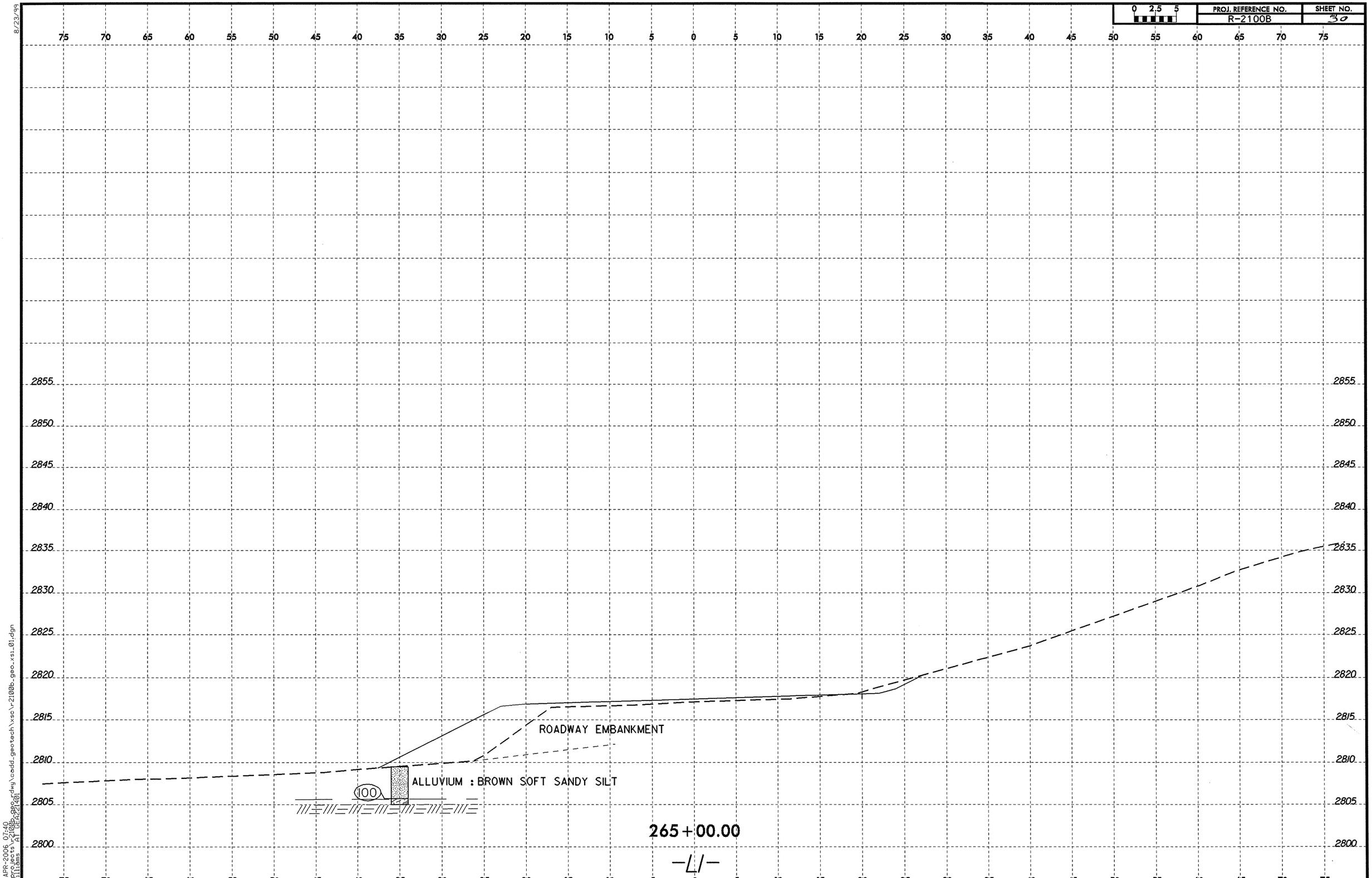
jtwilliams AT GEA221401



8/23/99

25-APR-2006 07:40
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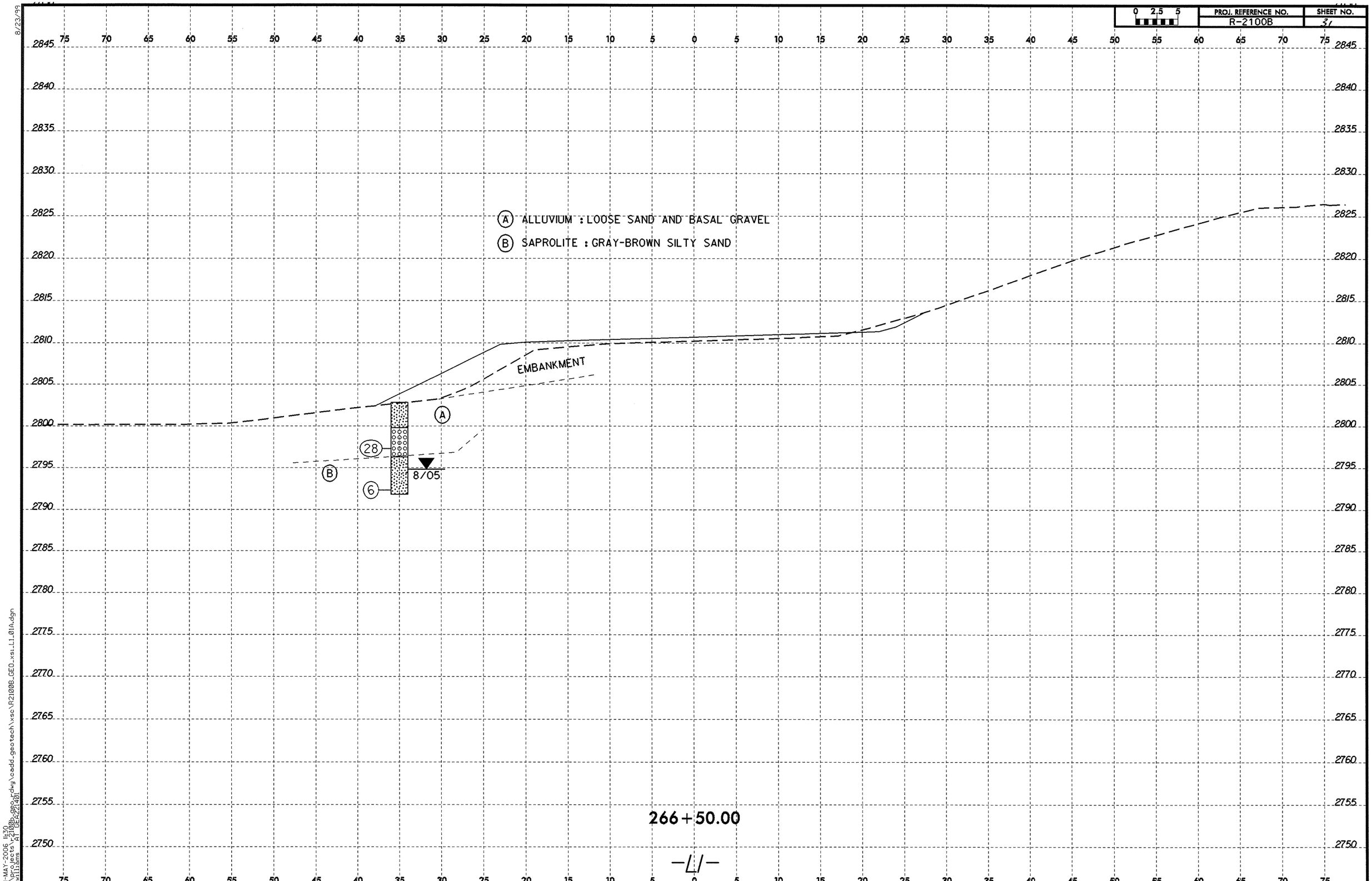
twilliams AT GEA221401



8/23/99

24-MAY-2006 11:30
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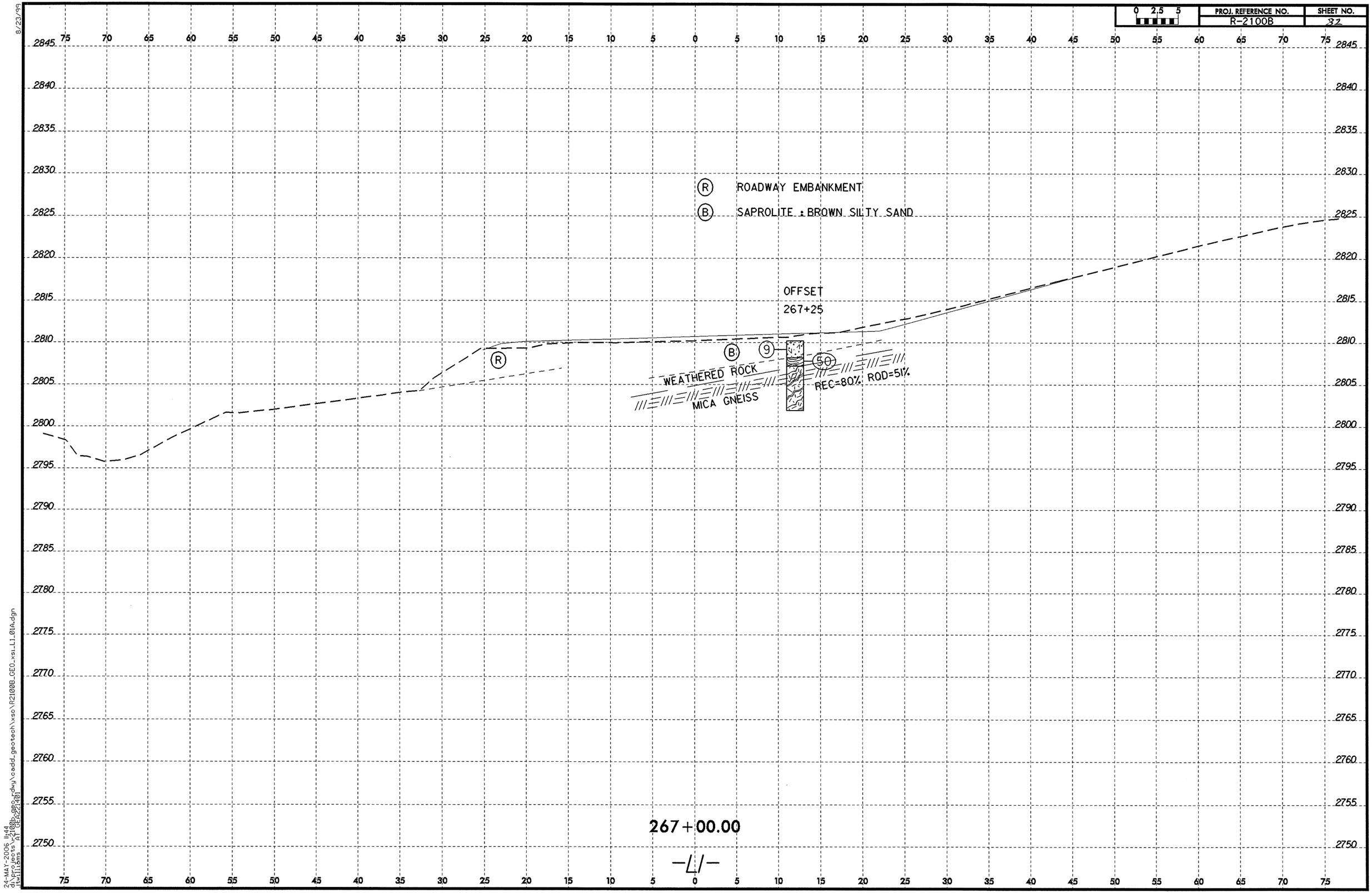
jtwilliams AT GEA221401



8/23/99

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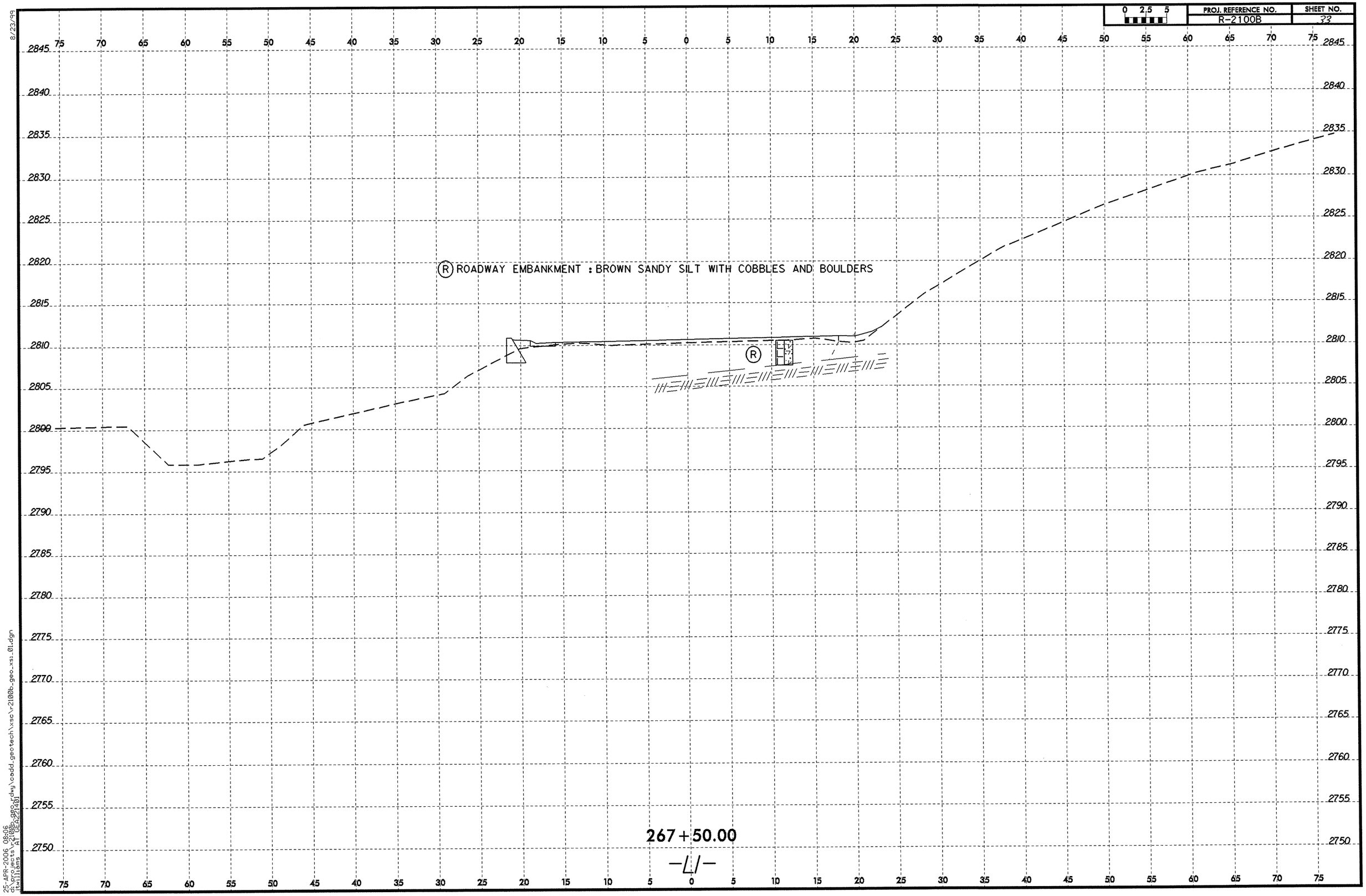
jtwilliams AT GEA221401



8/23/99
25-APR-2006 08:06
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	34

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

2850
2845
2840
2835
2830
2825
2820
2815
2810
2805
2800
2795

(R) ROADWAY EMBANKMENT : BROWN SANDY SILT WITH COBBLES AND BOULDERS

(B) SAPROLITE : BROWN DENSE SILTY SAND

OFFSET
267+90

R

B

WEATHERED ROCK

268+00.00

-L/-

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

24-MAY-2006 11:52
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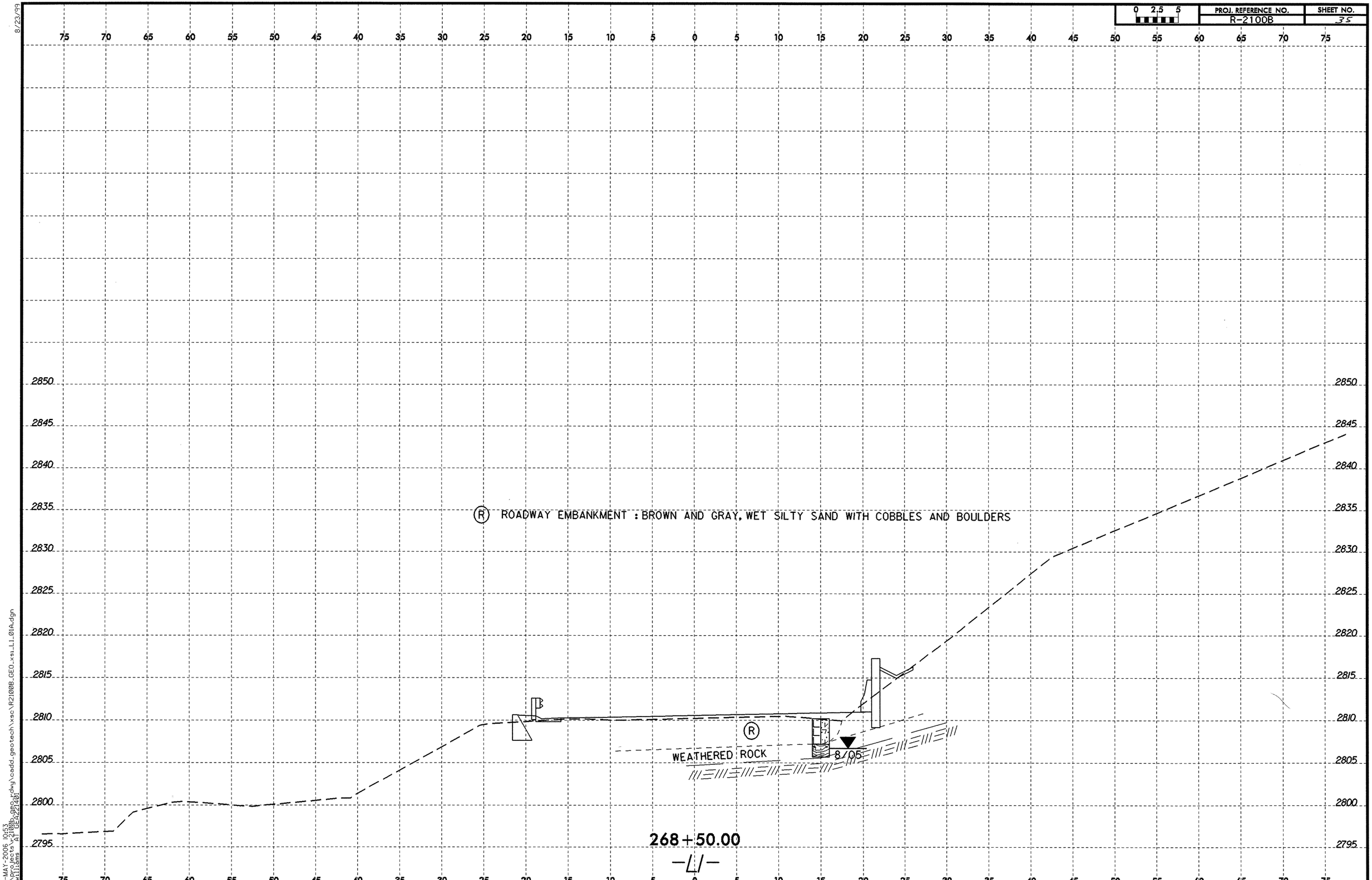
itswilliams



8/23/99

24-MAY-2006 10:53
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ltwilliams AT GEA221401

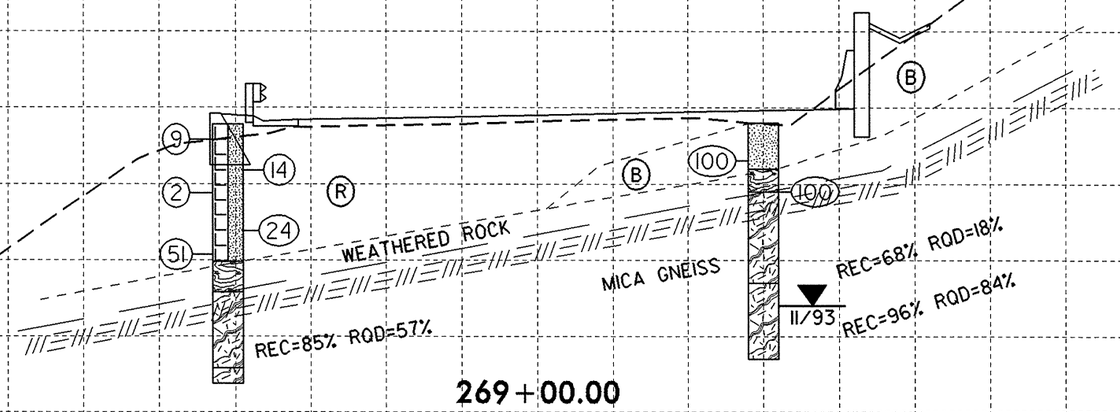
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	36

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

2845
2840
2835
2830
2825
2820
2815
2810
2805
2800
2795
2790

Ⓡ ROADWAY EMBANKMENT : BROWN SANDY SILT WITH COBBLES AND BOULDERS
Ⓑ SAPROLITE : BROWN AND GRAY SANDY SILT



269+00.00

-L/-

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

22-MAY-2006 11:03
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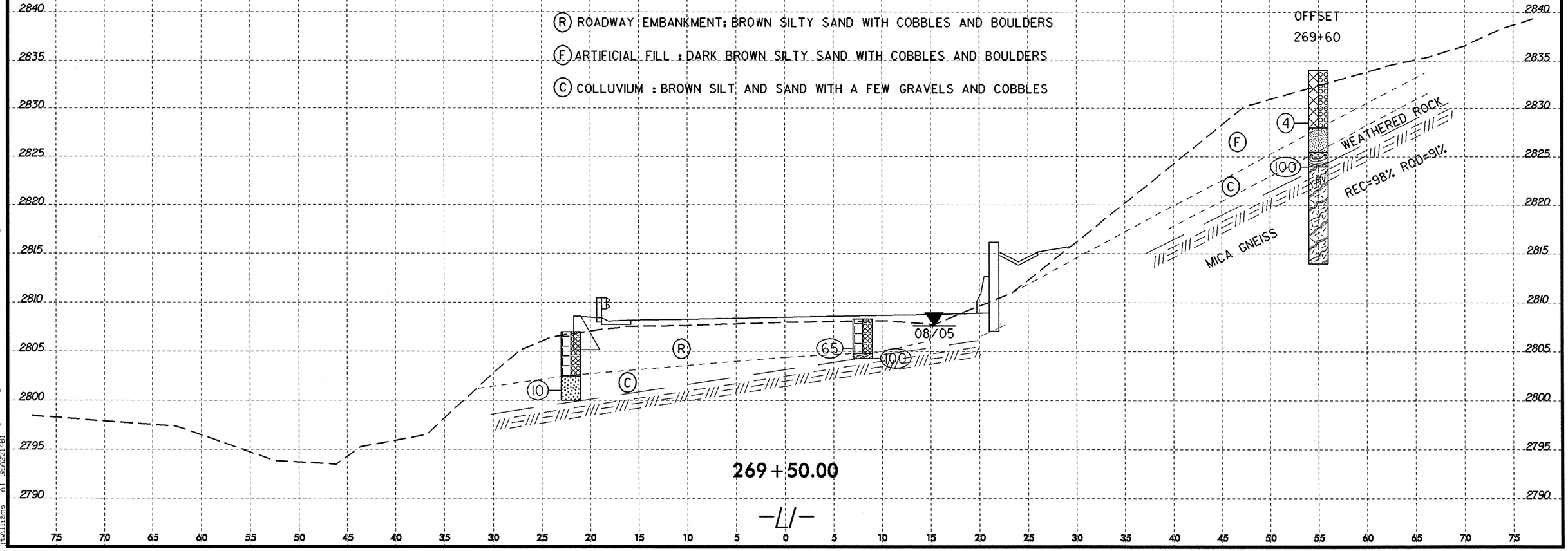
tswilliams AT GEA21401

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	37

(R) ROADWAY EMBANKMENT: BROWN SILTY SAND WITH COBBLES AND BOULDERS

(F) ARTIFICIAL FILL : DARK BROWN SILTY SAND WITH COBBLES AND BOULDERS

(C) COLLUVIUM : BROWN SILT AND SAND WITH A FEW GRAVELS AND COBBLES



269+50.00

-L1-

22-MAY-2006 11:25
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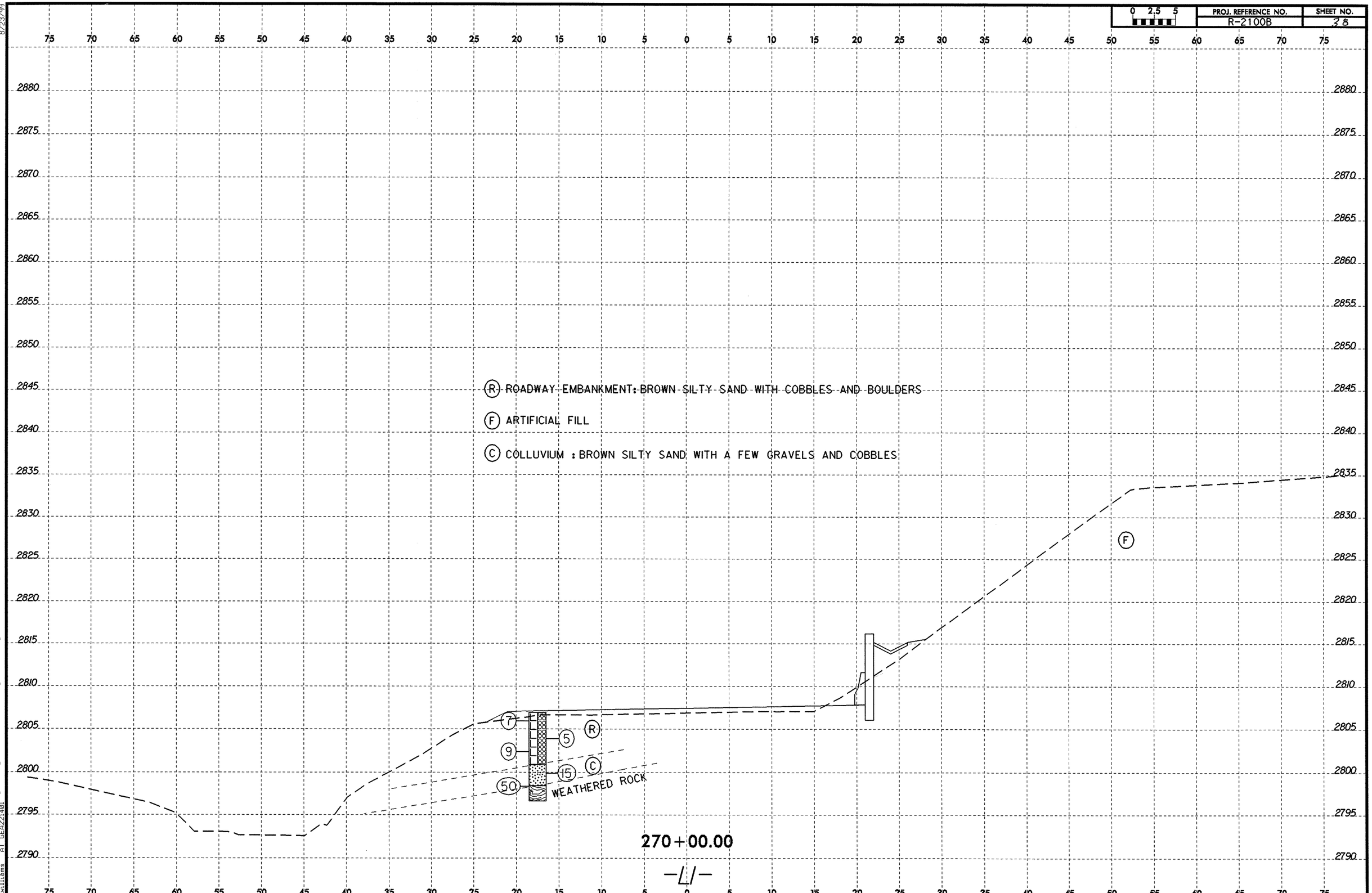
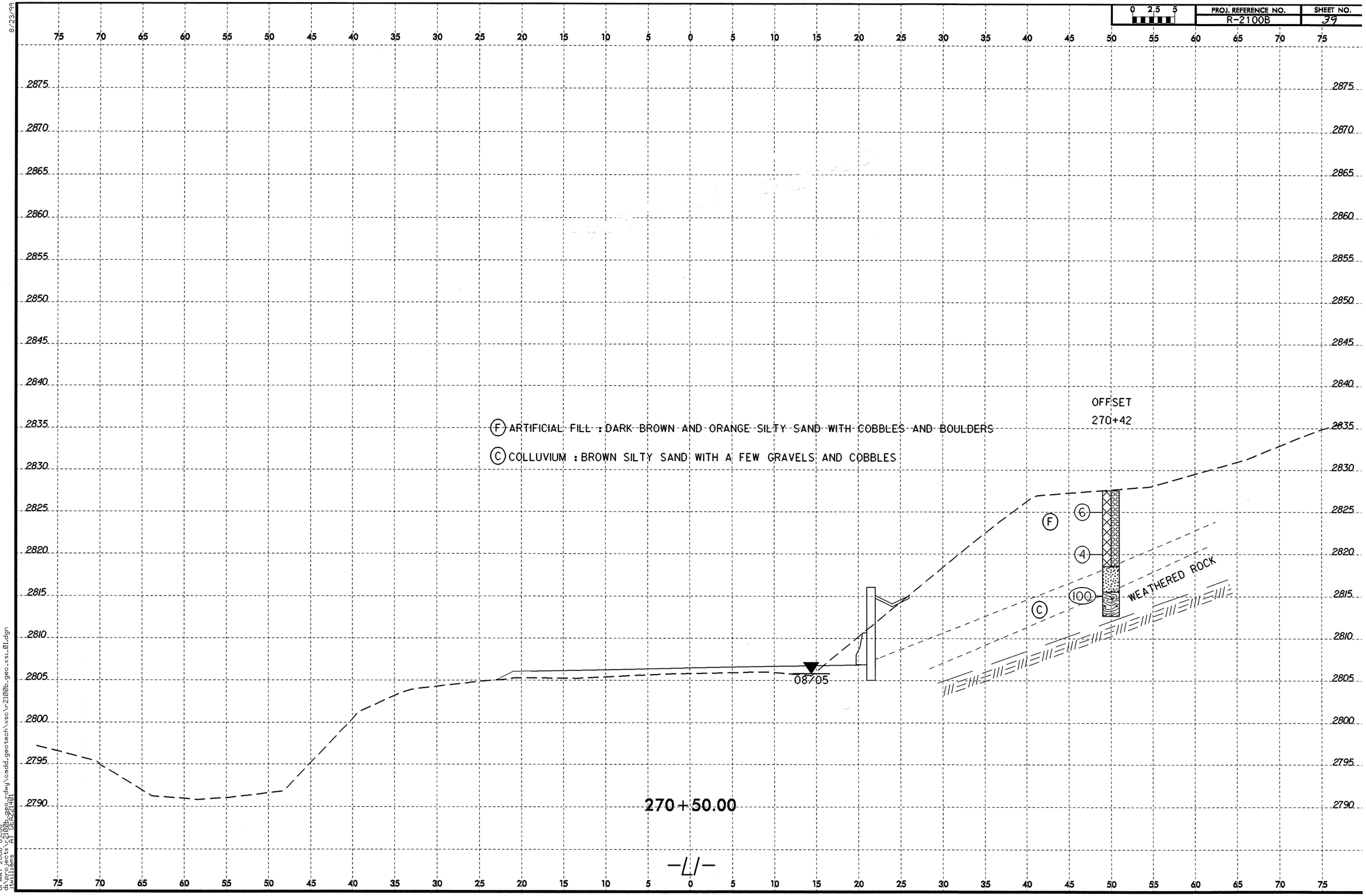
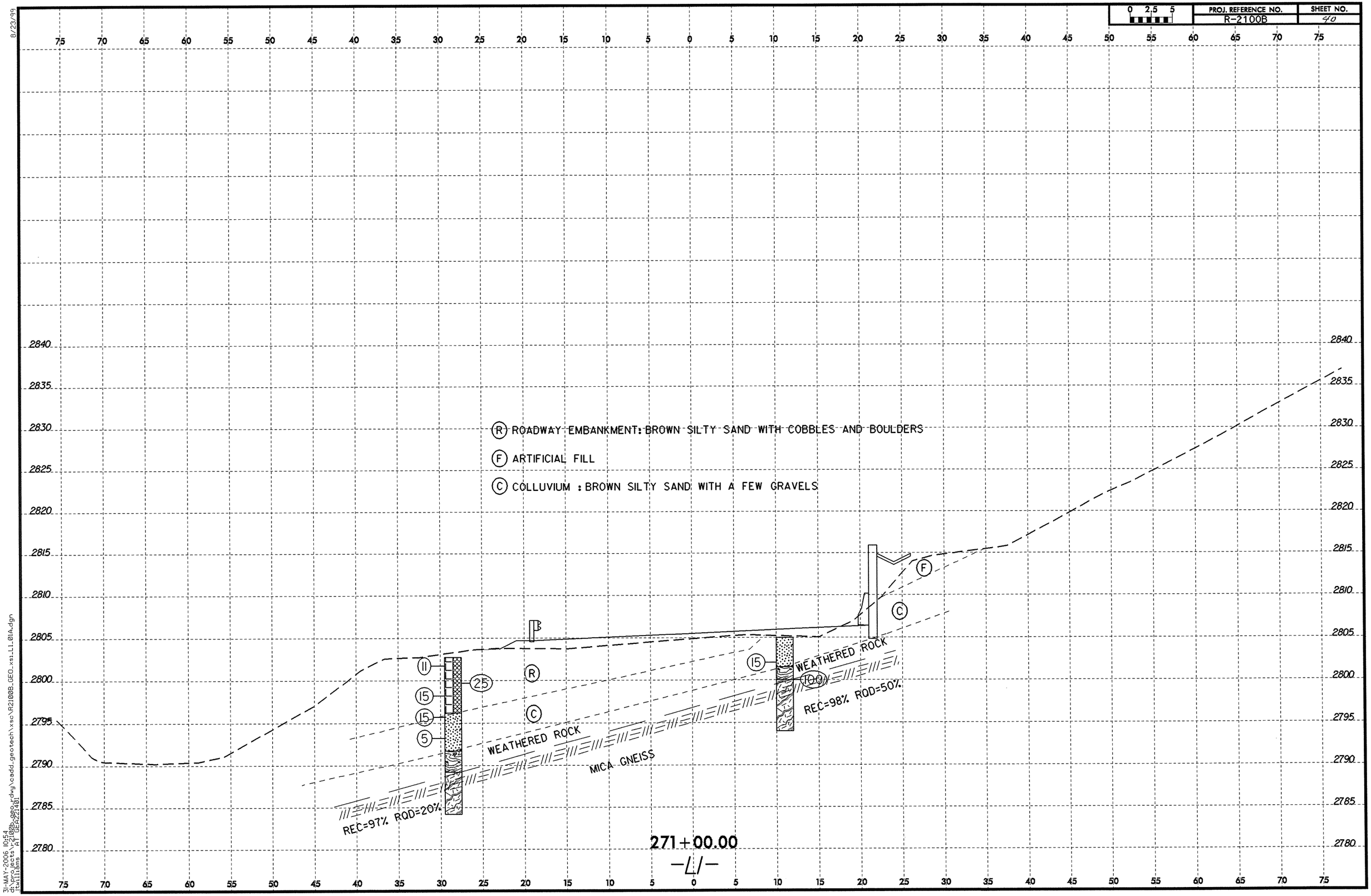
jtwilliams



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
38
8/23/99
R ROADWAY EMBANKMENT: BROWN SILTY SAND WITH COBBLES AND BOULDERS
F ARTIFICIAL FILL
C COLLUVIUM : BROWN SILTY SAND WITH A FEW GRAVELS AND COBBLES
WEATHERED ROCK
270+00.00
-L1-
17-MAY-2006 09:59
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xs1_01.dgn



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
39
0 2.5 5
F ARTIFICIAL FILL : DARK BROWN AND ORANGE SILTY SAND WITH COBBLES AND BOULDERS
C COLLUVIUM : BROWN SILTY SAND WITH A FEW GRAVELS AND COBBLES
OFFSET
270+42
6
4
100
WEATHERED ROCK
08/05
270+50.00
-L1-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
40
8/23/99
R ROADWAY EMBANKMENT: BROWN SILTY SAND WITH COBBLES AND BOULDERS
F ARTIFICIAL FILL
C COLLUVIUM : BROWN SILTY SAND WITH A FEW GRAVELS
WEATHERED ROCK
MICA GNEISS
REC=97% RQD=20%
REC=98% RQD=50%
271+00.00
-L/-
31-MAY-2006 10:54
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\R2100B_GEO_xs1_L1_01A.dgn

8/23/99

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
R-2100B	41

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

2840
2835
2830
2825
2820
2815
2810
2805
2800
2795
2790
2785

Ⓡ ROADWAY EMBANKMENT: BROWN SILT AND SAND WITH COBBLES AND BOULDERS

OFFSET
271+65

Ⓡ

271+50.00

-L1-

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

22-MAY-2006 12:33
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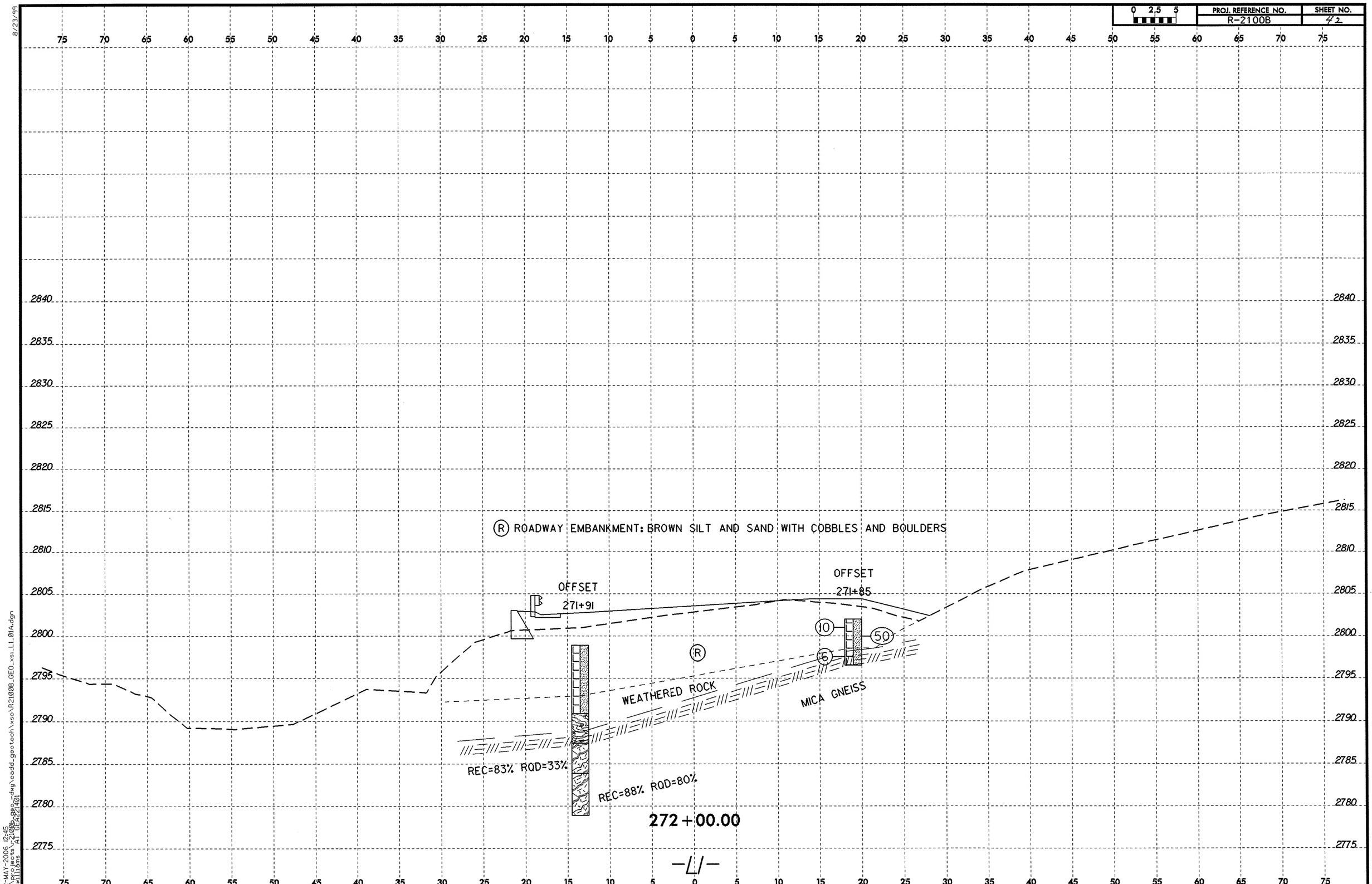
mwilliams



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
42
8/23/99
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
2840
2835
2830
2825
2820
2815
2810
2805
2800
2795
2790
2785
2780
2775
(R) ROADWAY EMBANKMENT: BROWN SILT AND SAND WITH COBBLES AND BOULDERS
OFFSET
271+91
OFFSET
271+85
10
50
6
(R)
WEATHERED ROCK
MICA GNEISS
REC=83% RQD=33%
REC=88% RQD=80%
272+00.00
-L1-
22-MAY-2006 12:45
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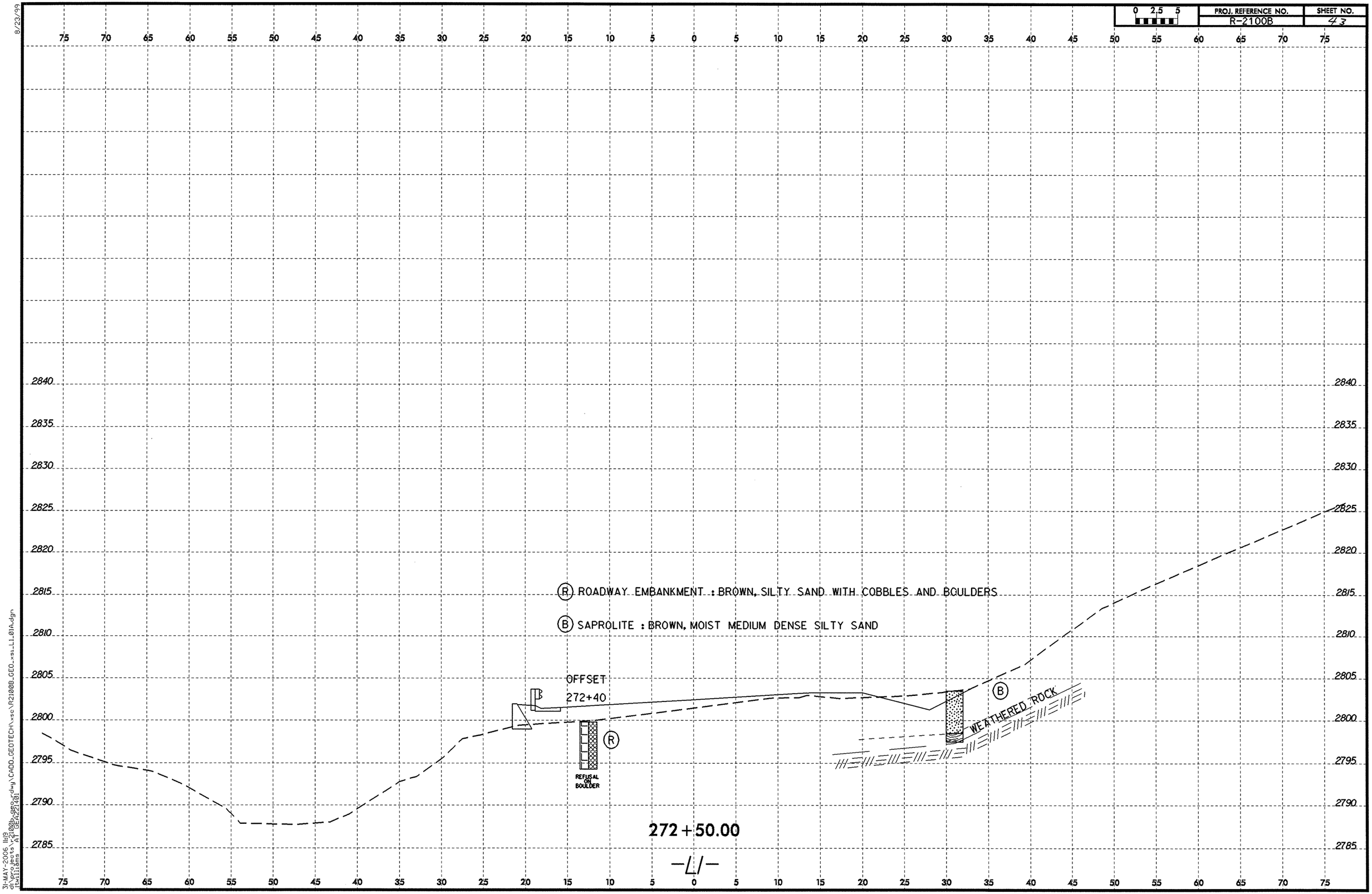
jtwilliams AT GEA221401



8/23/99

31-MAY-2006 11:19
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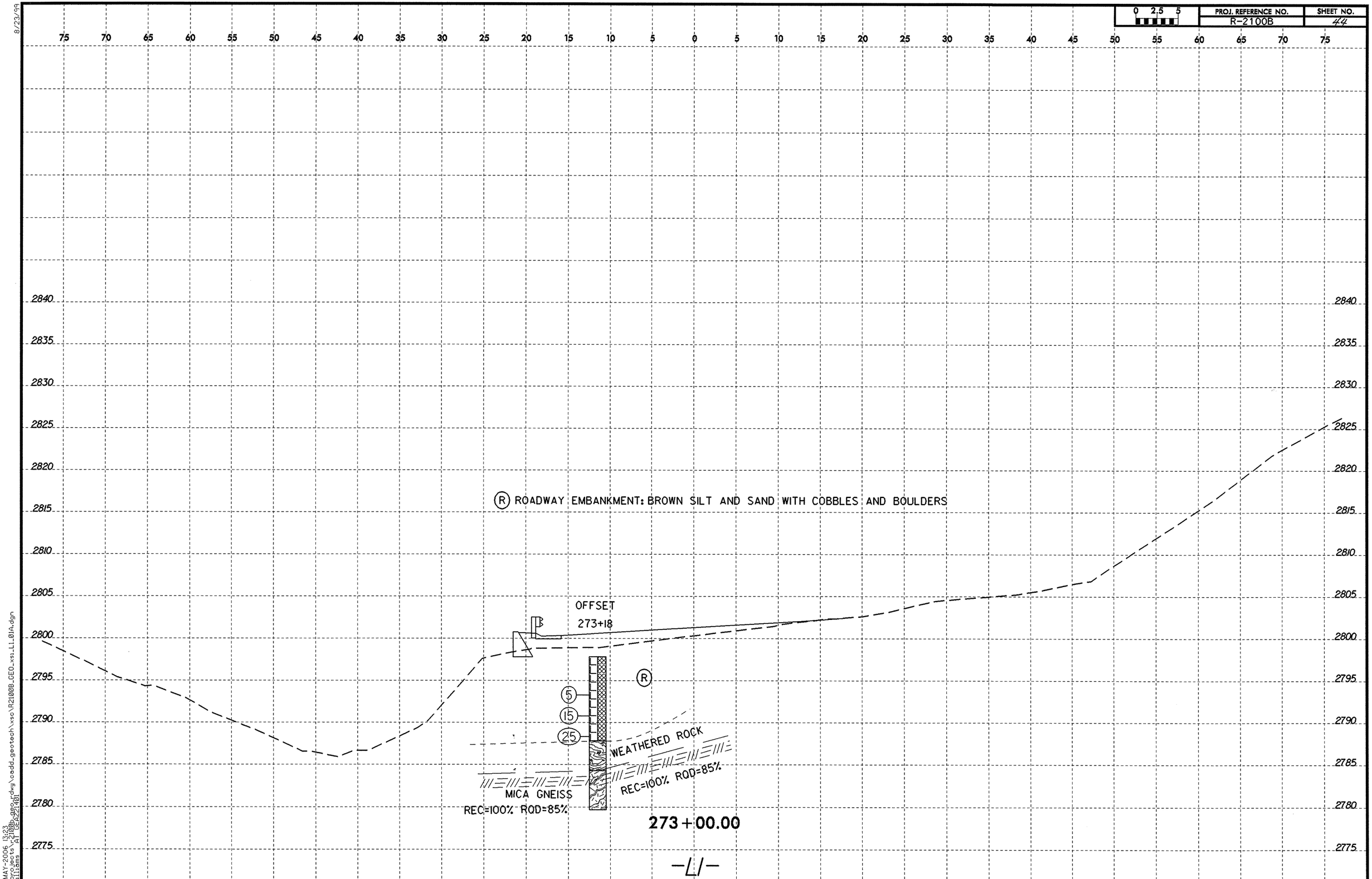
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
44
8/23/99
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
2840
2835
2830
2825
2820
2815
2810
2805
2800
2795
2790
2785
2780
2775
R ROADWAY EMBANKMENT: BROWN SILT AND SAND WITH COBBLES AND BOULDERS
OFFSET
273+18
R
5
15
25
WEATHERED ROCK
REC=100% RQD=85%
MICA GNEISS
REC=100% RQD=85%
273+00.00
-L1-
22-MAY-2006 13:23
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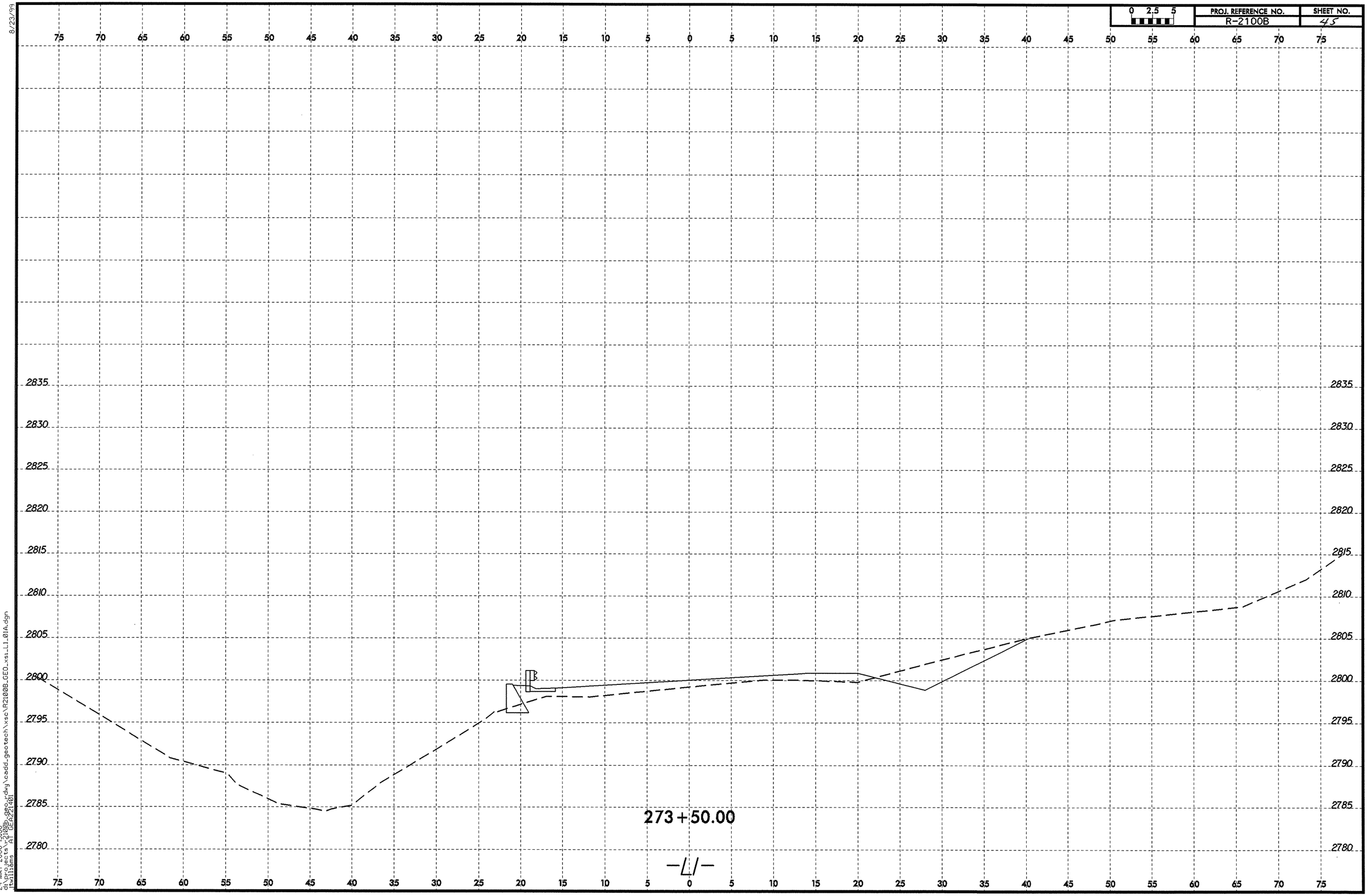
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 13:08
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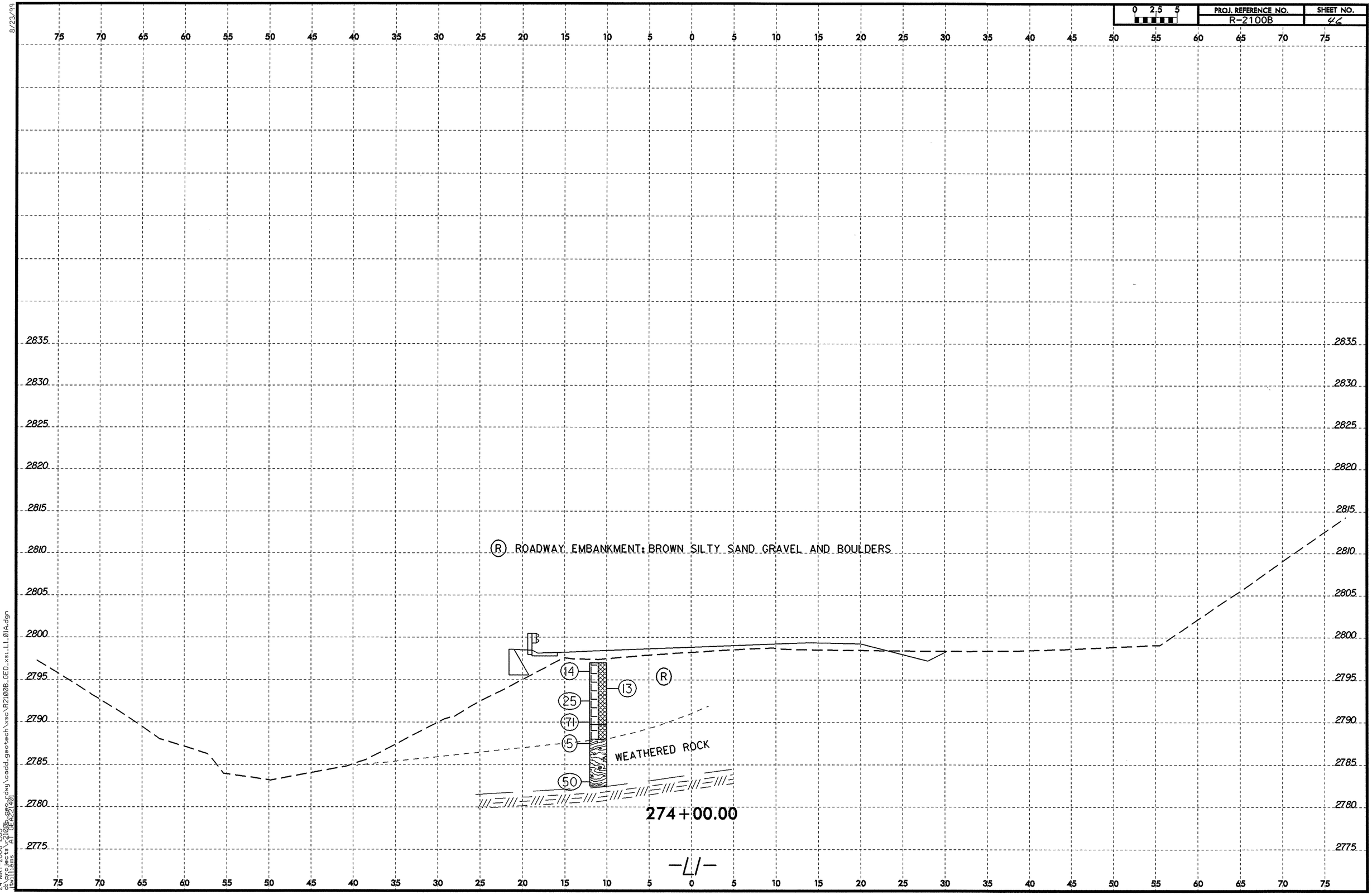
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 13:15
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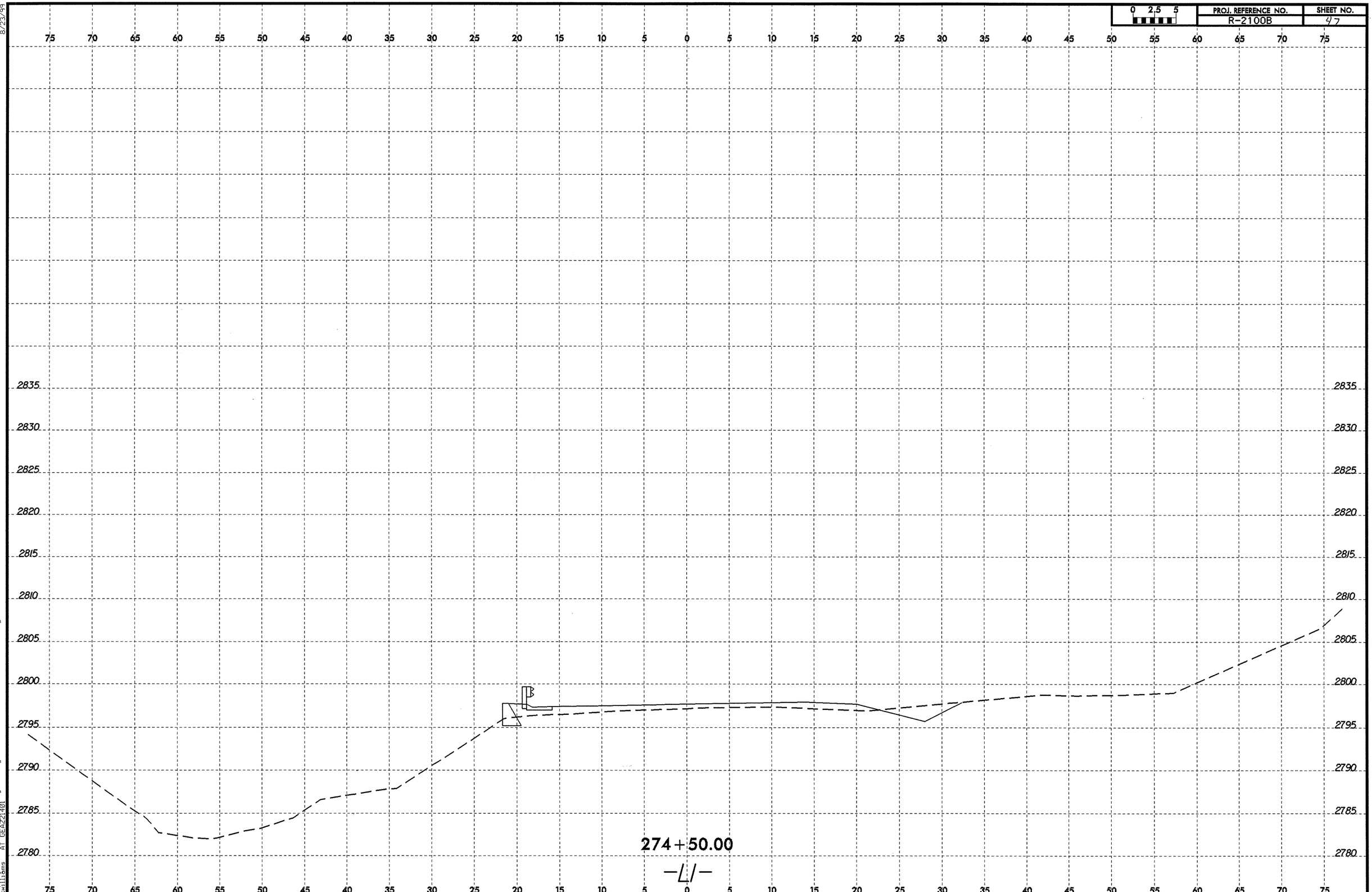
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 13:20
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	48

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

2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810 2805 2800 2795 2790 2785 2780 2775 2770

(R) ROADWAY EMBANKMENT: BROWN SILTY SAND GRAVEL AND BOULDERS

(B) SAPROLITE : FINE SANDY MICACEOUS SILT

OFFSET
275+17

9
5
8
8
31
R
B

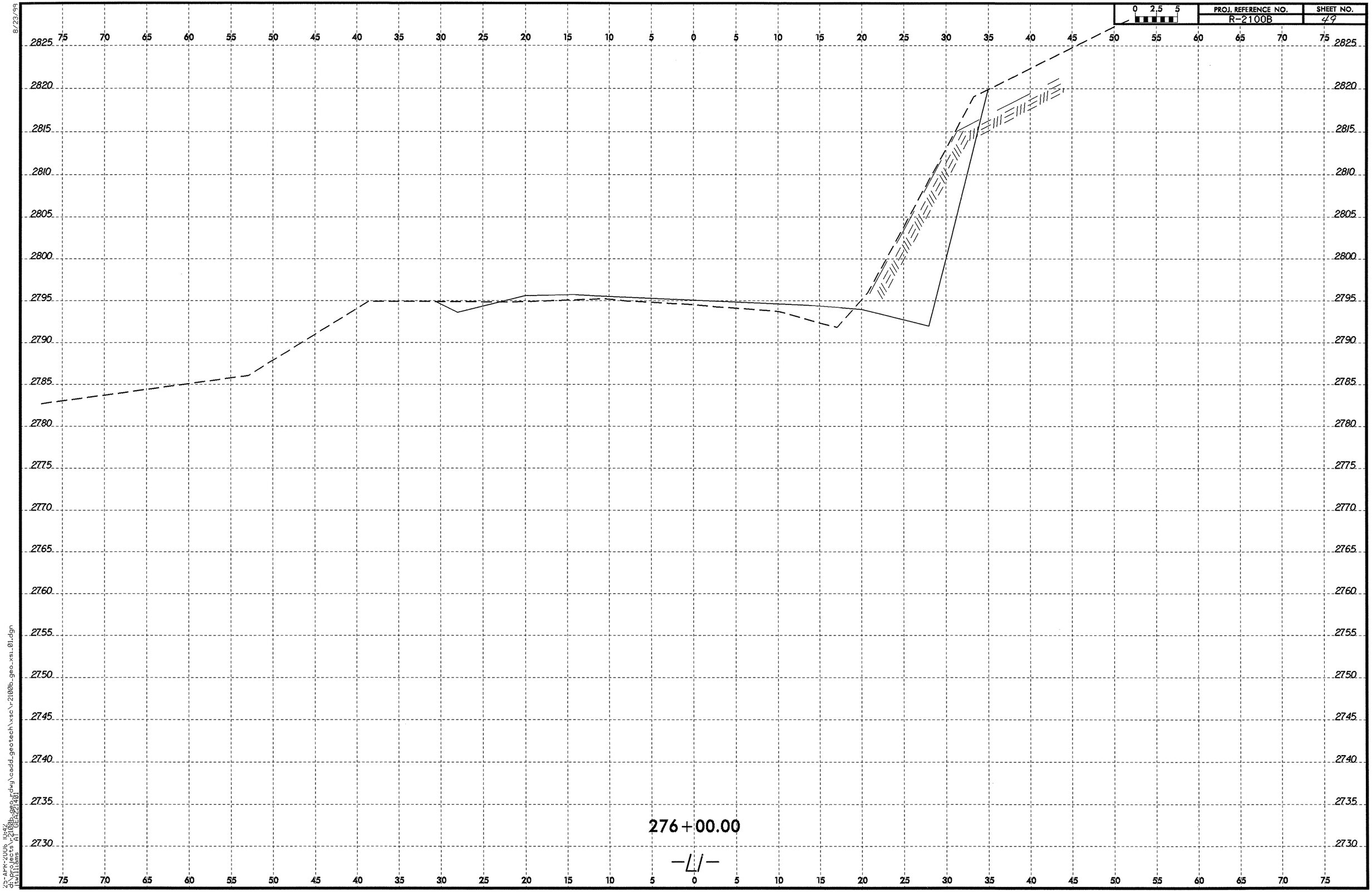
MICA GNEISS
(WEATHERED)

REC=29% RQD=18%
MICA GNEISS
(WEATHERED)

275+00.00

-L/-

26-MAY-2006 07:45
dt:\projects\2100b_geo_dwg\cadd_geotech\vso\R2100B_GEO_xs1_L1_01A.dgn
dt:\projects\2100b_geo_dwg\cadd_geotech\vso\R2100B_GEO_xs1_L1_01A.dgn



8/23/99

25-APR-2006 10:42
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	50

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

2875 2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810 2805 2800 2795 2790 2785 2780

276+50.00
—L/—

25-APR-2006 10:50
d:\Projects\r2100b_geo.dwg\cadd_geotech\xs\r2100b_geo_xs_01.dgn
twilliams AT GEH-221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	51

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

2830 2825 2820 2815 2810 2805 2800 2795 2790 2785 2780 2775

277+00.00

—L/—

31-MAY-2006 11:24
d:\projects\R2100B_geo_dwg\CADD_GEOTECH\xsc\R2100B_GEO_xsi_L1_01A.dgn
itwilliams

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	52

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

2870 2865 2860 2855 2850 2845 2840 2835 2830 2825 2820 2815 2810 2805 2800 2795 2790 2785 2780 2775

277+50.00

—L/—

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

25-APR-2006 10:51
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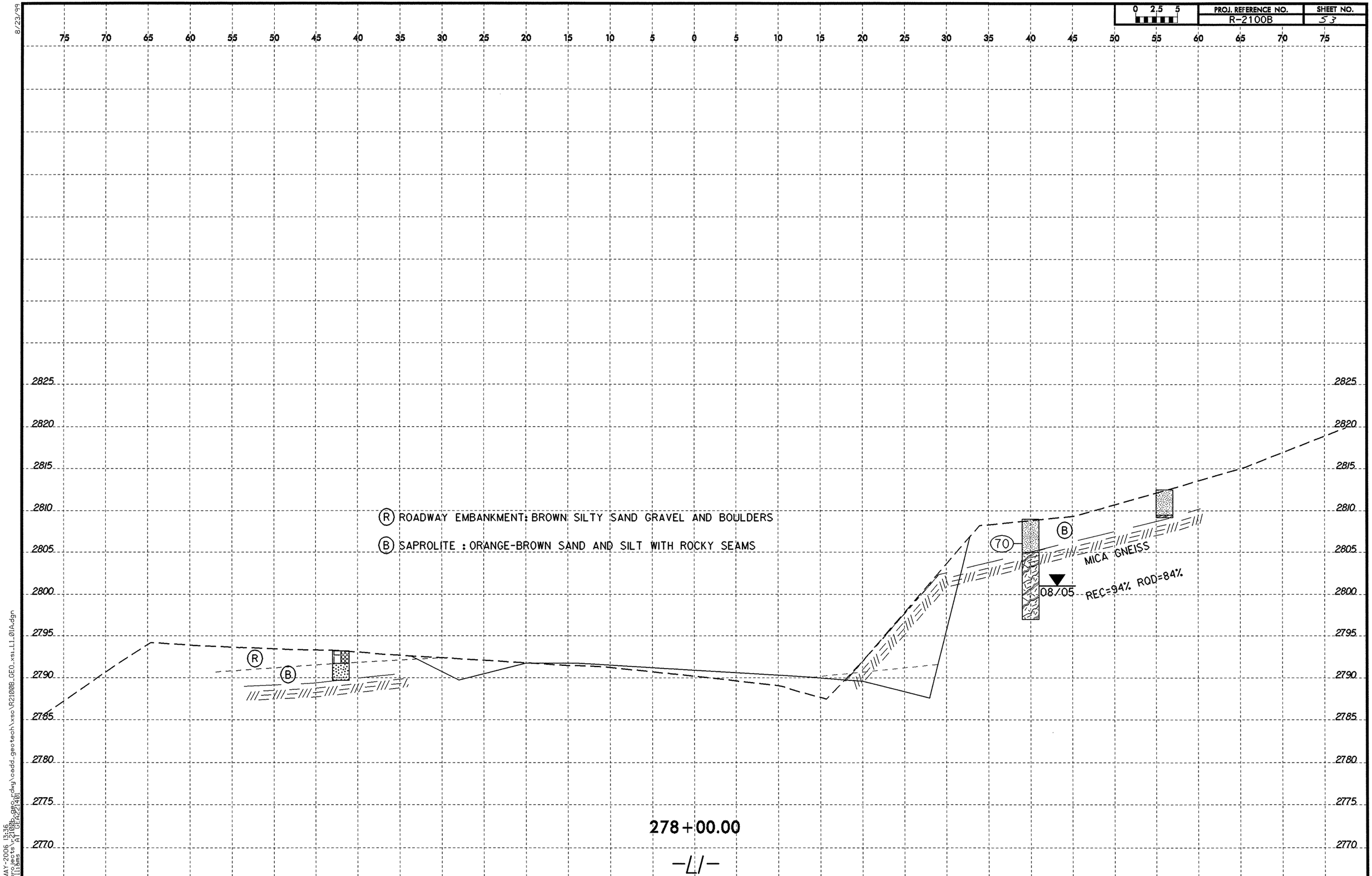
ltwilliams
AT GEA22401



8/23/99

24-MAY-2006 13:36
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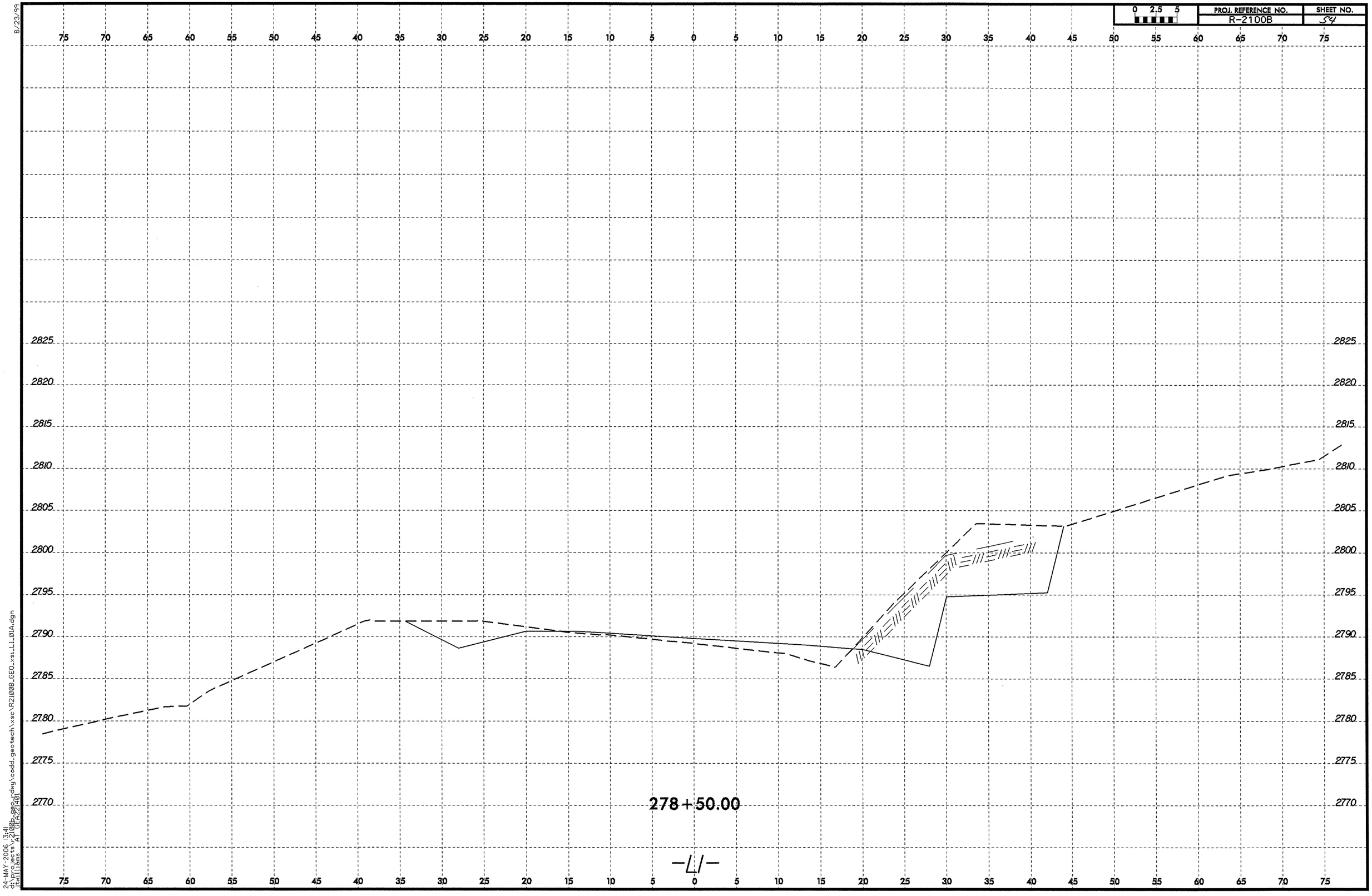
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 13:41
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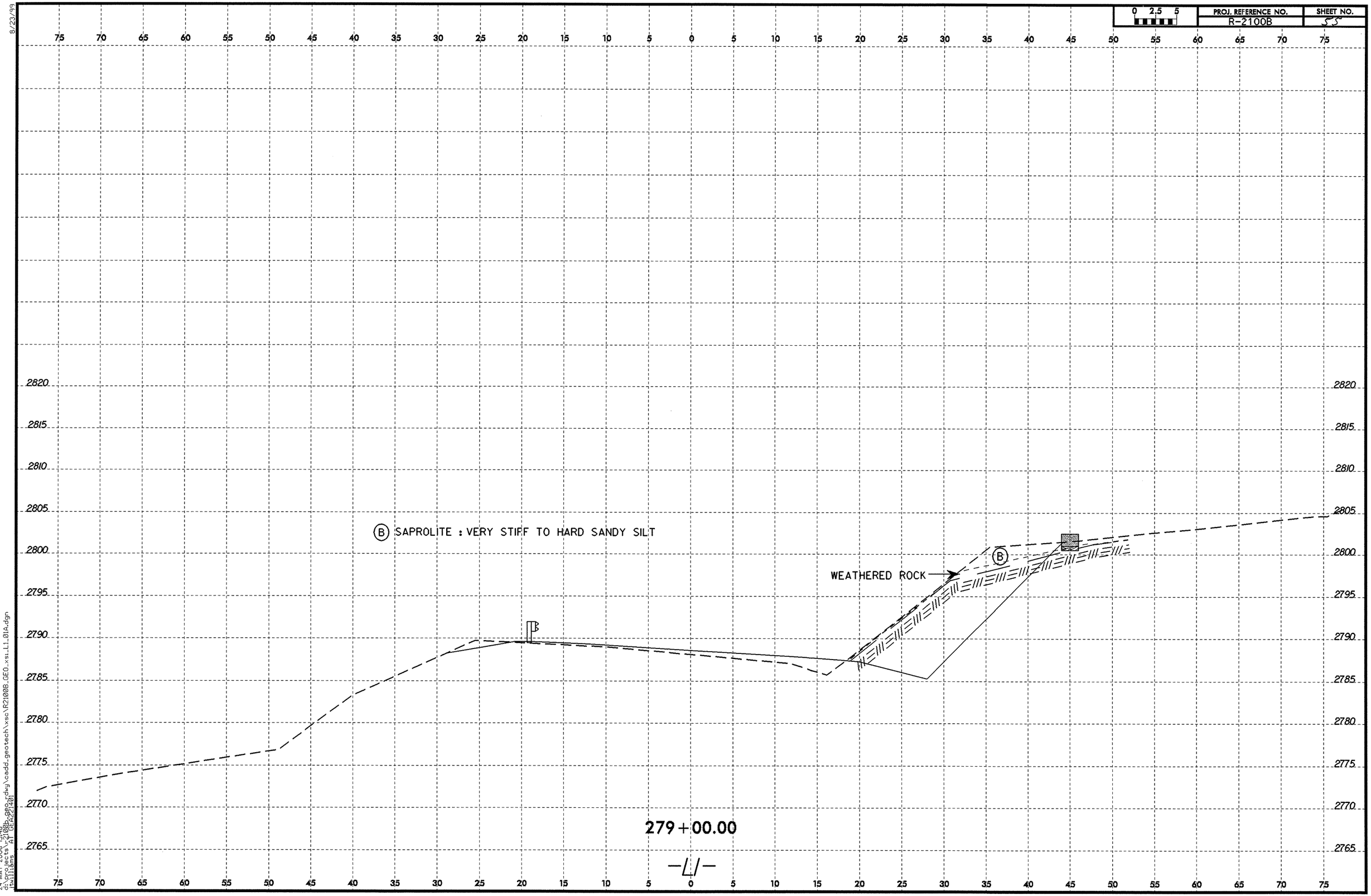
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
55
8/23/99
B SAPROLITE : VERY STIFF TO HARD SANDY SILT
WEATHERED ROCK
B
279+00.00
-L1-
24-MAY-2006 13:48
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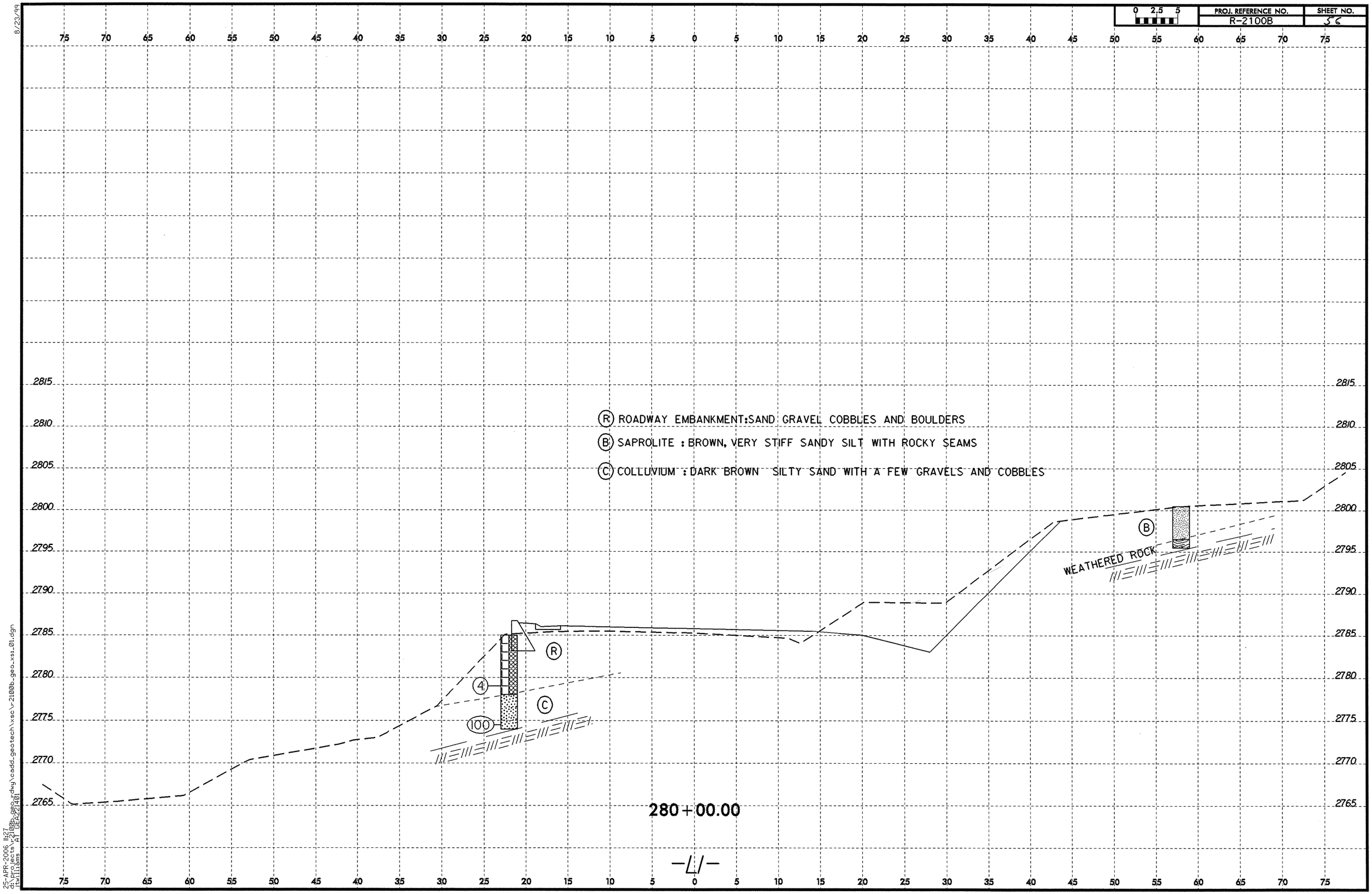

8/23/99

25-APR-2006 11:27
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	57

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

2815 2810 2805 2800 2795 2790 2785 2780 2775 2770 2765 2760

(R) ROADWAY EMBANKMENT : SAND, GRAVEL, COBBLES AND BOULDERS

(B) SAPROLITE : BROWN SILTY SAND WITH ROCKY SEAMS

(C) COLLUVIUM : BROWN SILTY SAND

OFFSET
280+30

(R)

(14)

(100)

WEATHERED ROCK

(C)

(B)

(32)

(100)

WEATHERED ROCK

280+50.00

-L/-

d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_01.dgn
twilliams
Al GEA22401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	58

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

2815 2810 2805 2800 2795 2790 2785 2780 2775 2770 2765 2760

Ⓑ SAPROLITE : BROWN, DENSE TO VERY DENSE SILTY SAND

WEATHERED ROCK

281+00.00

-L1-

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

22-MAY-2006 12:53
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twilliams
AT GEA22401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	52

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

2845 2840 2835 2830 2825 2820 2815 2810 2805 2800 2795 2790 2785 2780 2775 2770 2765 2760 2755

Ⓑ SAPROLITE : BROWN-ORANGE SILTY SAND WITH ROCKY SEAMS

35

68

100

Ⓑ

WEATHERED ROCK

282+00.00

—L/—

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

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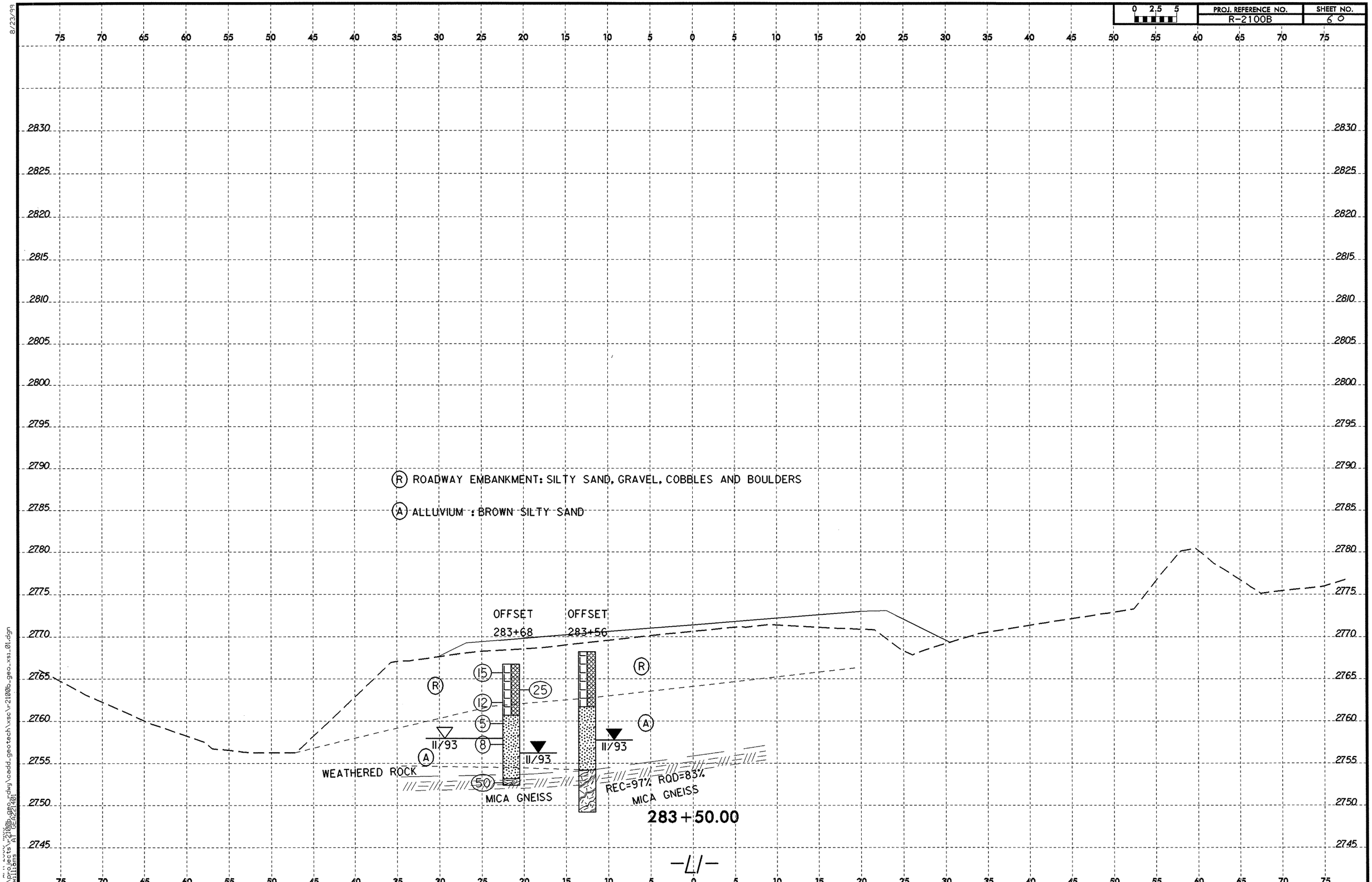
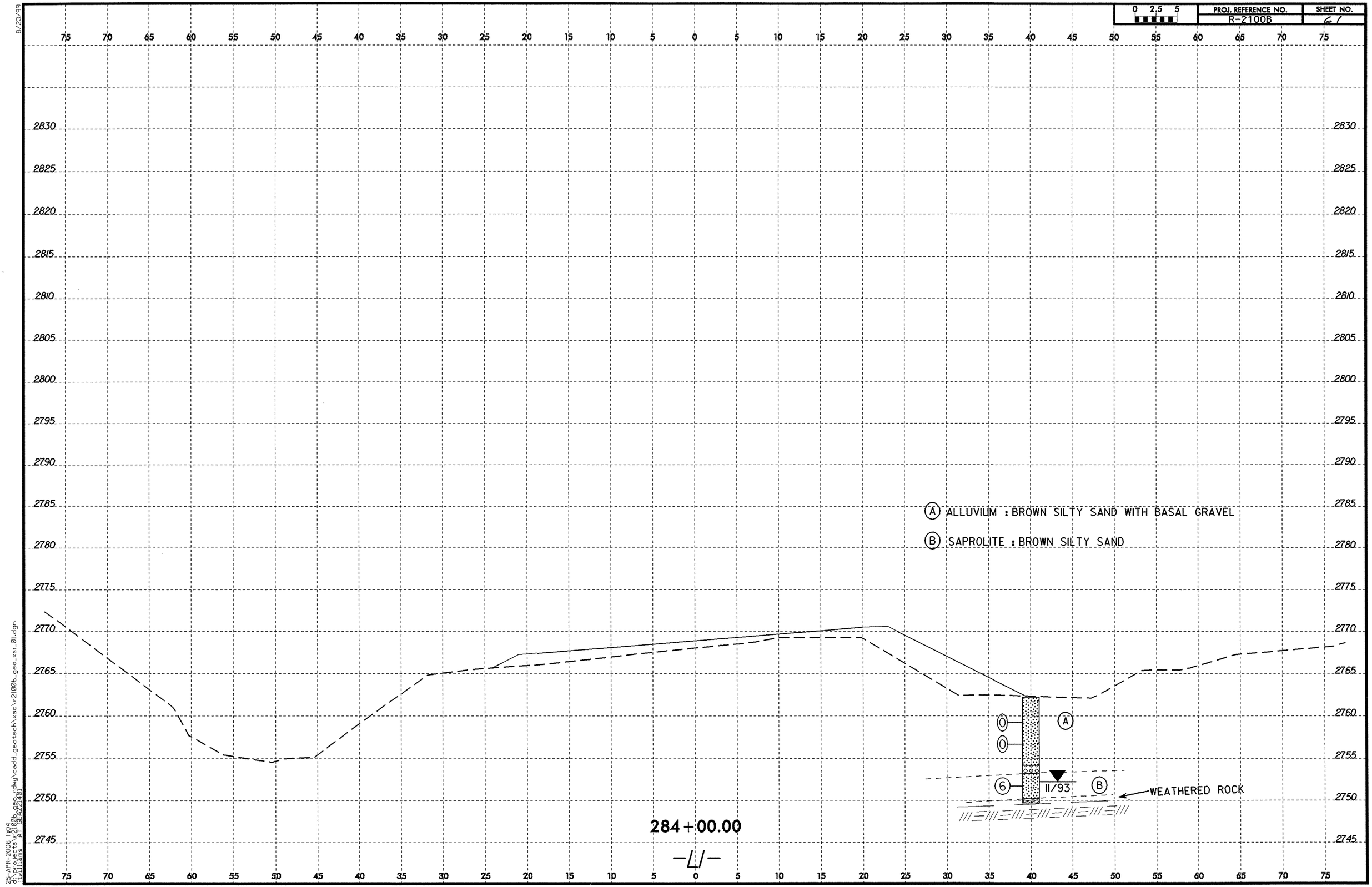
twilliams AT GEA22140



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
60
8/23/99
R ROADWAY EMBANKMENT: SILTY SAND, GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : BROWN SILTY SAND
OFFSET
283+68
OFFSET
283+56
15
25
12
5
8
50
11/93
11/93
11/93
WEATHERED ROCK
MICA GNEISS
REC=97% RQD=83%
MICA GNEISS
283+50.00
-L1-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
61
8/23/99
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
2830
2825
2820
2815
2810
2805
2800
2795
2790
2785
2780
2775
2770
2765
2760
2755
2750
2745
A ALLUVIUM : BROWN SILTY SAND WITH BASAL GRAVEL
B SAPROLITE : BROWN SILTY SAND
0
0
6
A
B
11/93
WEATHERED ROCK
284+00.00
-L1-
25-APR-2006 11:04
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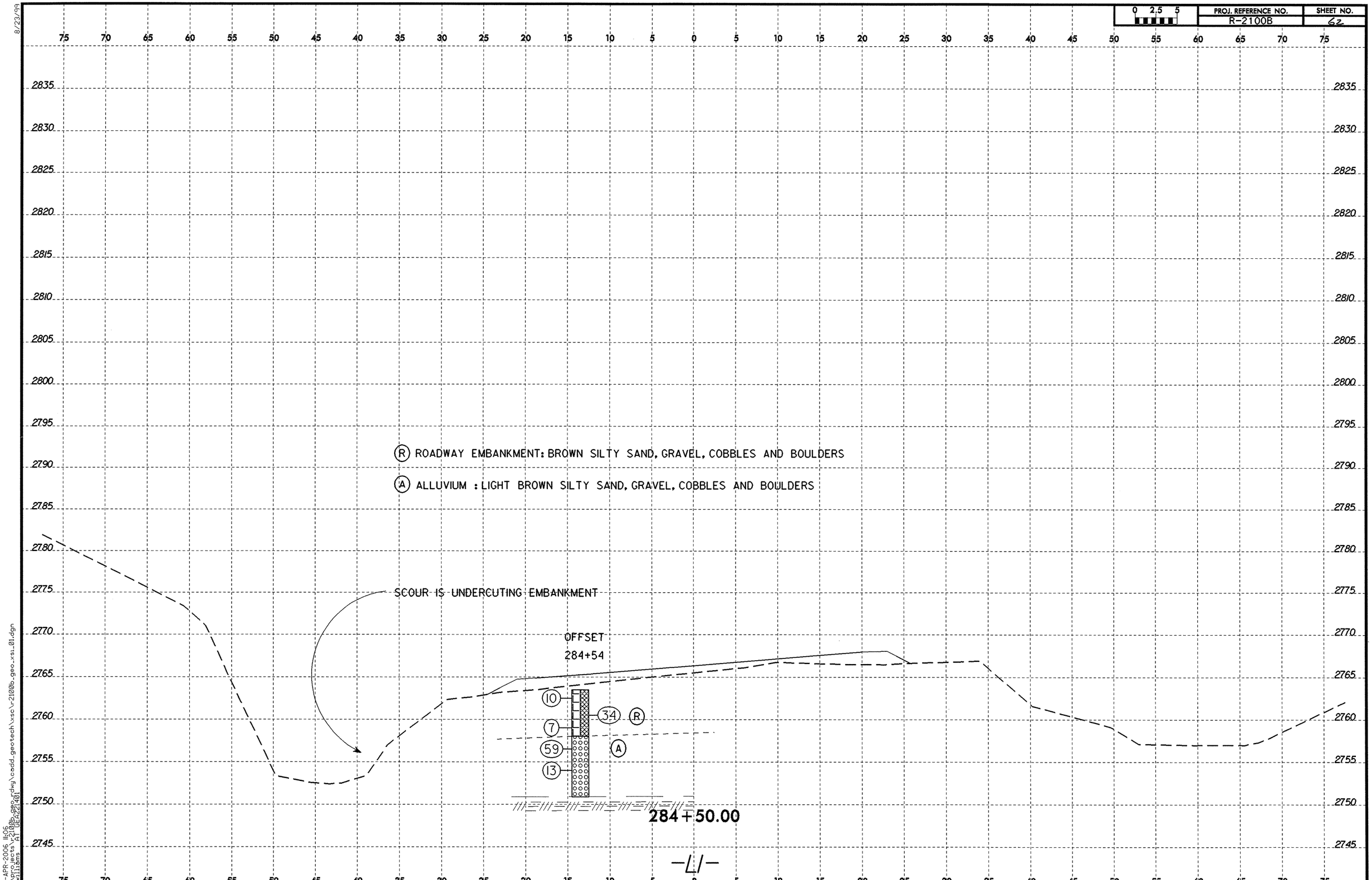
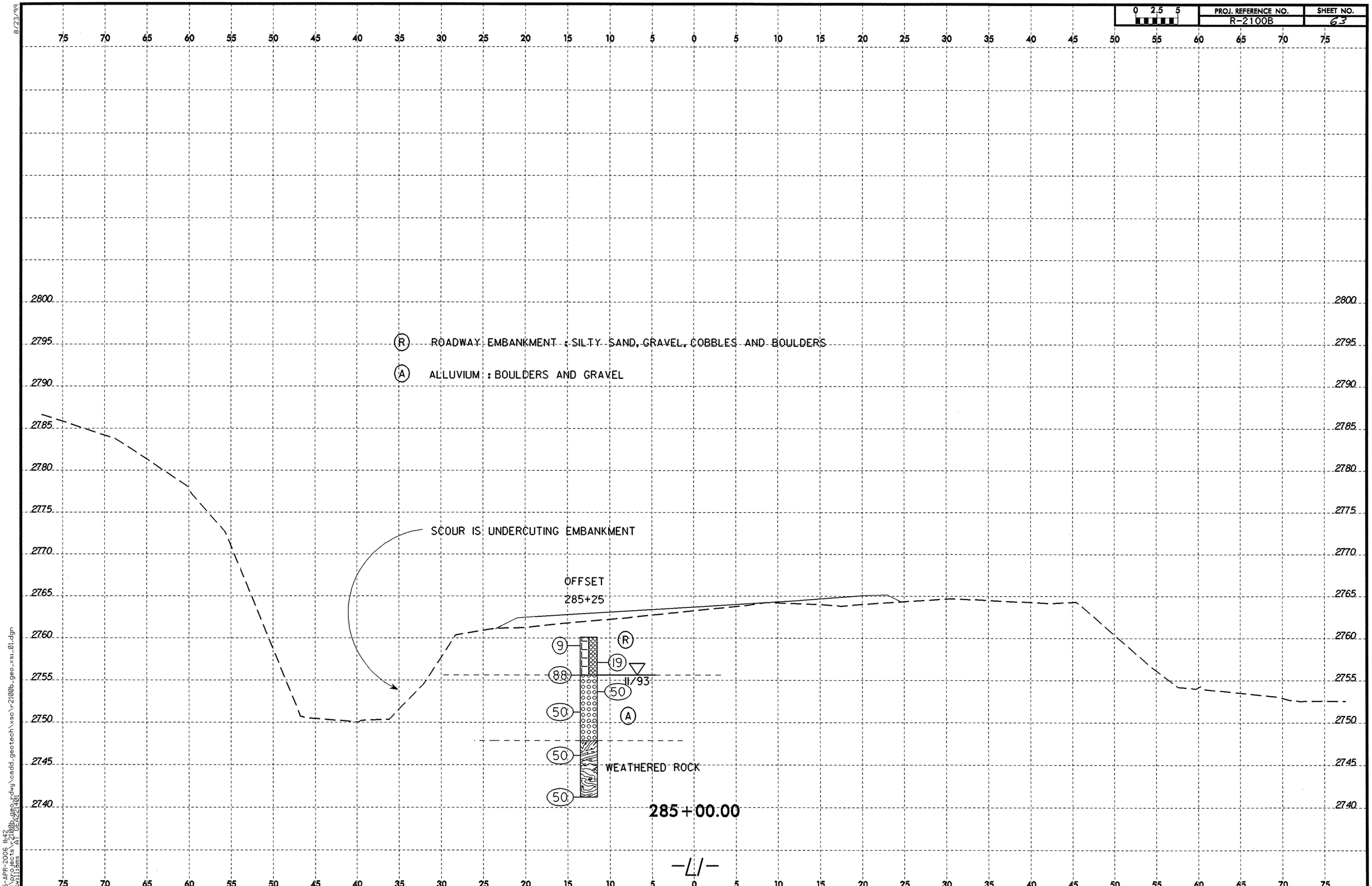
ltwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
62
8/23/99
R ROADWAY EMBANKMENT: BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : LIGHT BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
SCOUR IS UNDERCUTING EMBANKMENT
OFFSET
284+54
10
34
R
7
59
A
13
284+50.00
-L1-
25-APR-2006 11:06
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_01.dgn
twilliams AT GEA221401



8/23/99

25-APR-2006 11:42
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	64

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

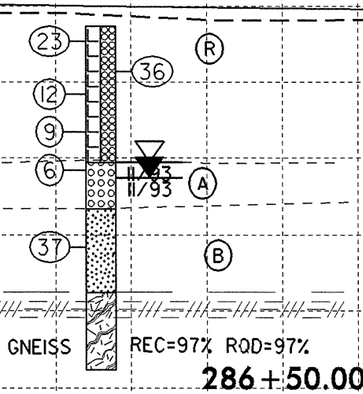
2795
2790
2785
2780
2775
2770
2765
2760
2755
2750
2745
2740
2735
2730

(R) ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS

(A) ALLUVIUM : BROWN SILT, SAND AND GRAVEL

(B) SAPROLITE : BROWN SILTY SAND

OFFSET
286+69



MICA GNEISS REC=97% RQD=97%

286+50.00

-L/-

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

25-APR-2006 12:36
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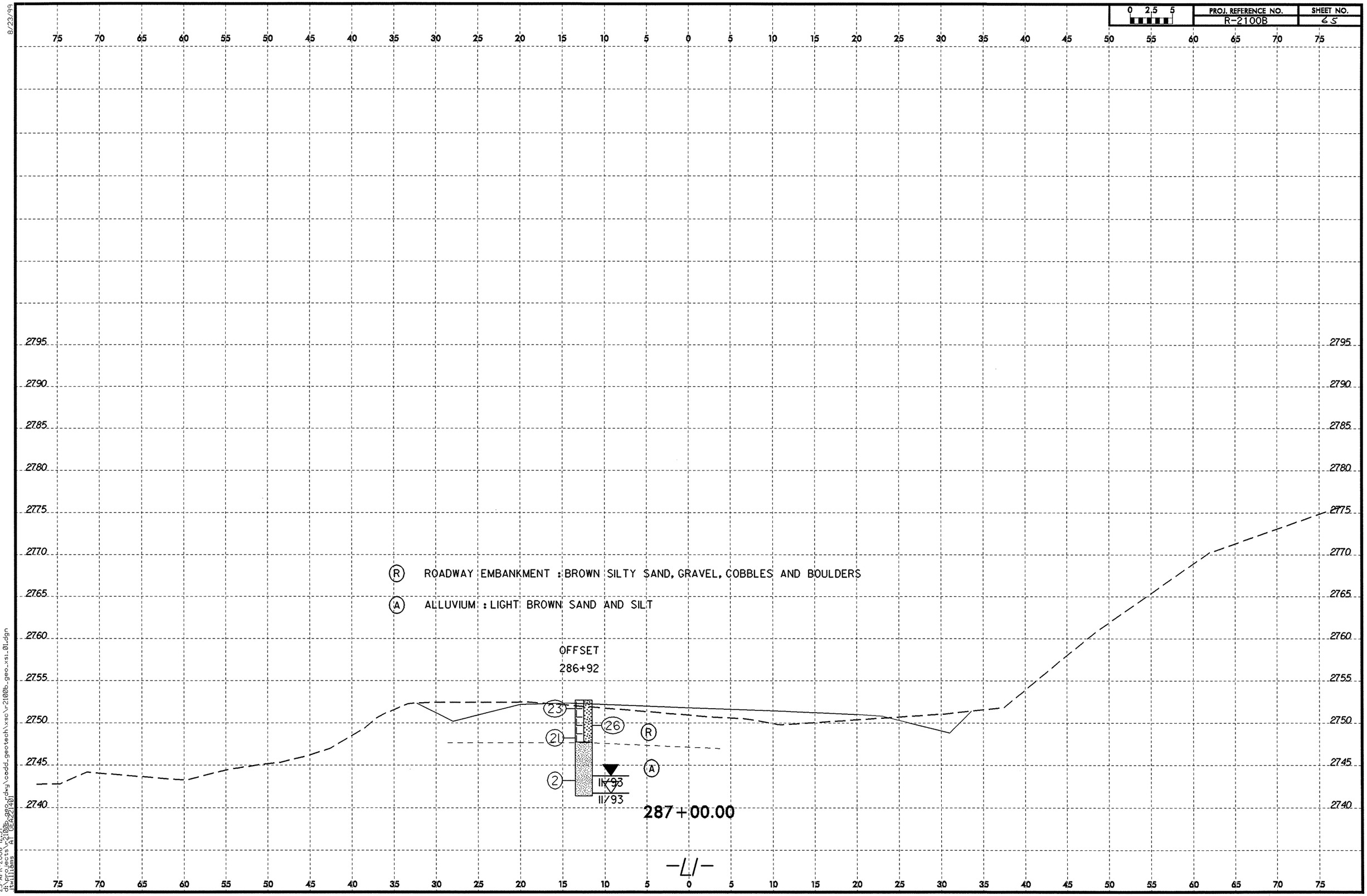
twilliams
A1 GEA221401



8/23/99

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ltwilliams AT GEA221401

8/23/99

0 2.5 5

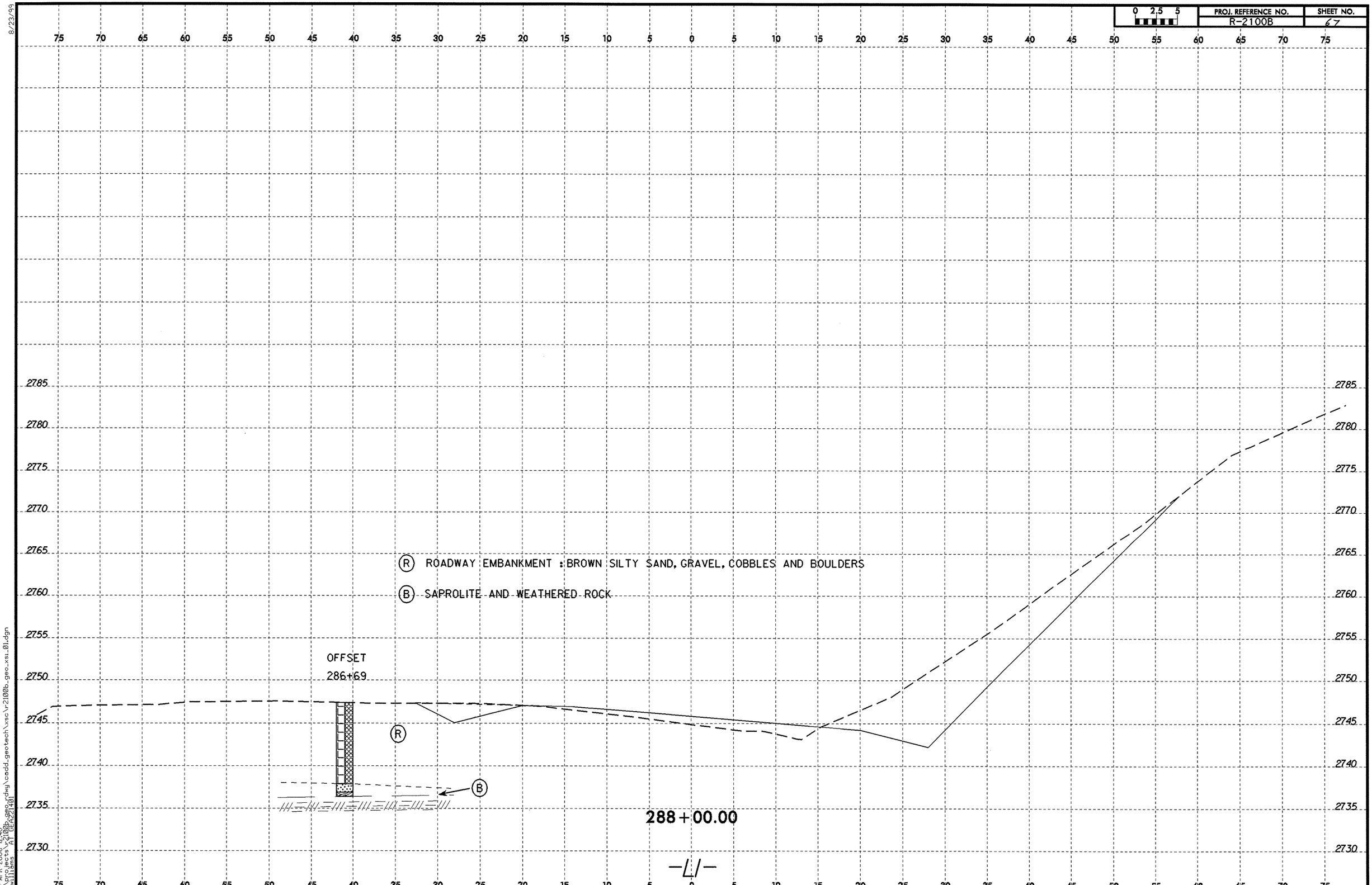
PROJ. REFERENCE NO.	SHEET NO.
R-2100B	66

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

2825 2820 2815 2810 2805 2800 2795 2790 2785 2780 2775 2770 2765 2760 2755 2750 2745 2740 2735

287+50.00

25-APR-2006 14:43
d:\projects\2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsl_01.dgn
tswilliams
AT GEA22140



8/23/99

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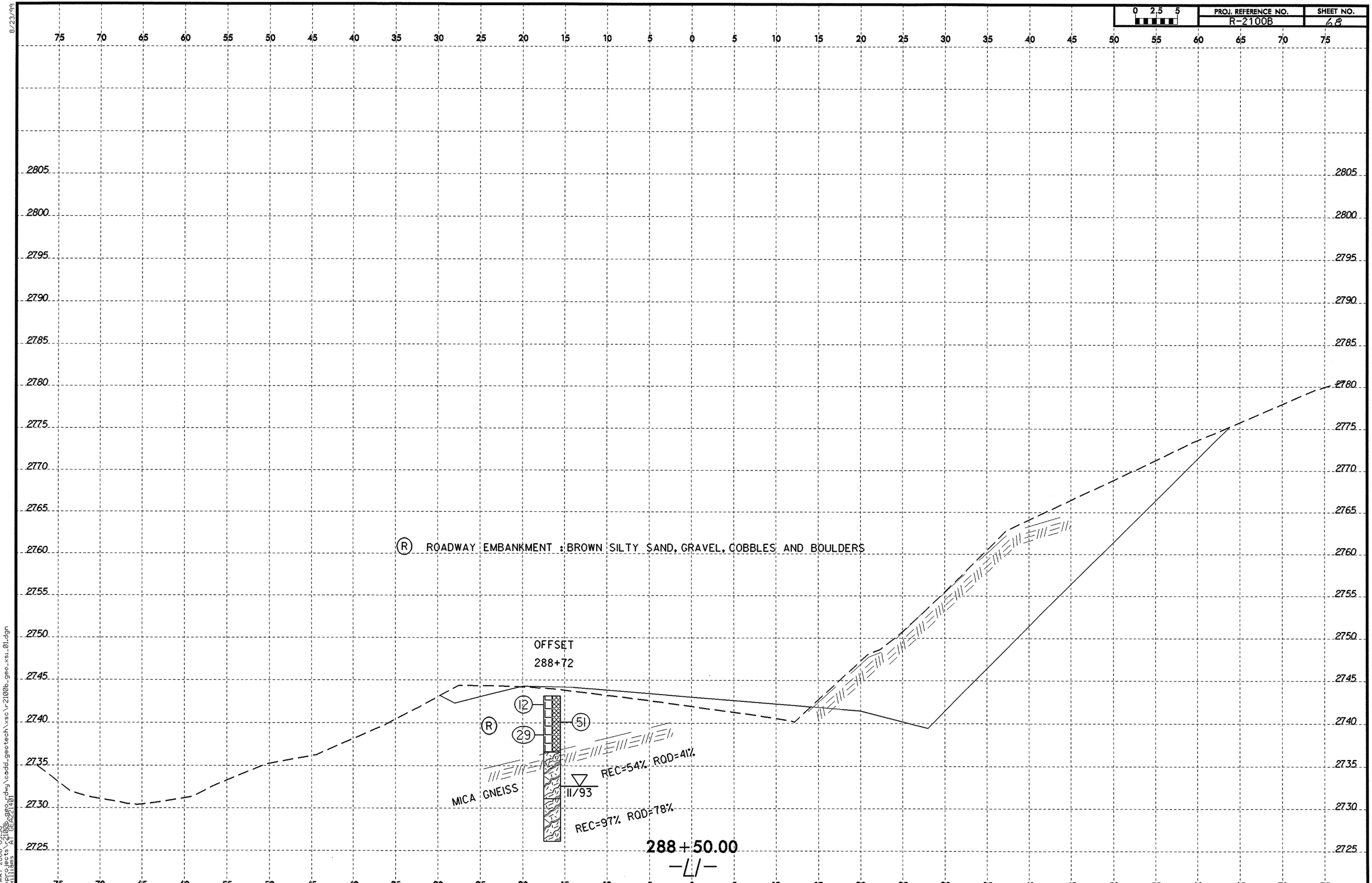
jtwilliams AT GEA221401



8/23/99

01-MAY-2006 09:36
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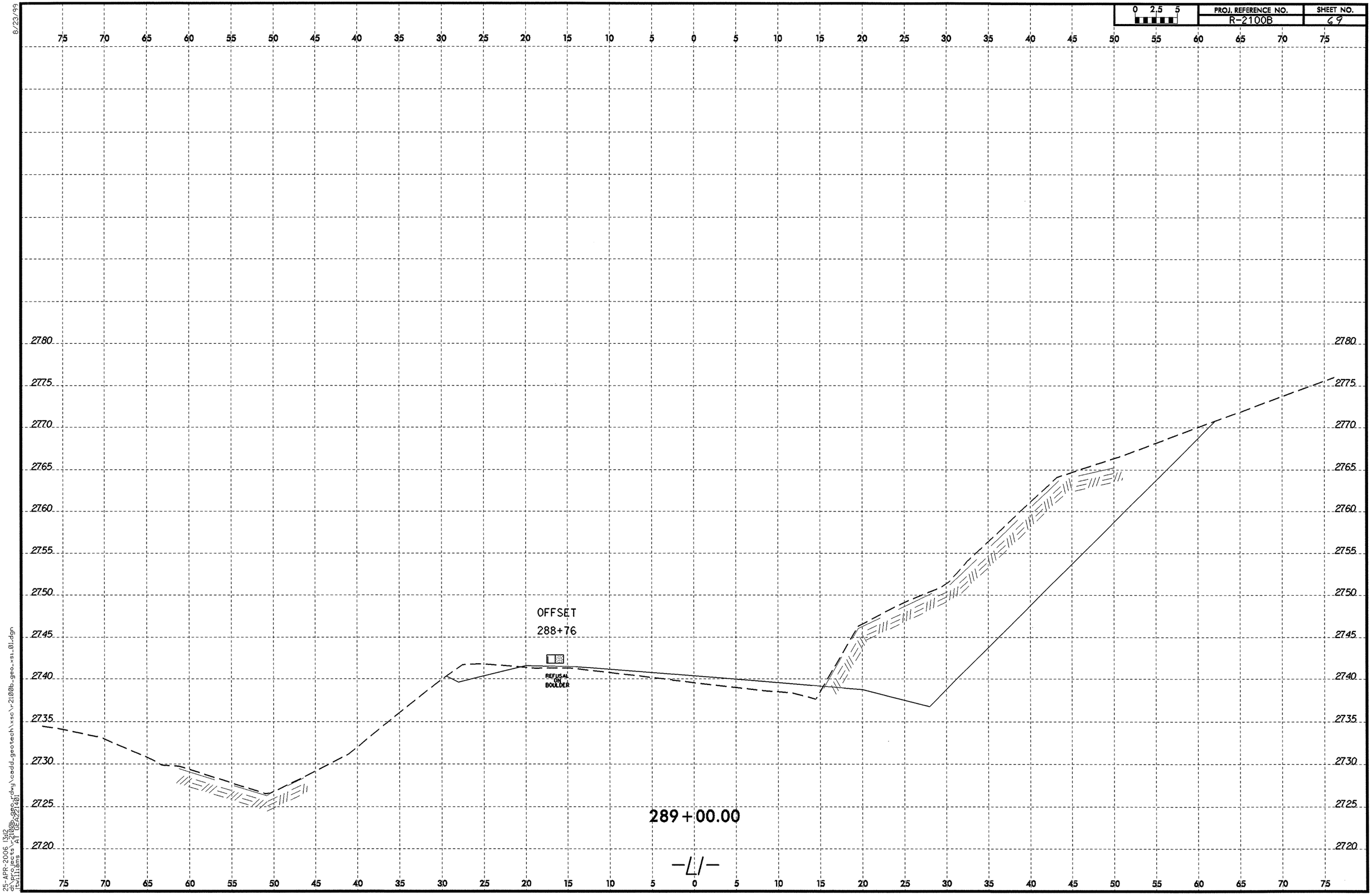
jtwilliams AT GEA221401



8/23/99

25-APR-2006 13:12
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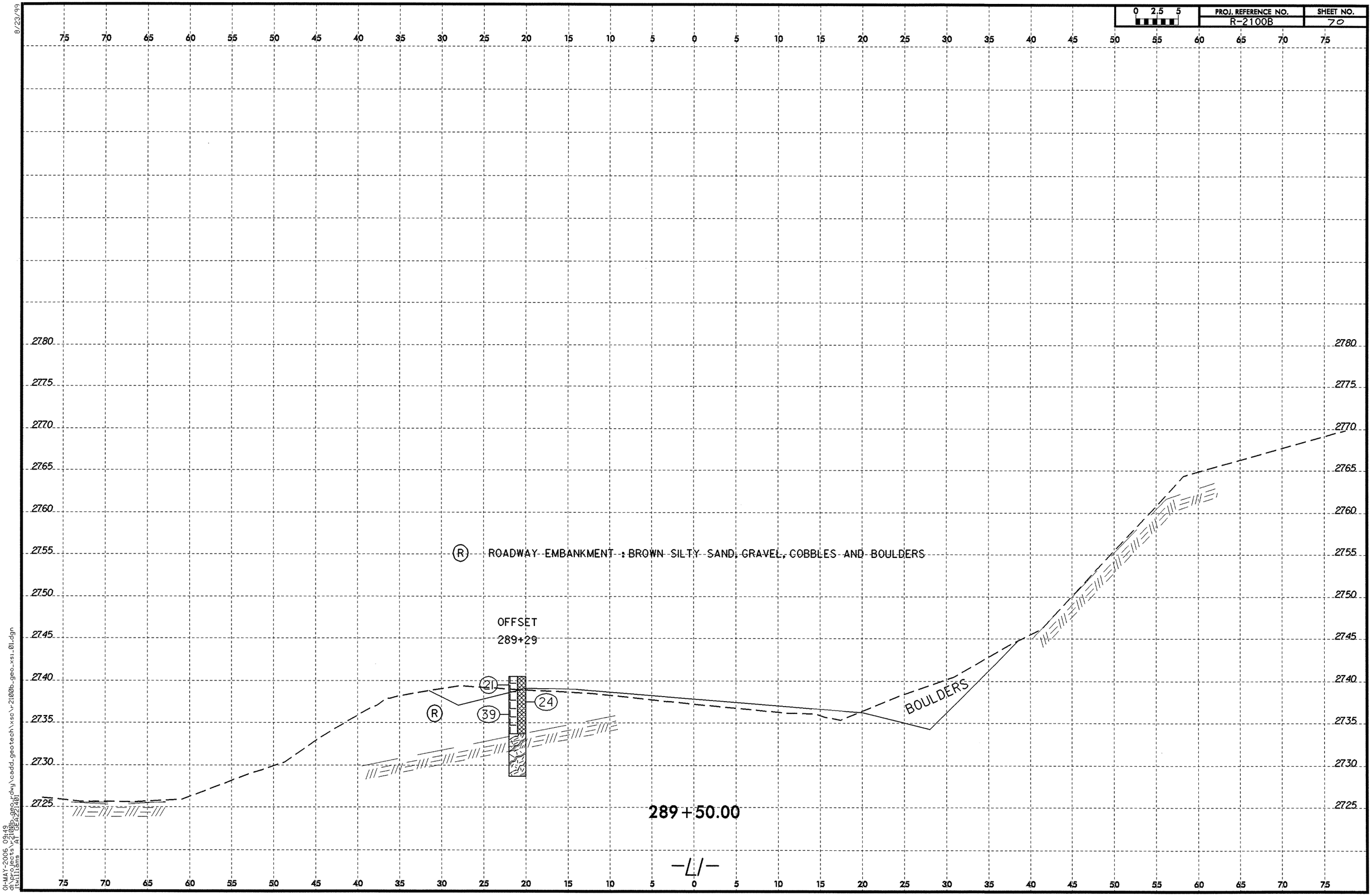
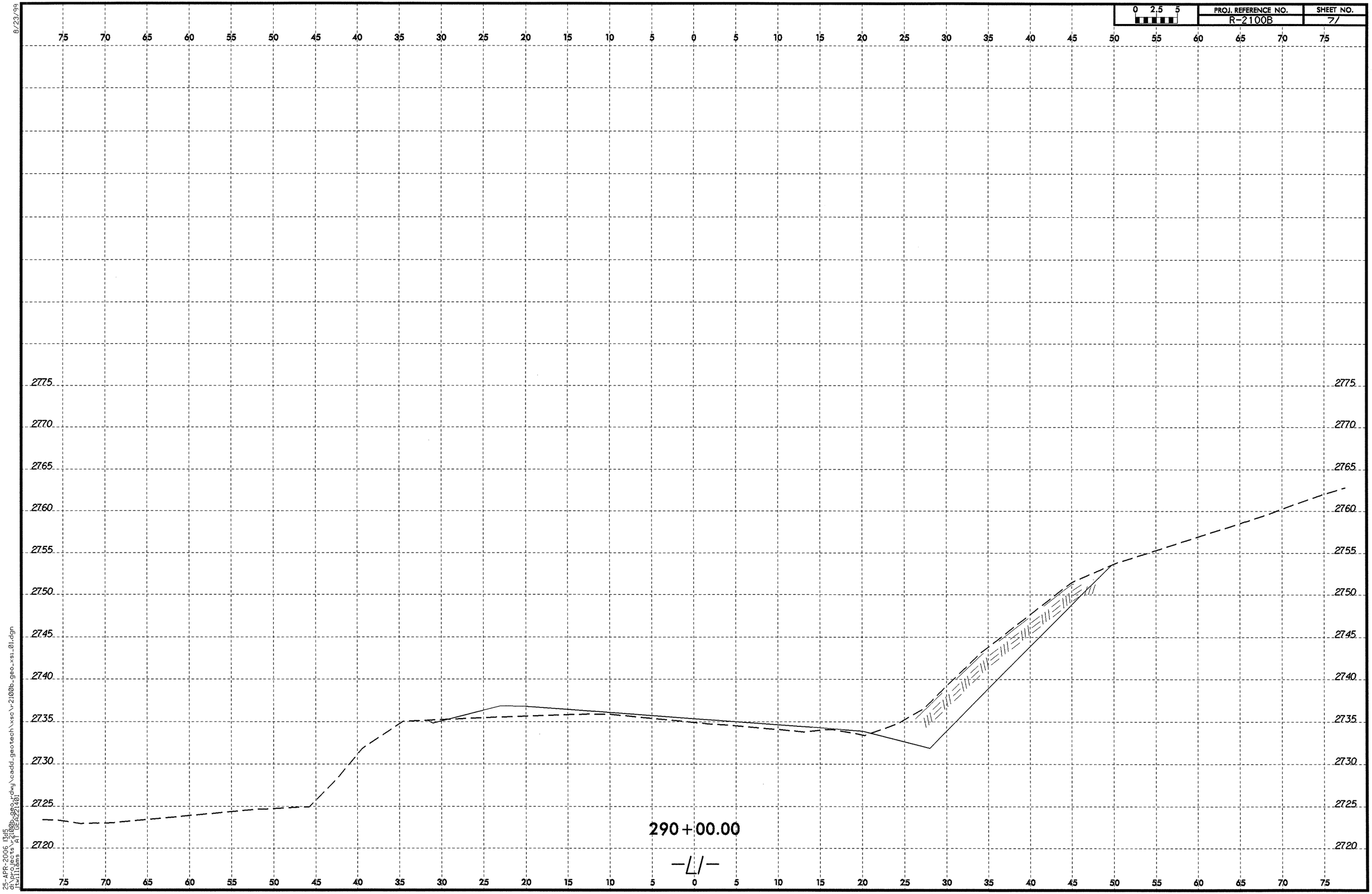
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
70
8/23/99
ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
OFFSET
289+29
21
24
39
R
BOULDERS
289+50.00
-L/-
01-MAY-2006 09:49
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_01.dgn
jtwilliams AT GEA221401



8/23/99

25-APR-2006 13:15
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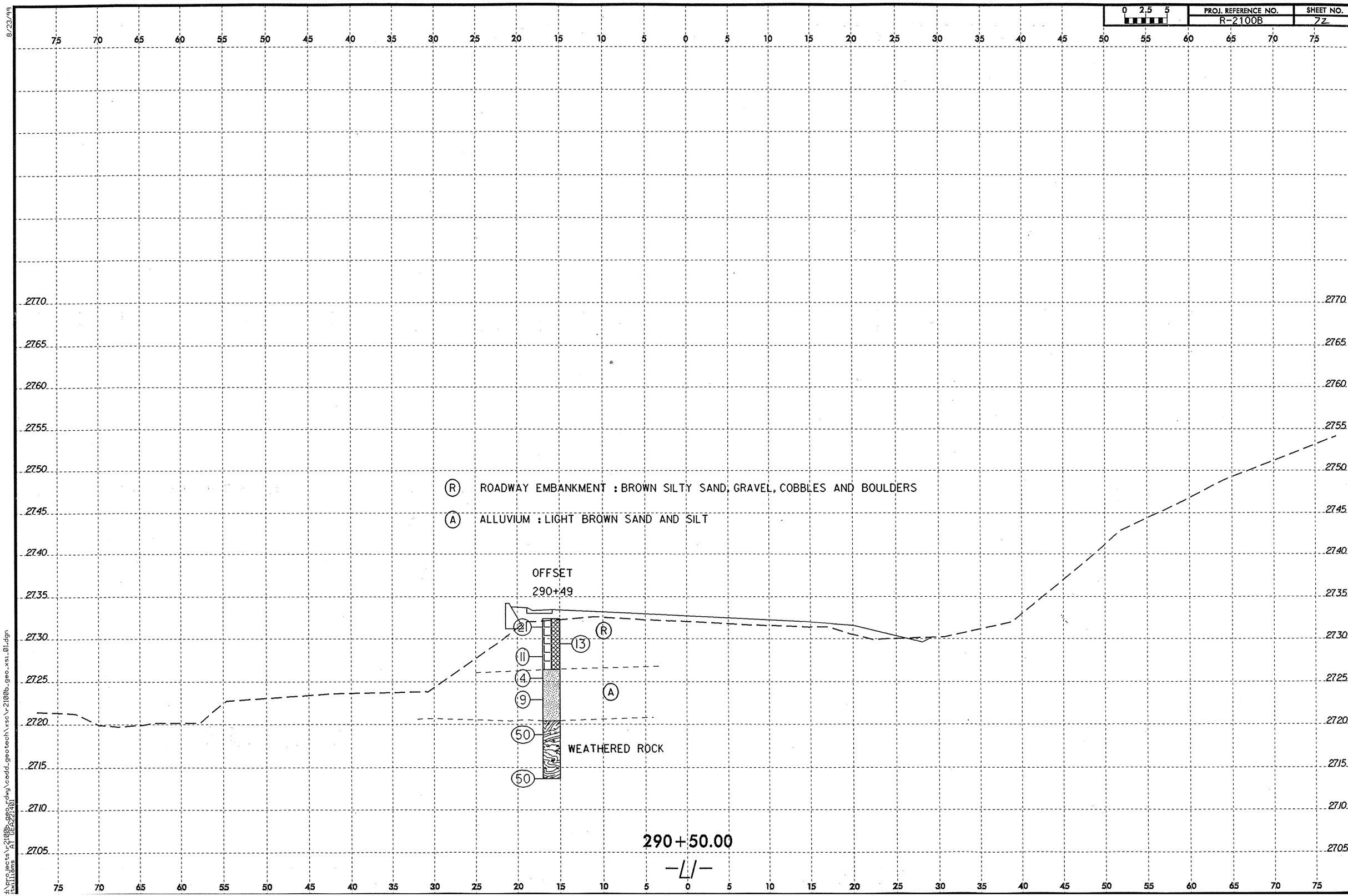
ltwilliams AT GEA2214(0)



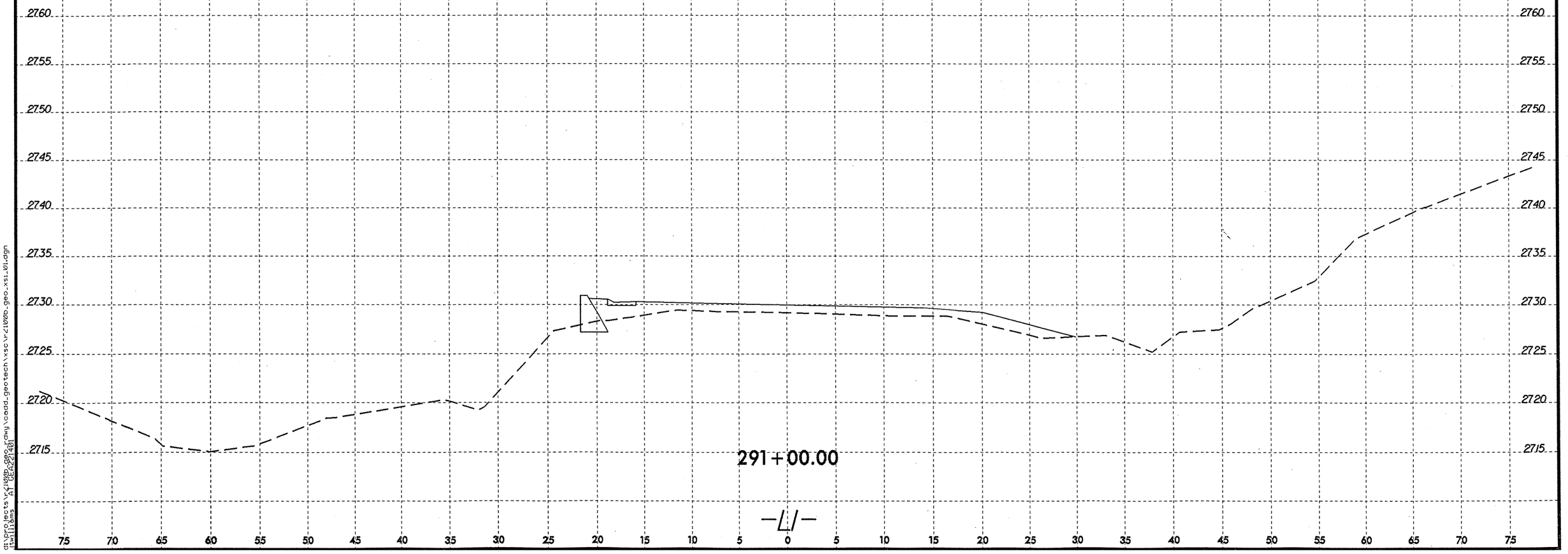
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
72
8/23/99
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
2770
2765
2760
2755
2750
2745
2740
2735
2730
2725
2720
2715
2710
2705
R ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : LIGHT BROWN SAND AND SILT
OFFSET
290+49
21
13
11
4
9
50
50
R
A
WEATHERED ROCK
290+50.00
-L1-

8/23/99

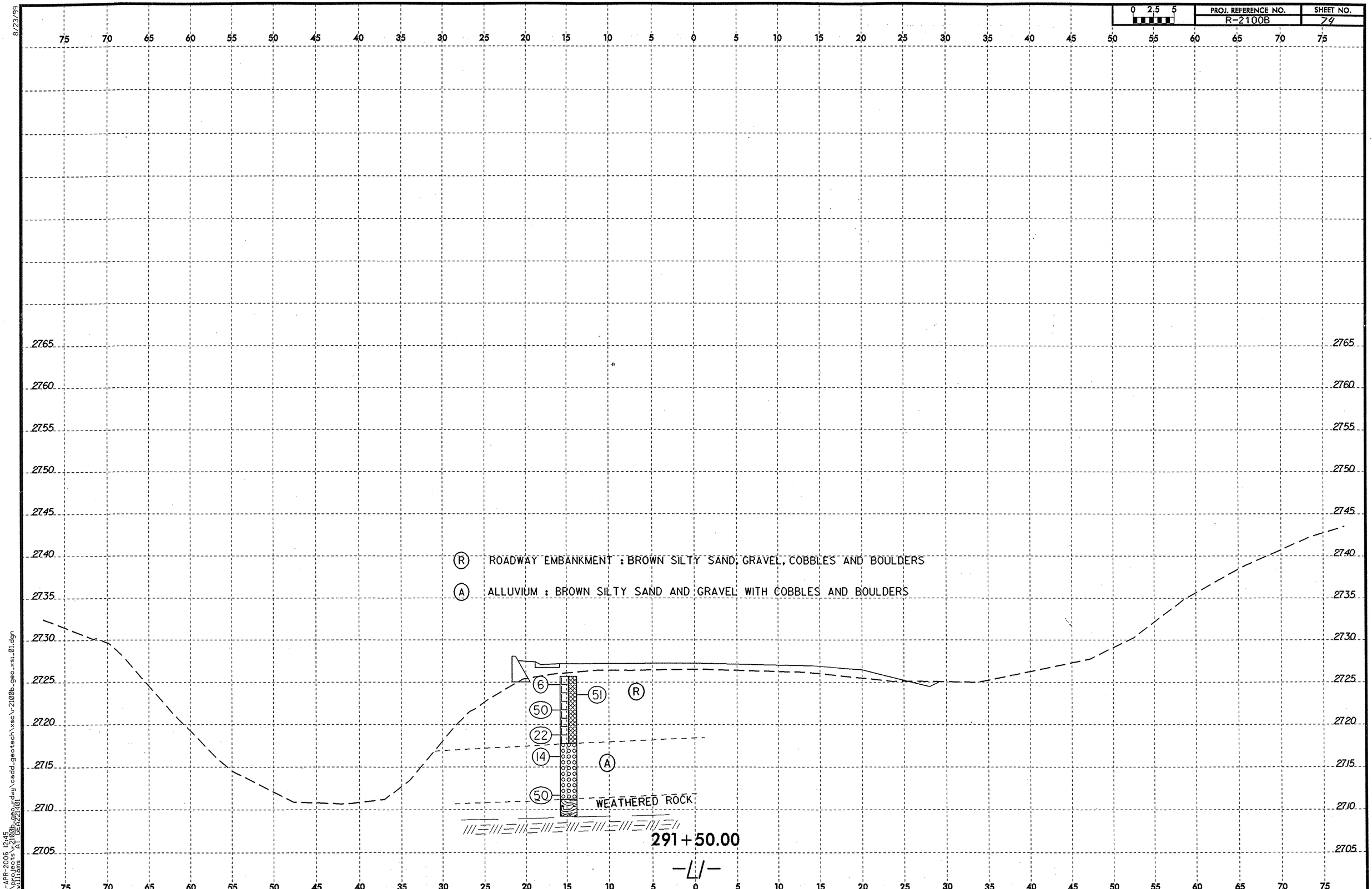
0 2,5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	23

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

2765 2760 2755 2750 2745 2740 2735 2730 2725 2720 2715



d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_01.dgn
tswilliams AT DEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
74
8/23/99
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
2765
2760
2755
2750
2745
2740
2735
2730
2725
2720
2715
2710
2705
R ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : BROWN SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS
6
51
50
22
14
50
R
A
WEATHERED ROCK
291+50.00
-L1-
25-APR-2006 12:45
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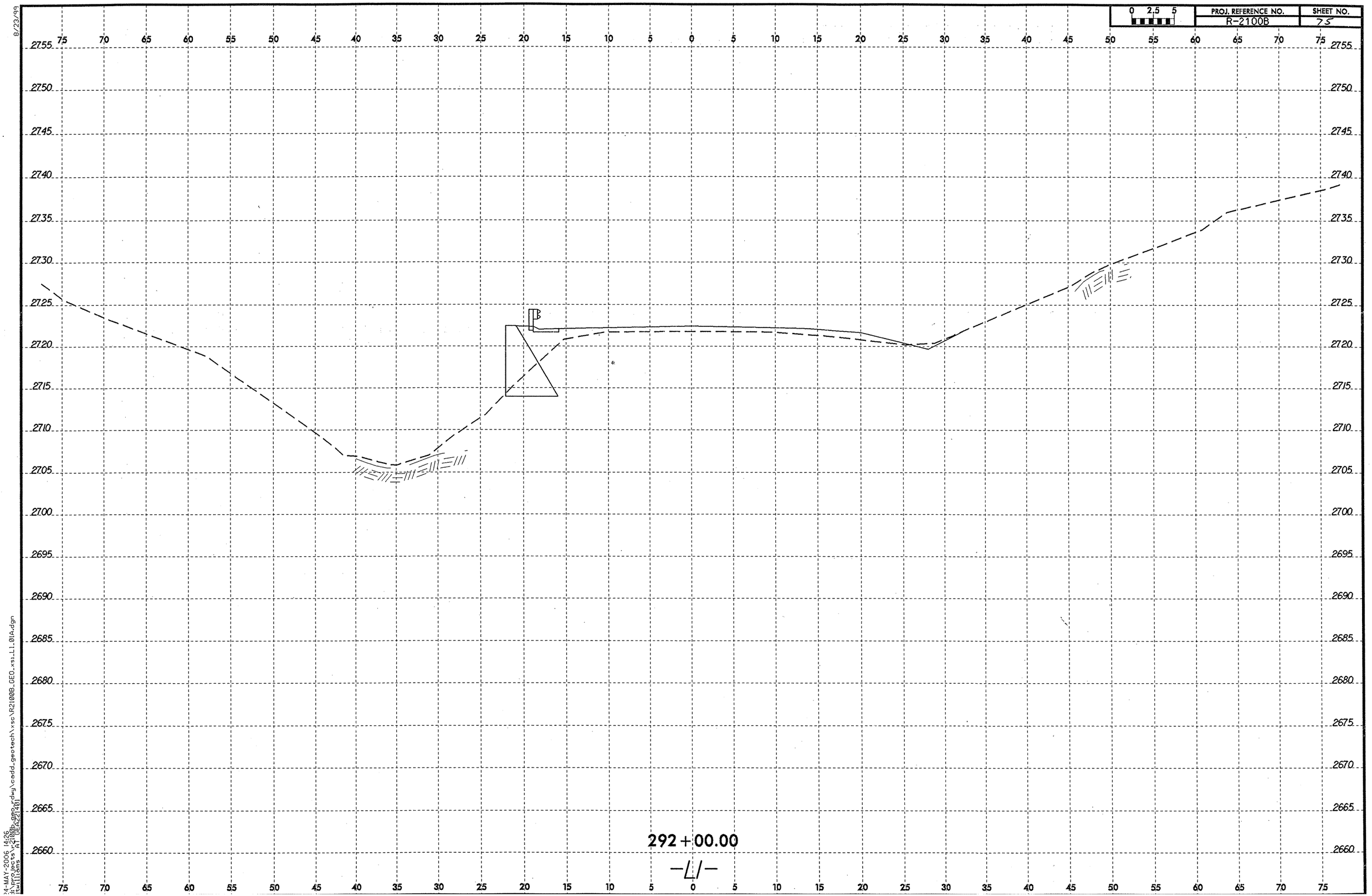
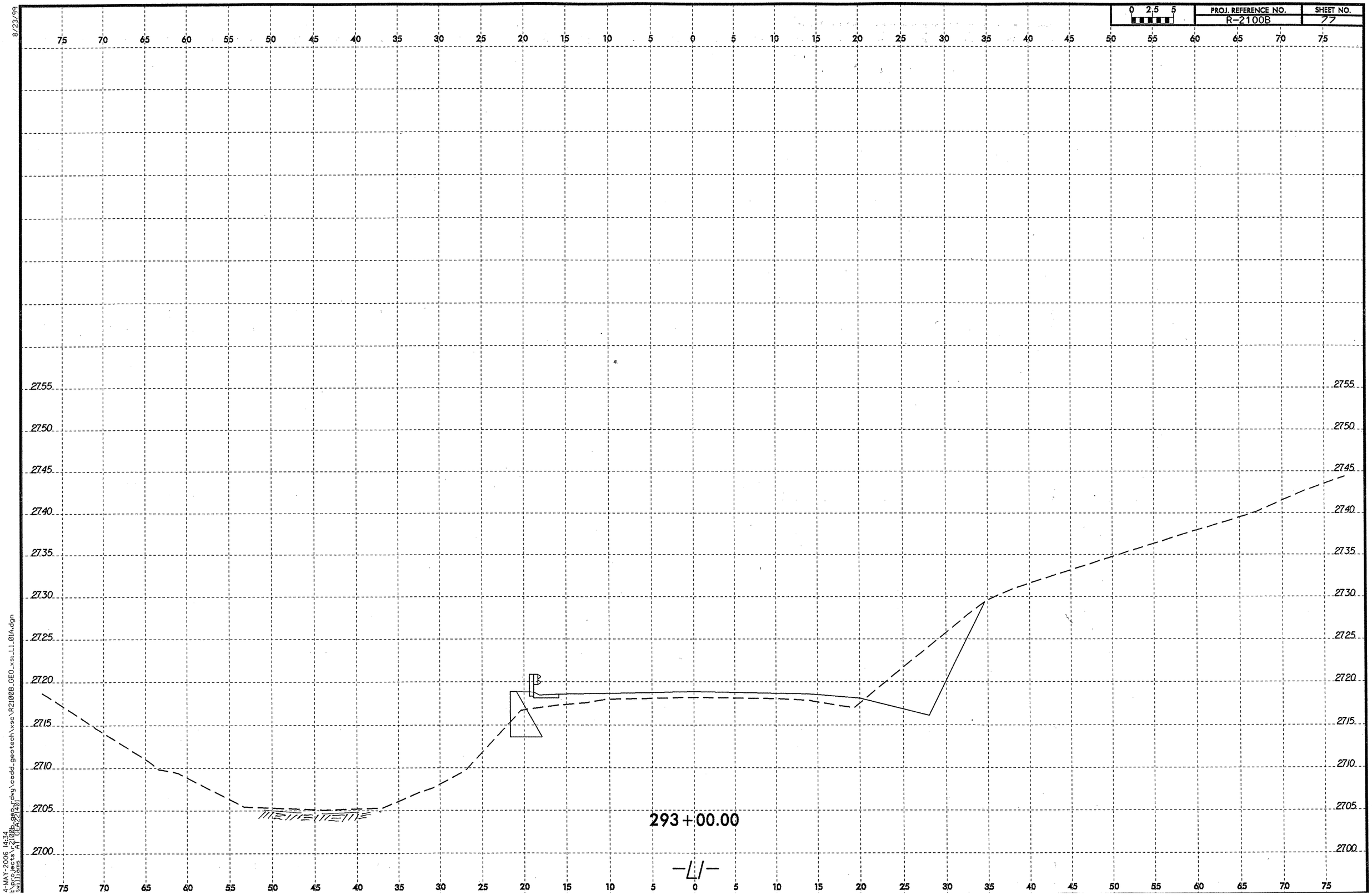
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
75
292+00.00
-L1-

8/23/99
R-2100B
(R) ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
(A) ALLUVIUM : BROWN SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS
OFFSET
292+52
R
7
4
50
11/93
A
WEATHERED ROCK
292+50.00
2755
2750
2745
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
2660
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
$$$$$SYSTIME$$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



8/23/99

4-MAY-2006 14:34
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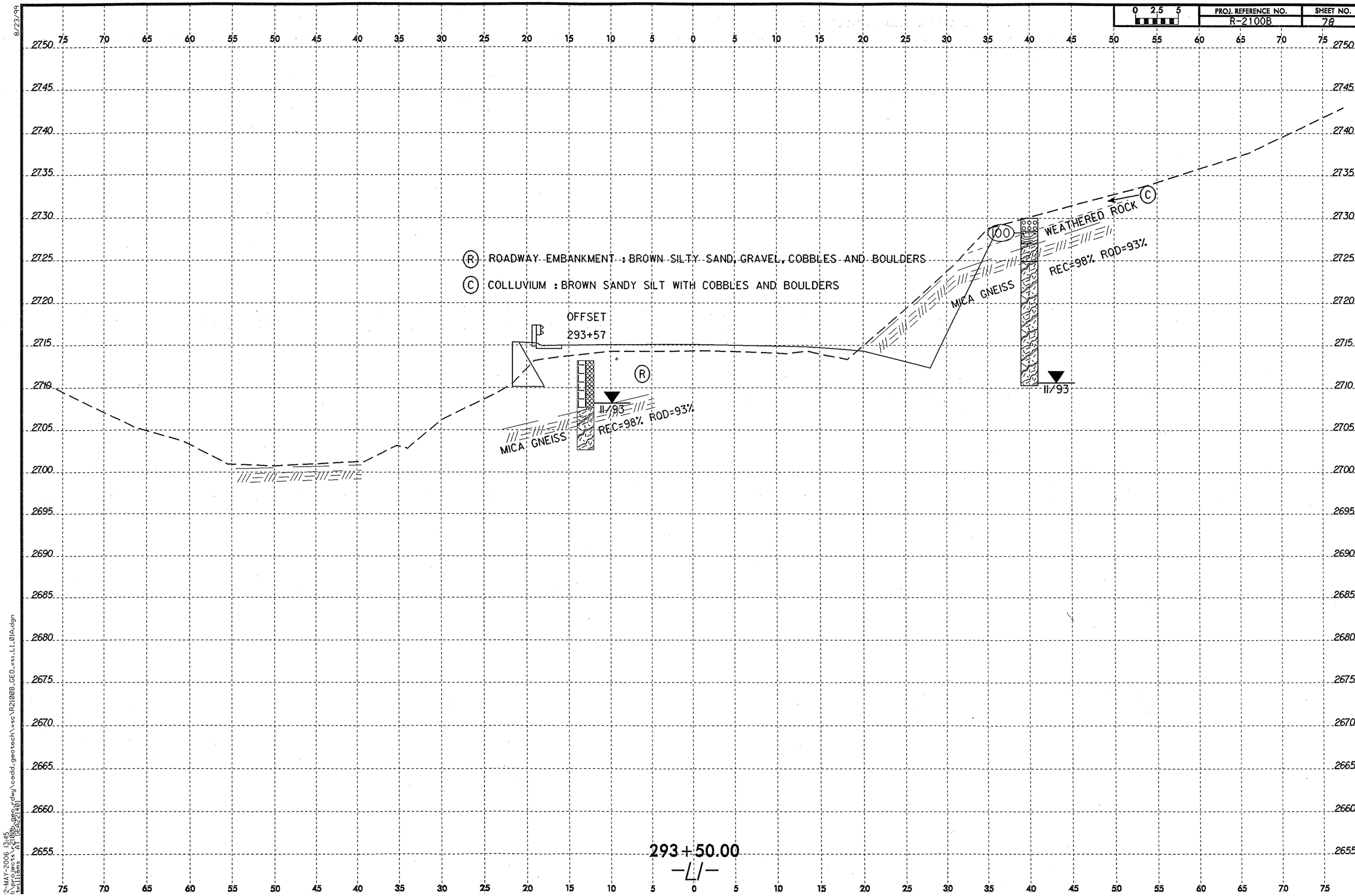
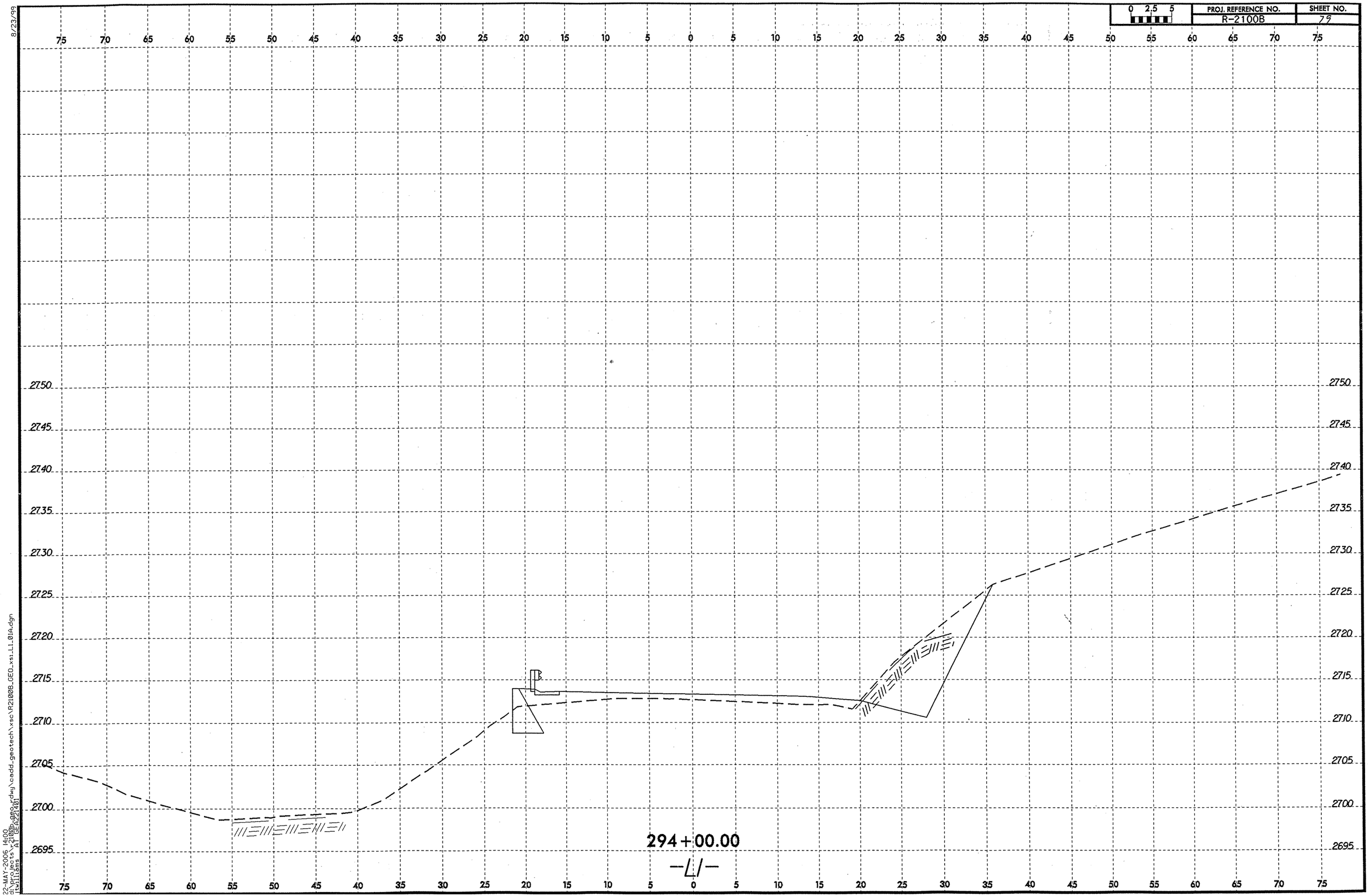
twilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
78
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SANDY SILT WITH COBBLES AND BOULDERS
OFFSET
293+57
R
11/93
REC=98% RQD=93%
MICA GNEISS
100
WEATHERED ROCK
C
REC=98% RQD=93%
MICA GNEISS
11/93
293+50.00
-L/-



8/23/99

22-MAY-2006 14:00
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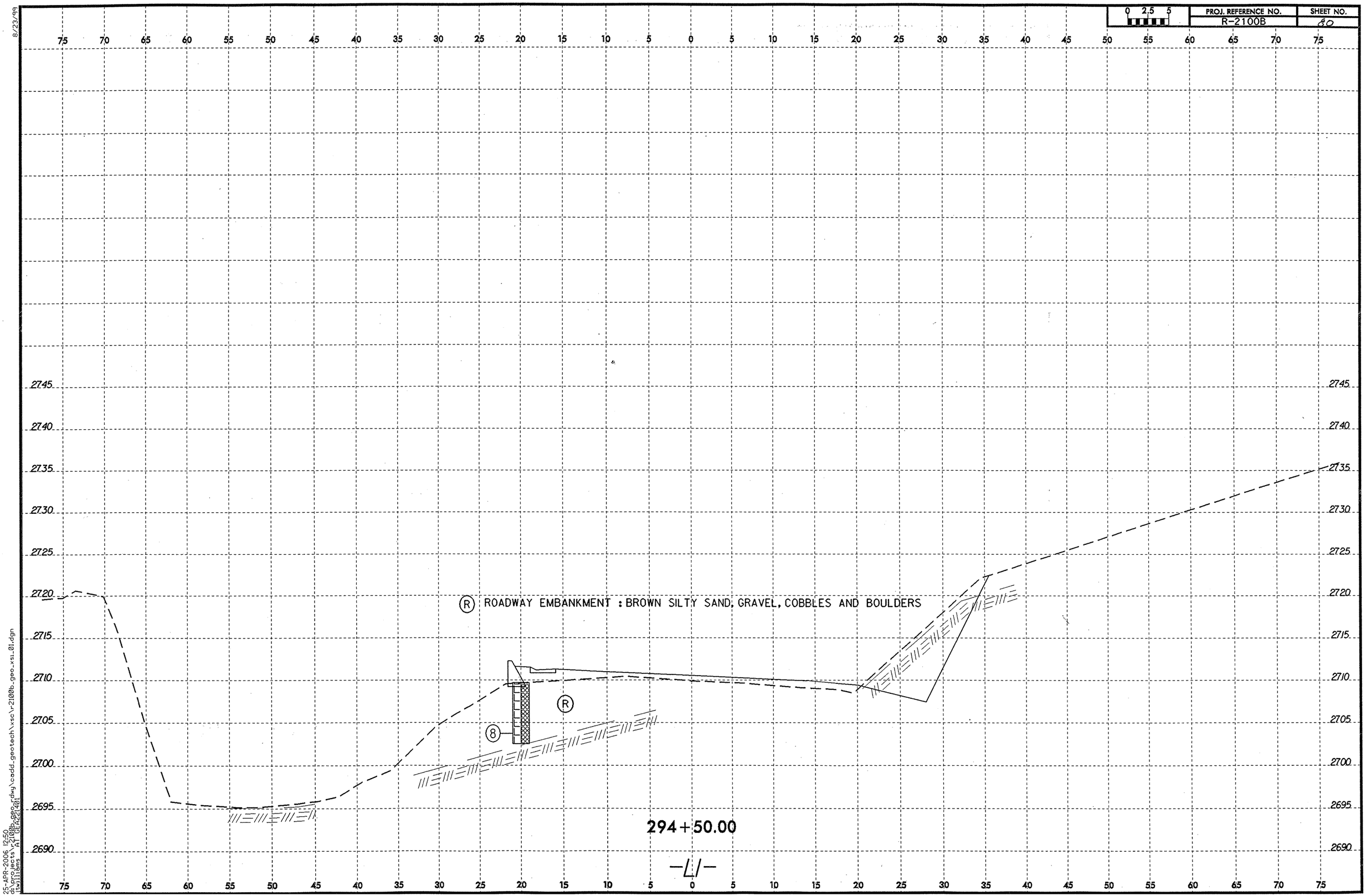
jtwilliams AT GEA221401



8/23/99

25-APR-2006 12:50
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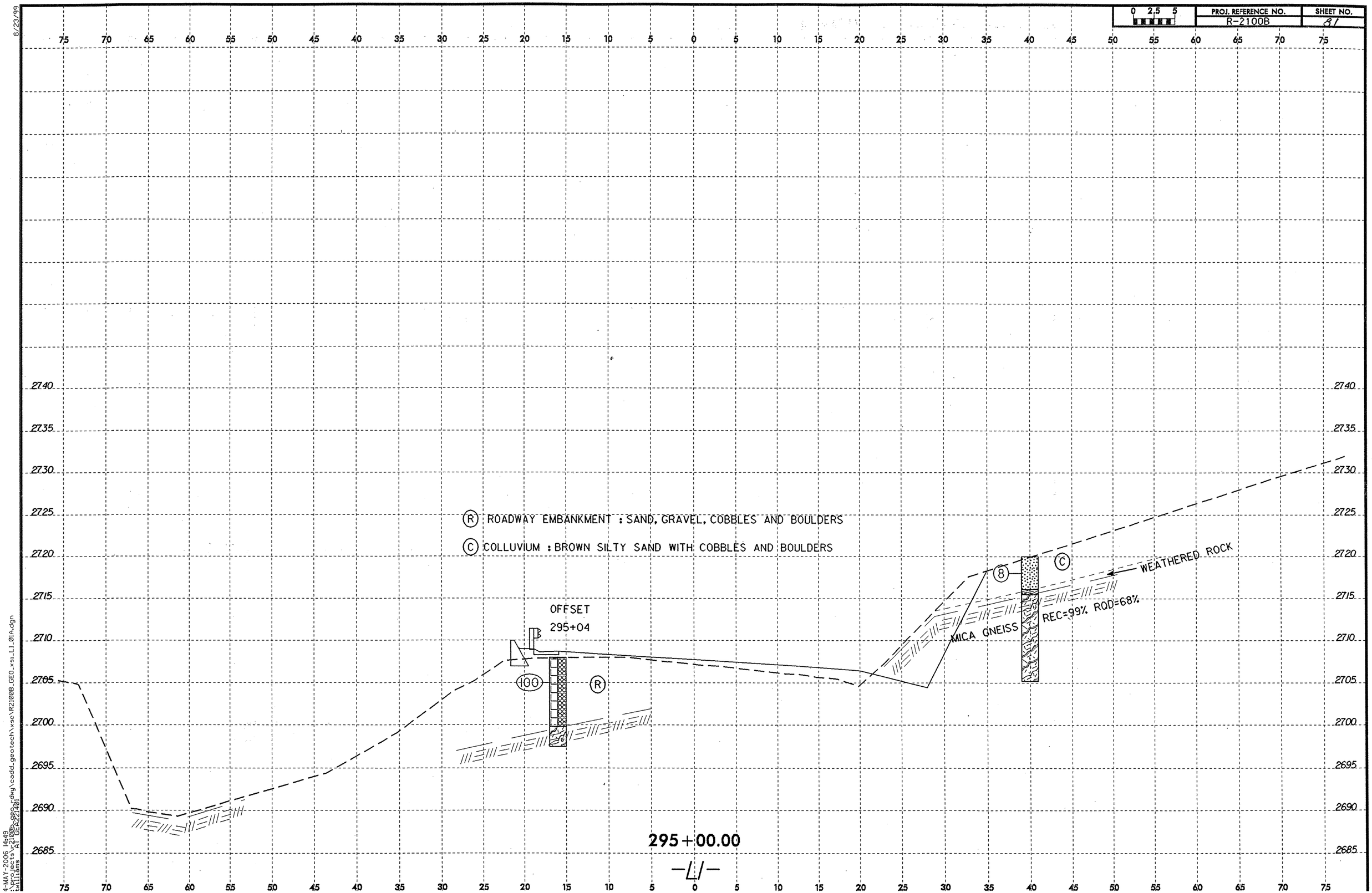
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
81
8/23/99
R ROADWAY EMBANKMENT : SAND, GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SILTY SAND WITH COBBLES AND BOULDERS
OFFSET
295+04
100
R
8
C
WEATHERED ROCK
MICA GNEISS
REC=99% ROD=68%
295+00.00
-L1-
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
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

8/23/99

0 2,5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	82

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

2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685

Ⓡ ROADWAY EMBANKMENT : SAND, GRAVEL, COBBLES AND BOULDERS
(MAY INCLUDE BOUNDARY ALLUVIUM OR COLLUVIUM IN LOWER PART)

OFFSET
295+48

100

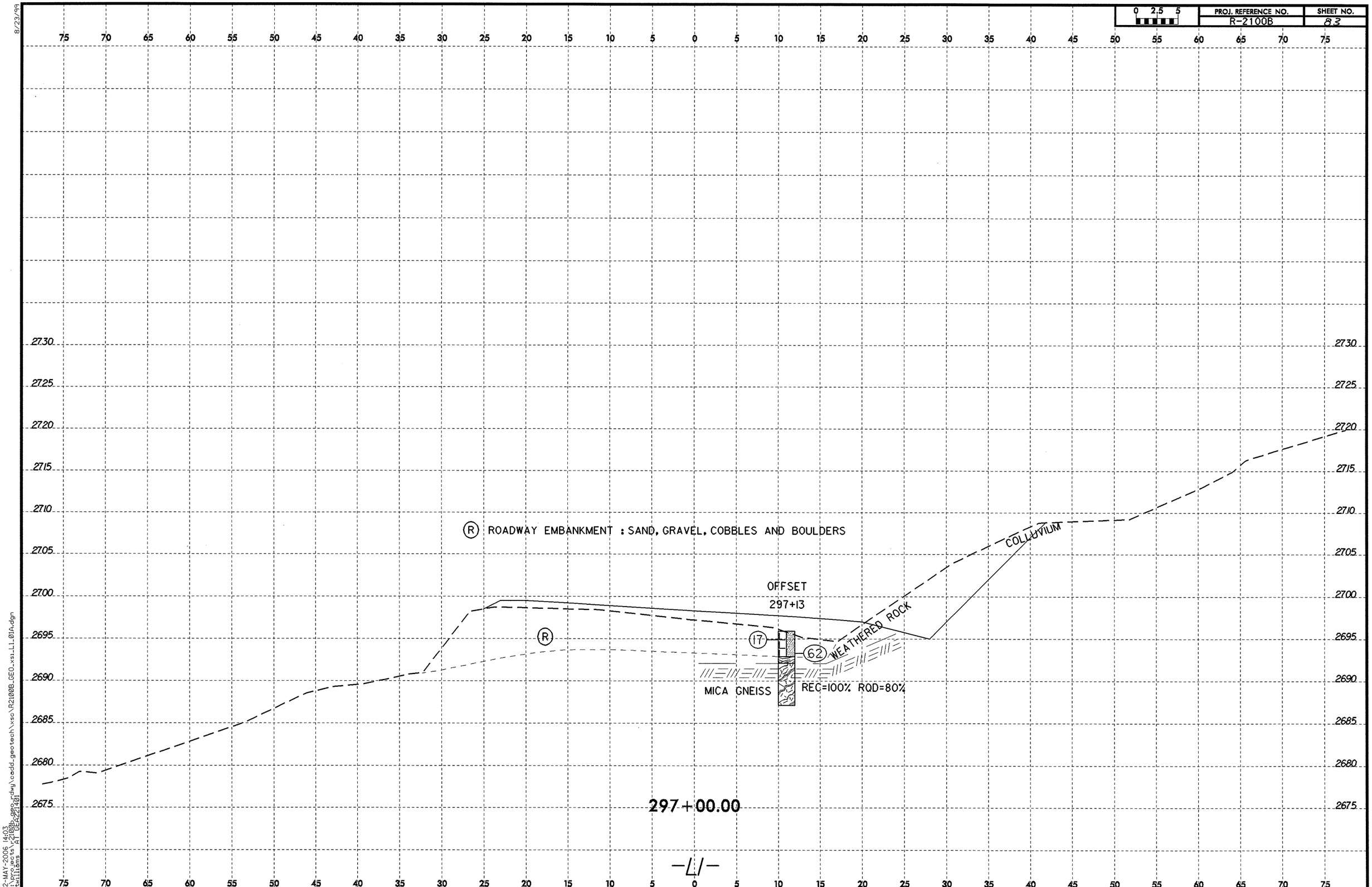
Ⓡ

295+50.00
-L/-

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

2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685

4-MAY-2006 15:08
\projects\r2100b_geo_rdwy\cadd_geotech\xsc\R2100B_GEO_xs1_L1_01A.dgn
williams AT GEA221401



8/23/99

22-MAY-2006 14:03
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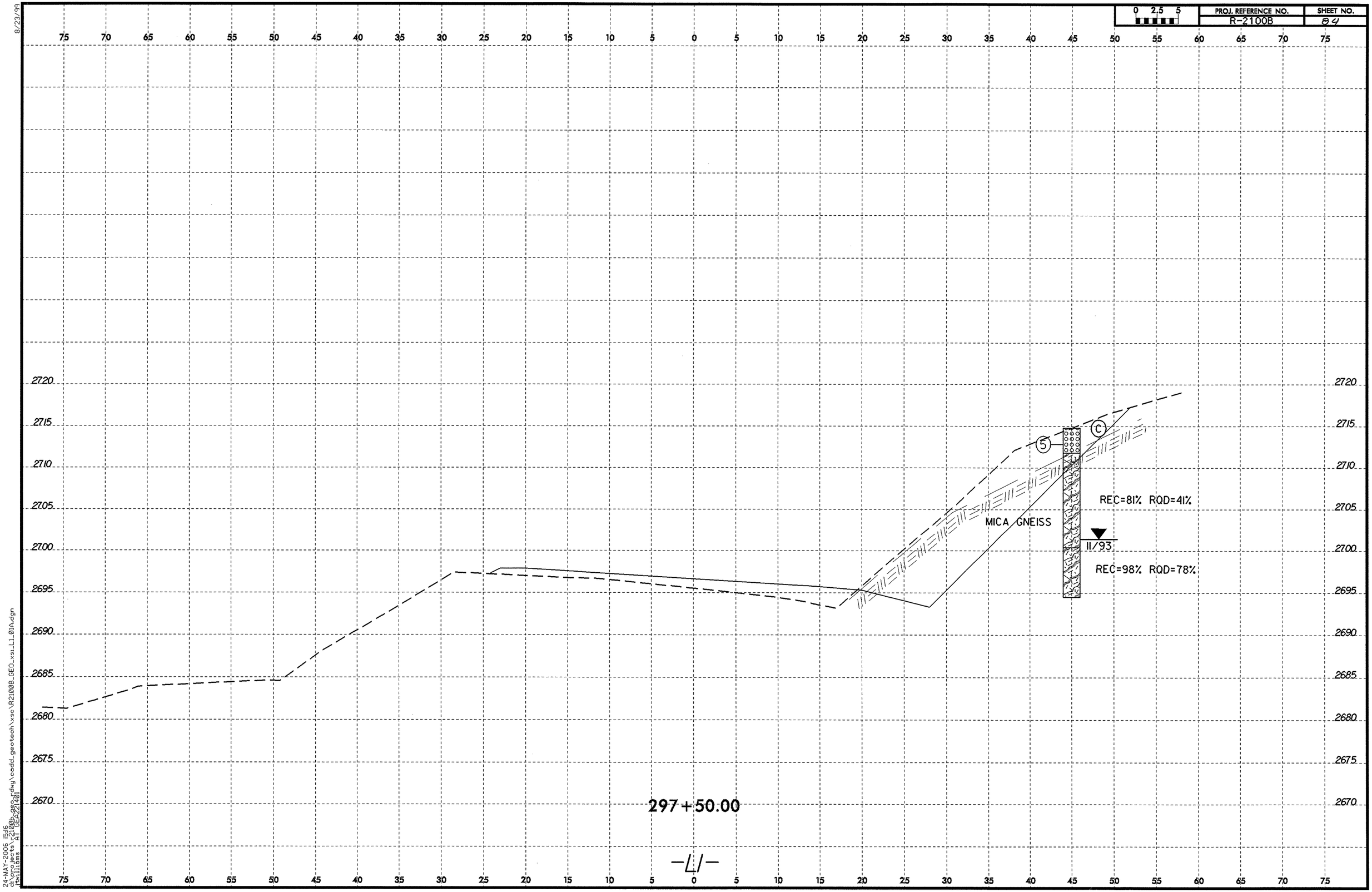
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 15:16
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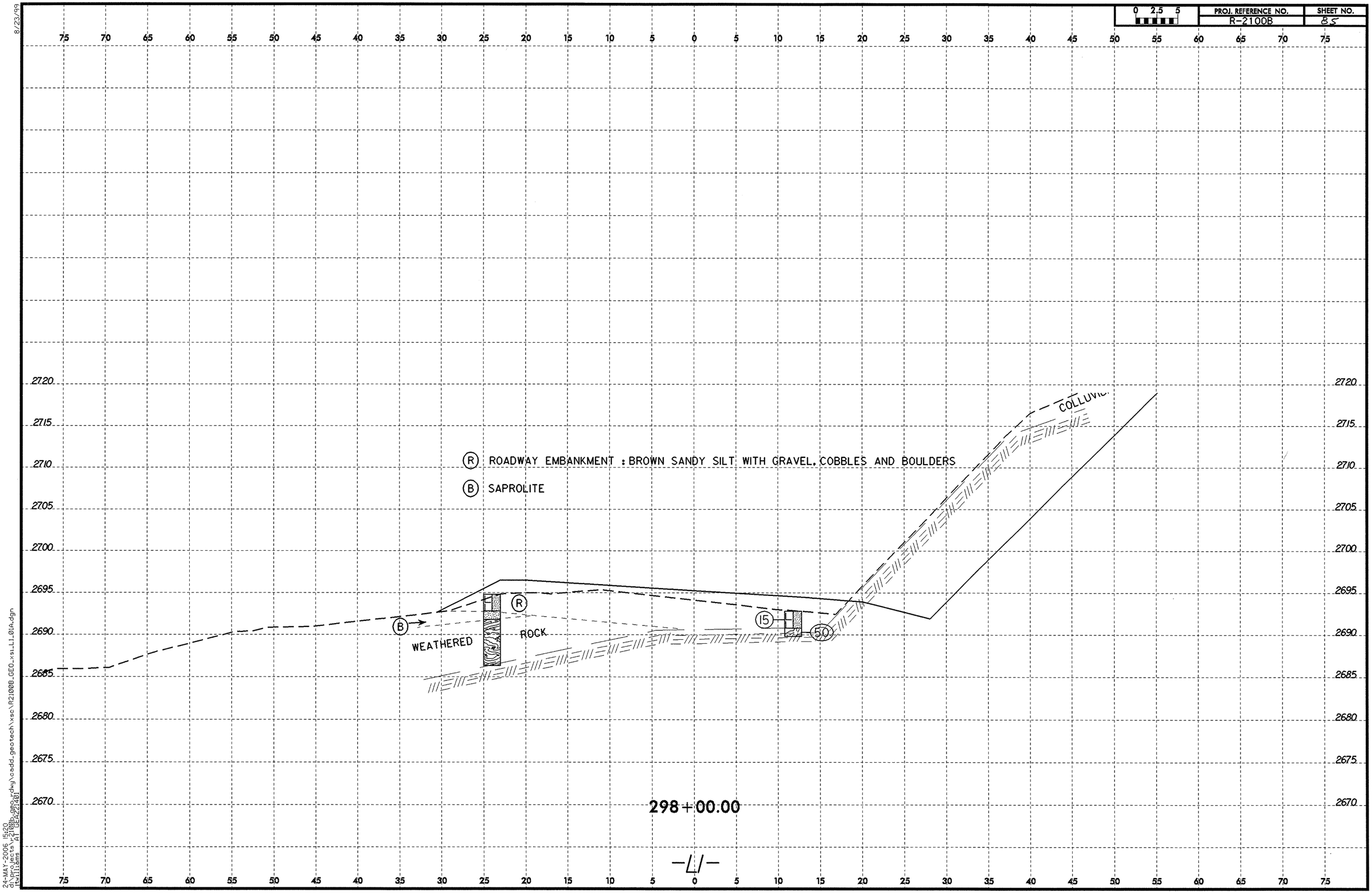
jtwilliams AT GEA221401



8/23/99

24-MAY-2006 15:20
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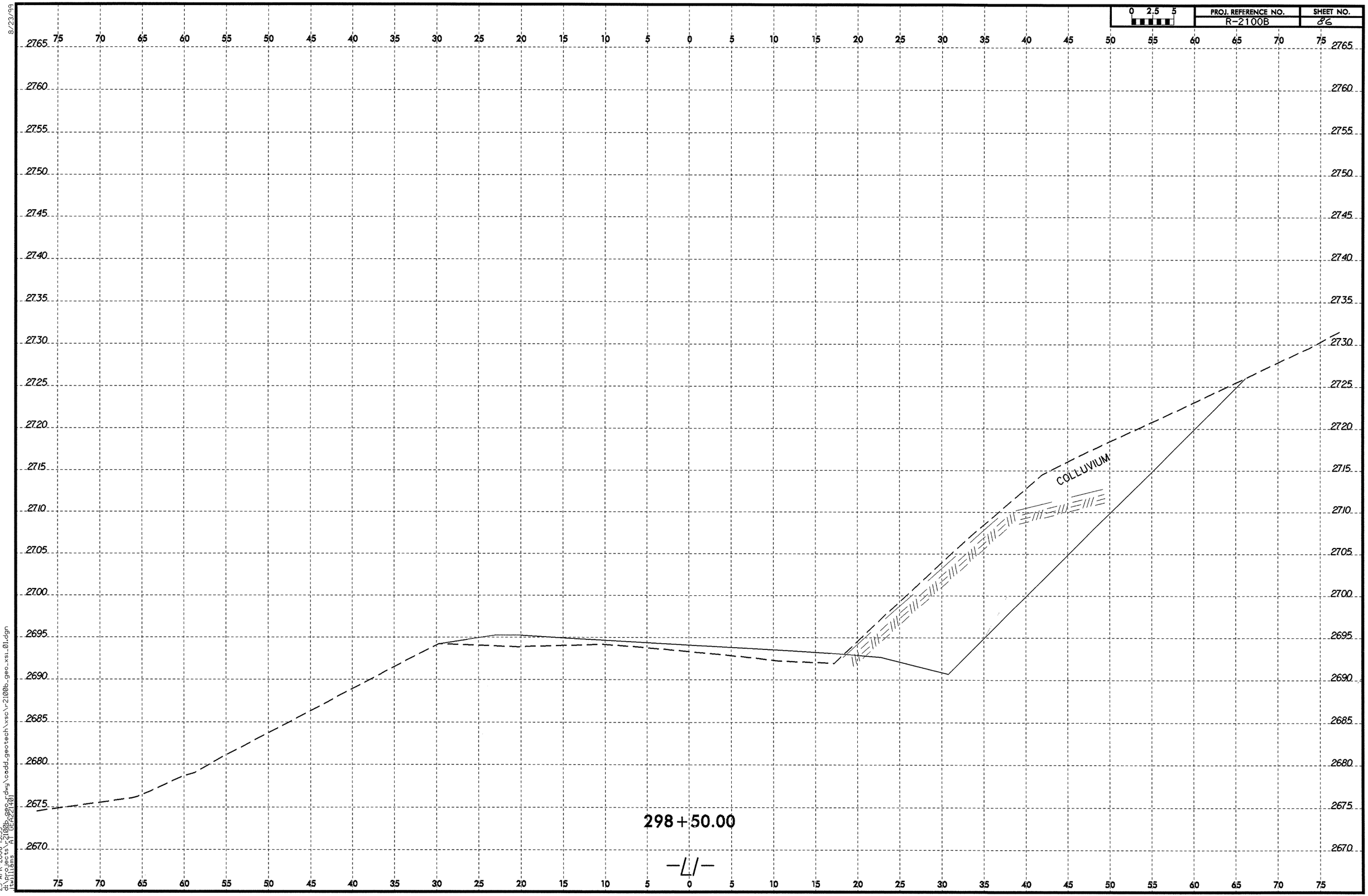
jtwilliams AT GEA221401



8/23/99
25-APR-2006 13:33
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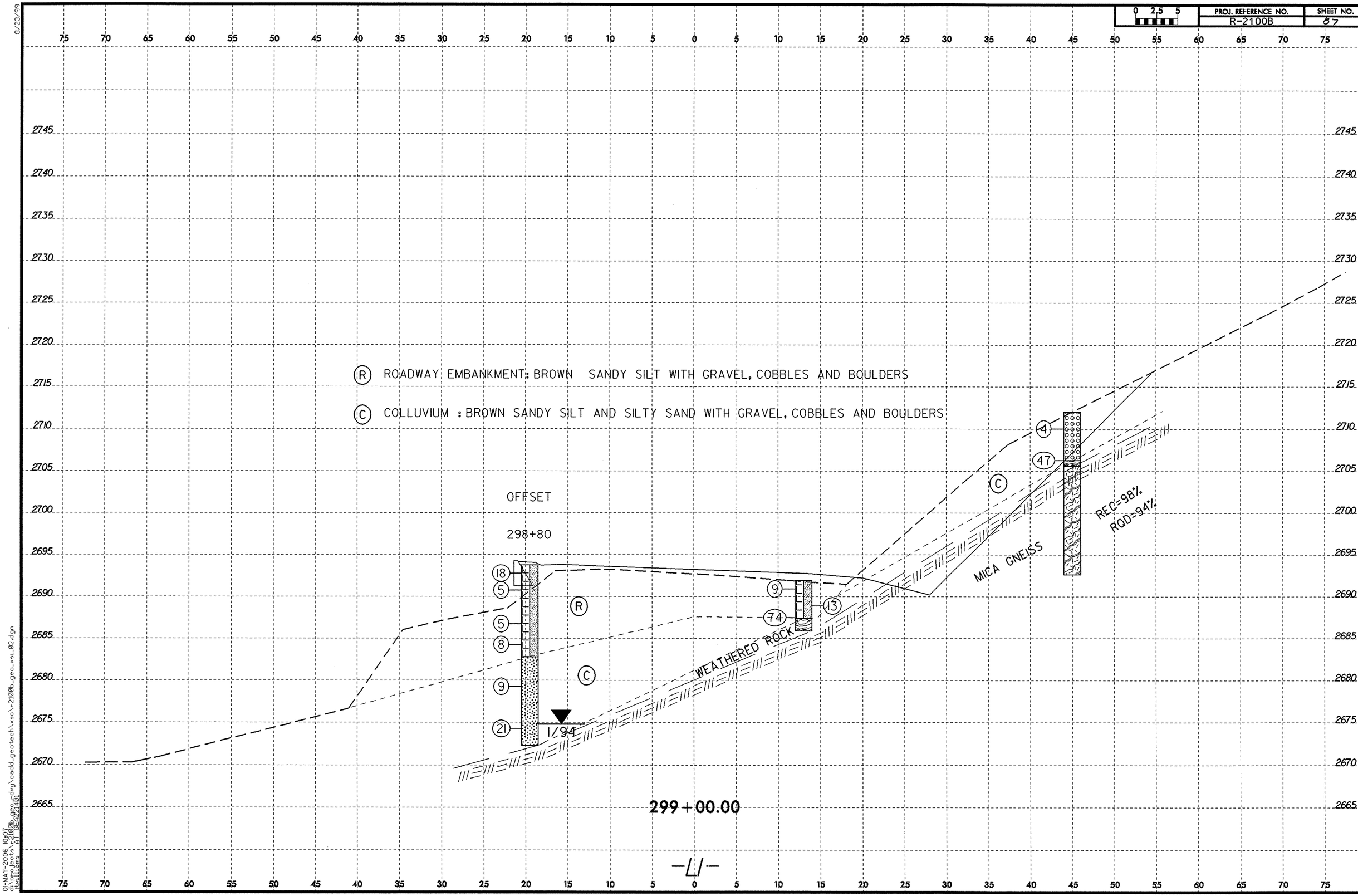
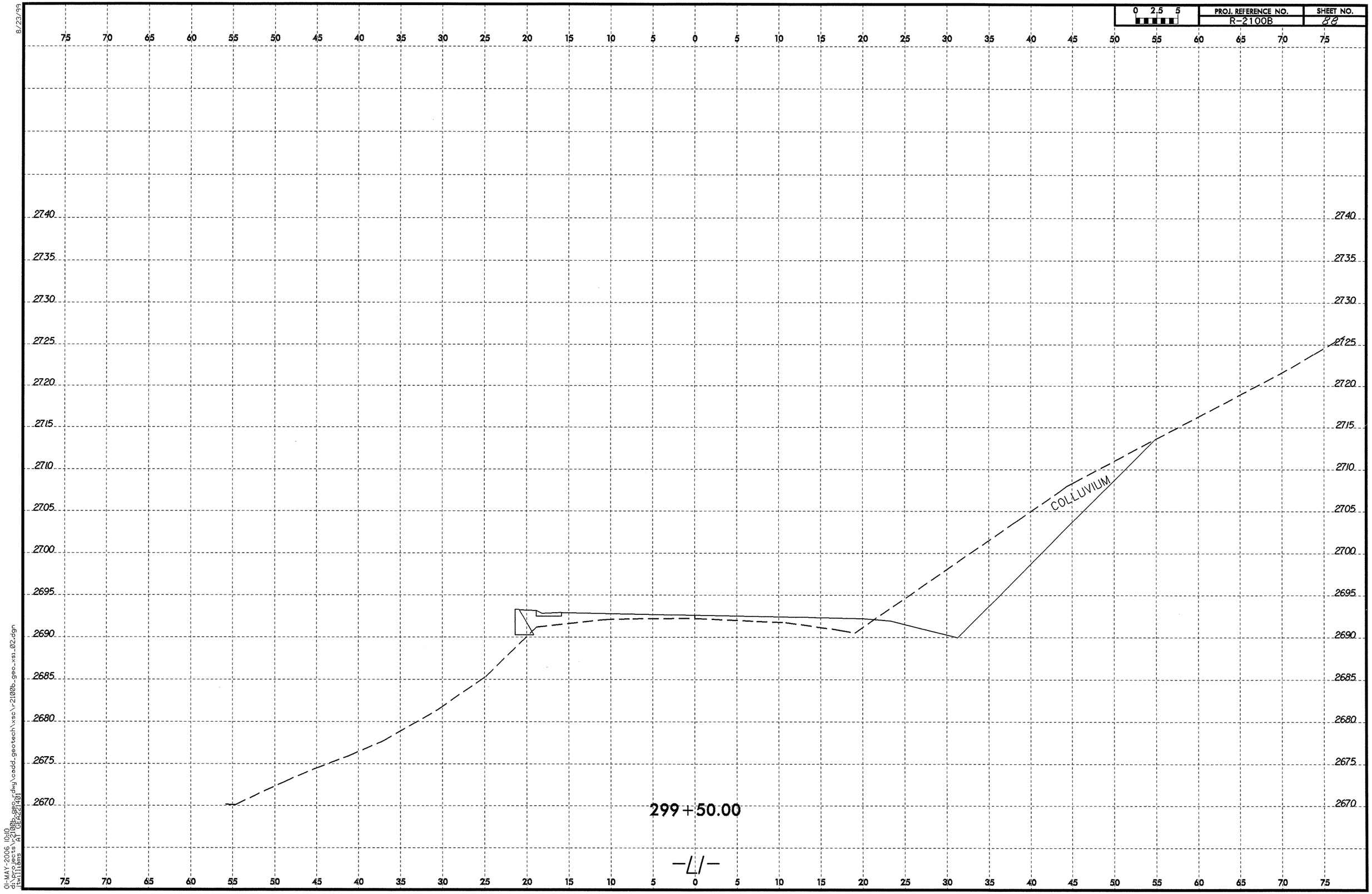
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
87
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SANDY SILT AND SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
298+80
18
5
5
8
9
21
1/94
R
C
9
74
13
WEATHERED ROCK
MICA GNEISS
4
47
C
REC=98%
RQD=94%
299+00.00
-L1-
01-MAY-2006 10:07
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401



8/23/99

01-MAY-2006 10:10
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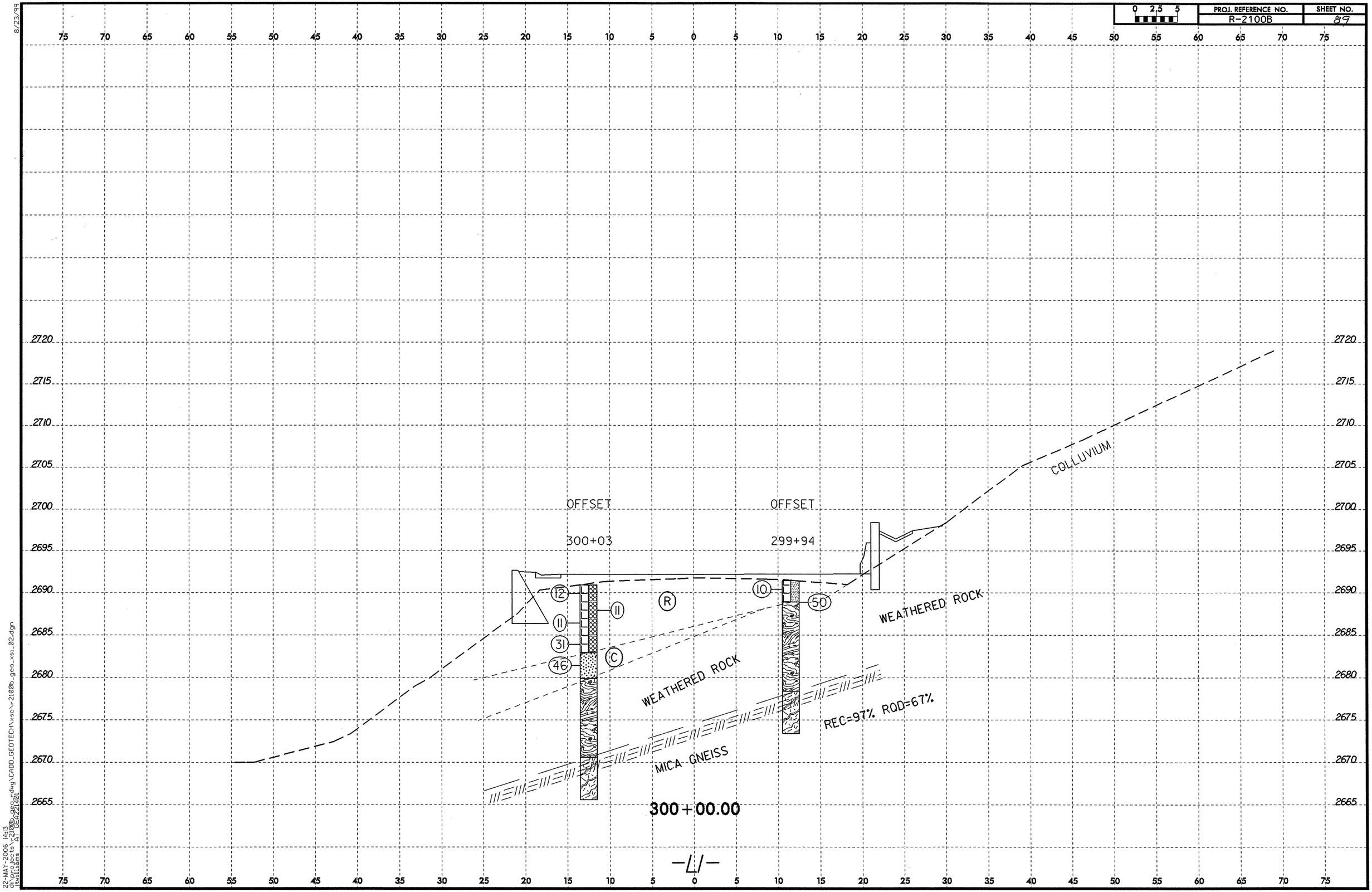
jtwilliams AT GEA221401



8/23/99

22-MAY-2006 14:13
d:\projects\r2100b_geo_rdwy\CADD_GEOTECH\xsc\r2100b_geo_xsi_02.dgn
ltwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	90

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

2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

Ⓒ COLLUVIUM : BROWN SANDY SILT WITH COBBLES AND BOULDERS

8
18
34
100
Ⓒ

WEATHERED ROCK

REC=87% RQD=30%

REC=99% RQD=97%

MICA GNEISS

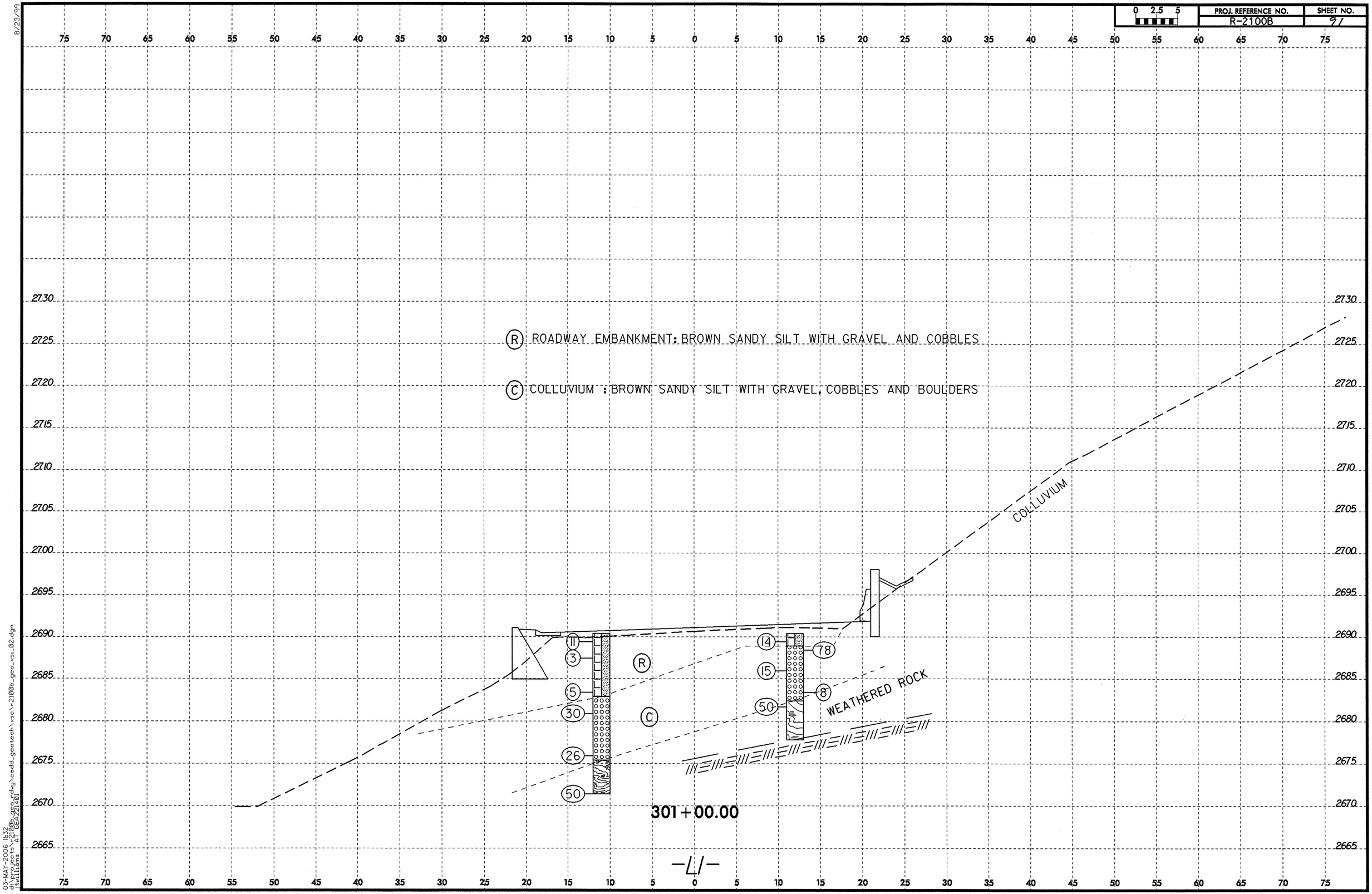
300+50.00

-L/-

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

2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

03-MAY-2006 11:01
d:\projects\r-2100b_geo_rdwy\xsdd_geotech\xsc\r-2100b_geo_xs1_02.dgn
tswilliams AT GEA221401



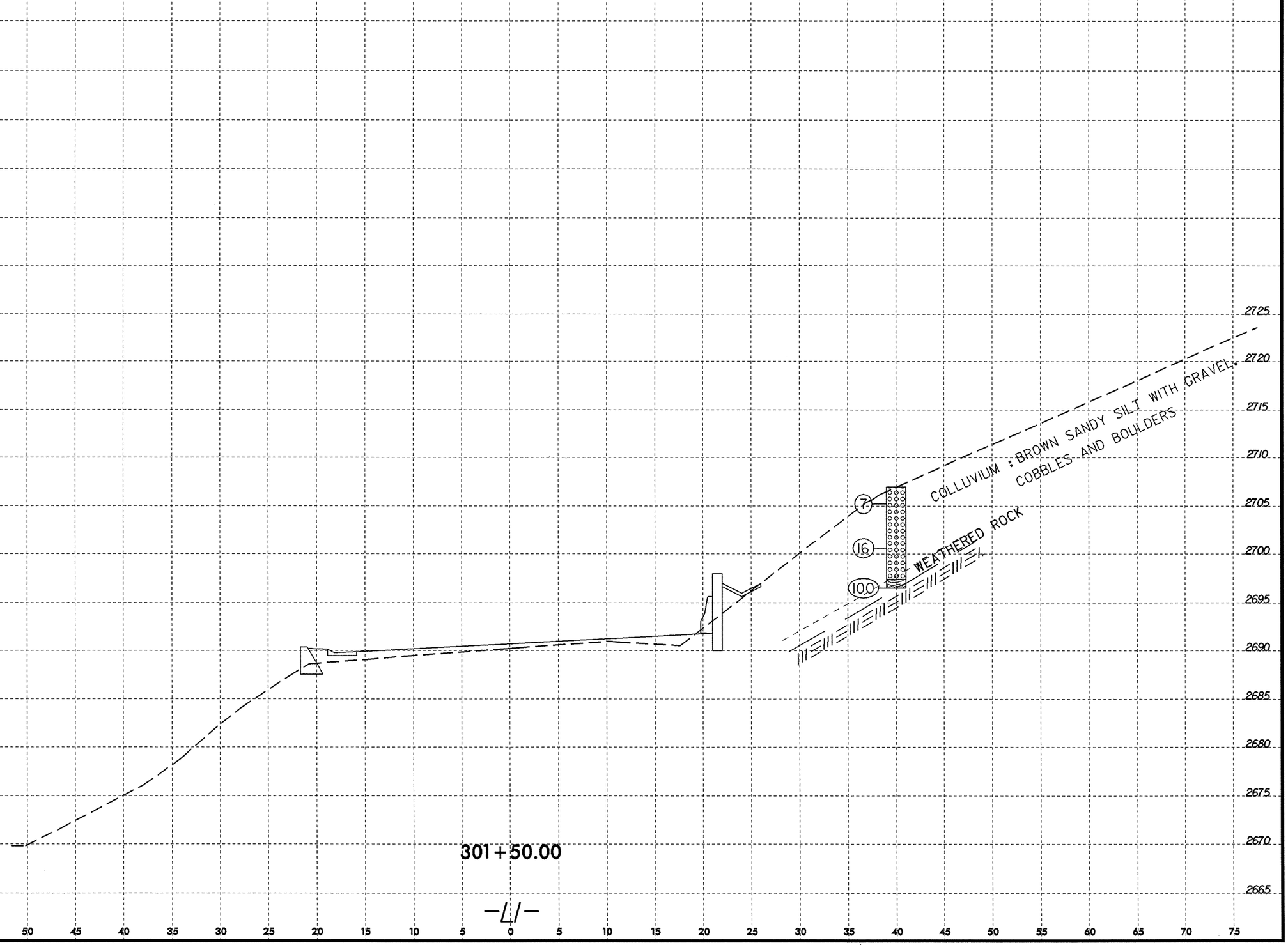
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
91
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL AND COBBLES
C COLLUVIUM : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
COLLUVIUM
WEATHERED ROCK
11
3
5
30
26
50
14
15
50
78
8
R
C
301+00.00
-L/-
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
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
03-MAY-2006 11:32
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
ltwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	92

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

2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665



301+50.00

-L1-

03-MAY-2006 12:12
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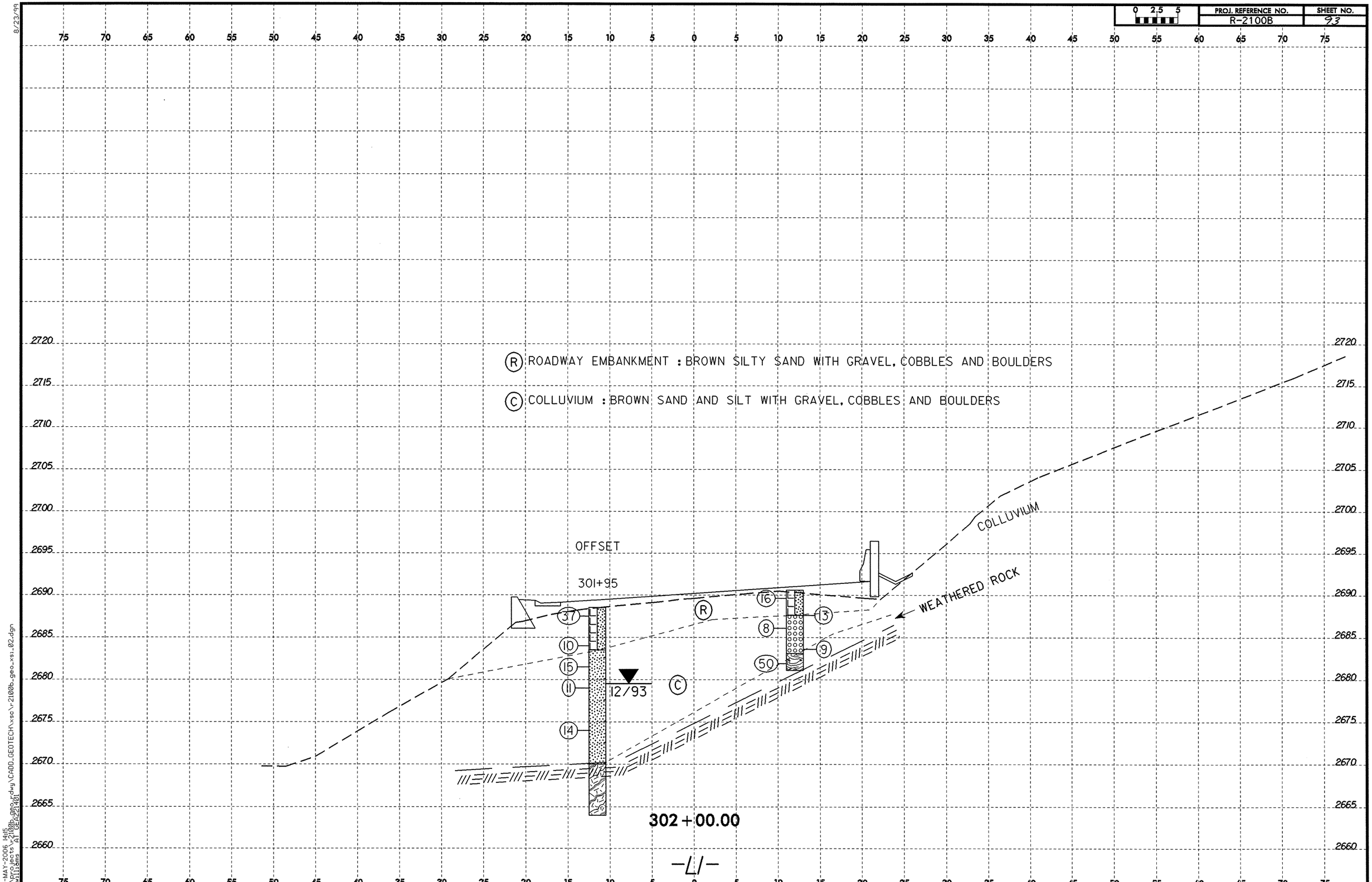
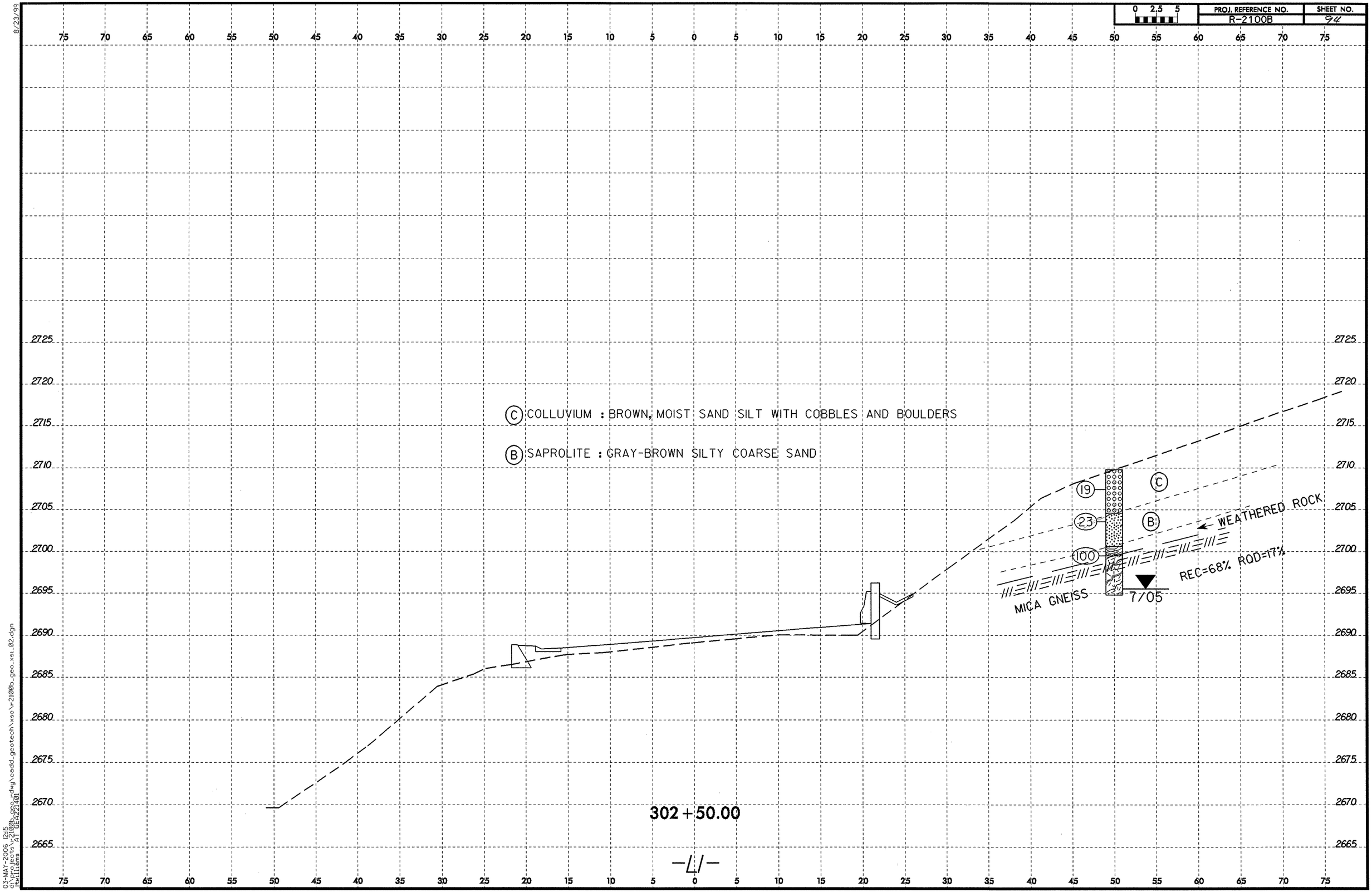
twilliams



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
93
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SAND AND SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
301+95
COLLUVIUM
WEATHERED ROCK
12/93
302+00.00
-L1-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
94
8/23/99
C COLLUVIUM : BROWN, MOIST SAND SILT WITH COBBLES AND BOULDERS
B SAPROLITE : GRAY-BROWN SILTY COARSE SAND
19
23
100
C
B
WEATHERED ROCK
REC=68% RQD=17%
MICA GNEISS
7/05
302+50.00
-L1-
03-MAY-2006 12:15
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
ltwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	95

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

2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

(R) ROADWAY EMBANKMENT : BROWN SILT AND SAND WITH GRAVEL, COBBLES AND BOULDERS

OFFSET

302+87

10 17 13

MICA GNEISS

303+00.00

-L1-

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

2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

22-MAY-2006 14:18
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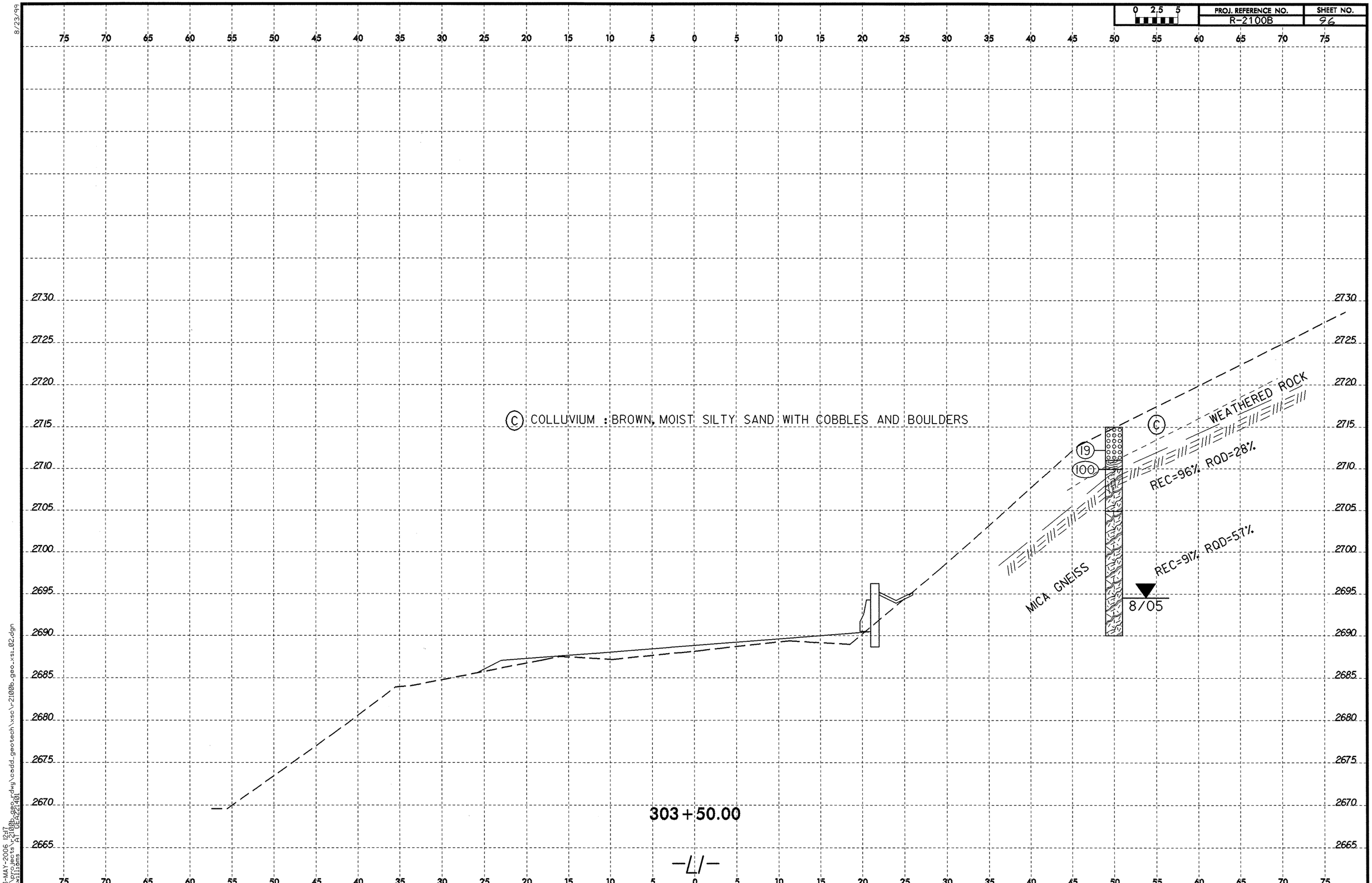
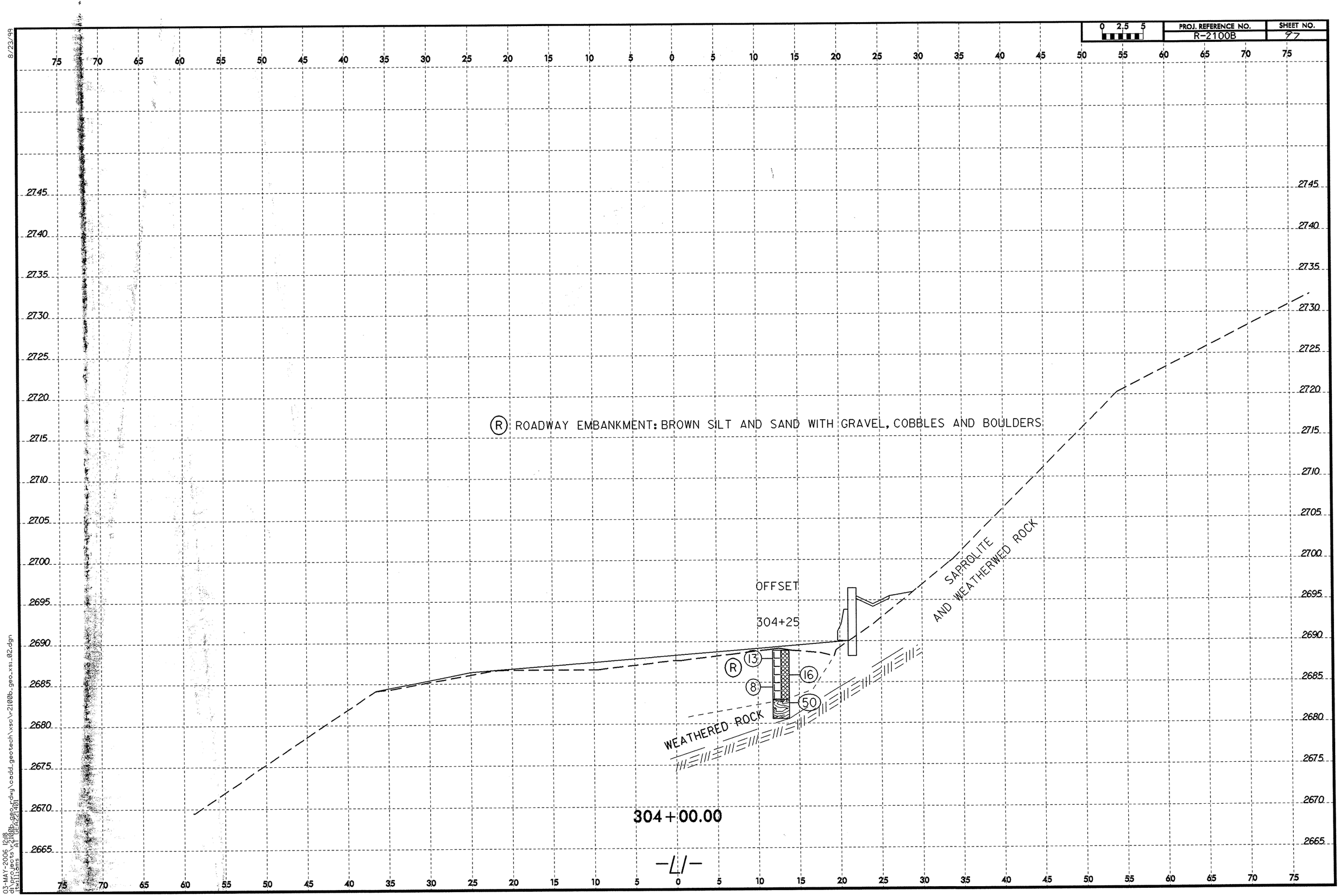
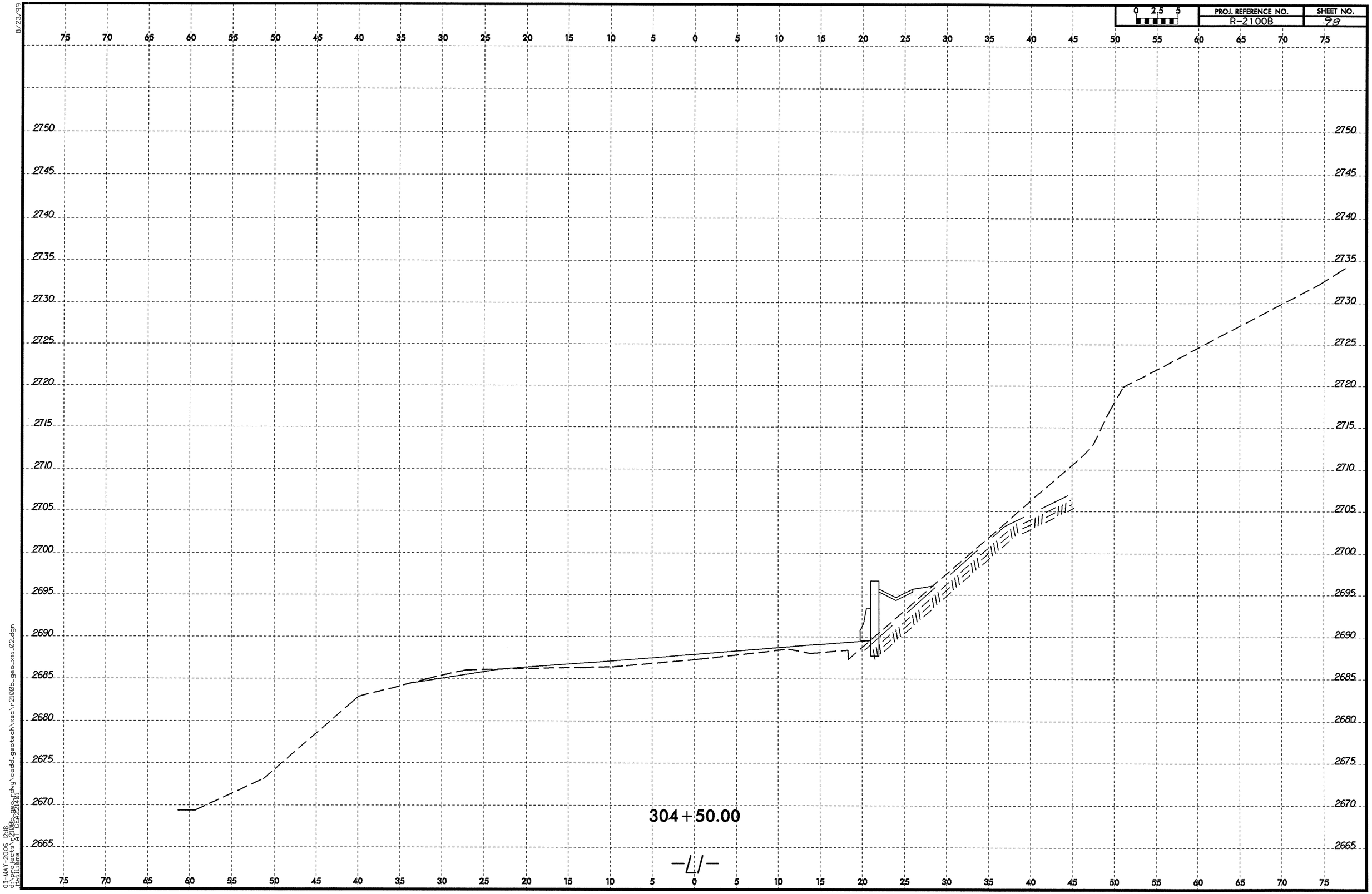
lswilliams A1 DEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
96
8/23/99
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
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
(C) COLLUVIUM : BROWN, MOIST SILTY SAND WITH COBBLES AND BOULDERS
WEATHERED ROCK
(C)
19
100
REC=96% RQD=28%
REC=91% RQD=57%
MICA GNEISS
8/05
303+50.00
-L/-
03-MAY-2006 12:17
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
twilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
97
0 2.5 5
R ROADWAY EMBANKMENT: BROWN SILT AND SAND WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
304+25
SAPROLITE AND WEATHERWED ROCK
WEATHERED ROCK
R
13
8
16
50
304+00.00
-L1-
8/23/99
03-MAY-2006 12:18
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xs1_02.dgn



8/23/99

03-MAY-2006 12:18
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jtwilliams AT GEA22140I

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	99

(R) ROADWAY EMBANKMENT: BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS

(C) COLLUVIUM : BROWN SANDY SILT WITH COBBLES AND BOULDERS

(B) SAPROLITE : BROWN SILTY SAND

OFFSET

305+01

AMPHIBOLITE

REC=82% RQD=0%

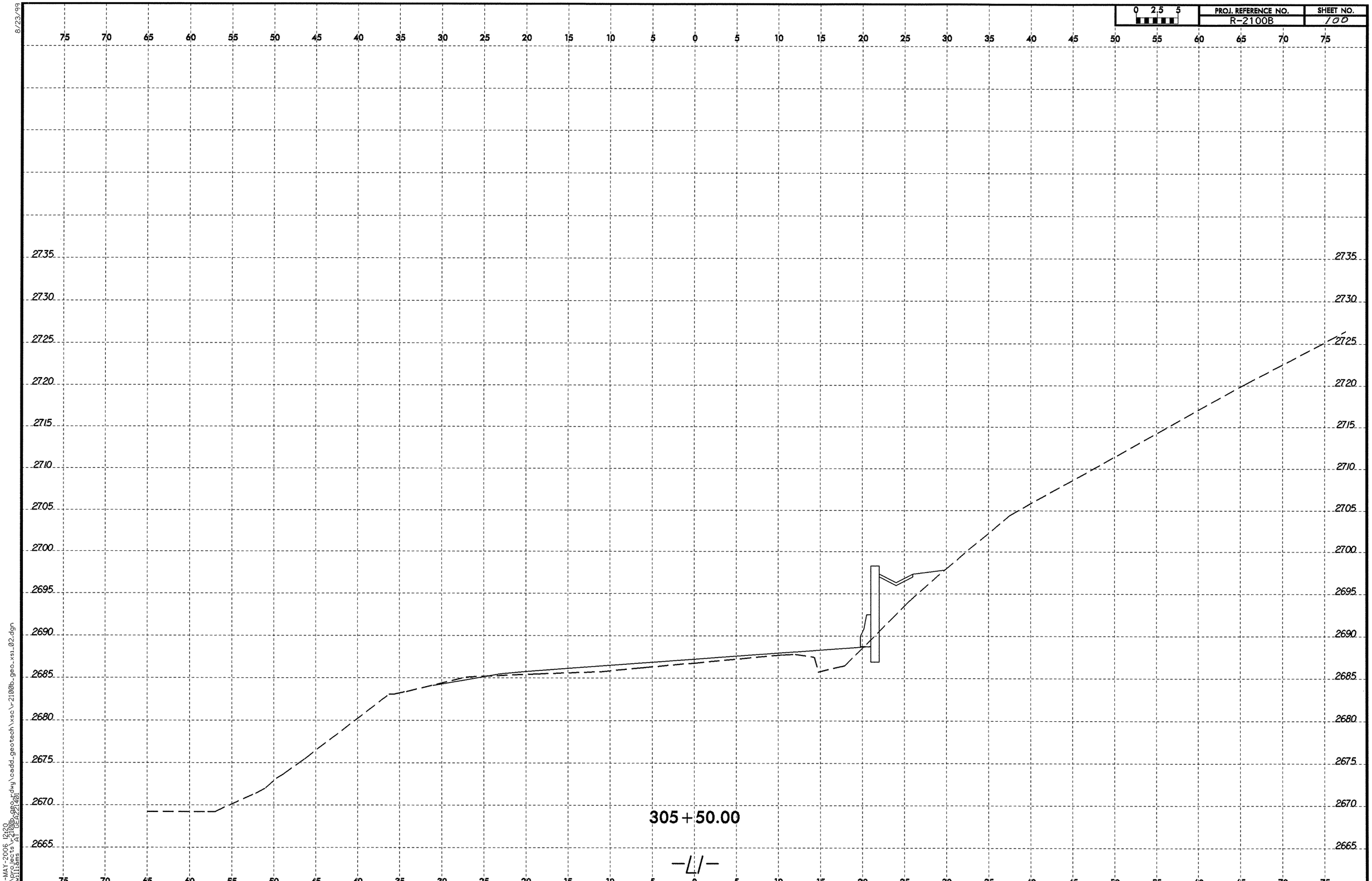
REC=93% RQD=62%

REC=89% RQD=6%

305+00.00

-L-

03-MAY-2006 12:20
d:\projects\r2100b_geo\dwg\cadd_geotech\xsc\r-2100b_geo_xs1_02.dgn
bwilliams



8/23/99

03-MAY-2006 12:20
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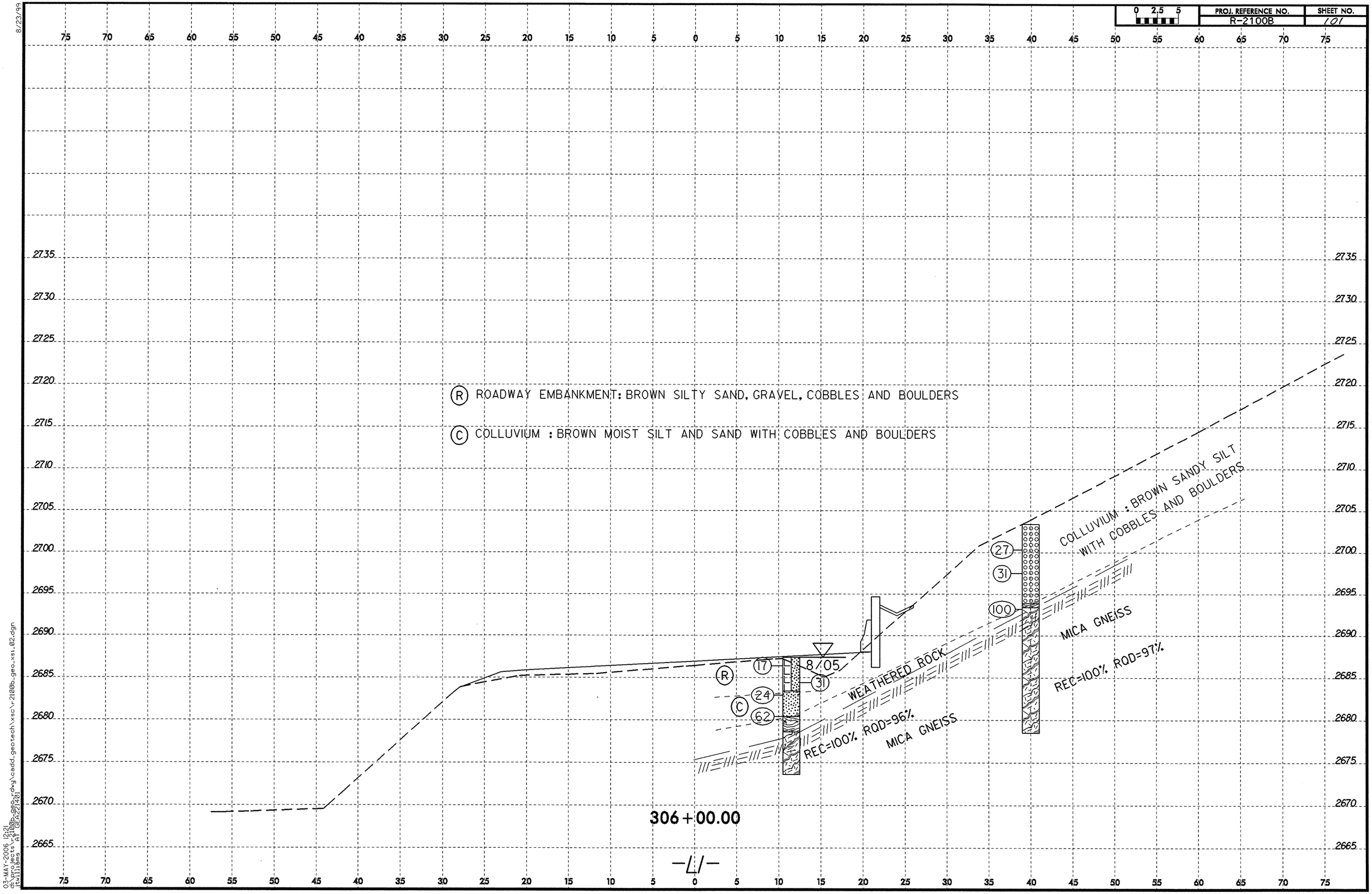
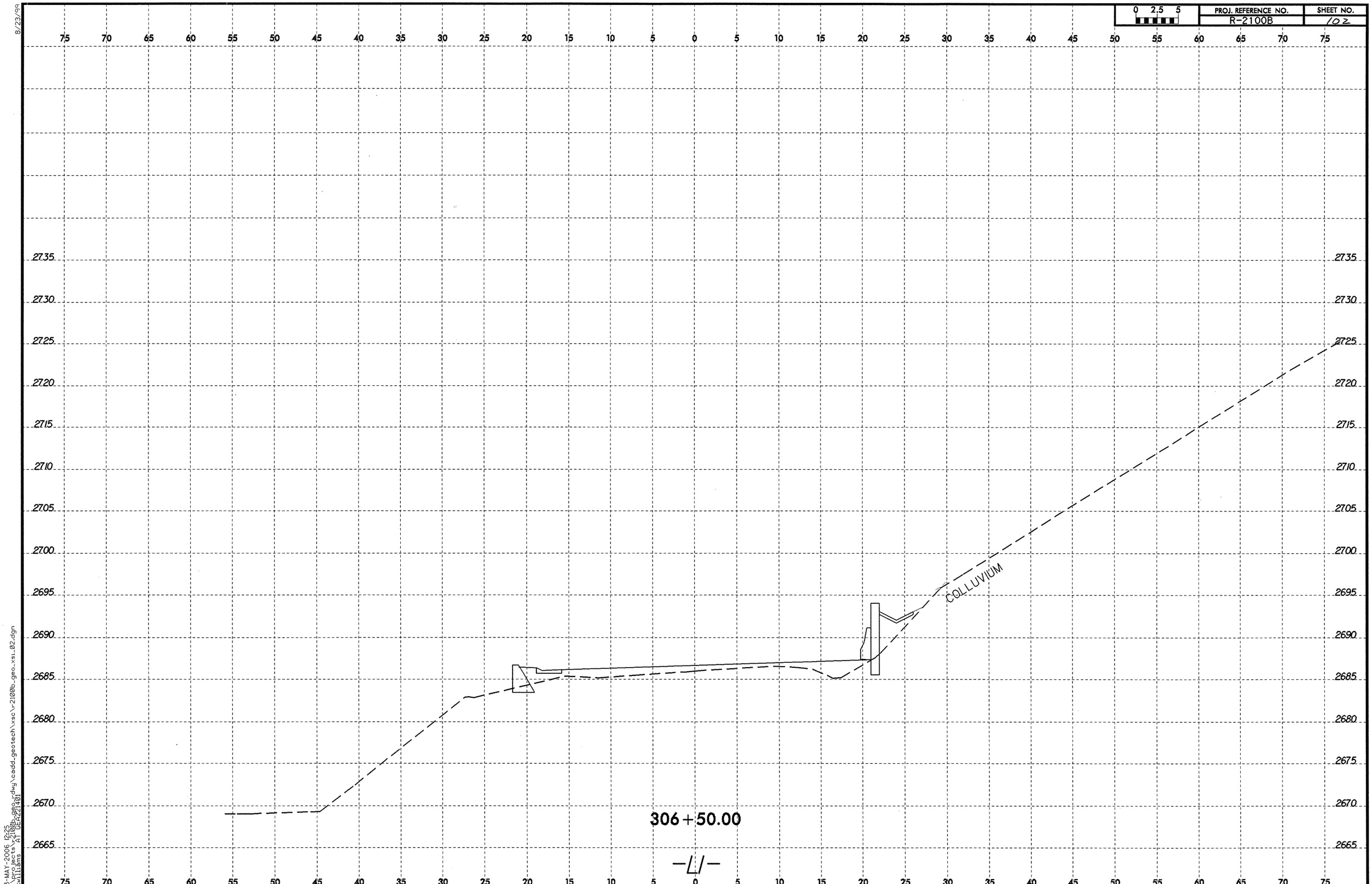
ltwilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
101
0 2.5 5
R ROADWAY EMBANKMENT: BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN MOIST SILT AND SAND WITH COBBLES AND BOULDERS
COLLUVIUM : BROWN SANDY SILT WITH COBBLES AND BOULDERS
MICA GNEISS
REC=100% RQD=97%
WEATHERED ROCK
REC=100% RQD=96%
MICA GNEISS
8/05
17
24
62
31
27
31
100
R
C
306+00.00
-L/-



8/23/99
03-MAY-2006 12:25
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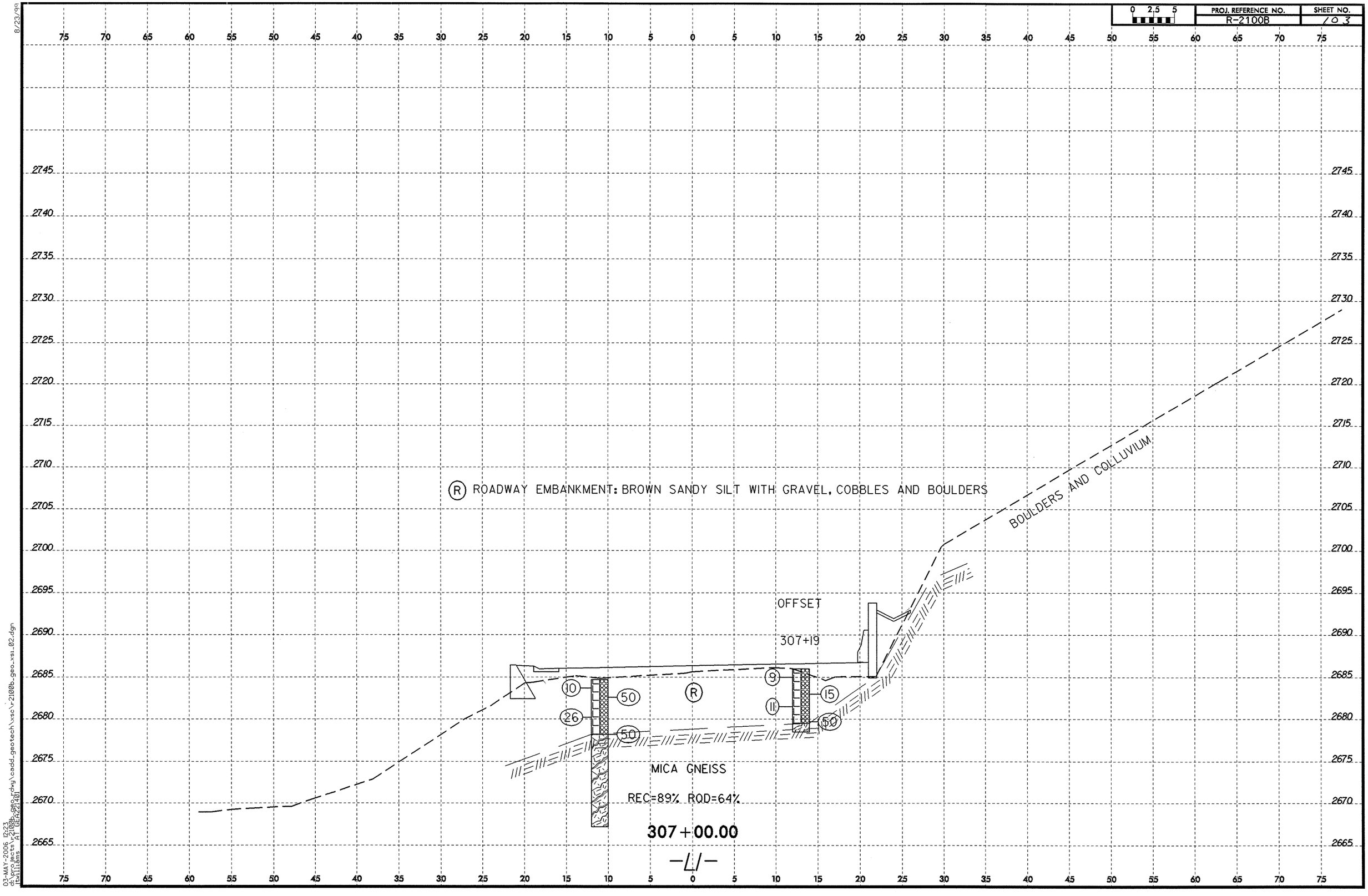
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
103
8/23/99
2745
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
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
(R) ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
BOULDERS AND COLLUVIUM
OFFSET
307+19
10
50
26
50
R
9
15
11
50
MICA GNEISS
REC=89% RQD=64%
307+00.00
-L/-
03-MAY-2006 12:23
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	7D4

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

2740 2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

Ⓒ COLLUVIUM : BROWN SILTY SAND WITH COBBLES AND BOULDERS

100

Ⓒ

MICA GNEISS

REC=97% RQD=93%

307+50.00

—L/—

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

2740 2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

03-MAY-2006 12:24
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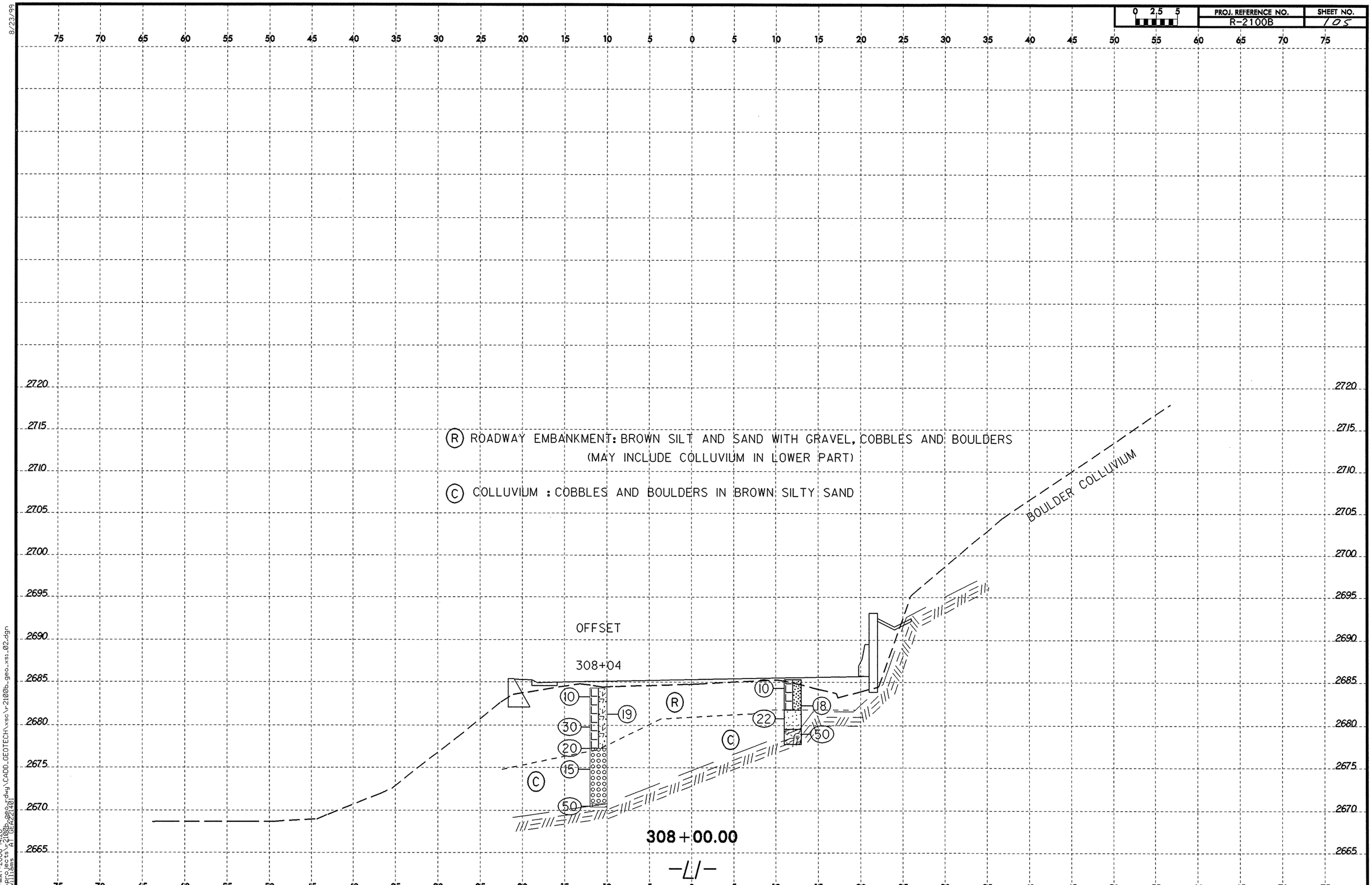
bwilliams



8/23/99

22-MAY-2006 14:20
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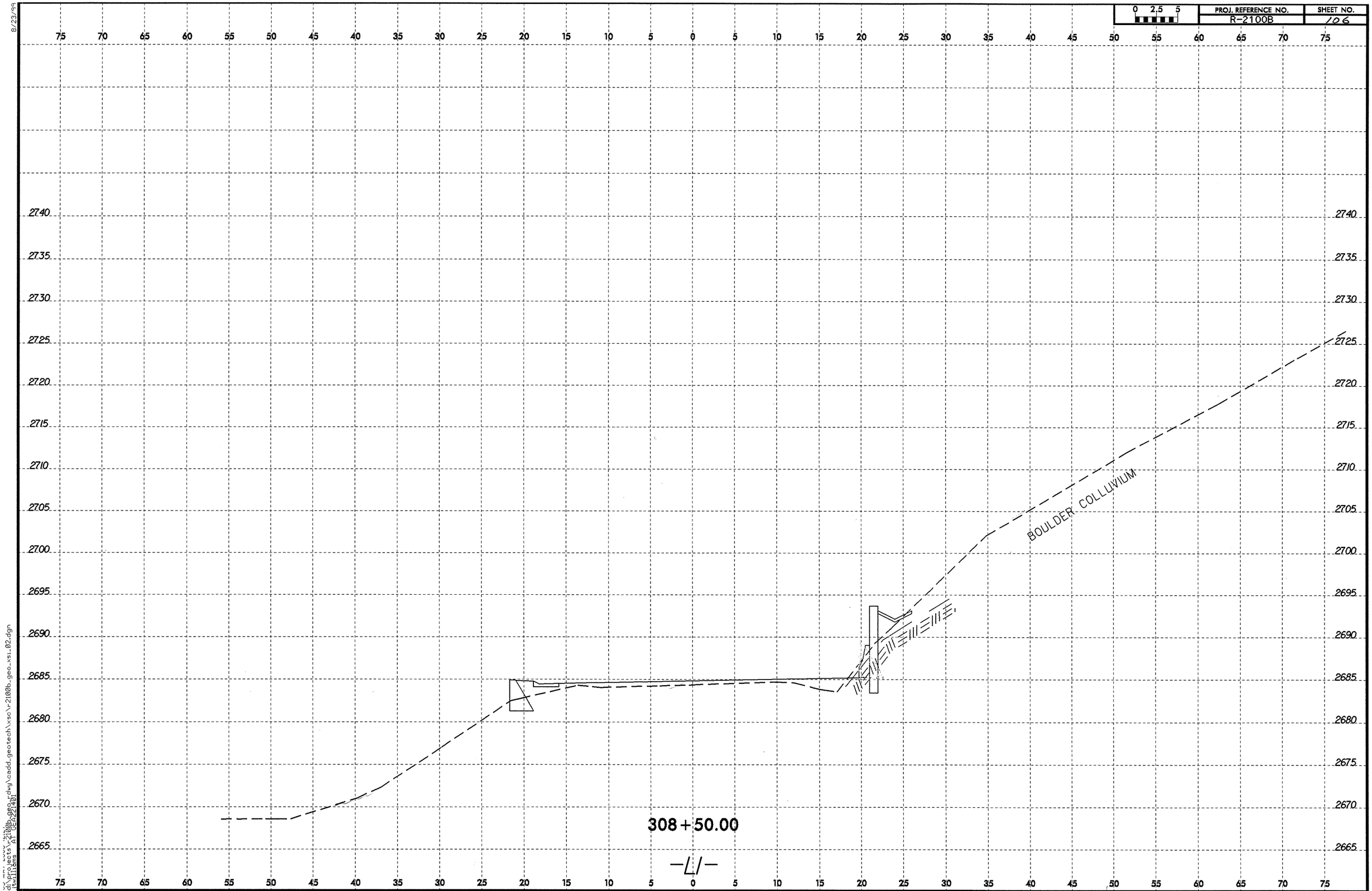
jtwilliams AT GEA221401



8/23/99

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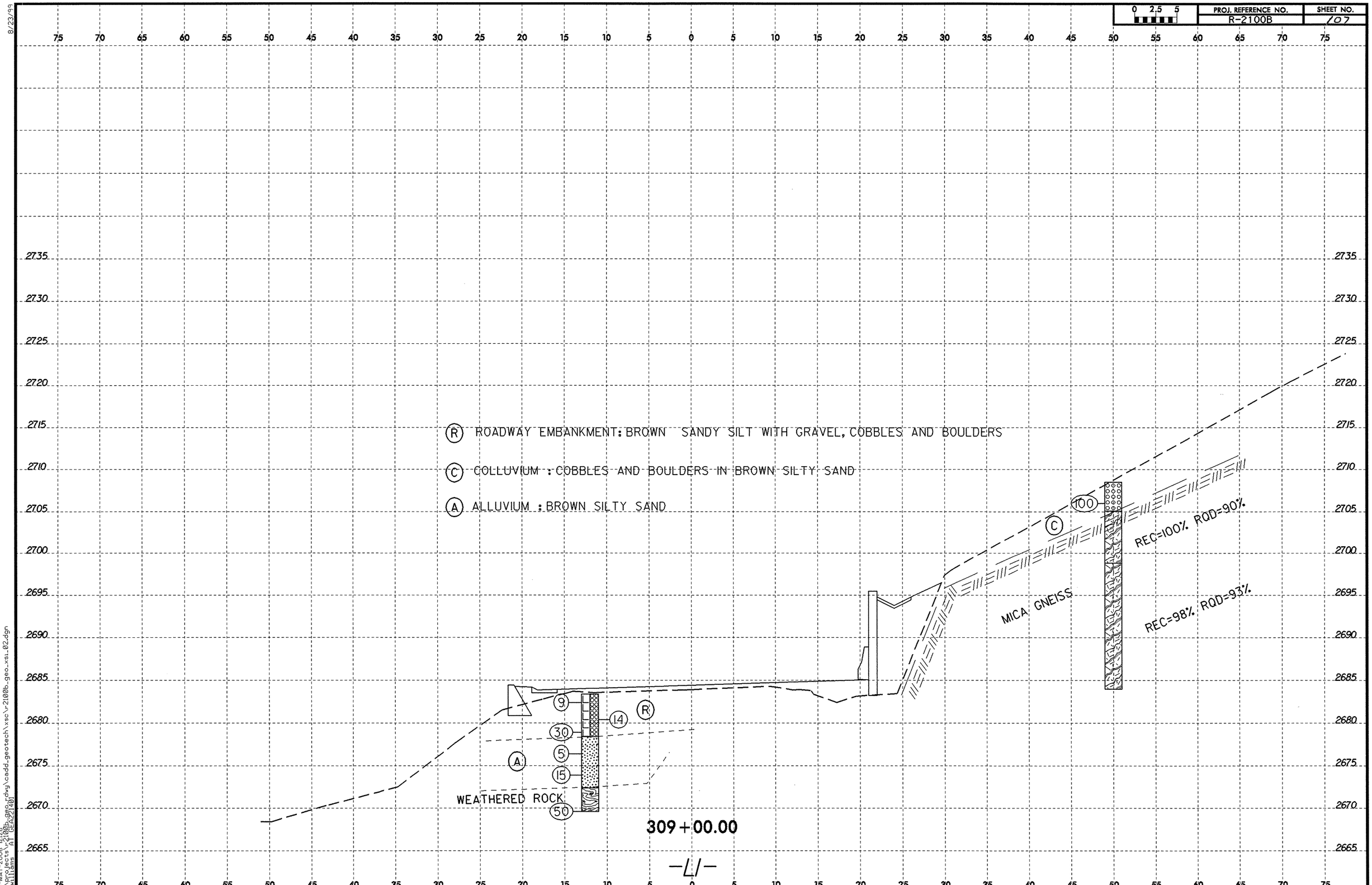
jtwilliams AT GEA221401



8/23/99

03-MAY-2006 12:28
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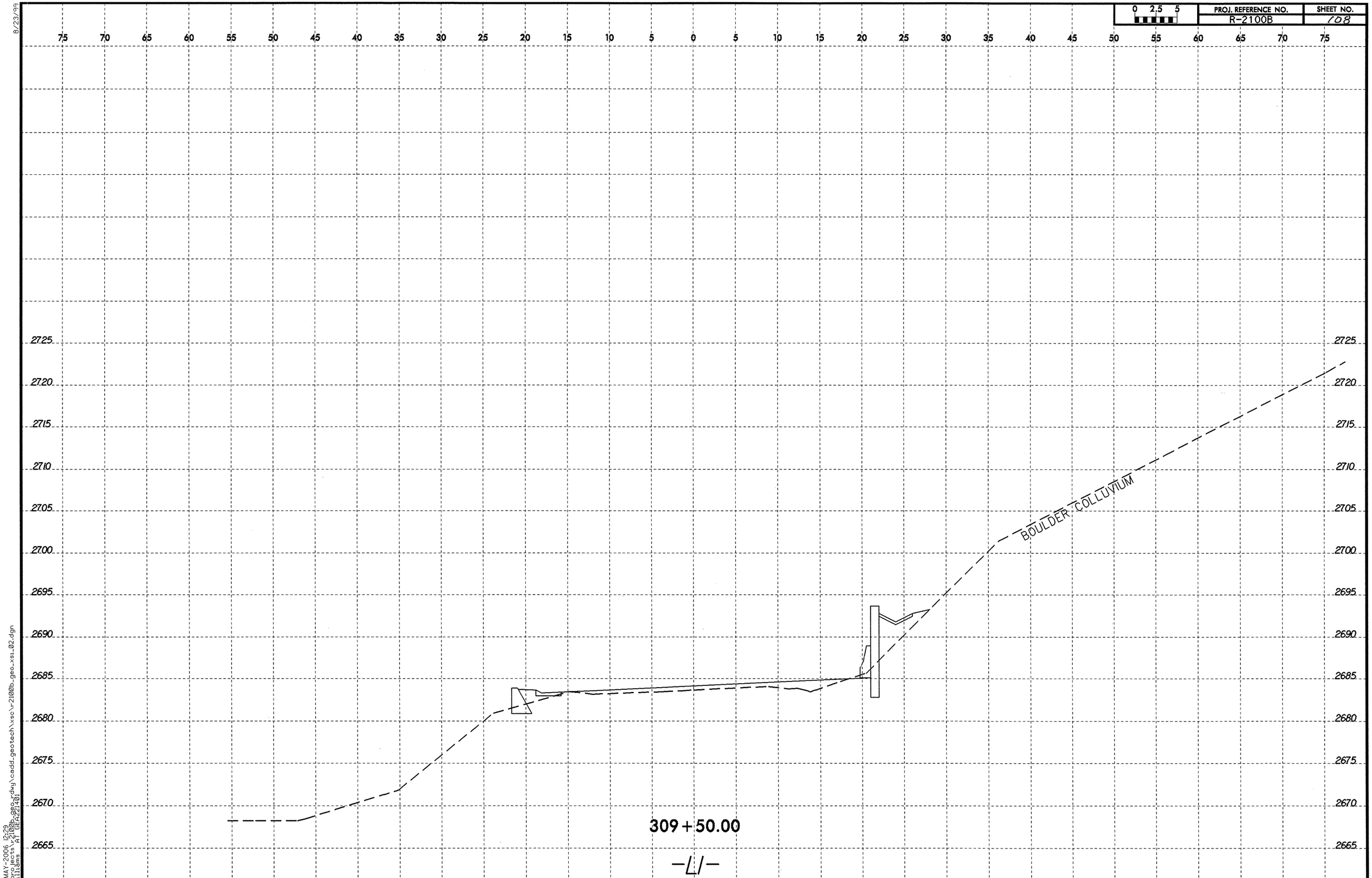
jtwilliams AT GEA221401



8/23/99

03-MAY-2006 12:29
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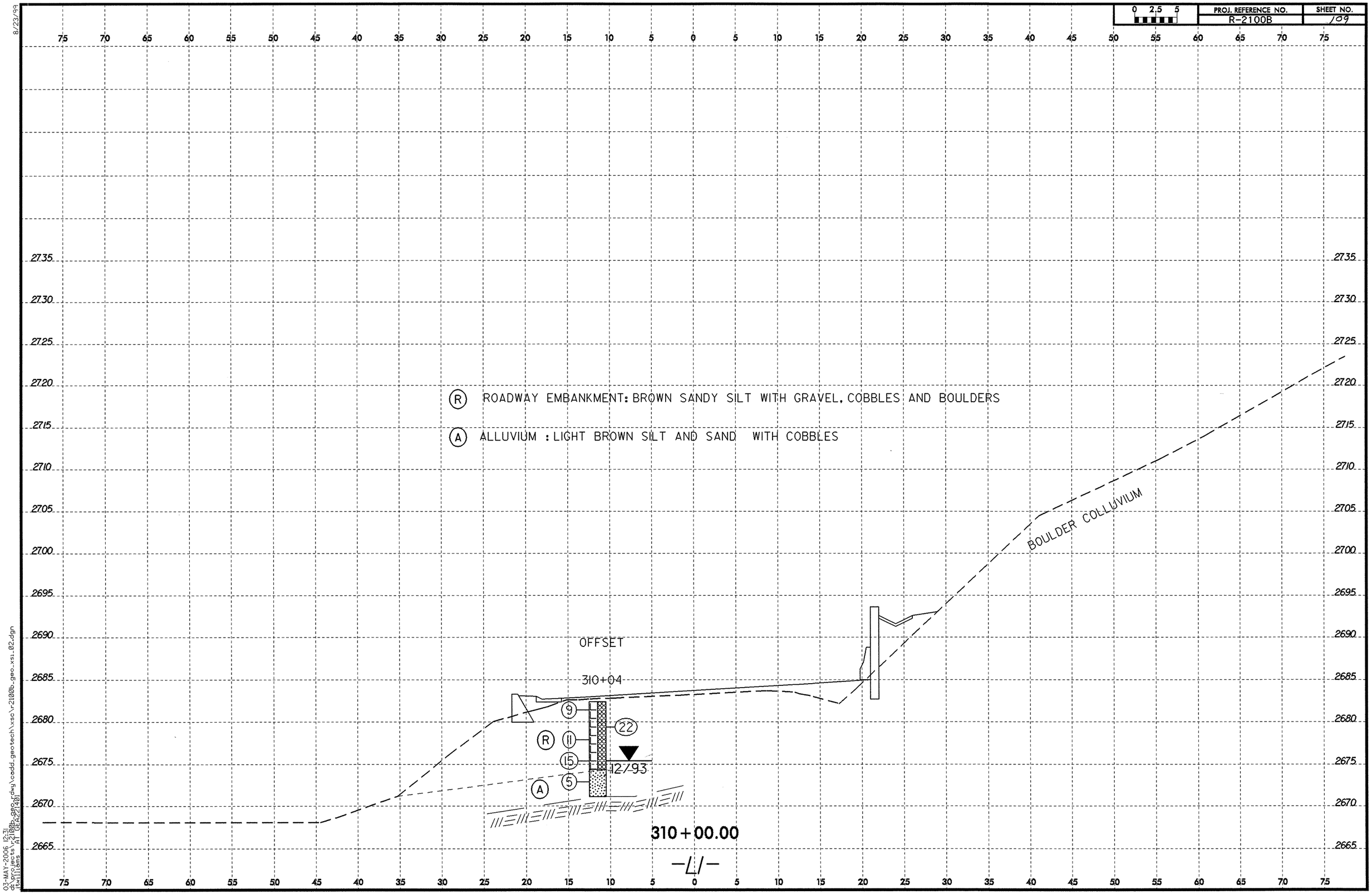
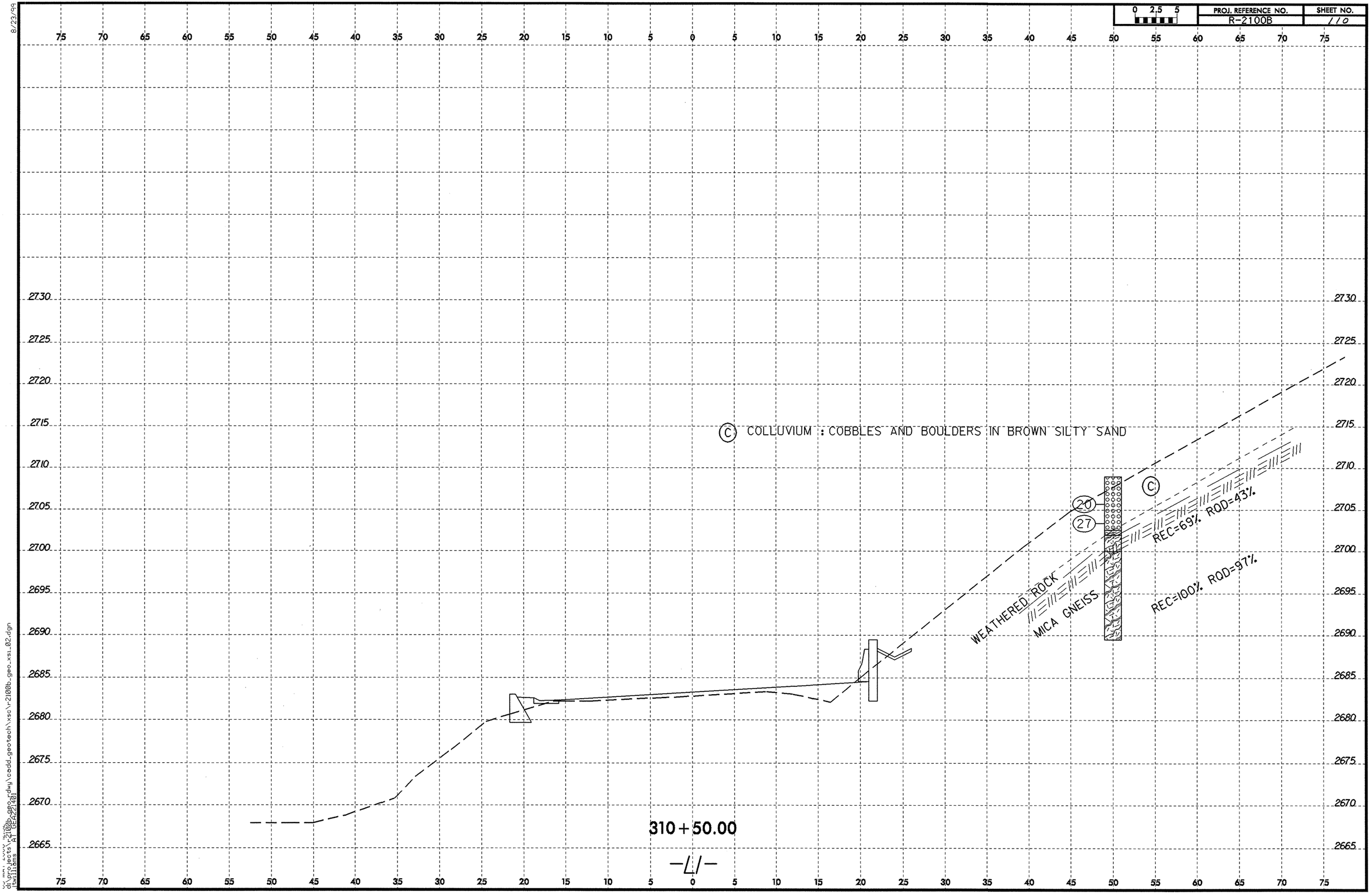
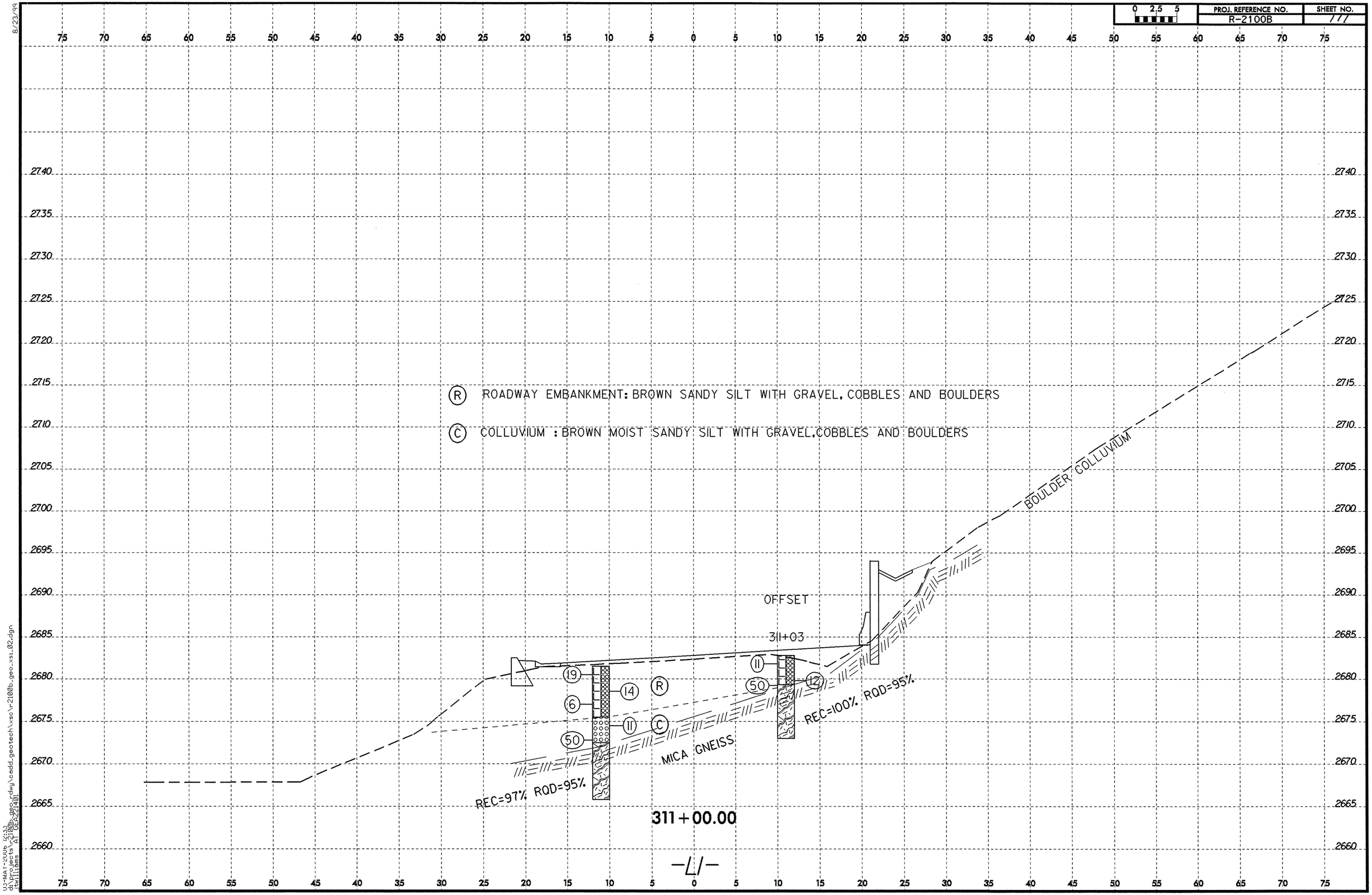
jtwilliams AT GEA221401



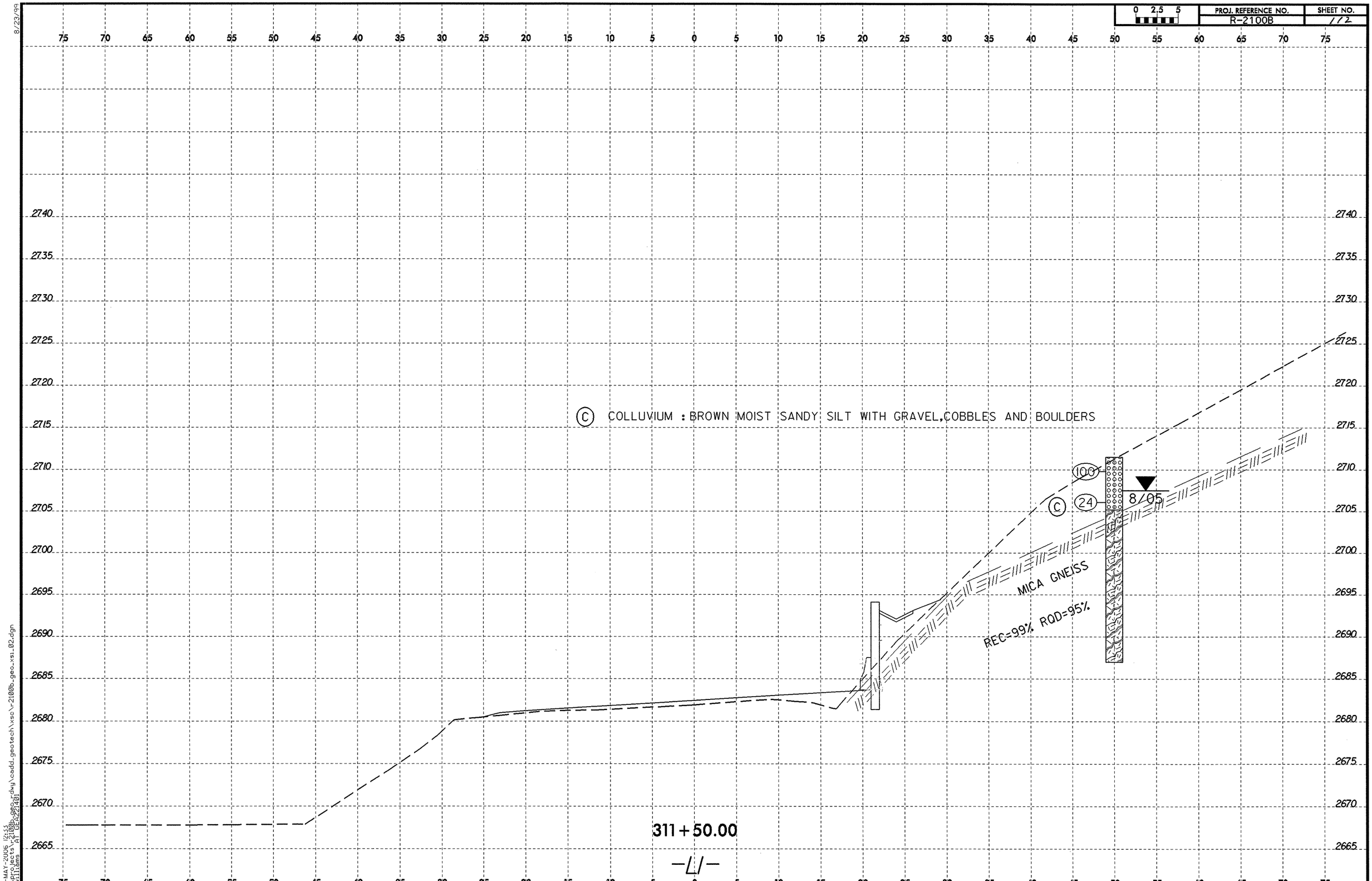
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
109
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : LIGHT BROWN SILT AND SAND WITH COBBLES
BOULDER COLLUVIUM
OFFSET
310+04
9
22
R
11
15
12/93
5
A
310+00.00
-L/-
03-MAY-2006 12:31
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401



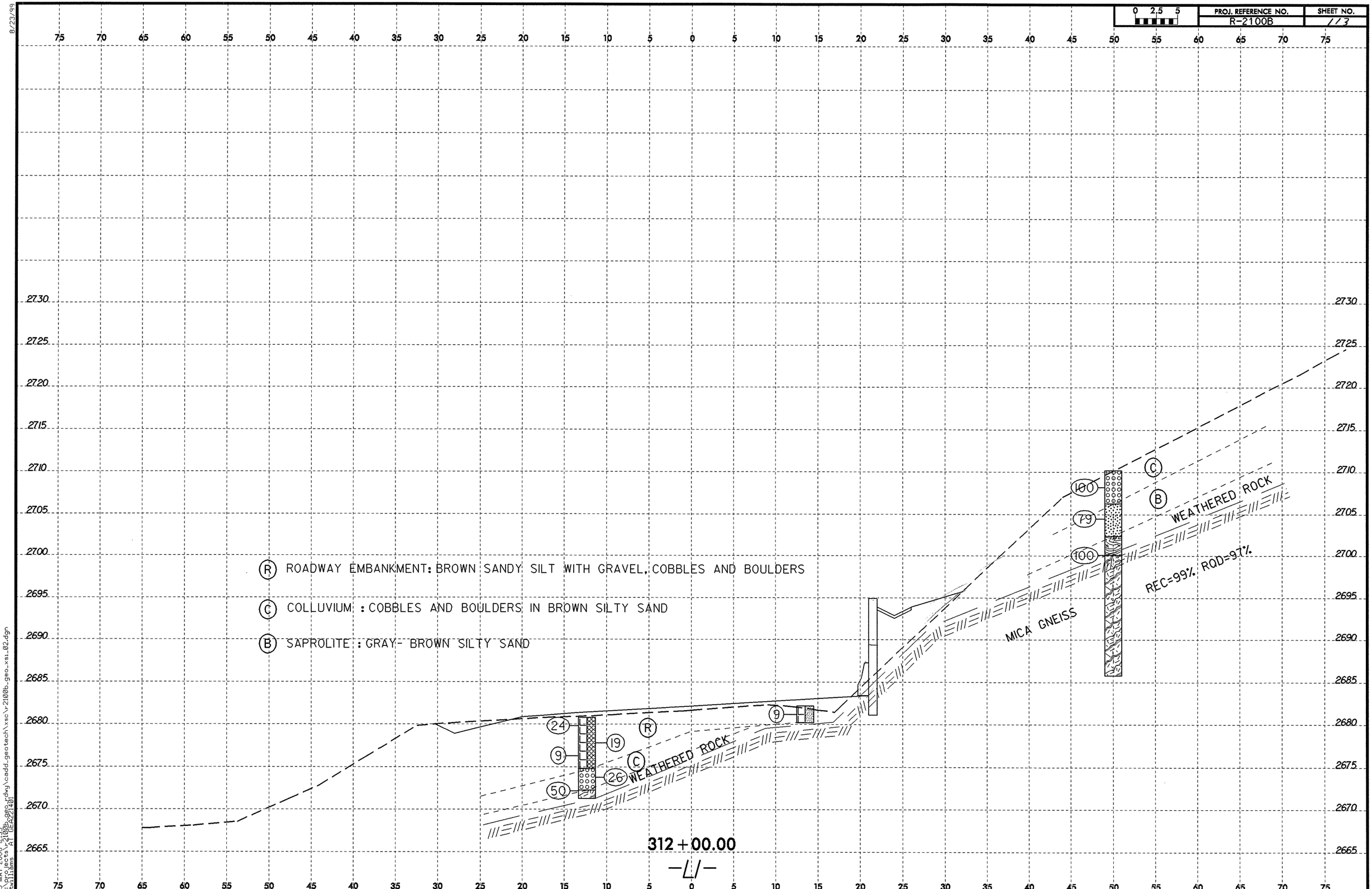
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
110
8/23/99
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
C COLLUVIUM : COBBLES AND BOULDERS IN BROWN SILTY SAND
C
20
27
REC=69% RQD=43%
REC=100% RQD=97%
WEATHERED ROCK
MICA GNEISS
310+50.00
-L/-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
777
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN MOIST SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
BOULDER COLLUVIUM
OFFSET
311+03
MICA GNEISS
REC=97% RQD=95%
REC=100% RQD=95%
311+00.00
-L/-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
112
8/23/99
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
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
(C) COLLUVIUM : BROWN MOIST SANDY SILT WITH GRAVEL,COBBLES AND BOULDERS
100
24
(C)
8/05
MICA GNEISS
REC=99% RQD=95%
311+50.00
-L/-
03-MAY-2006 12:33
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn



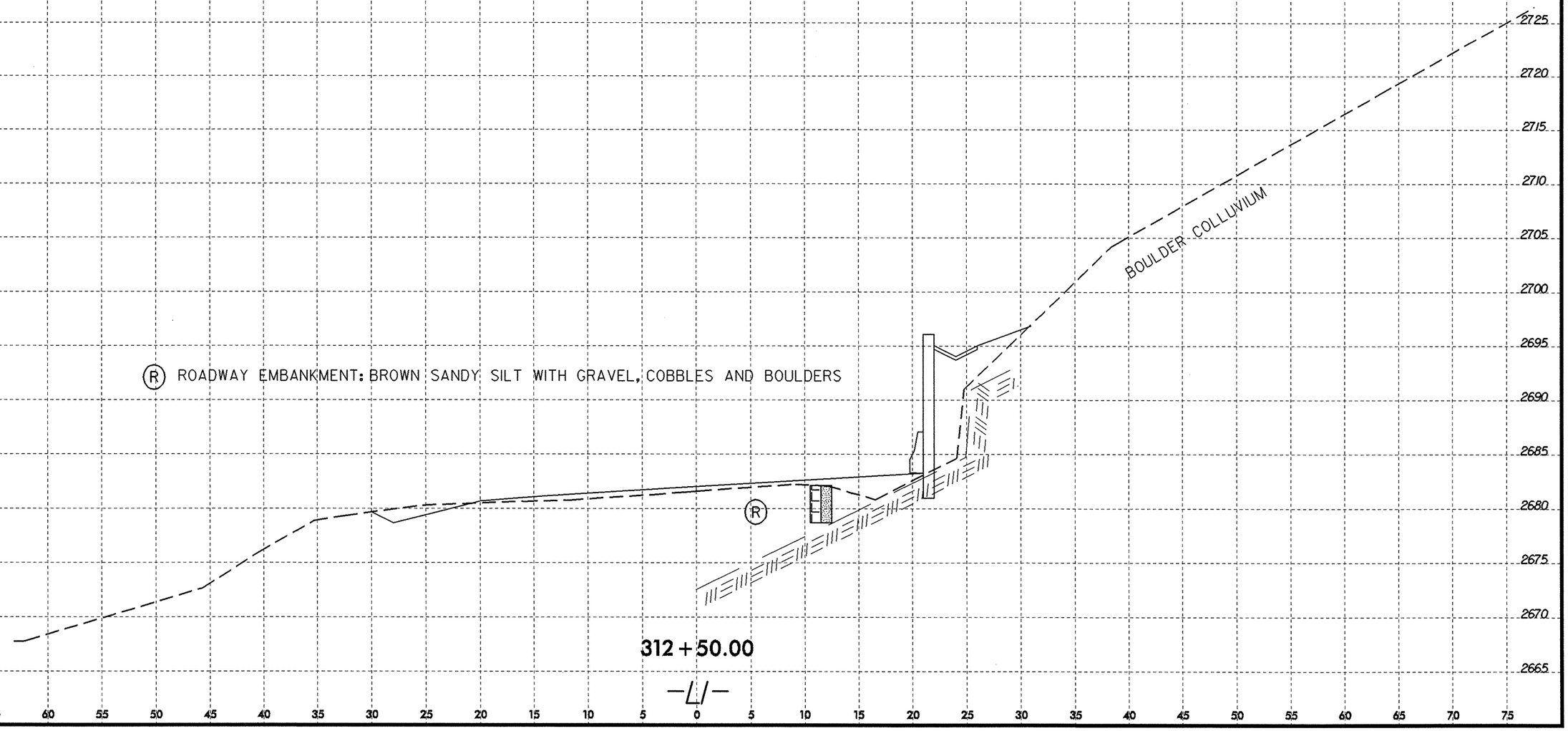
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
113
8/23/99
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : COBBLES AND BOULDERS IN BROWN SILTY SAND
B SAPROLITE : GRAY- BROWN SILTY SAND
WEATHERED ROCK
MICA GNEISS
REC=99% RQD=97%
312+00.00
-L1-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	1/4

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

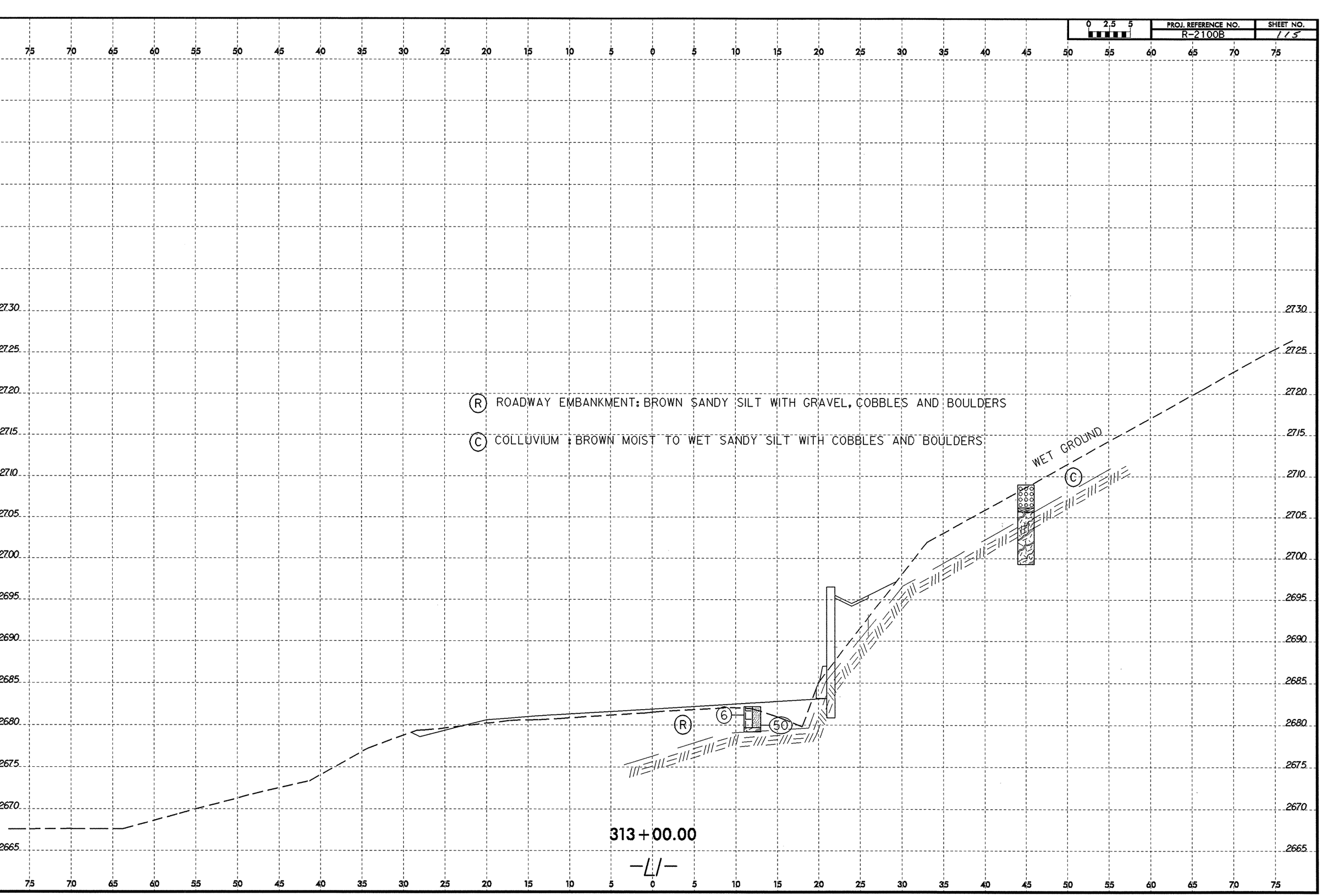
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665



312 + 50.00

-L-

03-MAY-2006 12:35
d:\projects\2100b_geo\dwg\cadd_geotech\xsc\r2100b_geo_xs1_02.dgn
Williams



8/23/99

03-MAY-2006 12:36
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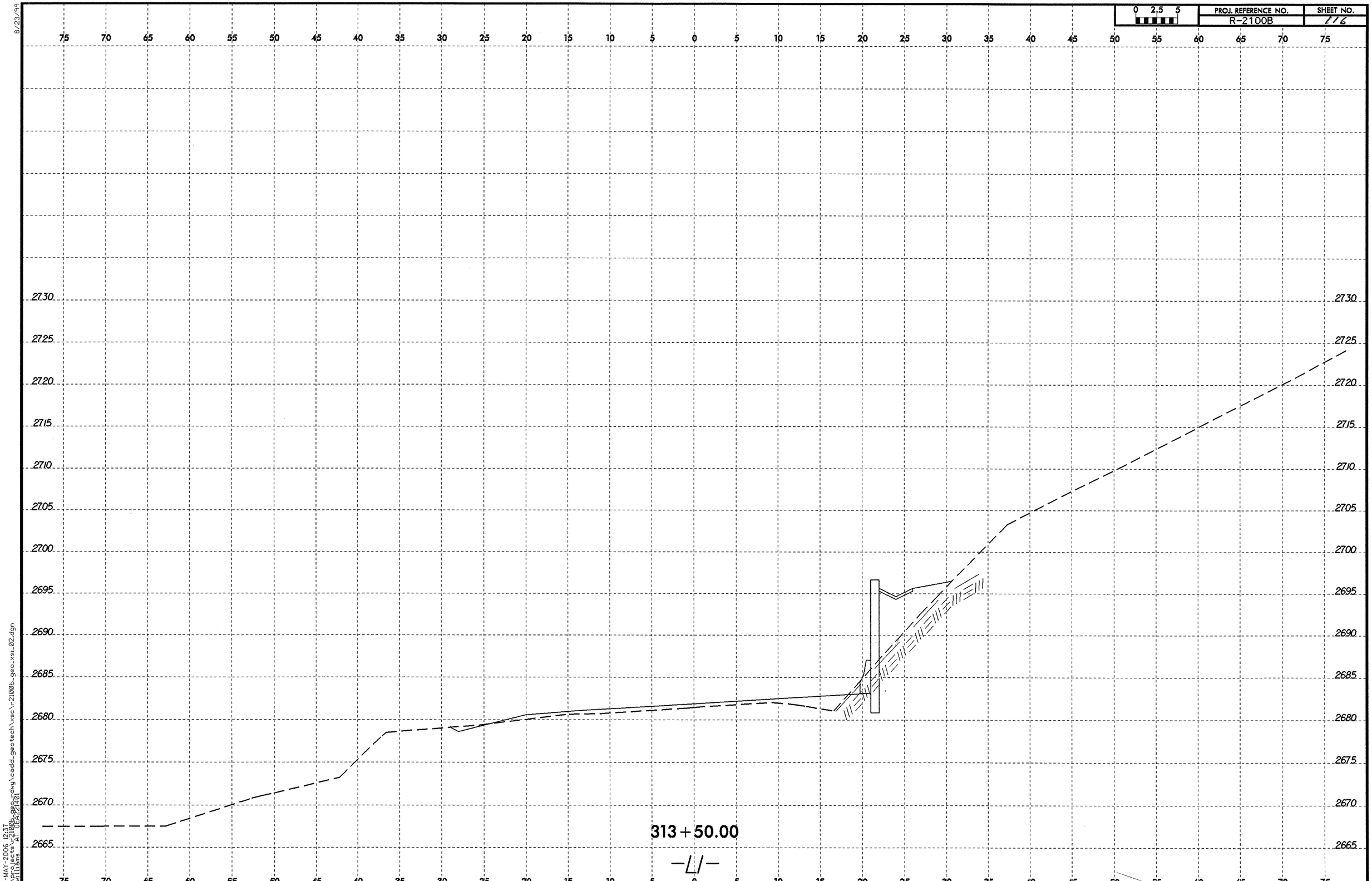
jtwilliams AT GEA221401



8/23/99

03-MAY-2006 12:37
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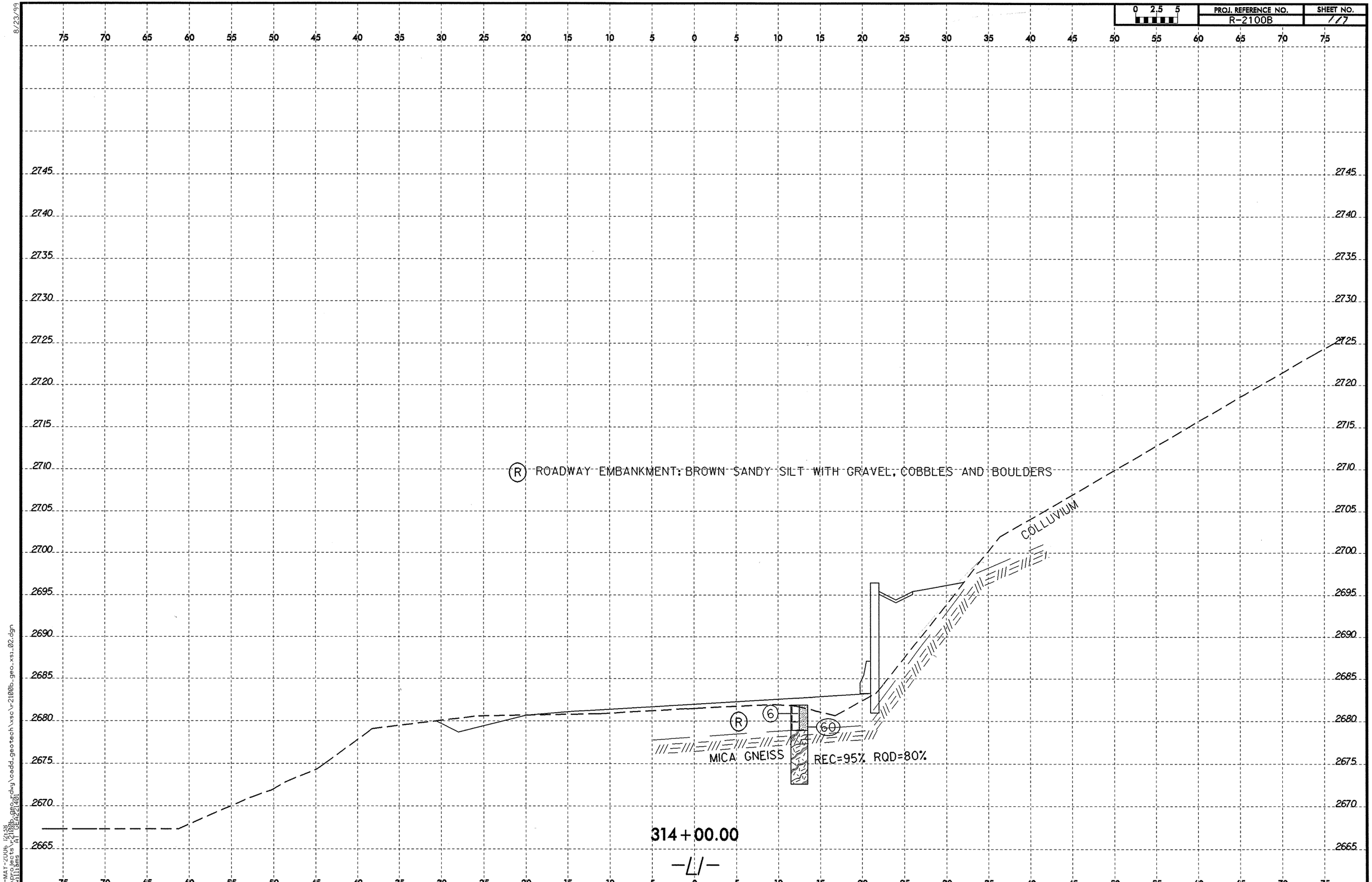
ltwilliams AT GEA221401



8/23/99

03-MAY-2006 12:38
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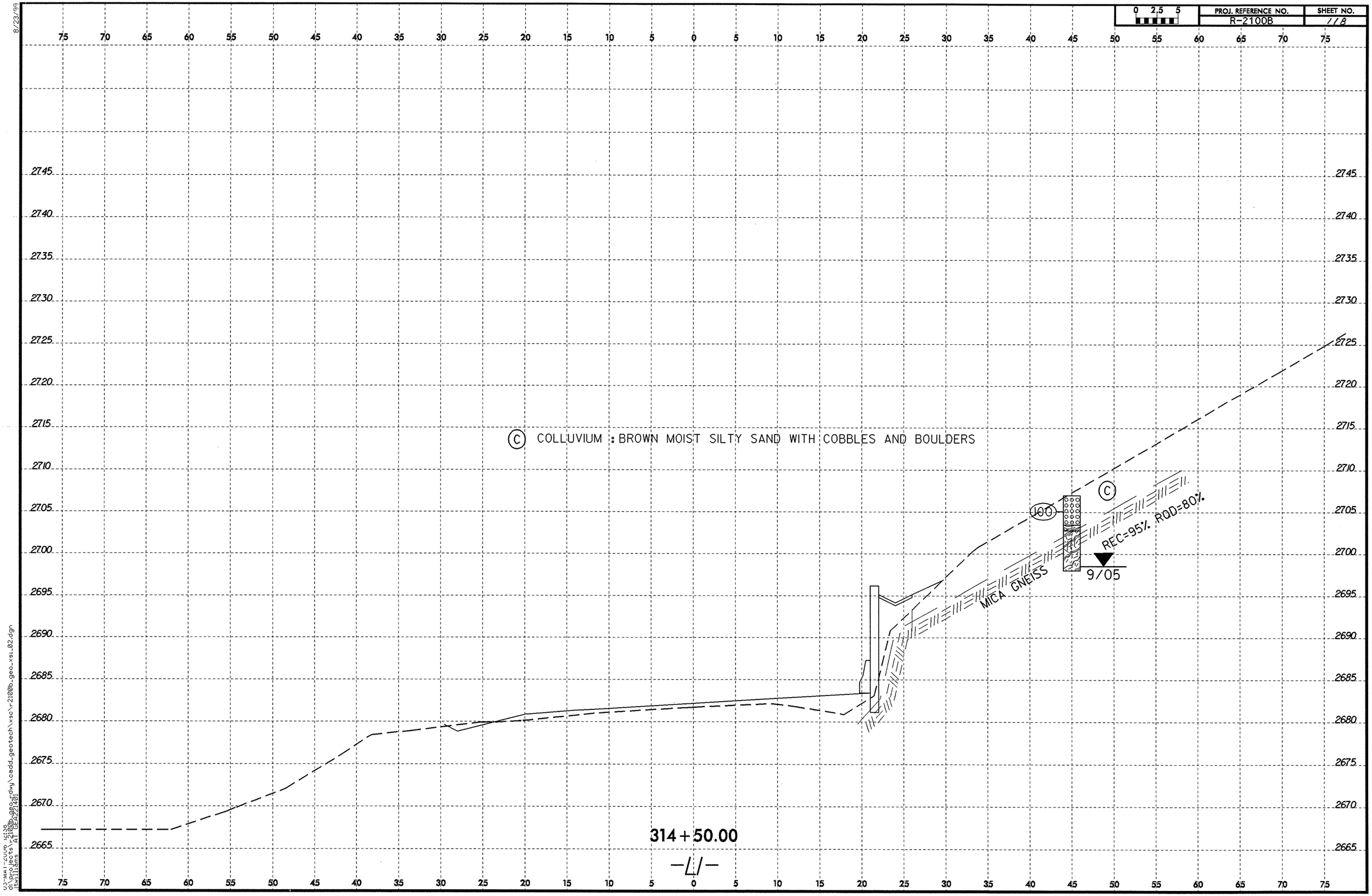
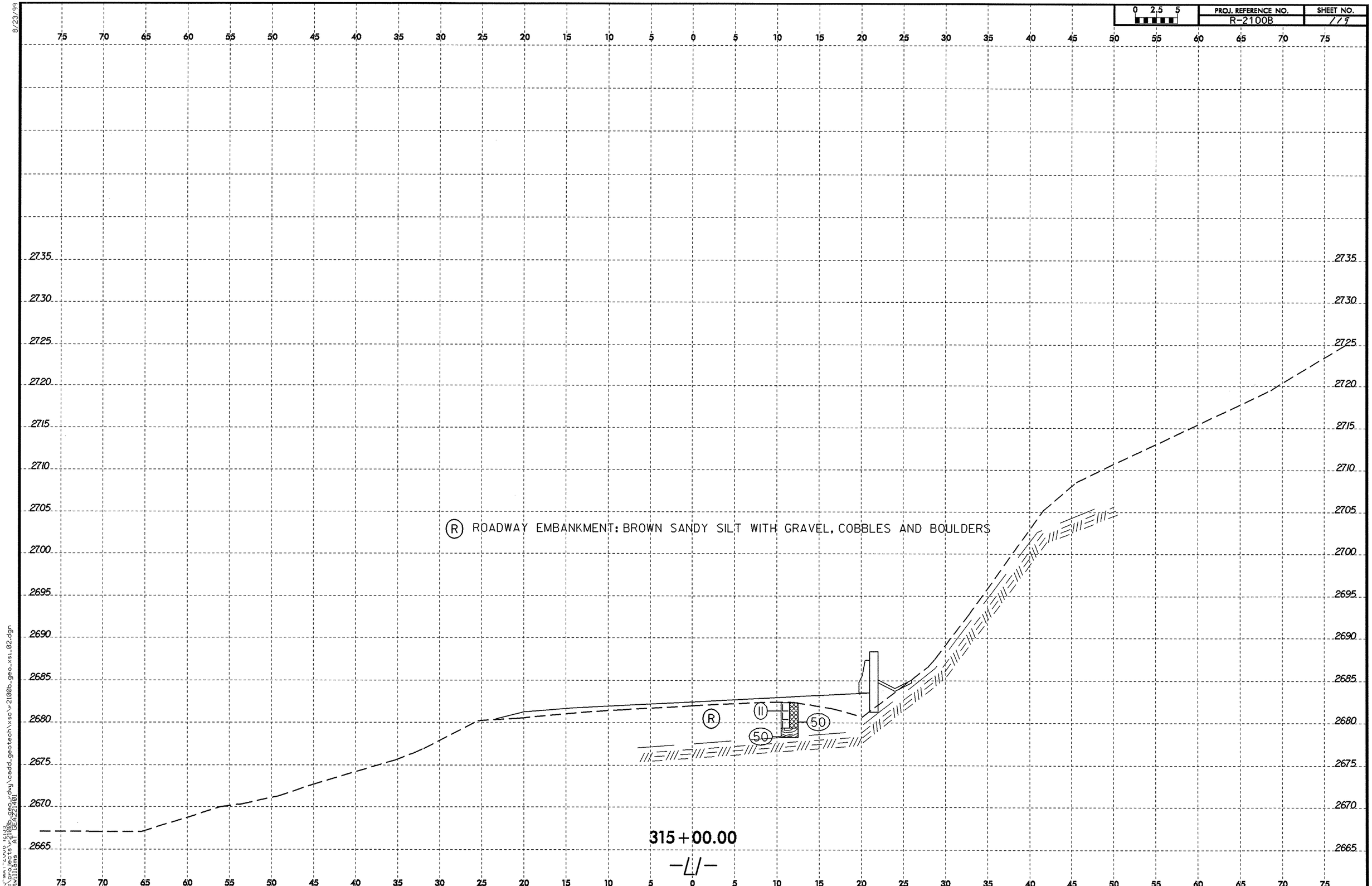
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
118
8/23/99
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
2745
2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
C COLLUVIUM : BROWN MOIST SILTY SAND WITH COBBLES AND BOULDERS
C
100
REC=95% RQD=80%
9/05
MICA GNEISS
314+50.00
-L/-



8/23/99

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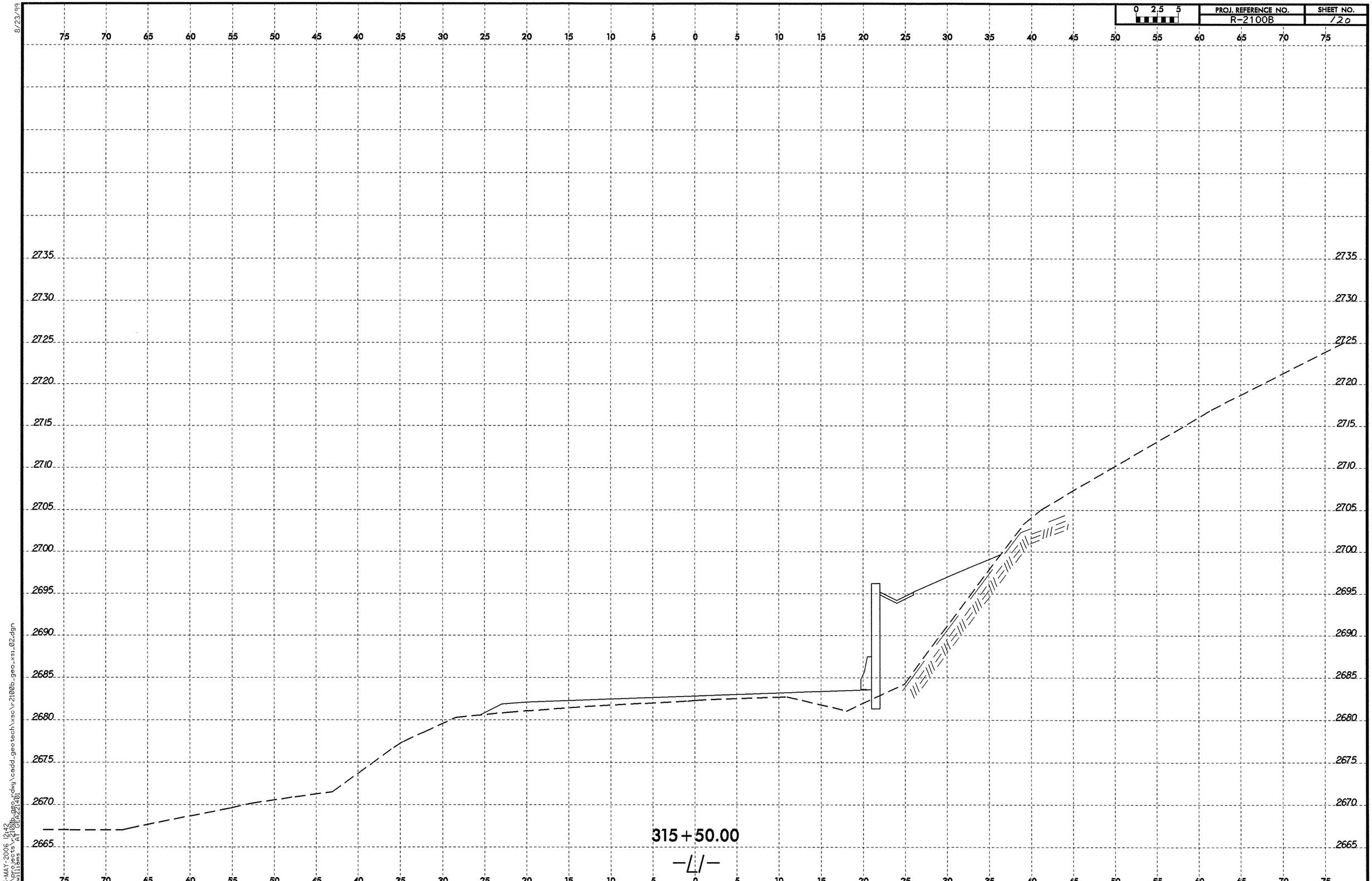
ftwilliams AT GEA221401



8/23/99

03-MAY-2006 12:42
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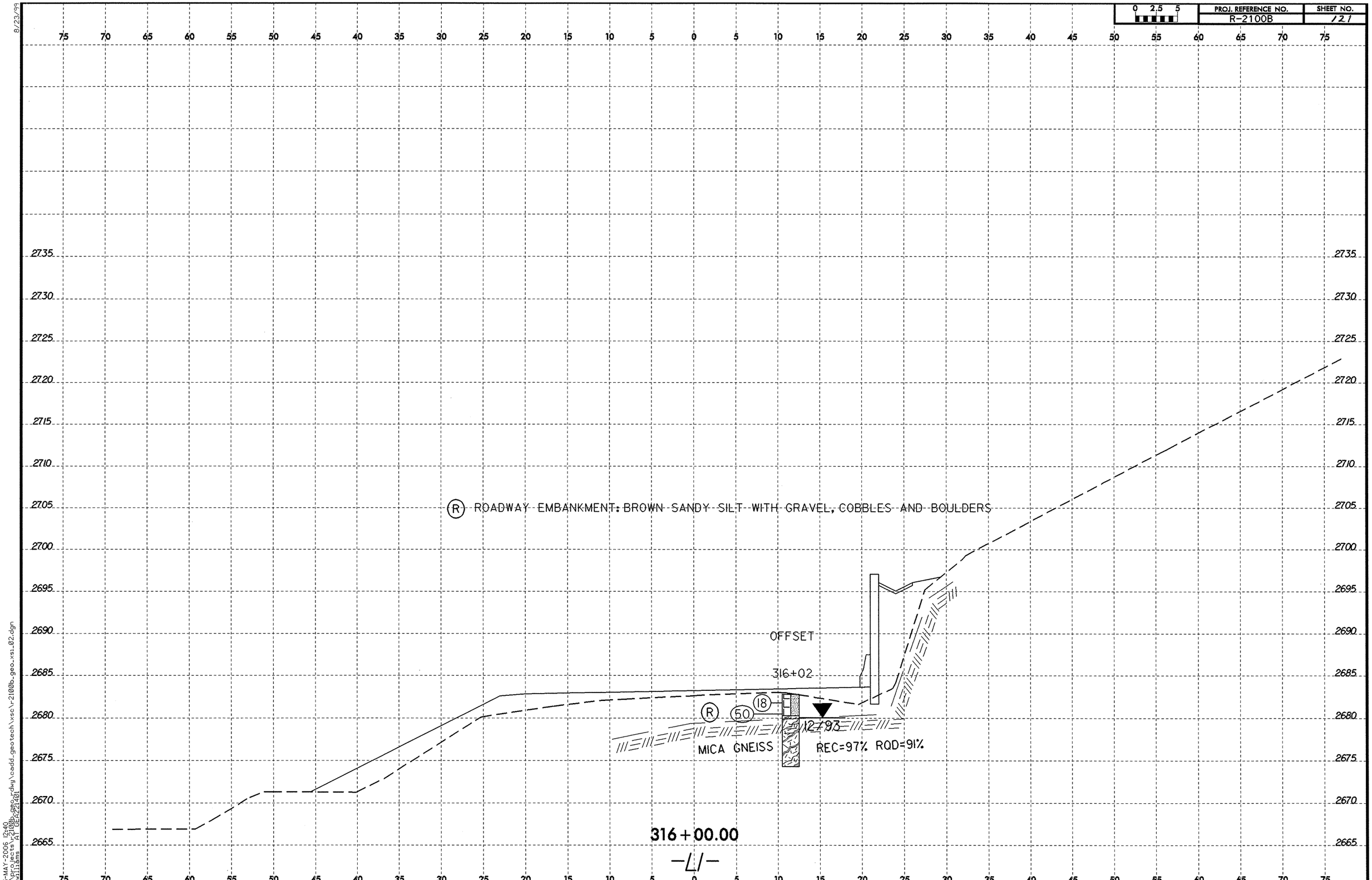
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
121
8/23/99
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
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
R ROADWAY EMBANKMENT: BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
316+02
18
R
50
12/93
MICA GNEISS
REC=97% RQD=91%
316+00.00
-L/-
03-MAY-2006 12:40
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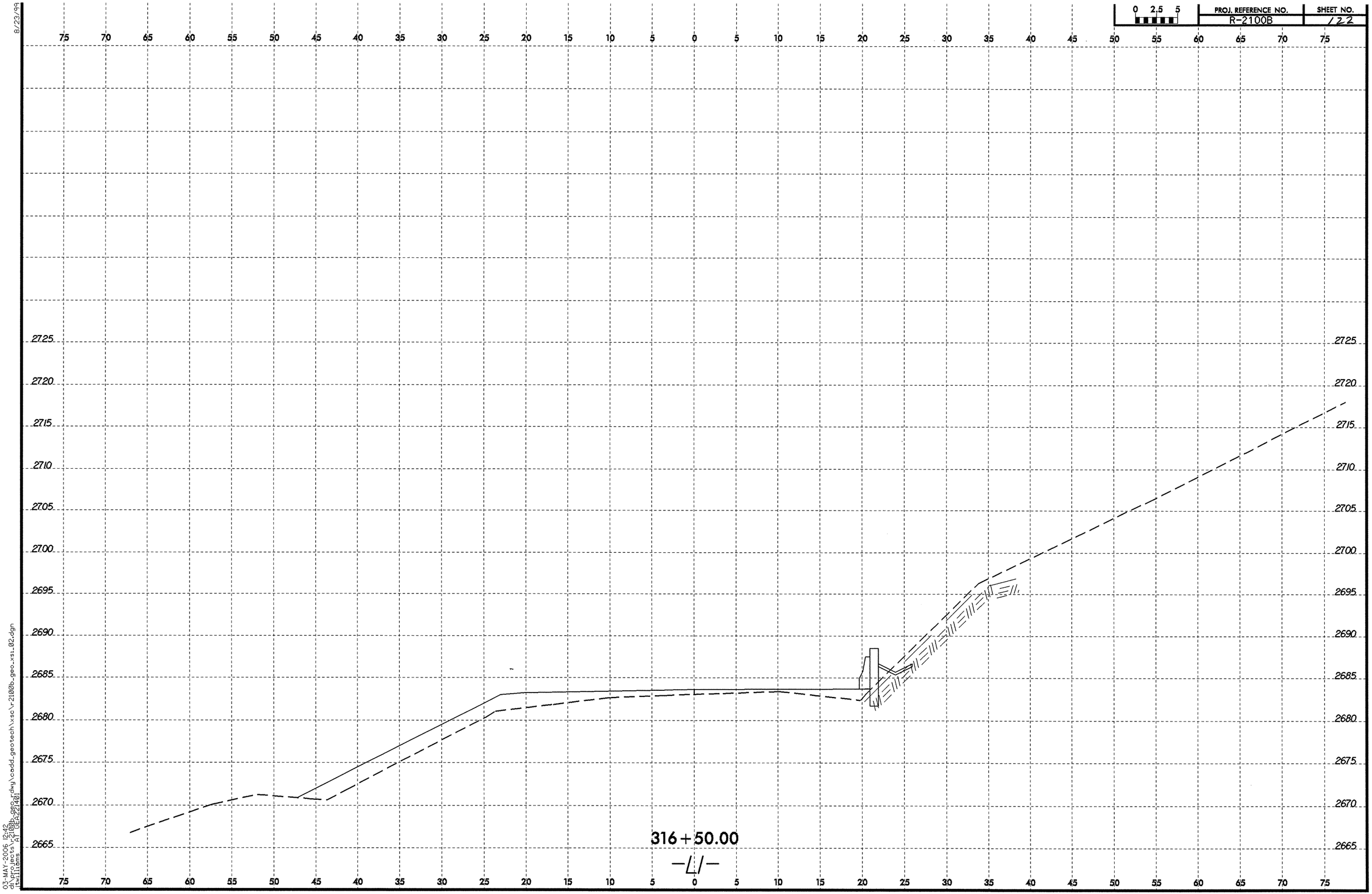
ltwilliams AT GEA221401



8/23/99

03-MAY-2006 12:42
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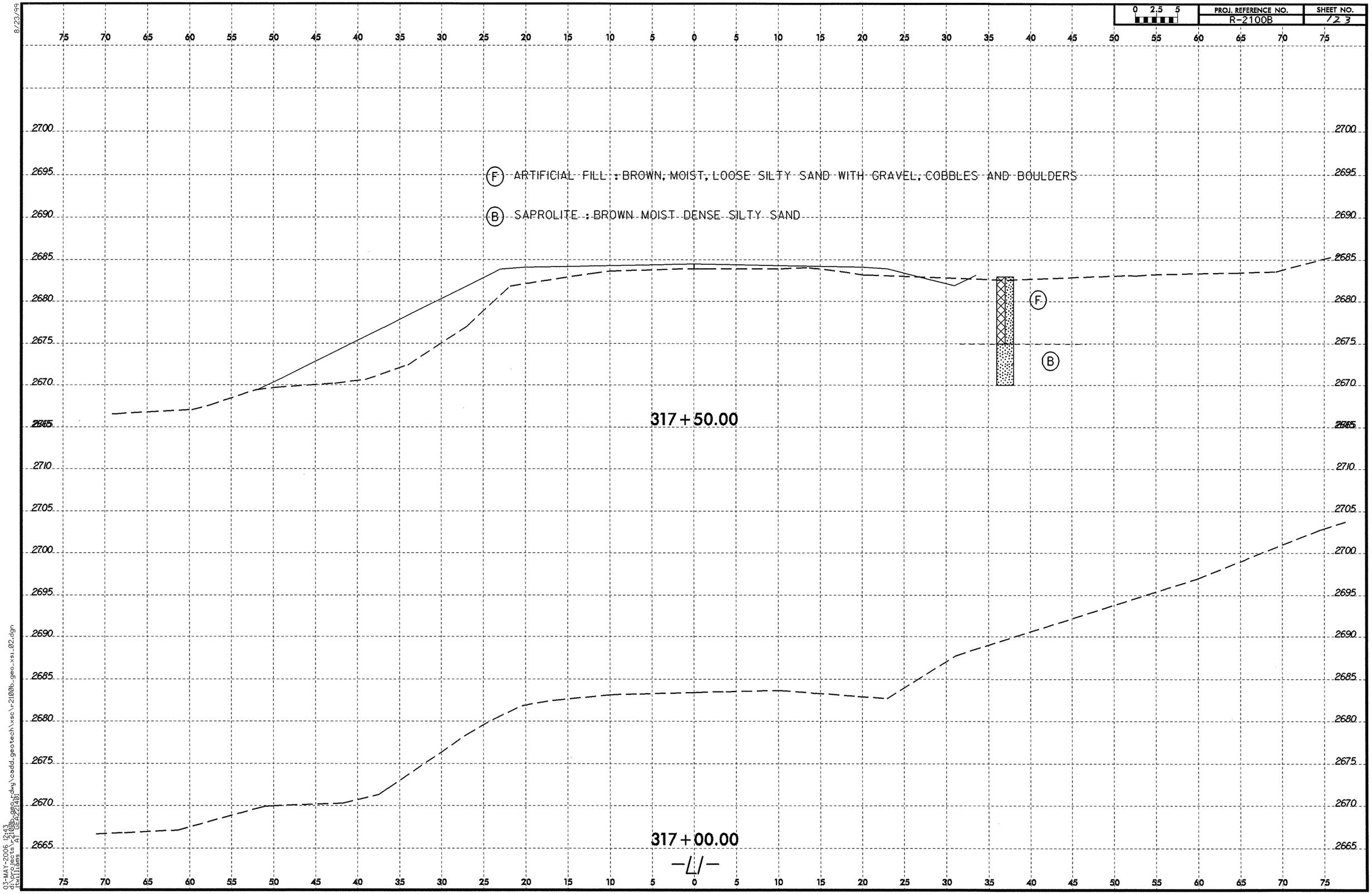
jtwilliams AT GEA221401



8/23/99

03-MAY-2006 12:43
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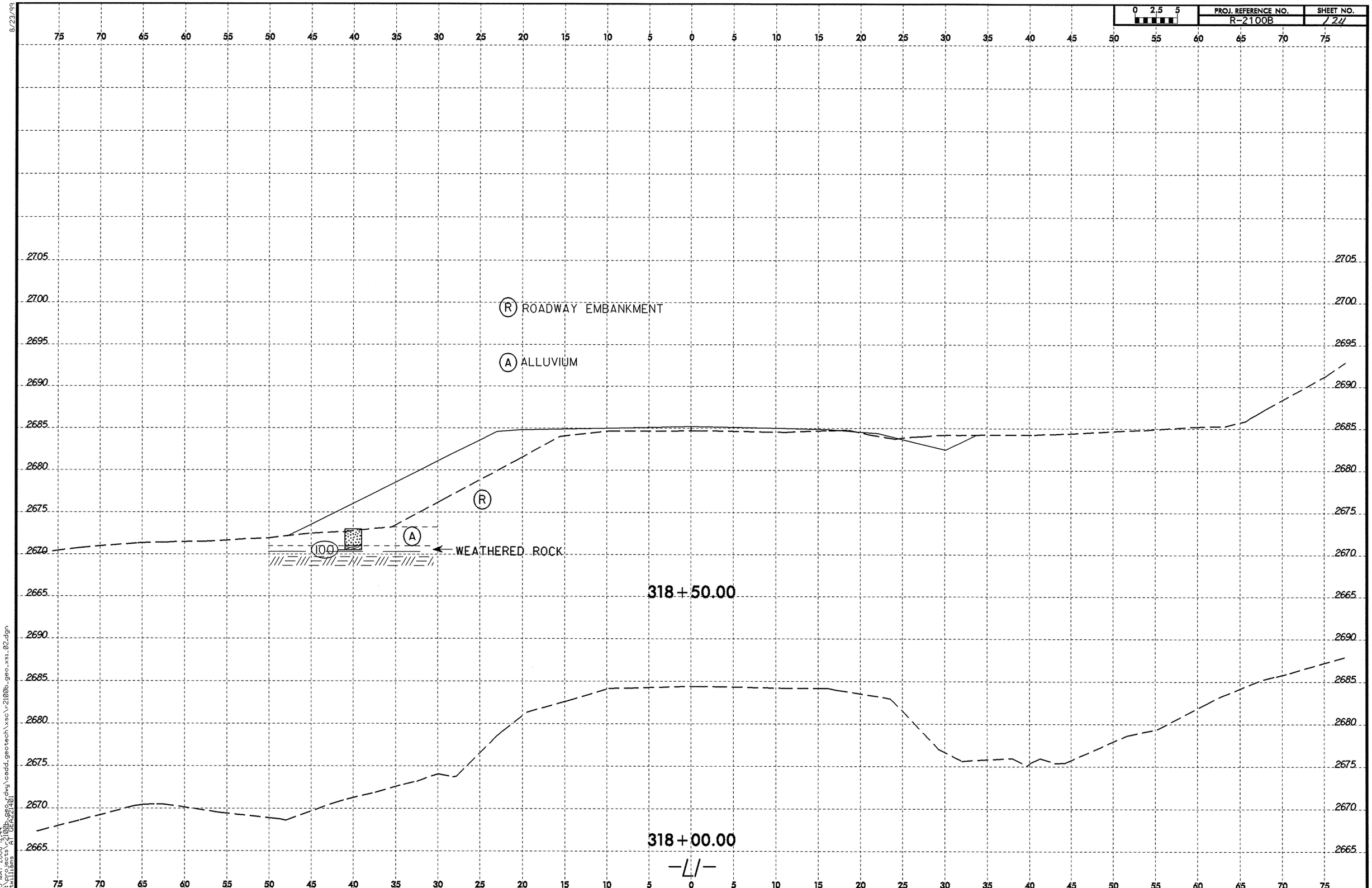
ltwilliams AT GEA221401



8/23/99

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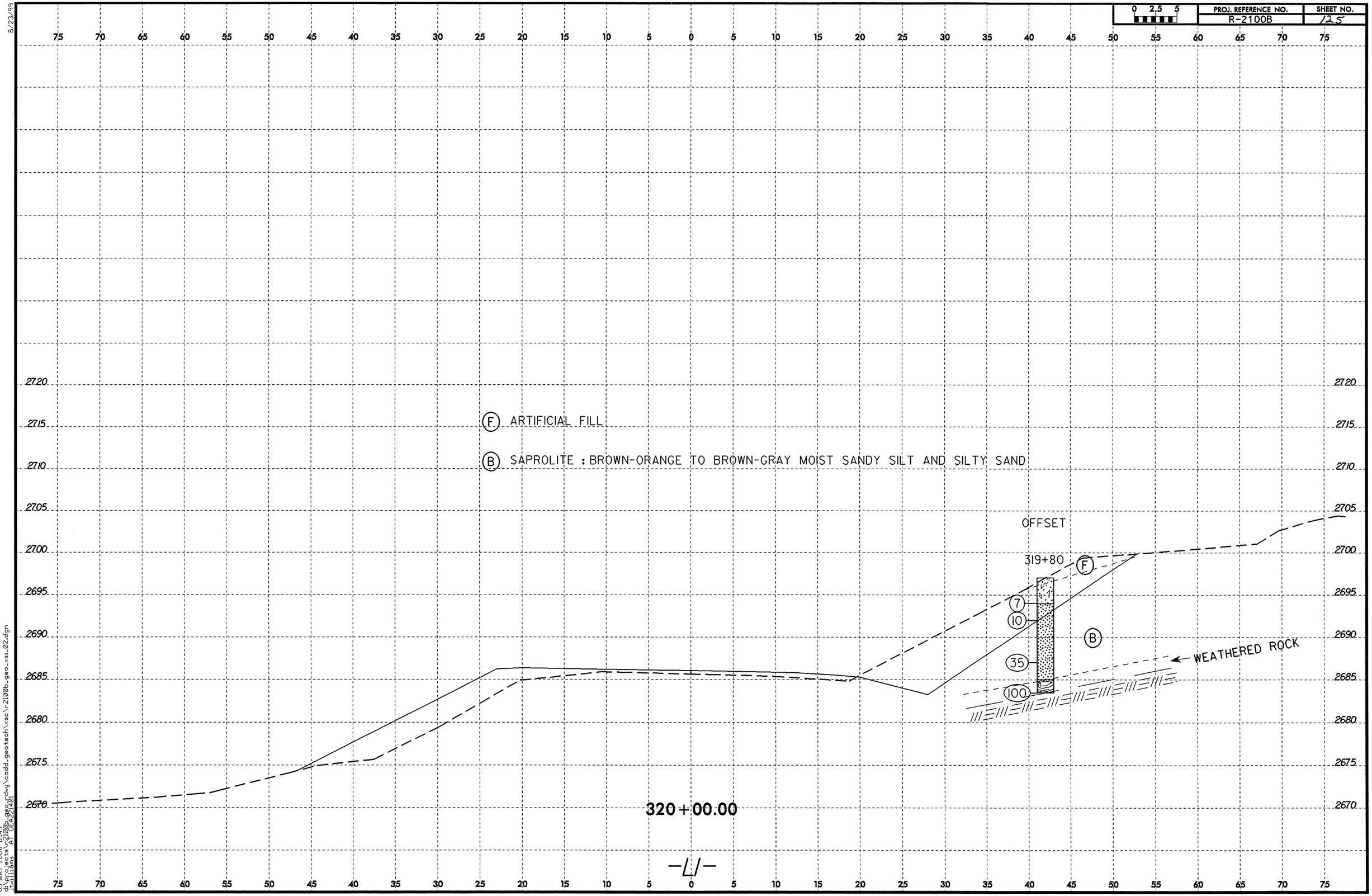
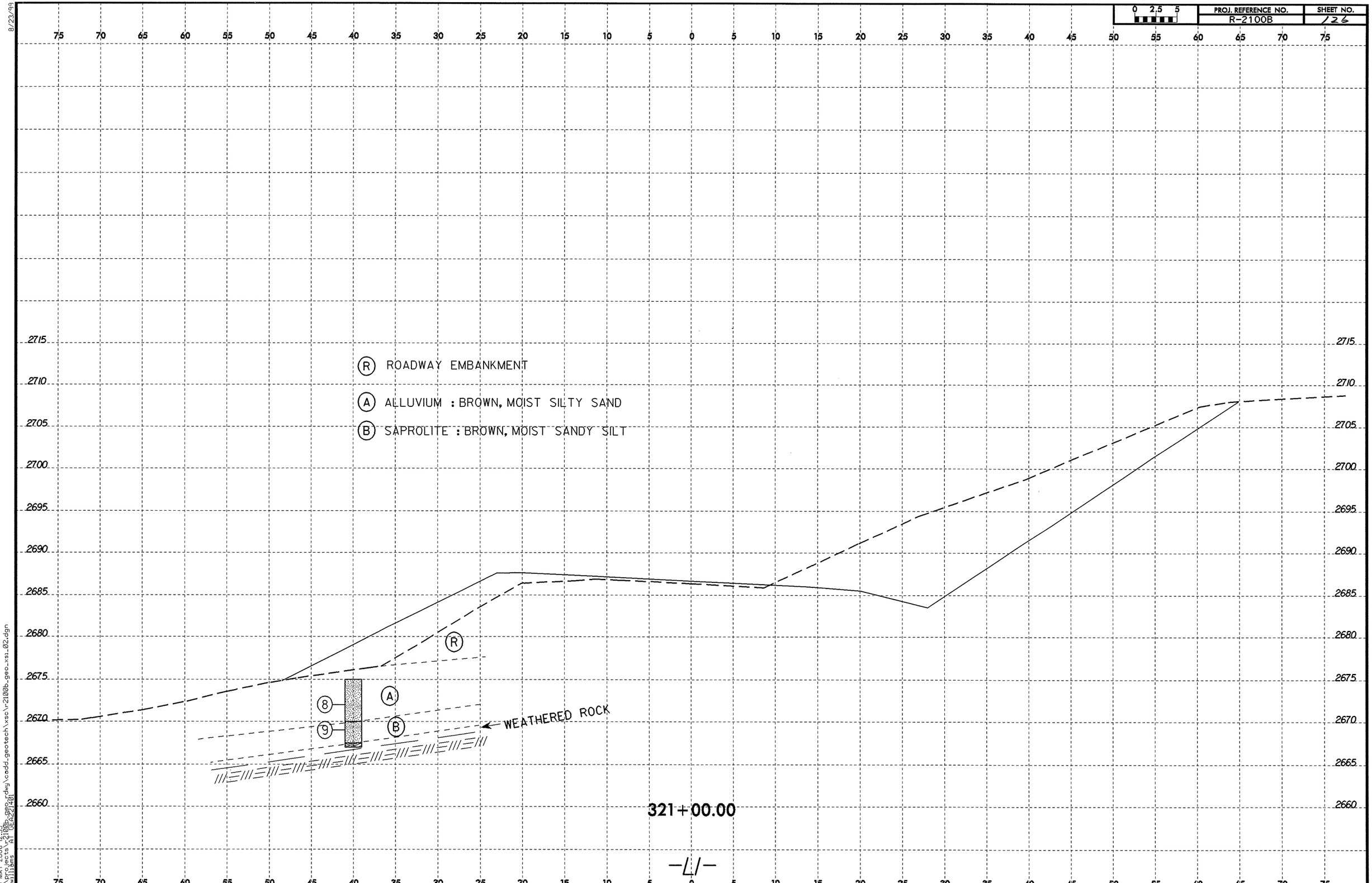
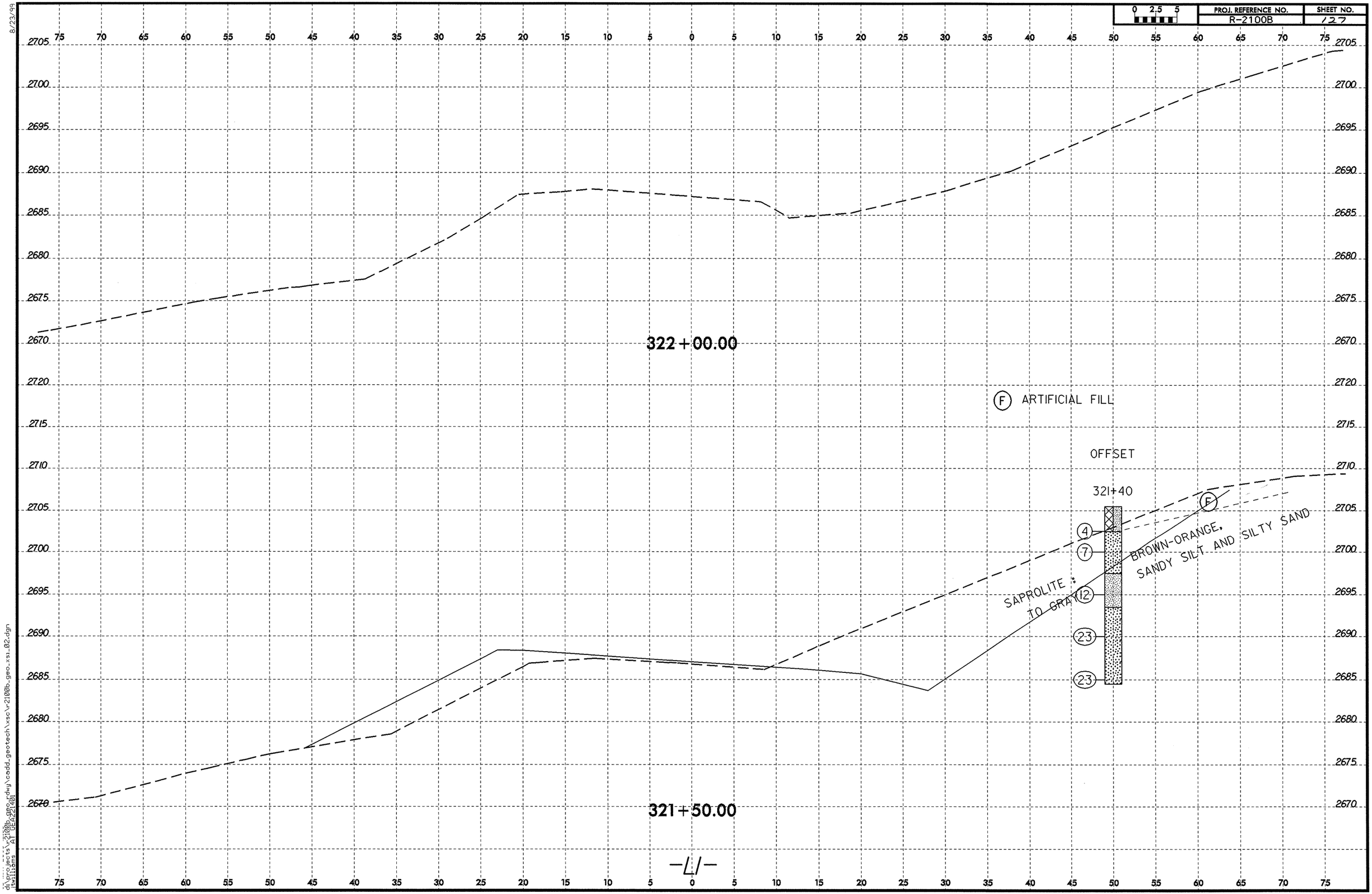
jtwilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
125
0 2.5 5
F ARTIFICIAL FILL
B SAPROLITE : BROWN-ORANGE TO BROWN-GRAY MOIST SANDY SILT AND SILTY SAND
OFFSET
319+80
F
7
10
35
100
B
WEATHERED ROCK
320+00.00
-L/-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
126
R ROADWAY EMBANKMENT
A ALLUVIUM : BROWN, MOIST SILTY SAND
B SAPROLITE : BROWN, MOIST SANDY SILT
WEATHERED ROCK
321+00.00
-L/-



8/23/99

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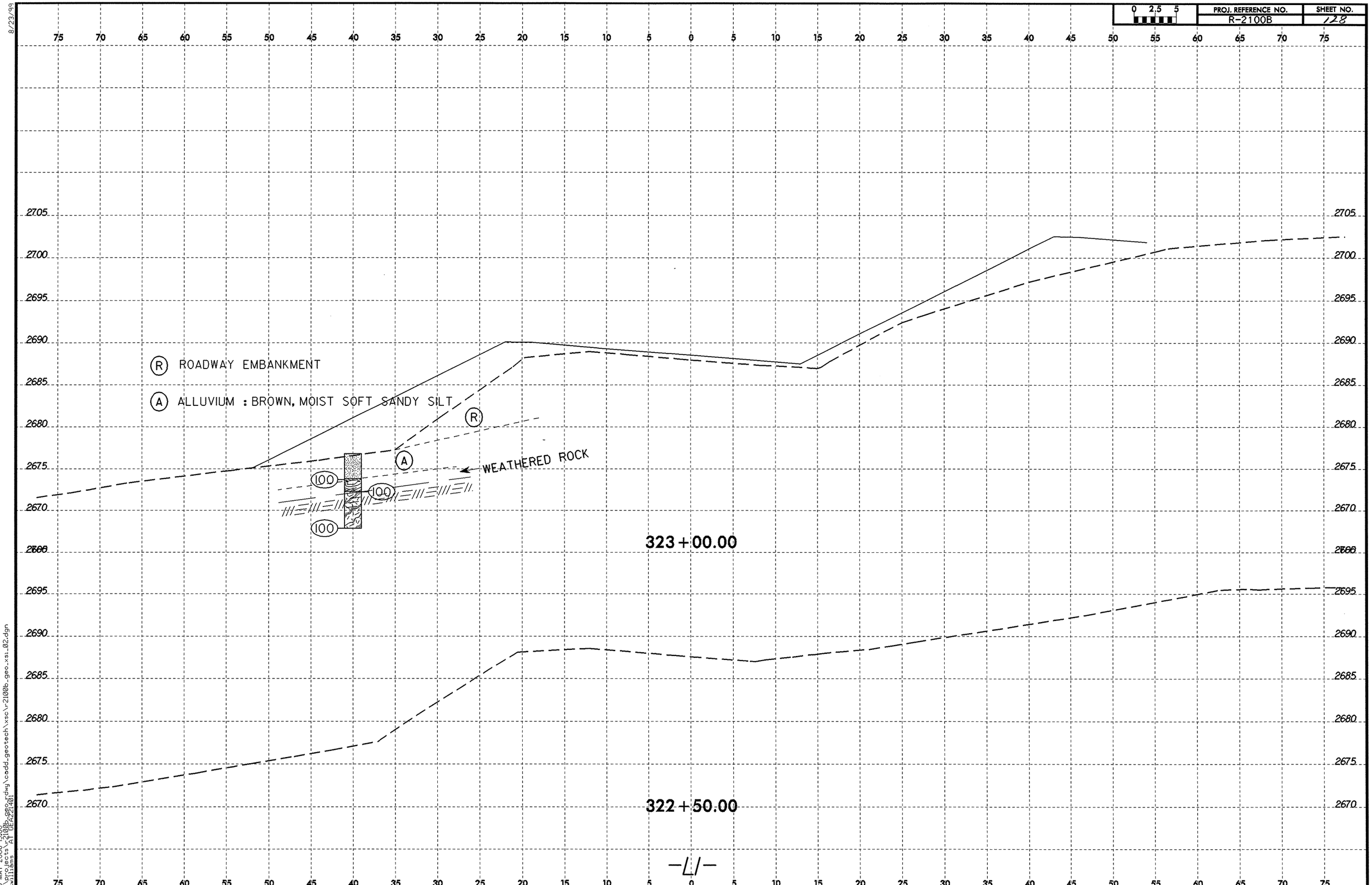
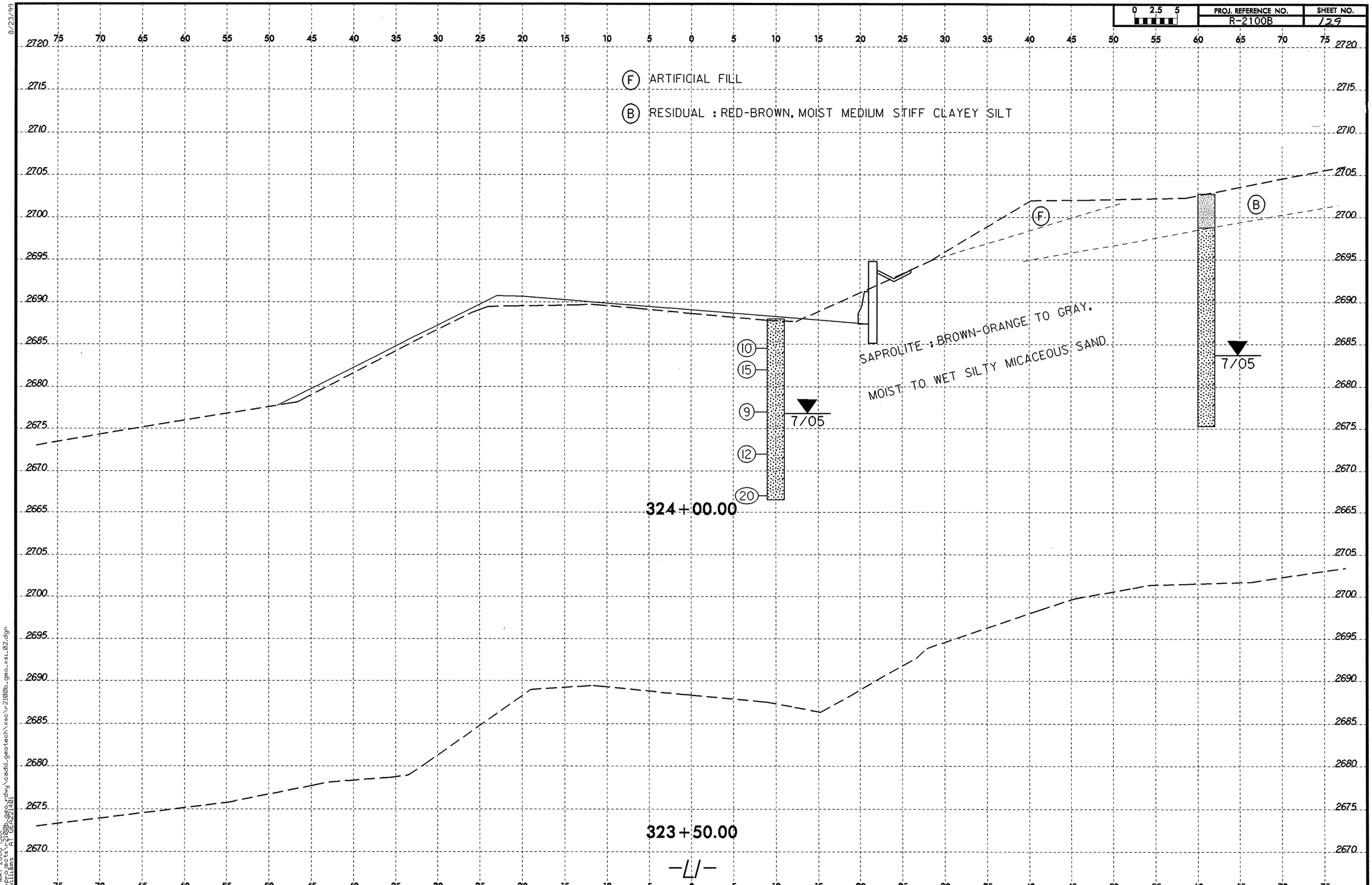
twilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
128
8/23/99
R ROADWAY EMBANKMENT
A ALLUVIUM : BROWN, MOIST SOFT SANDY SILT
WEATHERED ROCK
100
323+00.00
322+50.00
-L/-
03-MAY-2006 13:00
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn



8/23/99

03-MAY-2006 13:01
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jtwilliams AT GEA221401

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
R-2100B	130

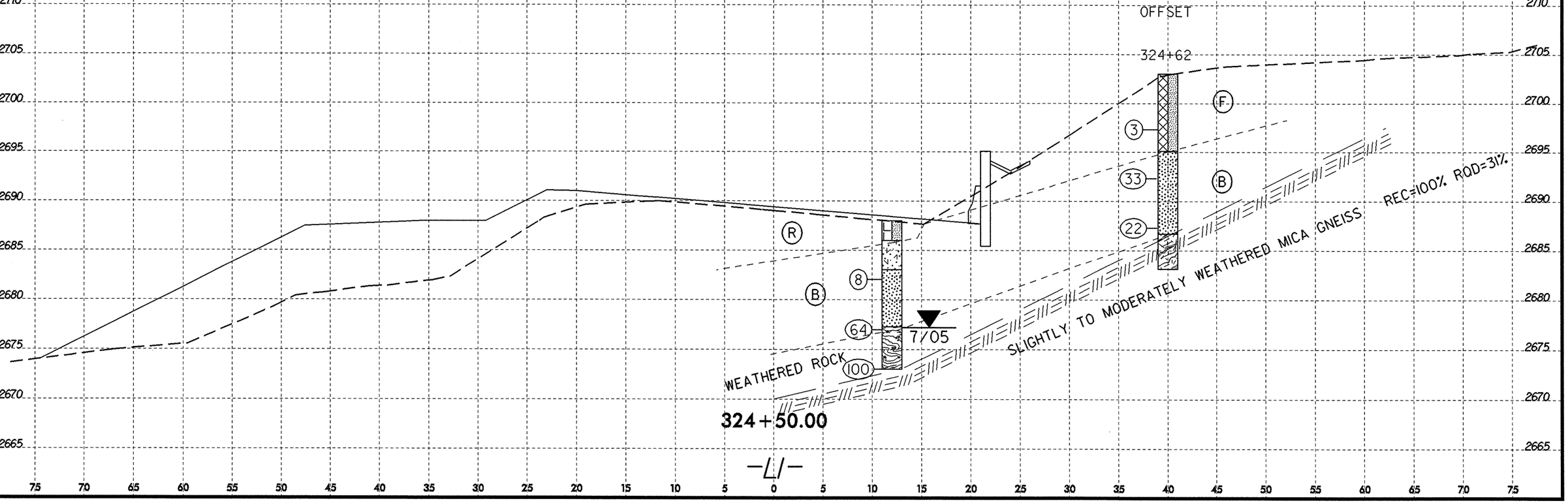
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

(R) ROADWAY EMBANKMENT : BROWN, SANDY SILT

(F) ARTIFICIAL FILL : ORANGE MOIST SANDY CLAYEY SILT

(B) SAPROLITE : ORANGE TO BROWN, MOIST SANDY SILT AND SILTY MICACEOUS SAND



8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	13

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

2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665 2660

(R) ROADWAY EMBANKMENT : BROWN, SANDY SILT

(F) ARTIFICIAL FILL : ORANGE TO BROWN CLAYEY SILT AND SAND

(C) COLLUVIUM : BROWN SANDY SILT WITH A FEW COBBLES

OFFSET

324+85

(C)

(R)

(F)

100

WEATHERED ROCK

MICA GNEISS

REC=98% RQD=70%

100

WEATHERED ROCK

MICA GNEISS

REC=100% RQD=45%

8/05

SAPROLITE AND WEATHERED ROCK

325+00.00

-L/-

22-MAY-2006 15:02
dir \projects\r-2100b_geo_dwg\CADD_GEOTECH\xsc\r2100b_geo_xs1_02.dgn
twilliams
AT GER/2401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	122

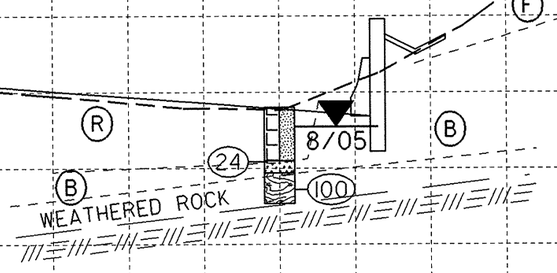
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2715
2710
2705
2700
2695
2690
2685
2680
2675
2670

(R) ROADWAY EMBANKMENT : ORANGE, SANDY SILT WITH GRAVEL

(F) ARTIFICIAL FILL

(B) SAPROLITE : BROWN SILTY SAND



325+50.00

-L/-

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

23-MAY-2006 09:21
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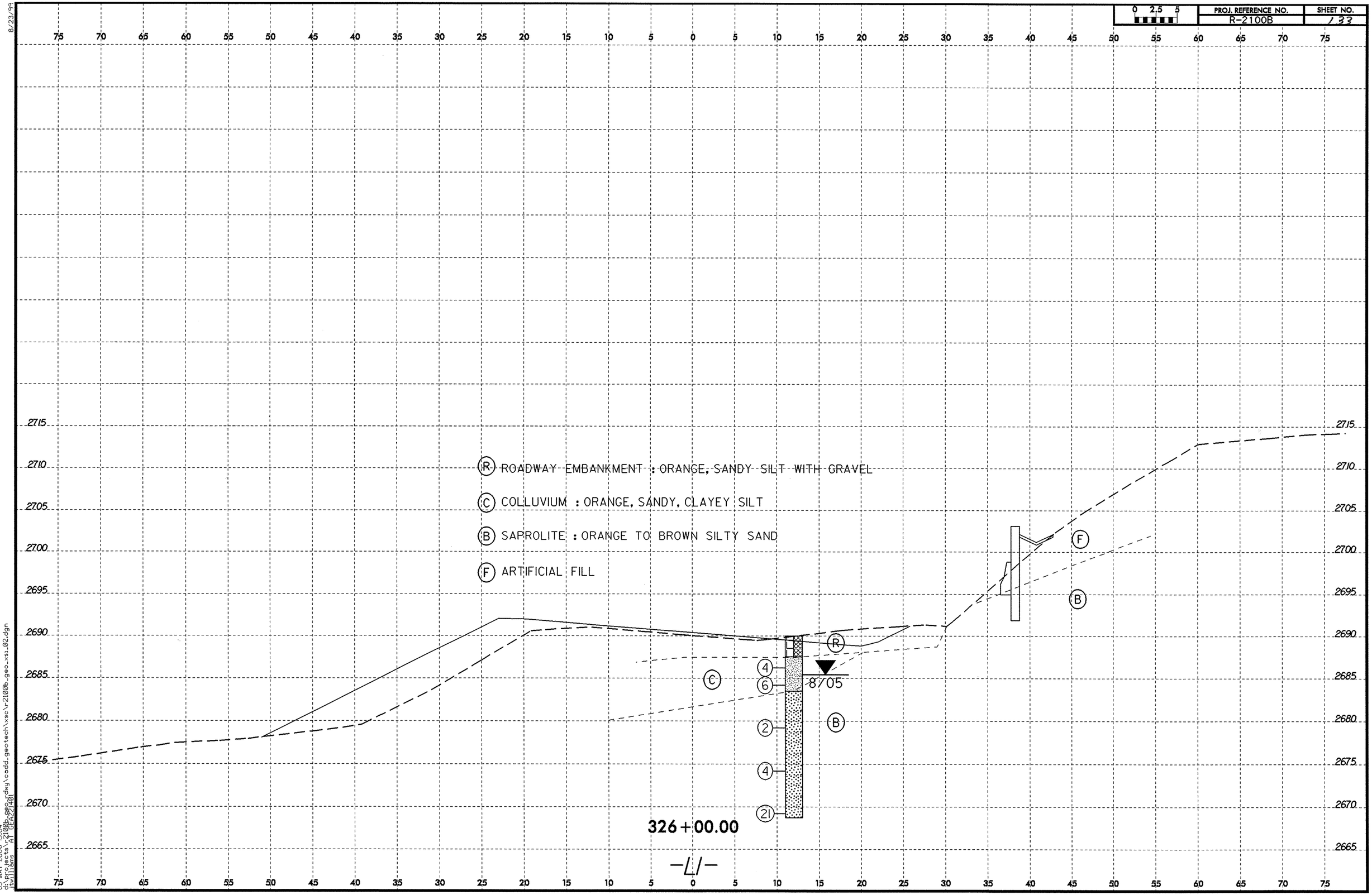
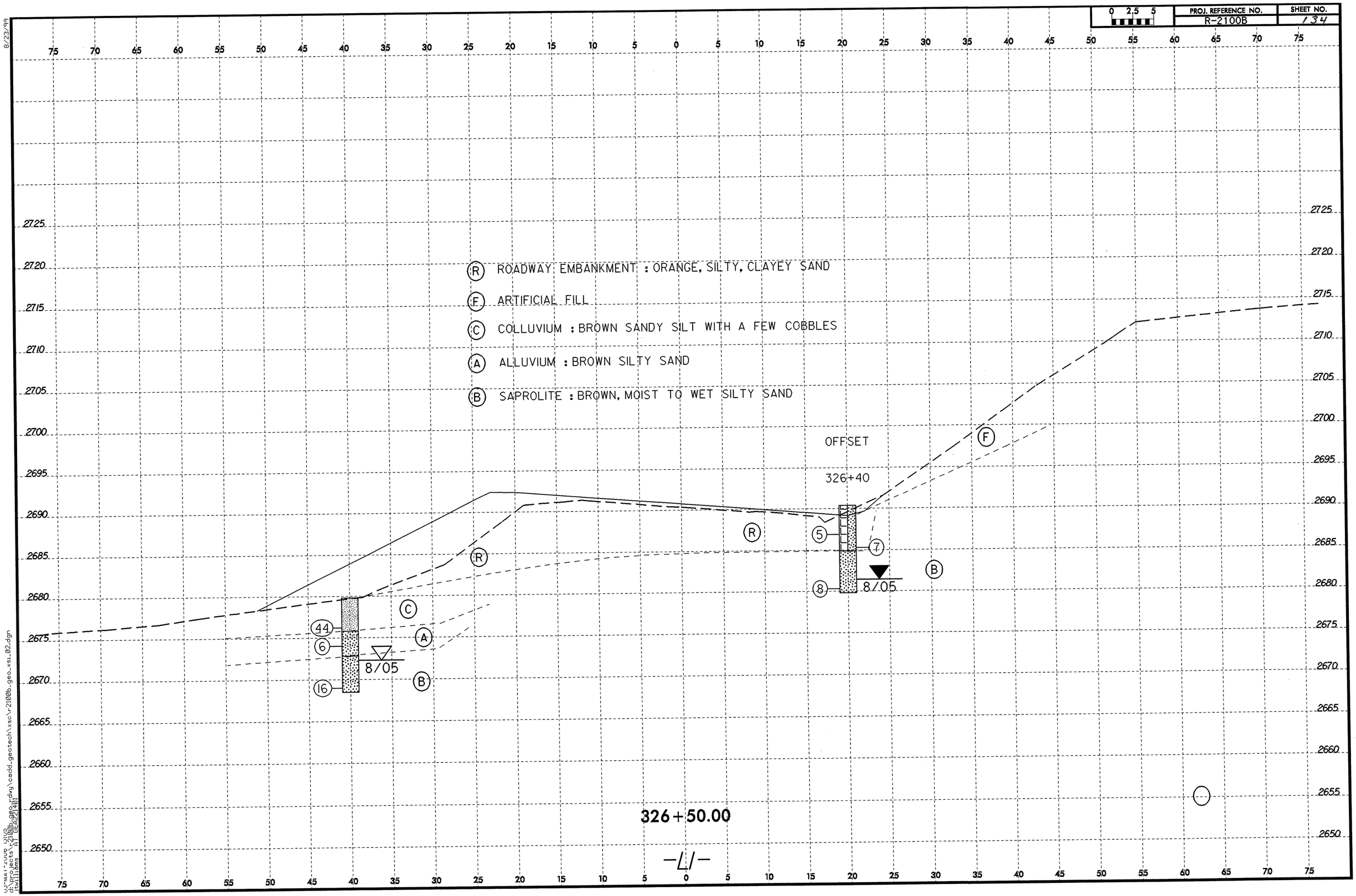
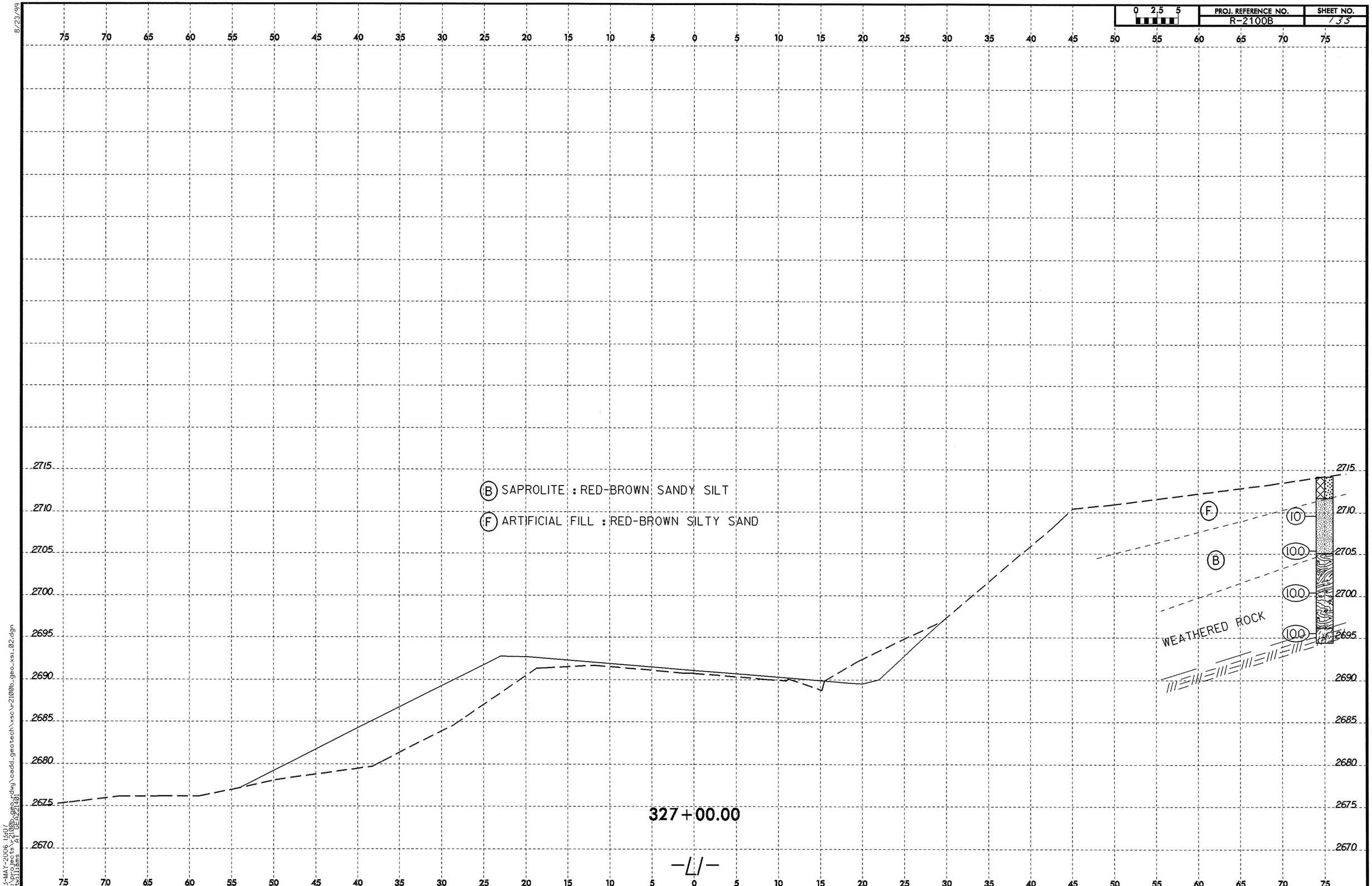
tbwilliams A1 GEA22140



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
133
R ROADWAY EMBANKMENT : ORANGE, SANDY SILT WITH GRAVEL
C COLLUVIUM : ORANGE, SANDY, CLAYEY SILT
B SAPROLITE : ORANGE TO BROWN SILTY SAND
F ARTIFICIAL FILL
8/05
326+00.00
-L/-



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
134
0 2.5 5
8/23/99
R ROADWAY EMBANKMENT : ORANGE, SILTY, CLAYEY SAND
F ARTIFICIAL FILL
C COLLUVIUM : BROWN SANDY SILT WITH A FEW COBBLES
A ALLUVIUM : BROWN SILTY SAND
B SAPROLITE : BROWN, MOIST TO WET SILTY SAND
OFFSET
326+40
8/05
8/05
326+50.00
-L1-



8/23/99

03-MAY-2006 13:07
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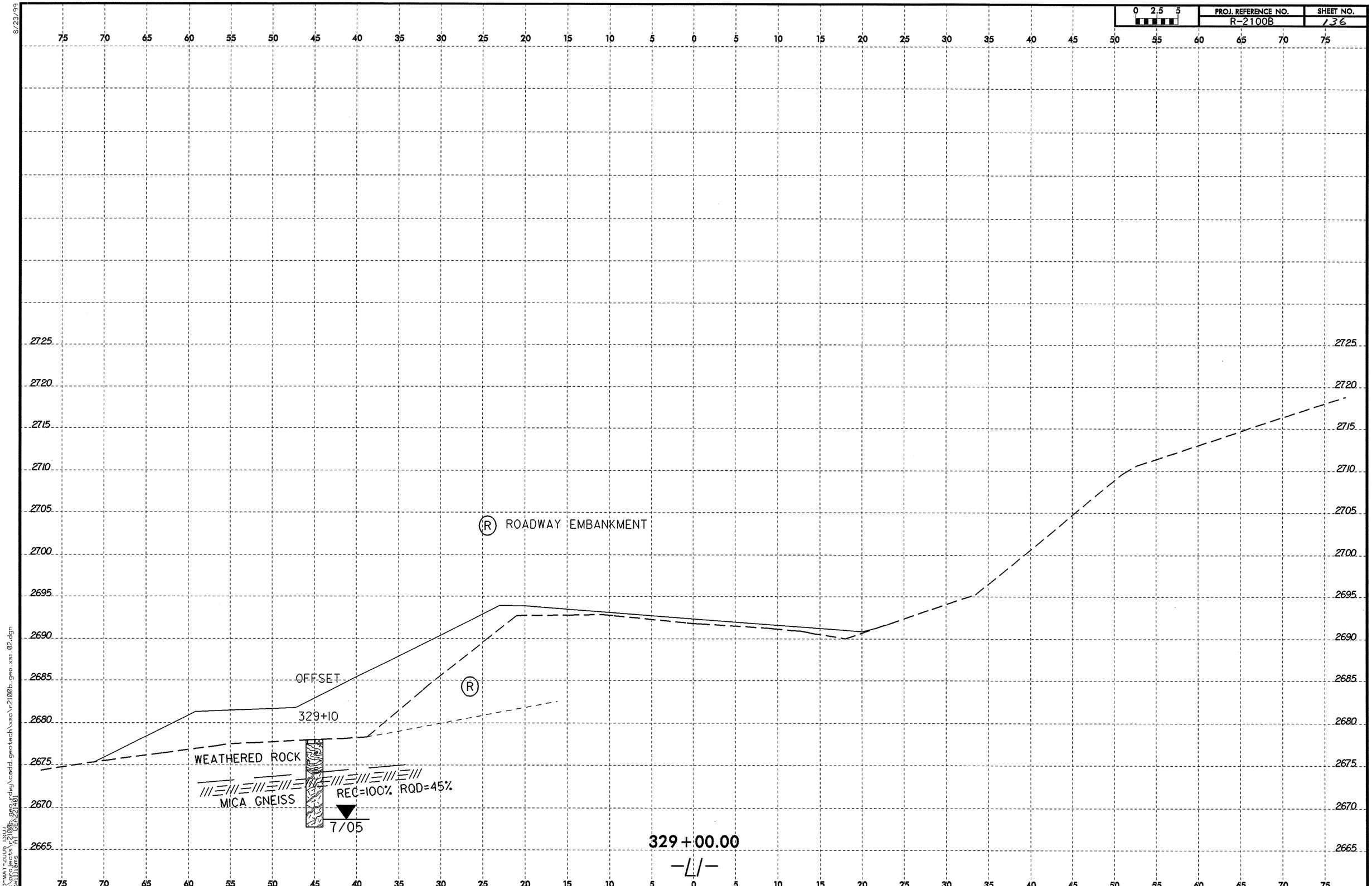
ltwilliams AT GEA221401



8/23/99

05-MAY-2006 15:07
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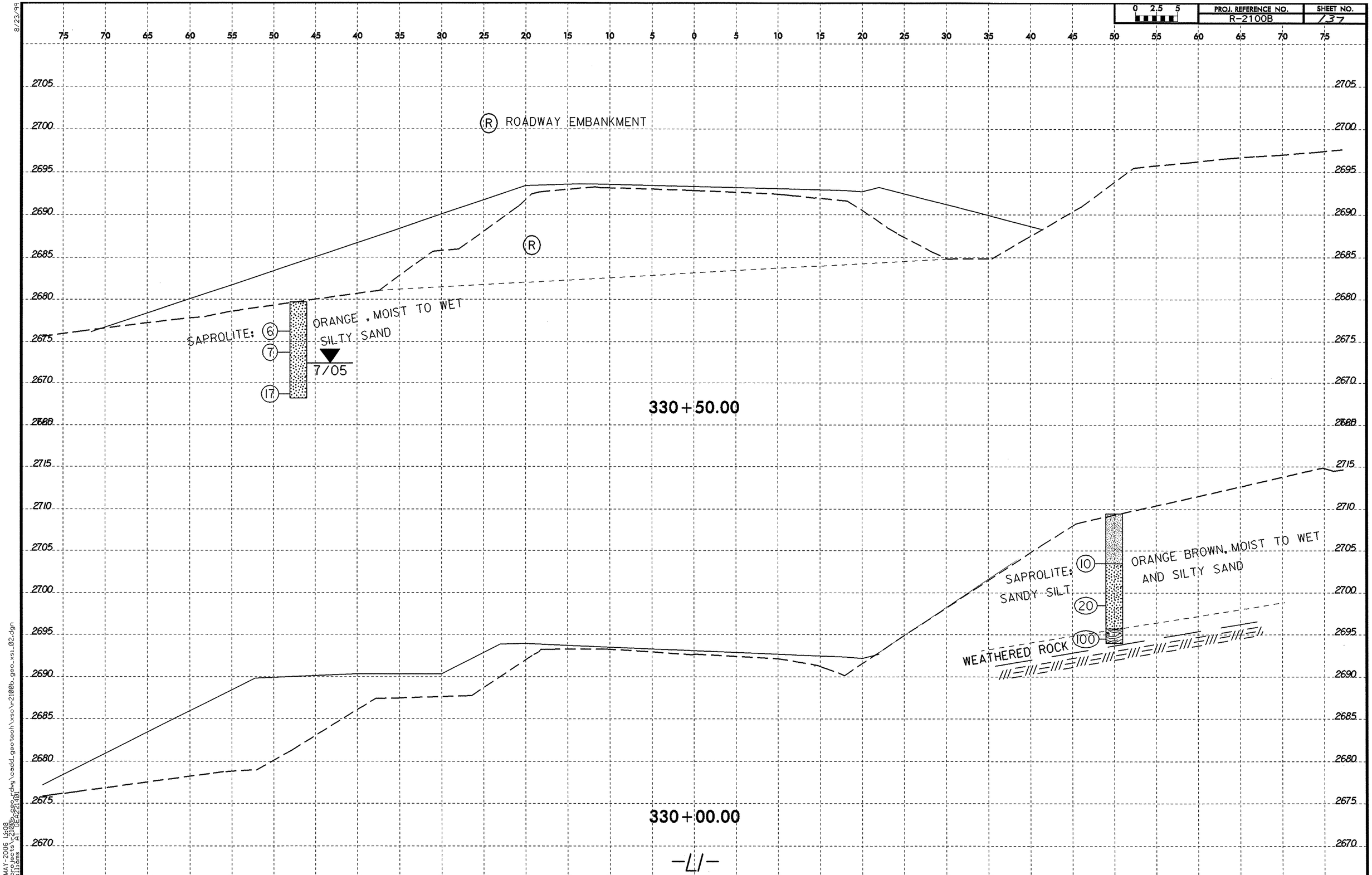
jtwilliams AT GEA221401



8/23/99

03-MAY-2006 13:08
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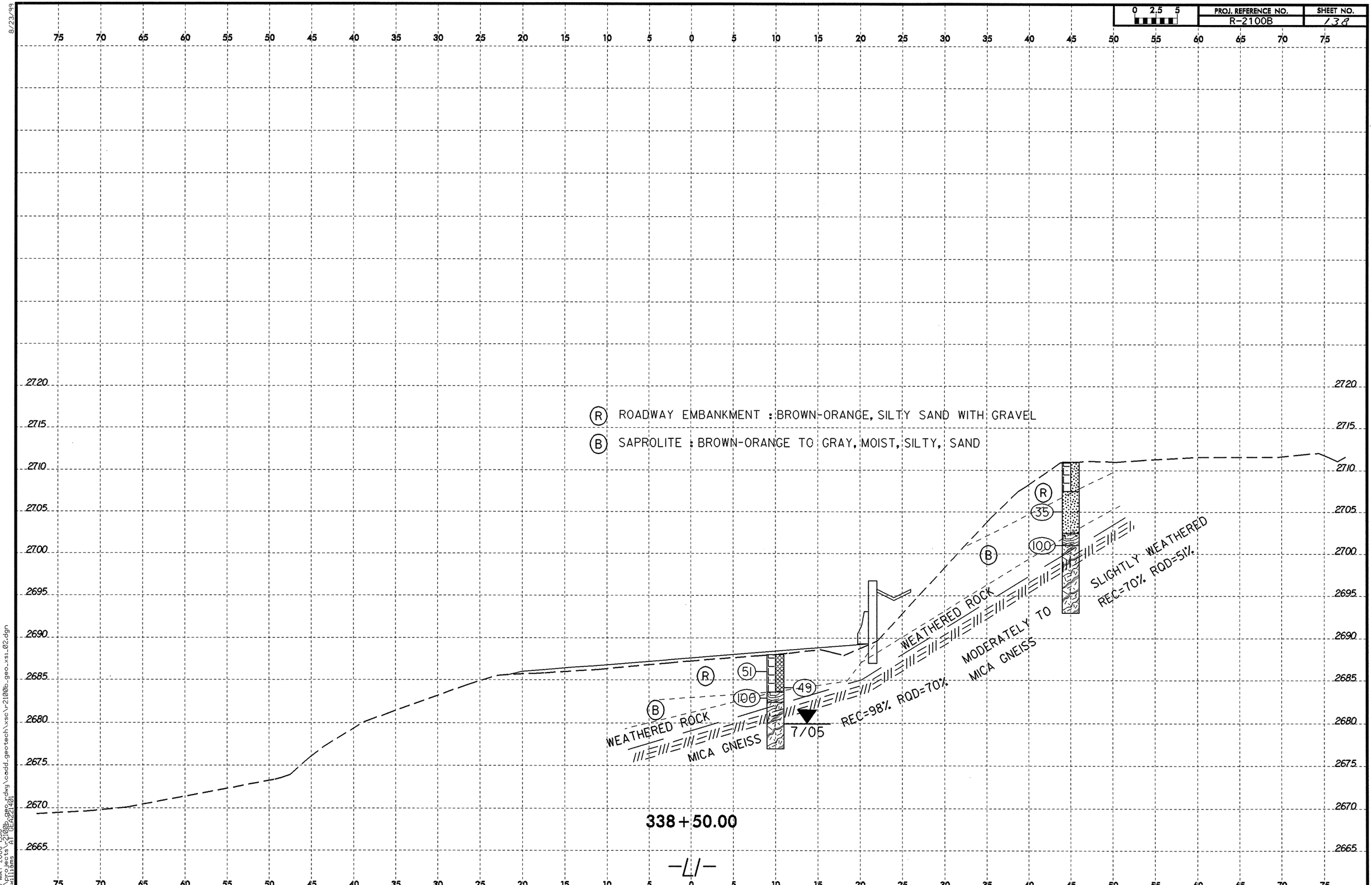
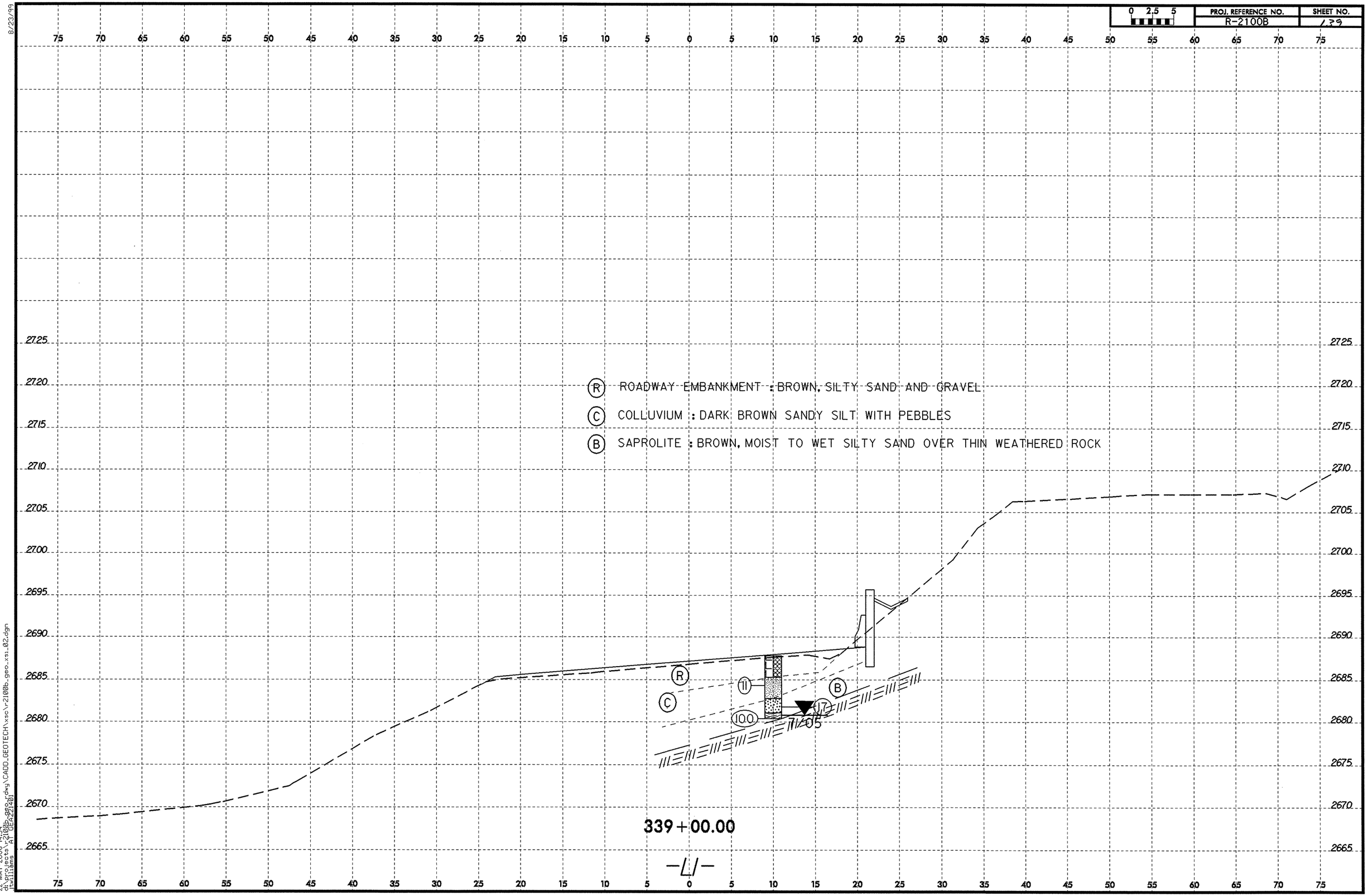
jtwilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
138
0 2.5 5
R ROADWAY EMBANKMENT : BROWN-ORANGE, SILTY SAND WITH GRAVEL
B SAPROLITE : BROWN-ORANGE TO GRAY, MOIST, SILTY, SAND
WEATHERED ROCK
MICA GNEISS
REC=98% RQD=70%
MODERATELY TO
MICA GNEISS
SLIGHTLY WEATHERED
REC=70% RQD=51%
7/05
338+50.00
-L1-



8/23/99

22-MAY-2006 14:54
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jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	140

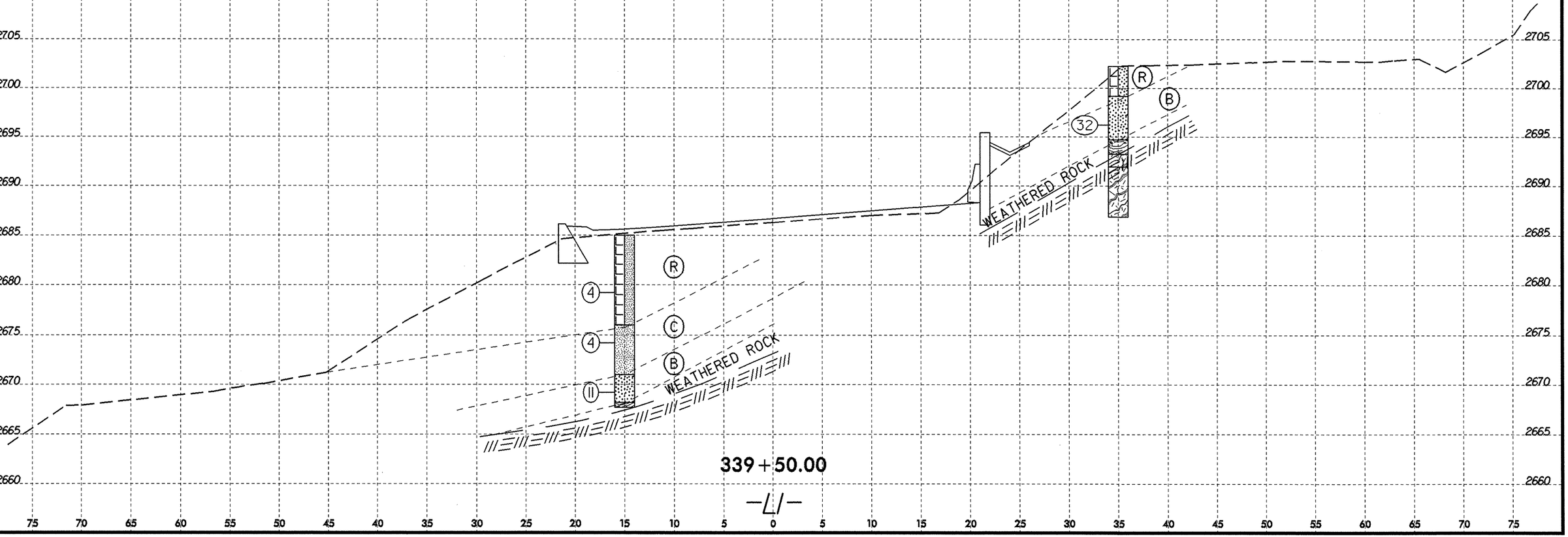
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665 2660

(R) ROADWAY EMBANKMENT : BROWN AND GRAY, SANDY SILT WITH A FEW GRAVELS AND COBBLES

(C) COLLUVIUM : DARK BROWN SANDY SILT WITH PEBBLES

(B) SAPROLITE : BROWN-ORANGE, MOIST SILTY SAND



339+50.00

-L-

03-MAY-2006 13:20
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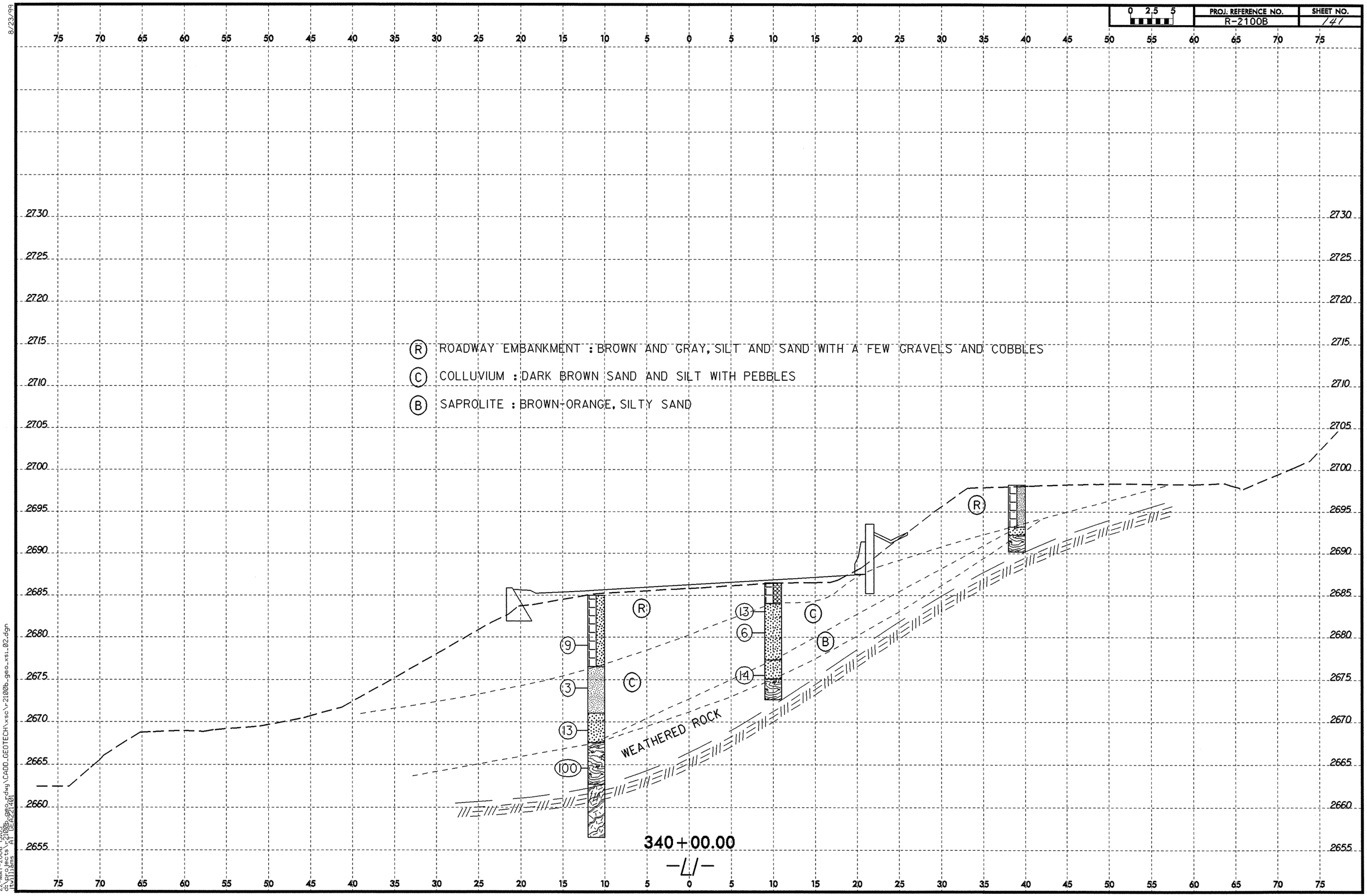
bwilliams



8/23/99

22-MAY-2006 15:05
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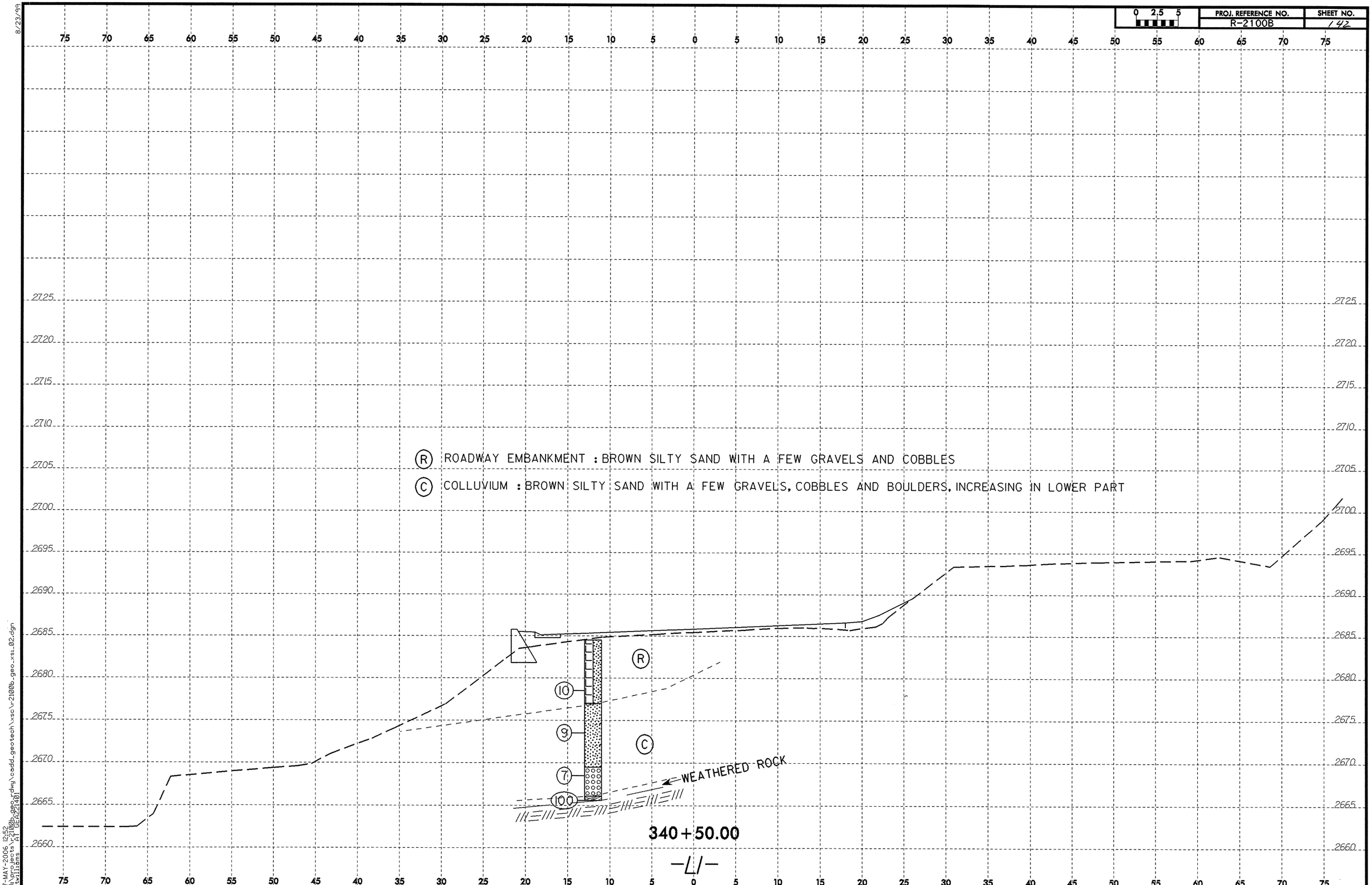
jtwilliams AT GEA221401



8/23/99

17-MAY-2006 12:52
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jtwilliams AT GEA221401

8/23/99

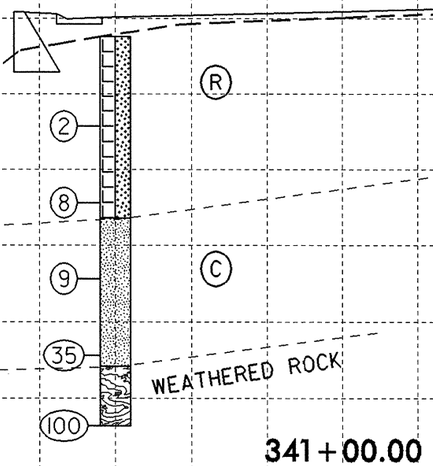
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	14 3

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

27.30
27.25
27.20
27.15
27.10
27.05
27.00
26.95
26.90
26.85
26.80
26.75
26.70
26.65
26.60
26.55

(R) ROADWAY EMBANKMENT : BROWN AND GRAY SILTY SAND WITH A FEW GRAVELS, COBBLES AND BOULDERS

(C) COLLUVIUM : BROWN SANDY SILT WITH A FEW GRAVELS, COBBLES AND BOULDERS INCREASING IN LOWER PART



341+00.00

-L/-

03-MAY-2006 13:22
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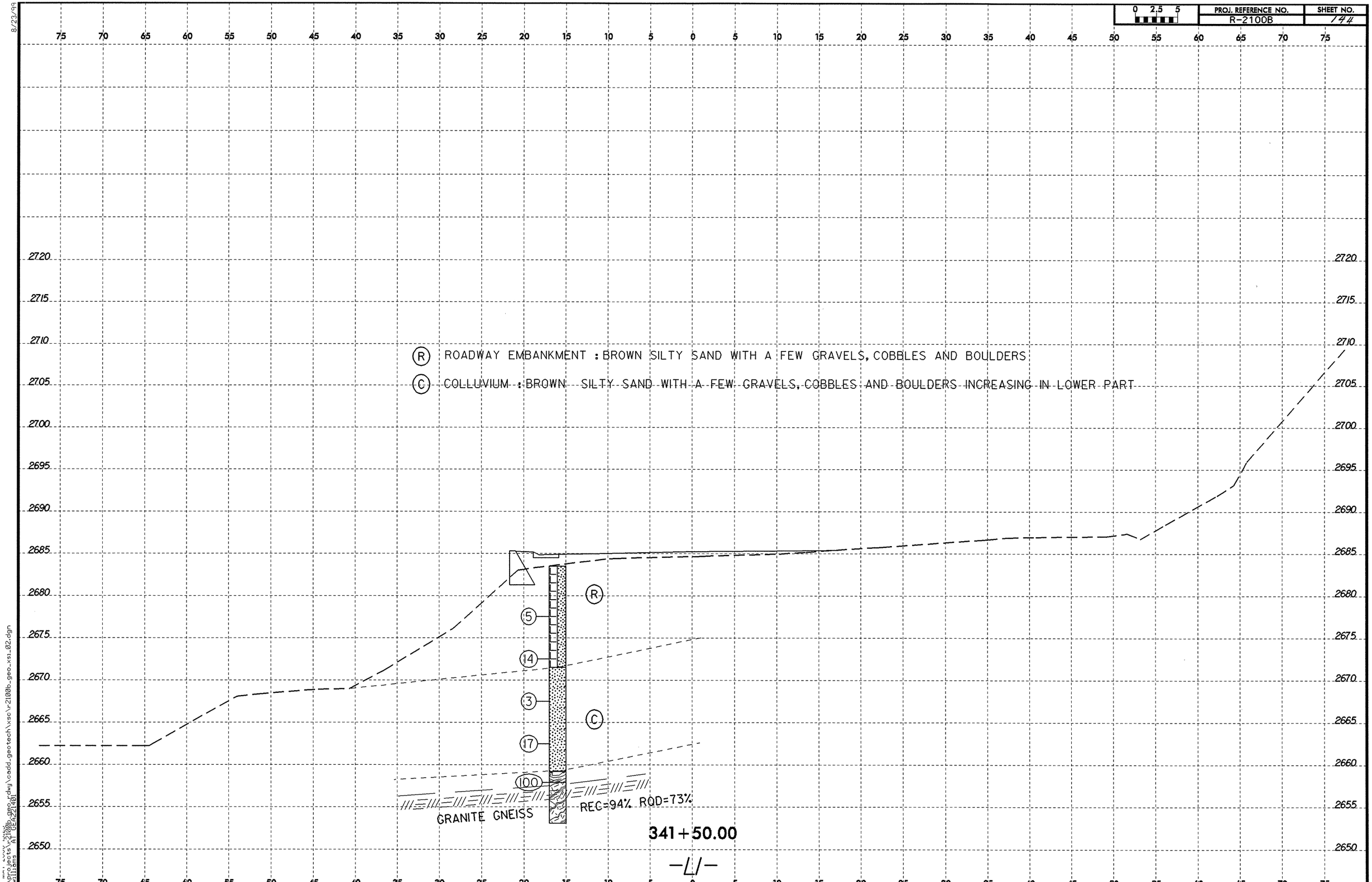
tswilliams AT GEA22140



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
144
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH A FEW GRAVELS, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SILTY SAND WITH A FEW GRAVELS, COBBLES AND BOULDERS INCREASING IN LOWER PART
R
C
5
14
3
17
100
GRANITE GNEISS
REC=94% RQD=73%
341+50.00
-L/-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	145

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

2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665 2660

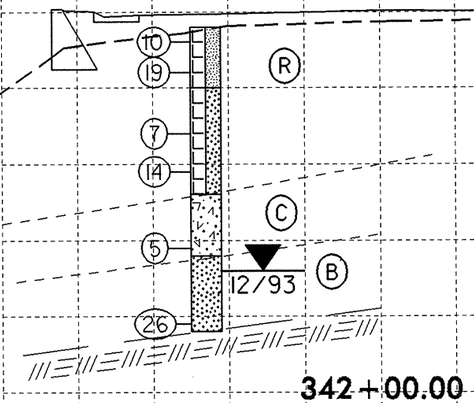
Ⓡ ROADWAY EMBANKMENT : BROWN SILT AND SAND WITH A FEW GRAVELS AND COBBLES

Ⓒ COLLUVIUM : BROWN CLAYEY SILT

Ⓑ SAPROLITE : LIGHT BROWN SILTY SAND

OFFSET

341+94



342+00.00

-L/-

23-MAY-2006 09:23
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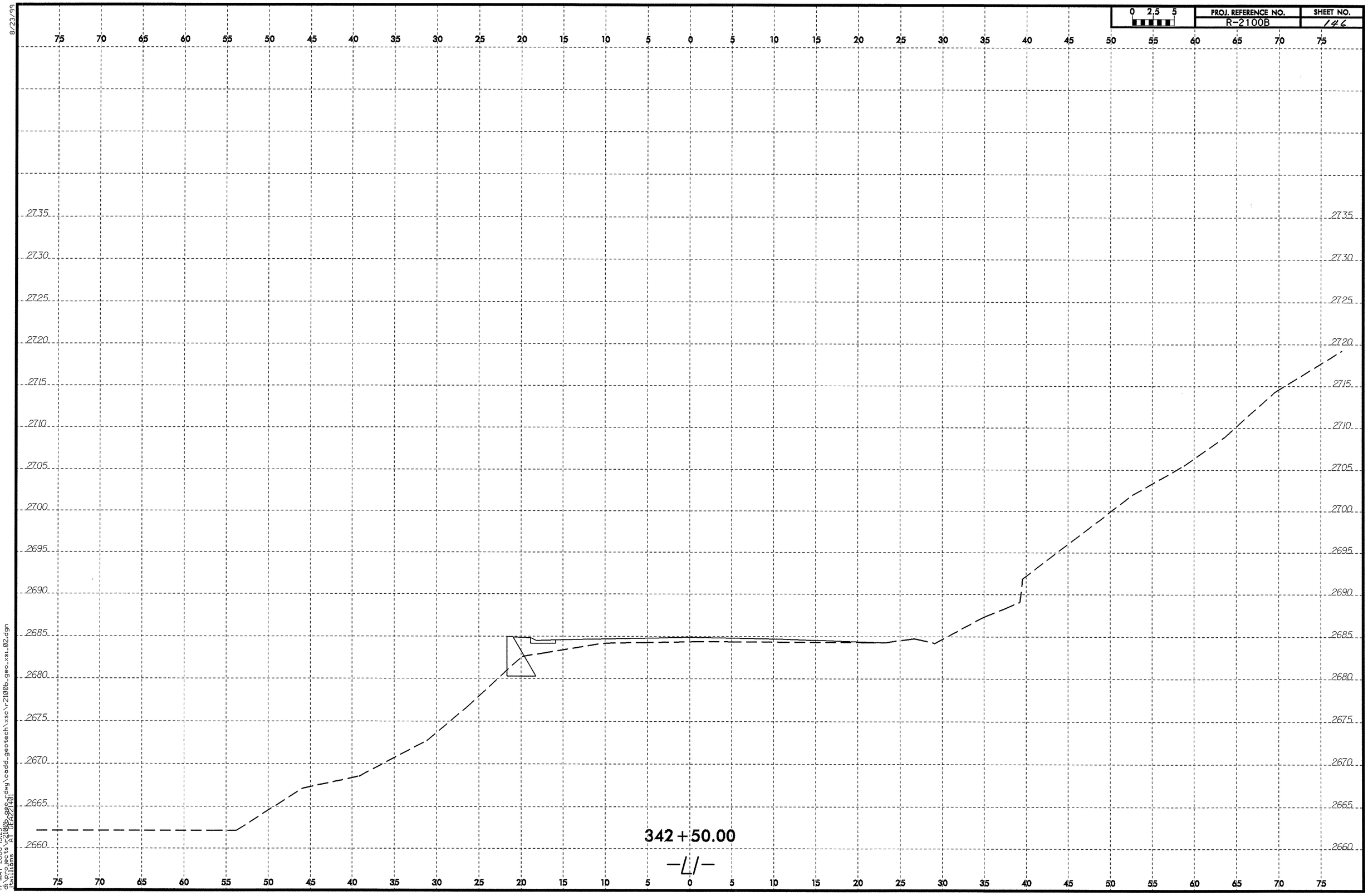
tswilliams AT GEA221401



8/23/99

17-MAY-2006 13:23
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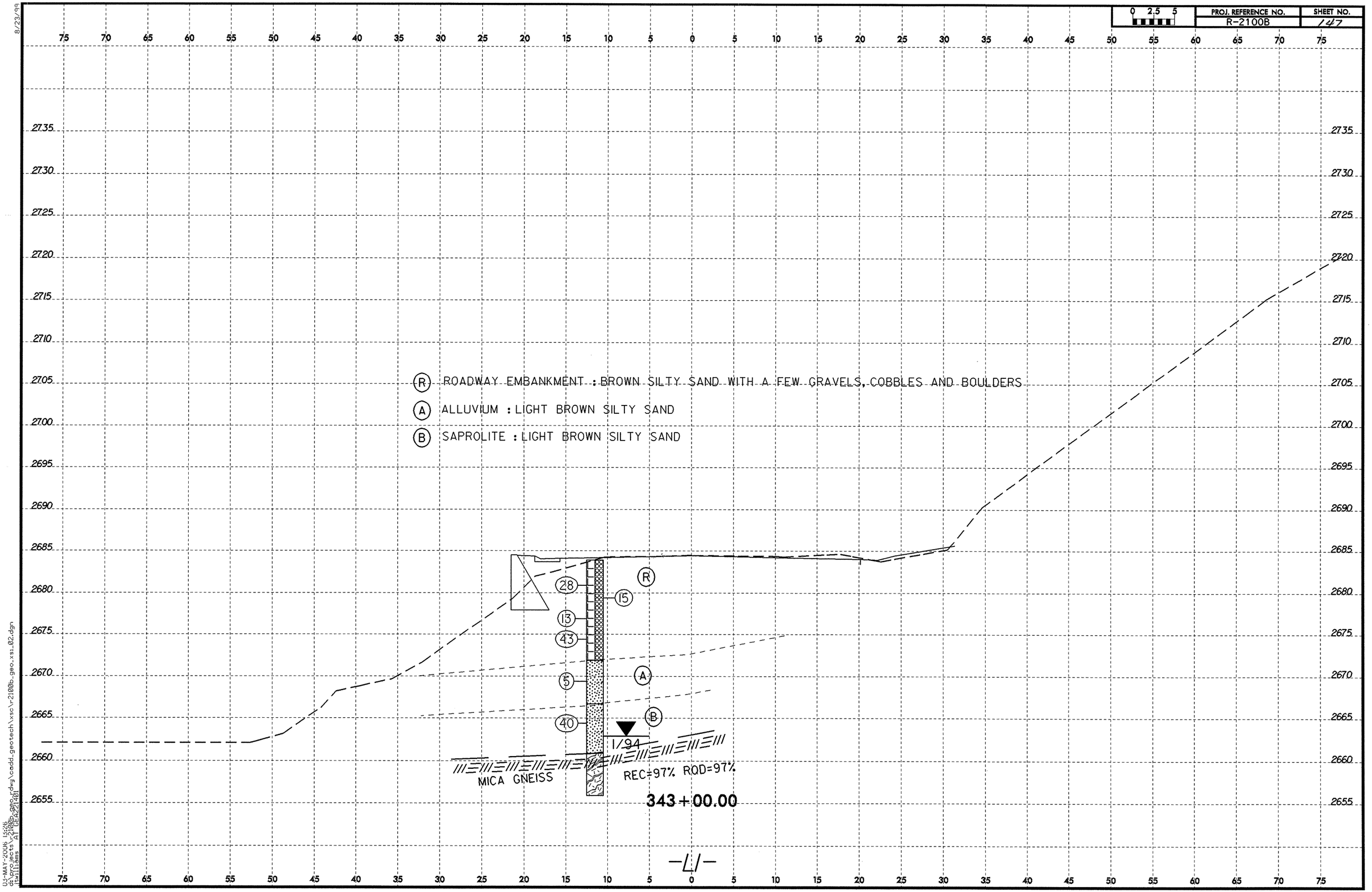
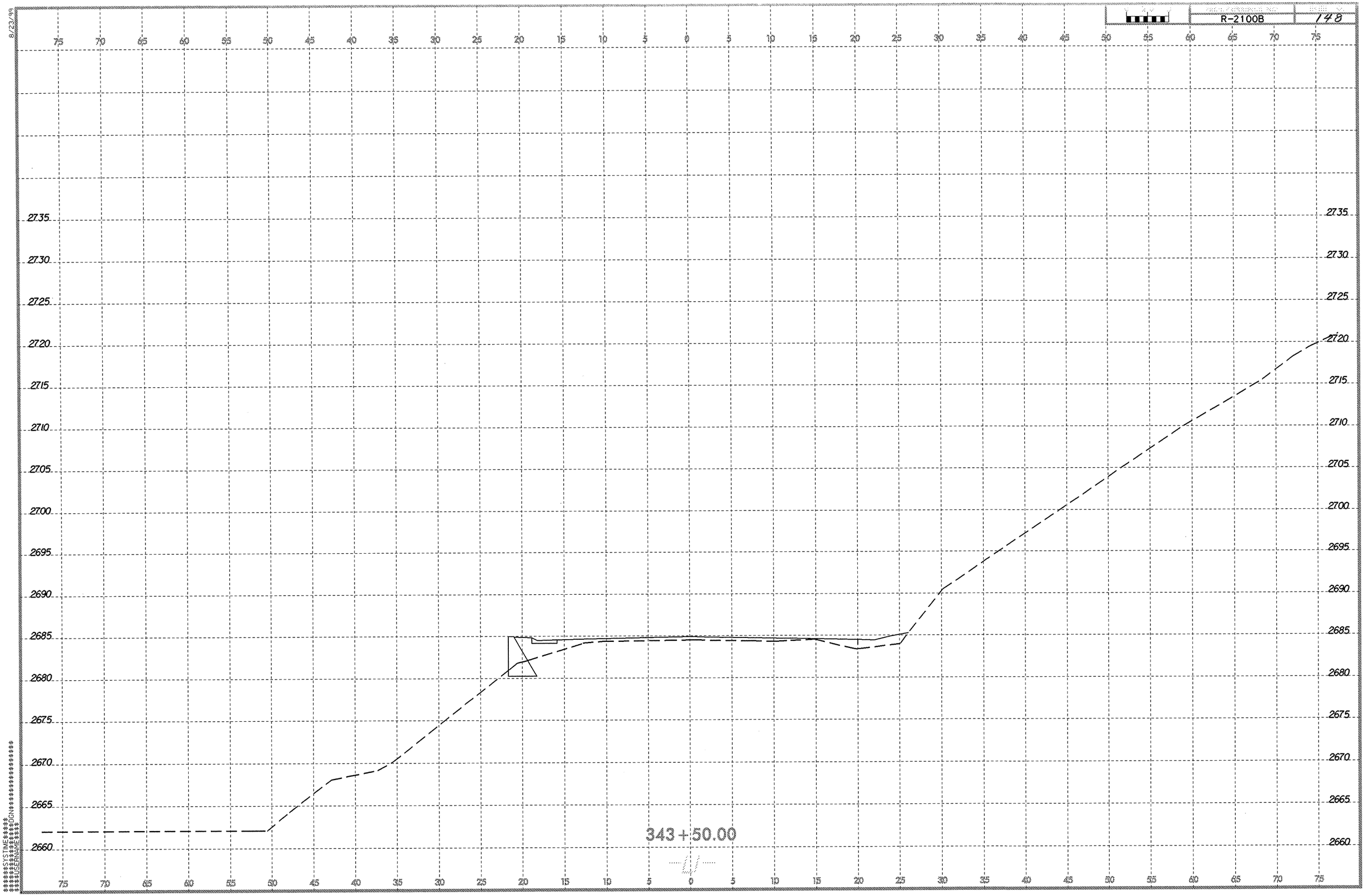
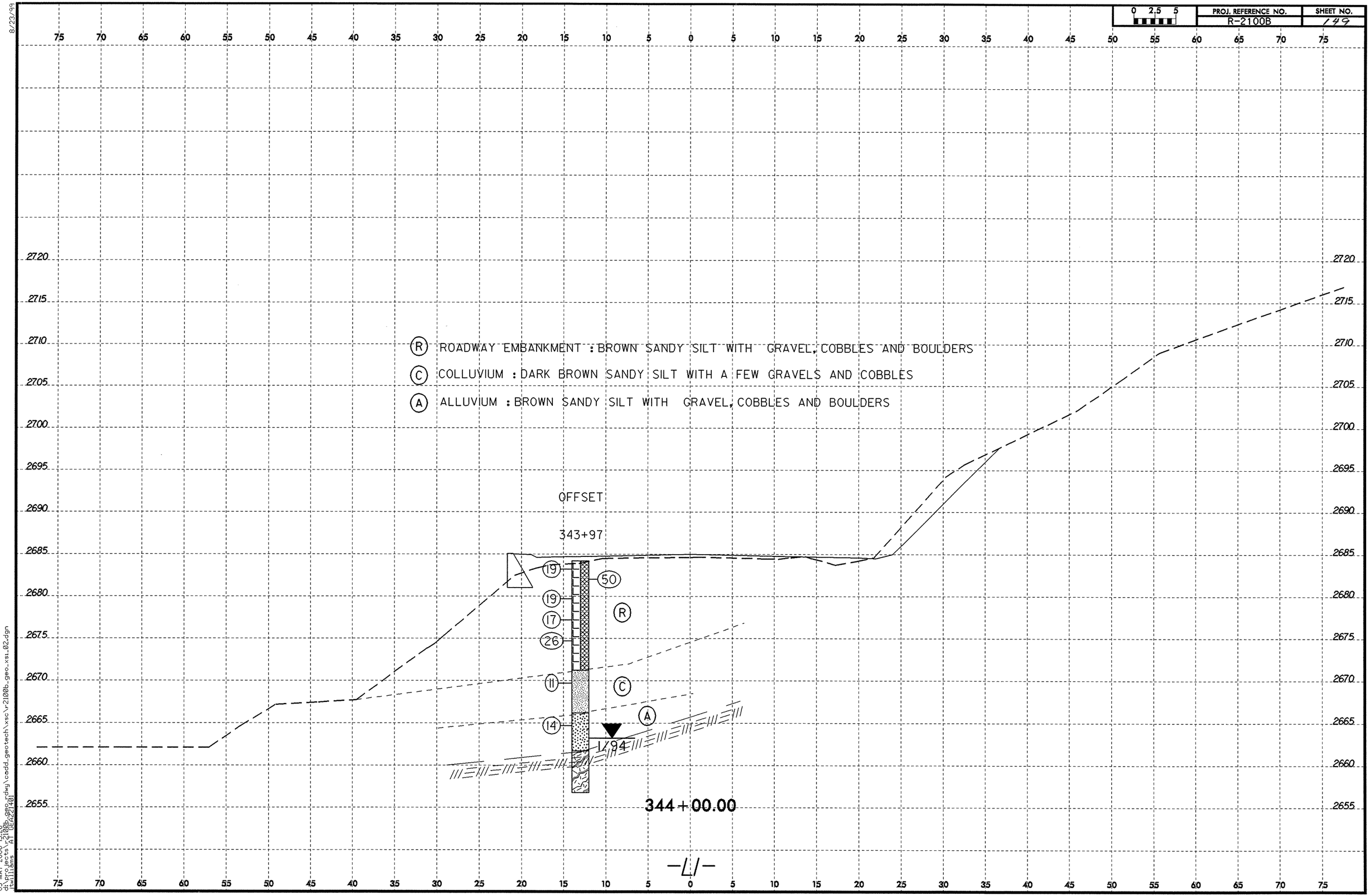
jtwilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
147
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH A FEW GRAVELS, COBBLES AND BOULDERS
A ALLUVIUM : LIGHT BROWN SILTY SAND
B SAPROLITE : LIGHT BROWN SILTY SAND
28
15
13
43
5
40
1/94
MICA GNEISS
REC=97% RQD=97%
343+00.00
-L1-


R-2100B
148
343+50.00
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
2660
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



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
149
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : DARK BROWN SANDY SILT WITH A FEW GRAVELS AND COBBLES
A ALLUVIUM : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
343+97
19
19
17
26
11
14
50
R
C
A
1/94
344+00.00
-L/-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	150

(R) ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS

(A) ALLUVIUM : LIGHT BROWN SILTY FINE SAND

(C) COLLUVIUM : BROWN SILTY SAND WITH A FEW GRAVELS, COBBLES AND BOULDERS, INCREASING IN LOWER PART

OFFSET

344+91

8 17 50 43 11 50 18

1/94

R

A

345+00.00

344+50.00

-L/-

23-MAY-2006 09:28
d:\projects\r2100b_geo_rdwy\CADD_GEOTECH\xsec\r-2100b_geo-xs1_02.dgn
itwilliams
AT GEA22140

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	157

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

2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

345+50.00

—L/—

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

31-MAY-2006 10:49
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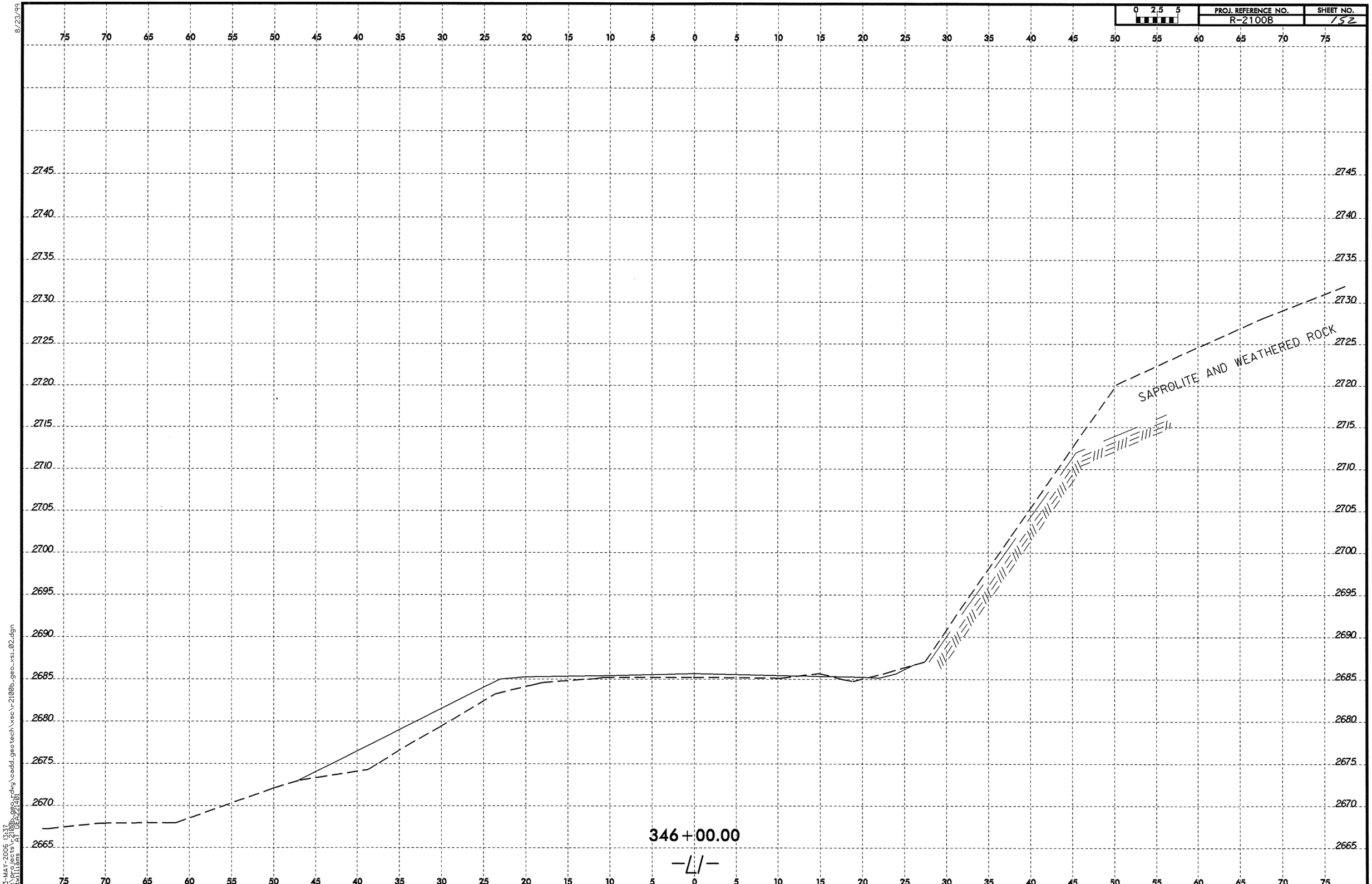
twilliams
AT (DEA221401)



8/23/99

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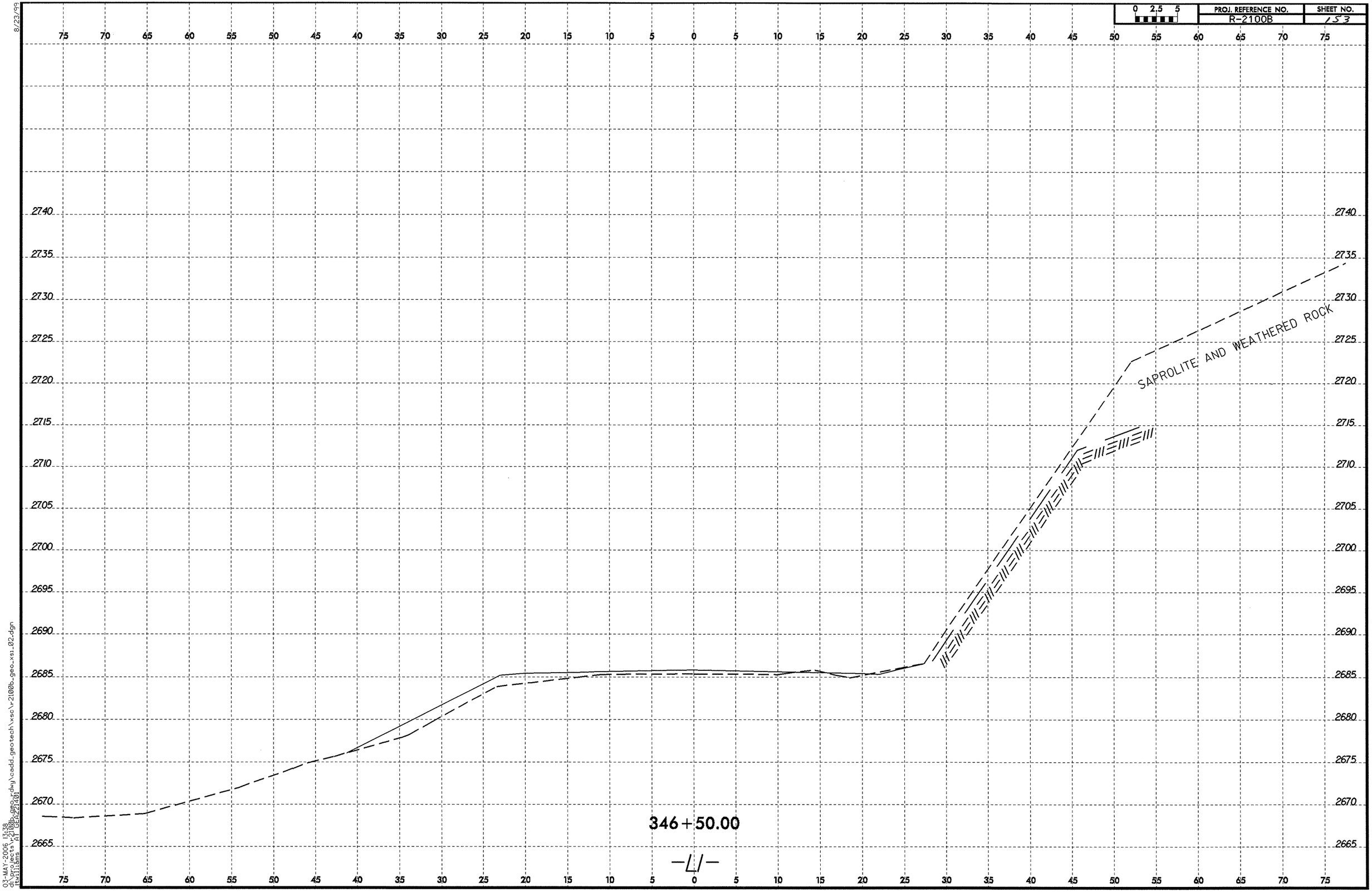
jtwilliams AT GEA221401



8/23/99

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ltwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	154

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

2740
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

SAPROLITE AND WEATHERED ROCK

347+00.00

—L/—

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

03-MAY-2006 15:59
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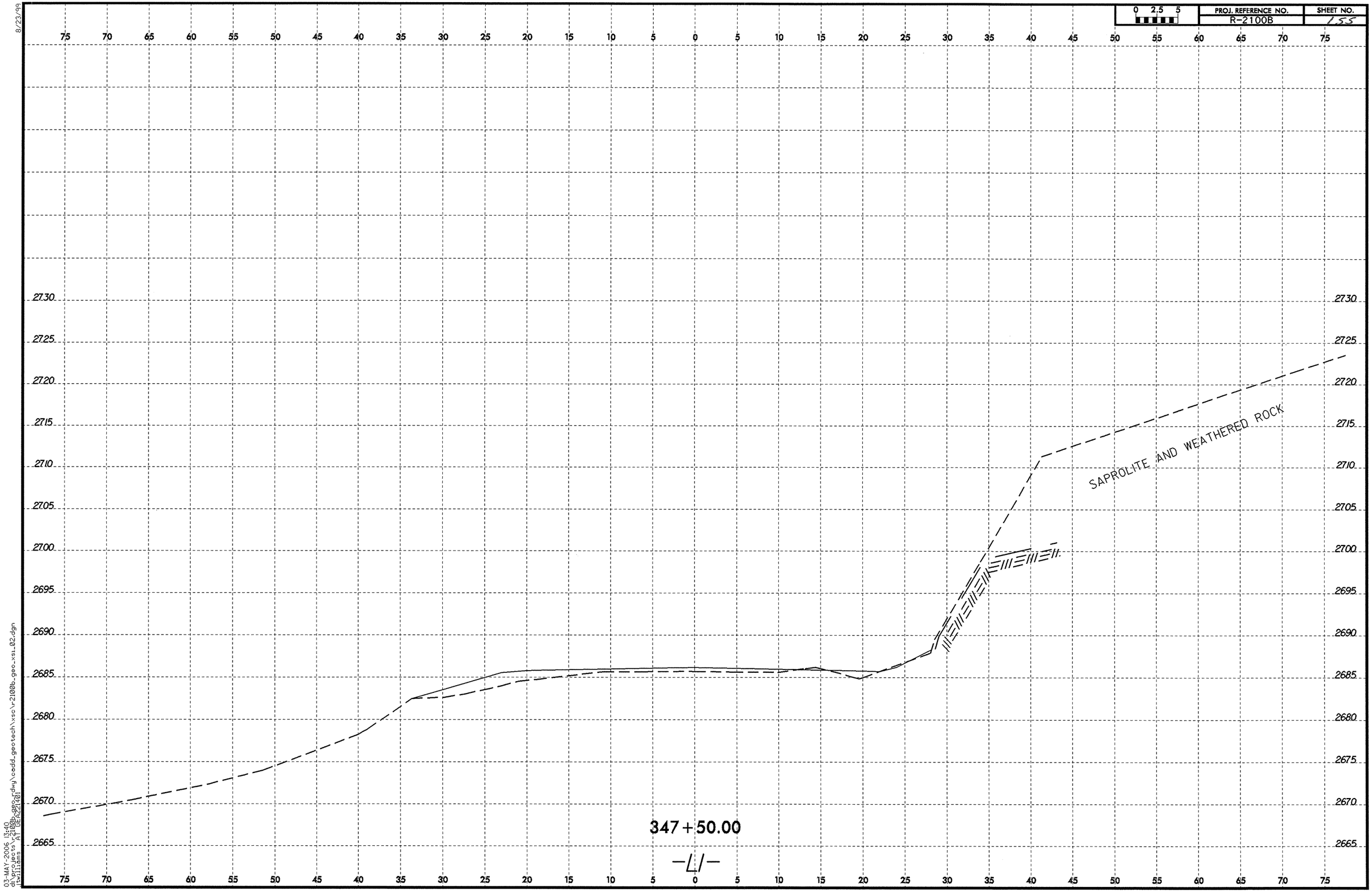
twilliams
AT GEA22140



8/23/99

03-MAY-2006 13:40
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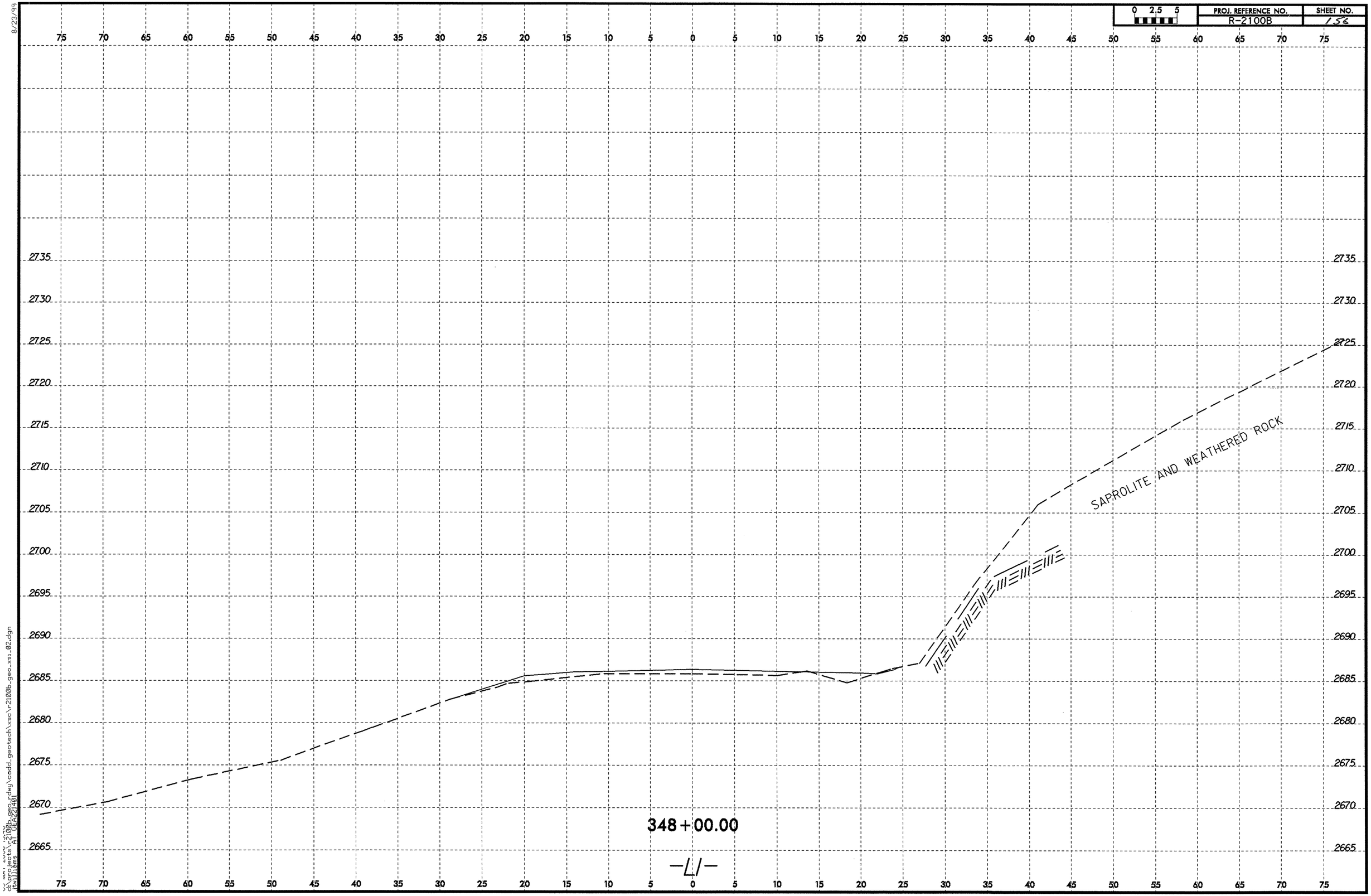
jtwilliams AT GEA221401



8/23/99

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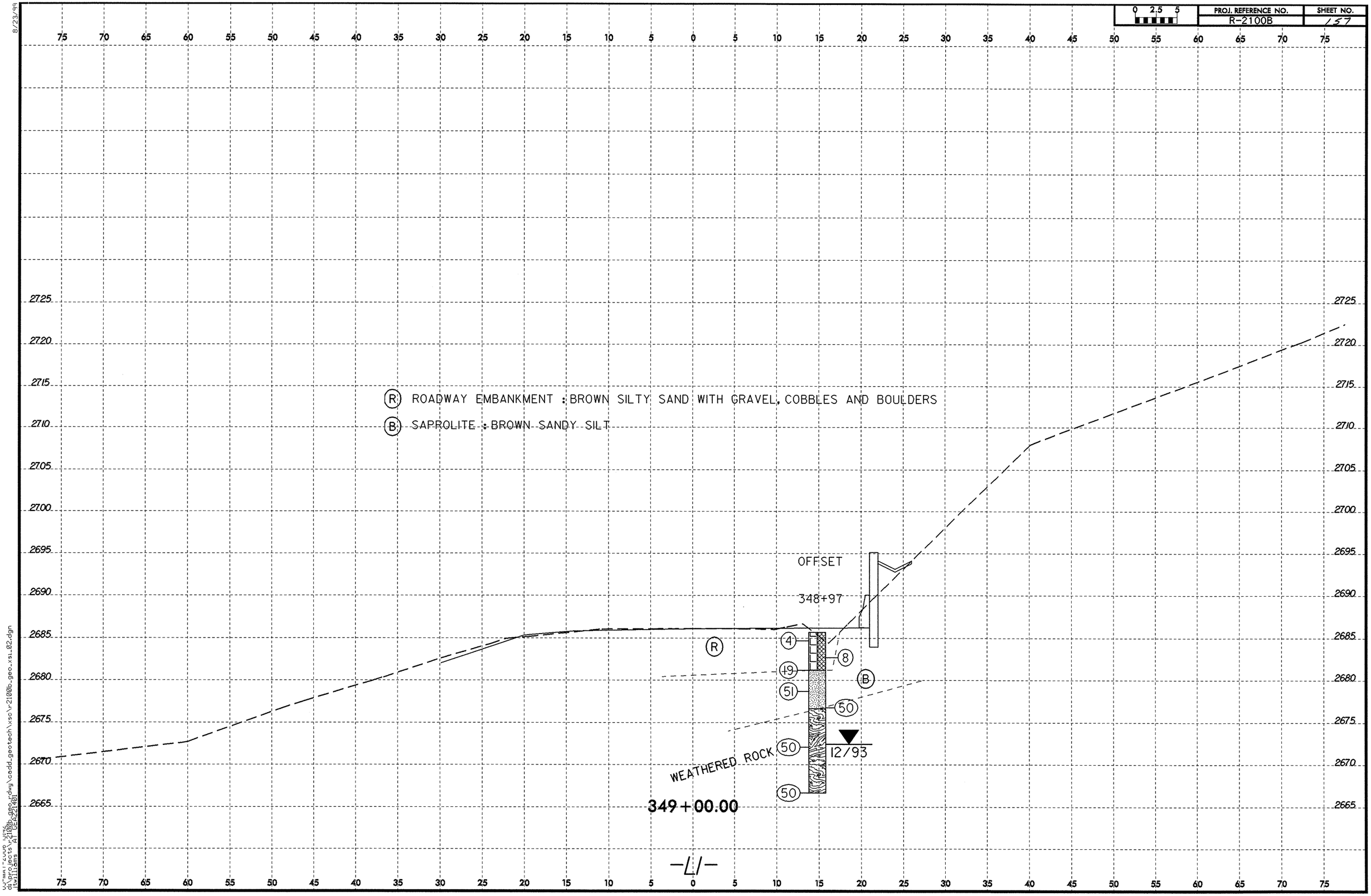
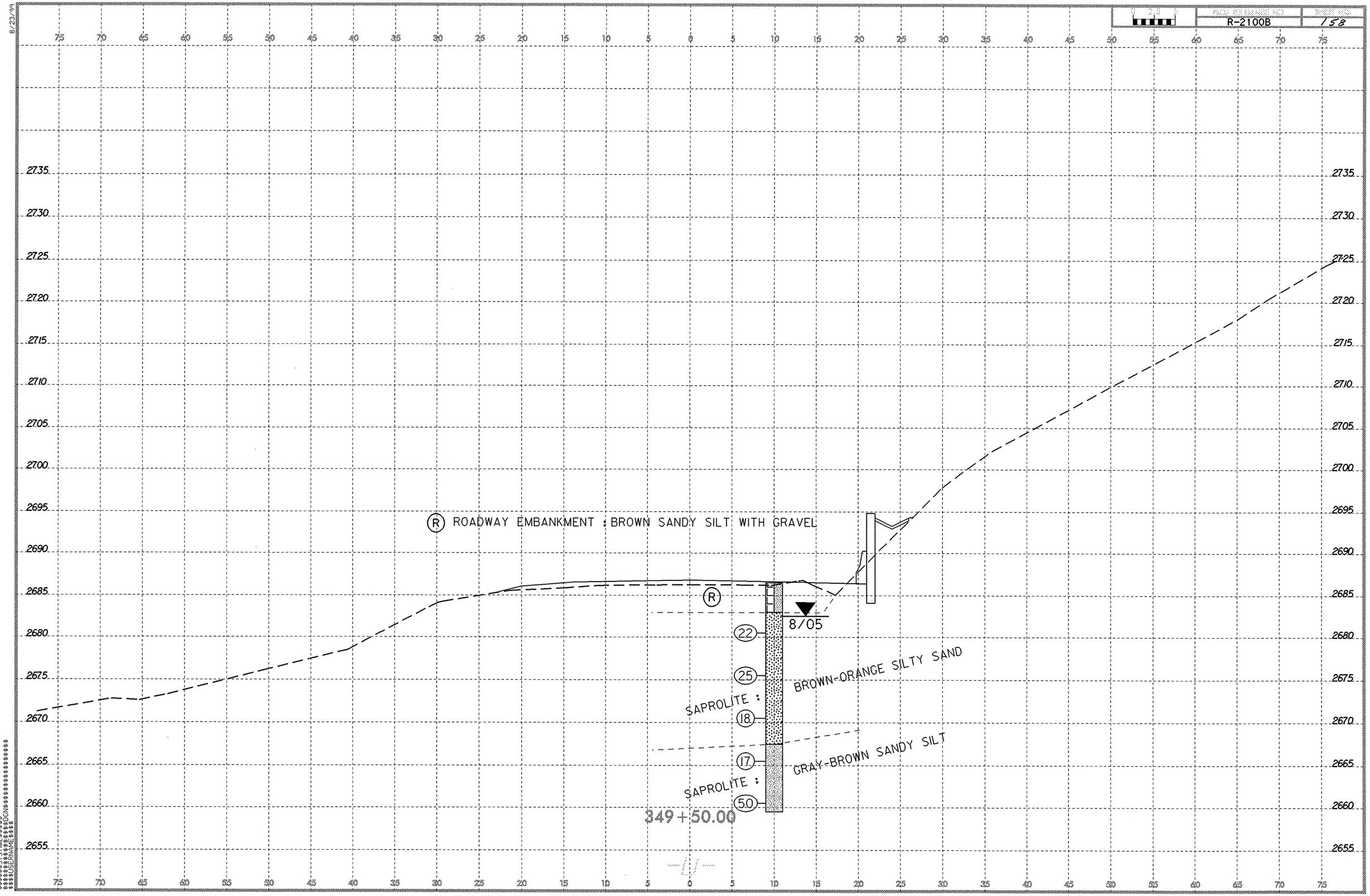
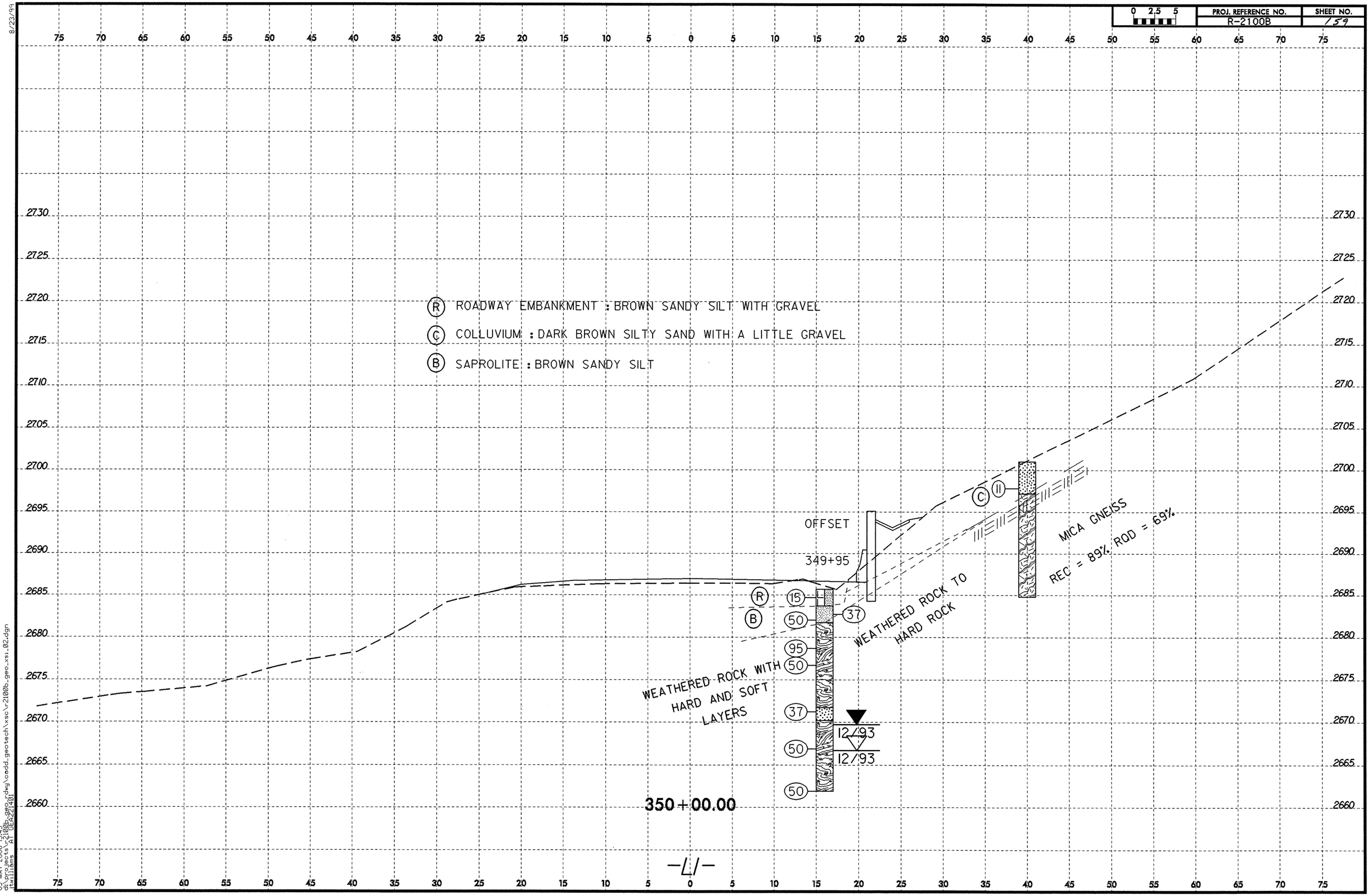
jtwilliams AT GEA221401

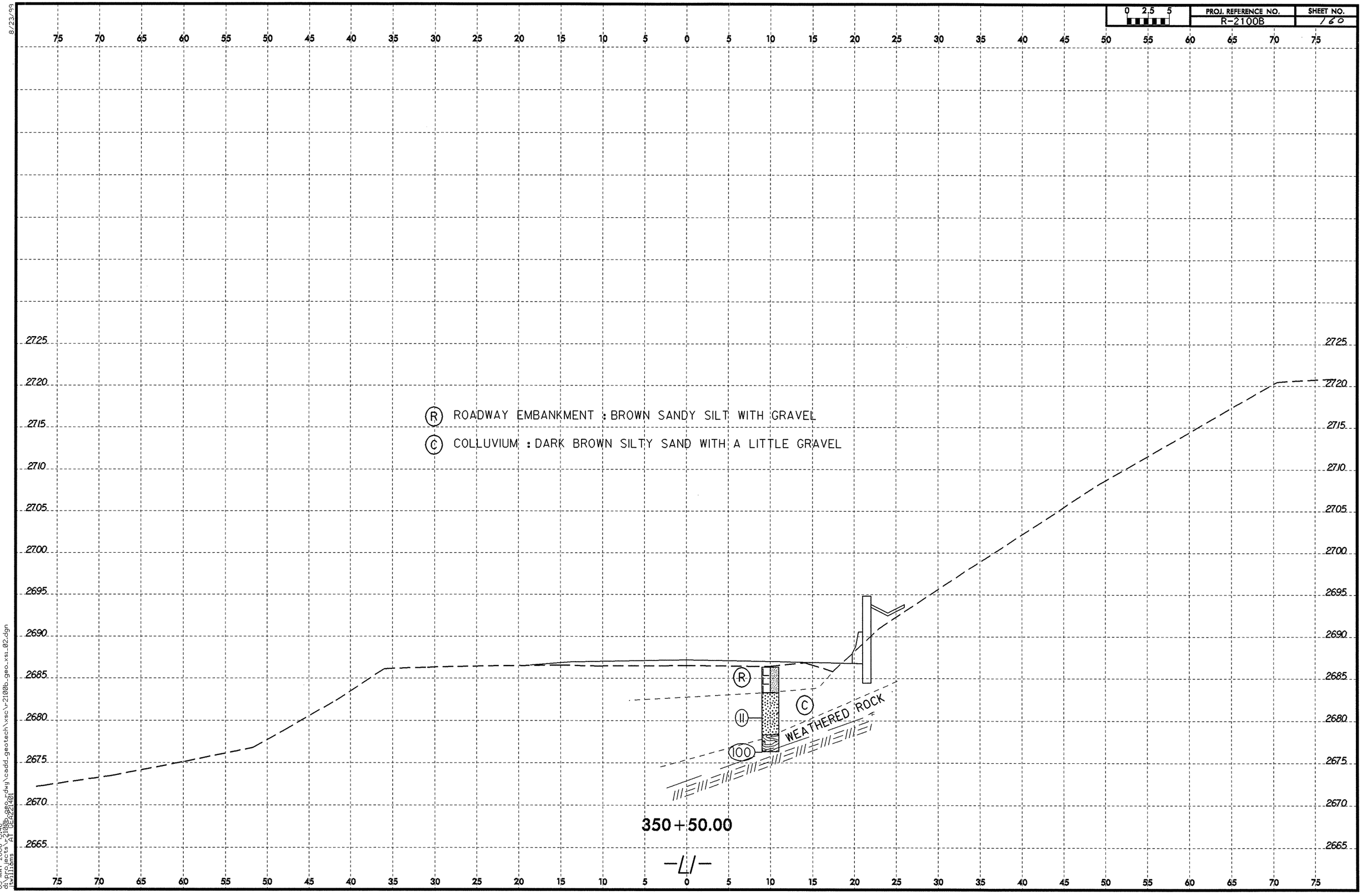


PROJ. REFERENCE NO.
R-2100B
SHEET NO.
157
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
B SAPROLITE : BROWN SANDY SILT
OFFSET
348+97
4
8
19
51
50
50
50
12/93
WEATHERED ROCK
349+00.00
-L1-
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

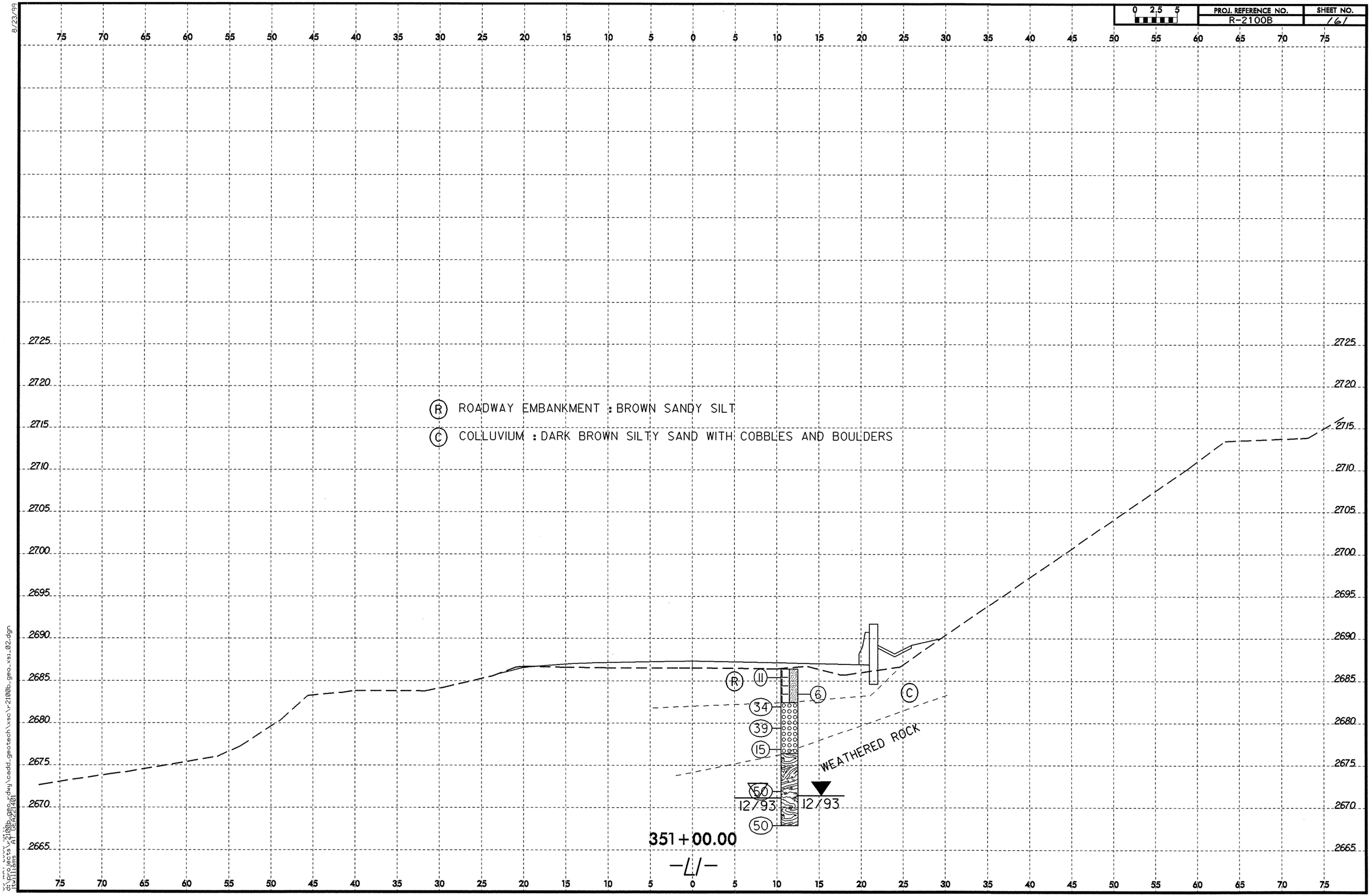

R-2100B
158
ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
8/05
22
25
18
17
5.0
BROWN-ORANGE SILTY SAND
SAPROLITE :
GRAY-BROWN SANDY SILT
SAPROLITE :
349+50.00
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
2660
2655



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
159
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
C COLLUVIUM : DARK BROWN SILTY SAND WITH A LITTLE GRAVEL
B SAPROLITE : BROWN SANDY SILT
OFFSET
349+95
MICA GNEISS
REC = 89% RQD = 69%
WEATHERED ROCK TO HARD ROCK
WEATHERED ROCK WITH HARD AND SOFT LAYERS
12/93
12/93
350+00.00
-L1-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
160
8/23/99
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
C COLLUVIUM : DARK BROWN SILTY SAND WITH A LITTLE GRAVEL
R
C
11
100
WEATHERED ROCK
350+50.00
-L/-
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
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



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
161
8/23/99
R ROADWAY EMBANKMENT : BROWN SANDY SILT
C COLLUVIUM : DARK BROWN SILTY SAND WITH COBBLES AND BOULDERS
WEATHERED ROCK
R
11
6
C
34
39
15
50
12/93
12/93
50
351+00.00
-L1-
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
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

8/23/99

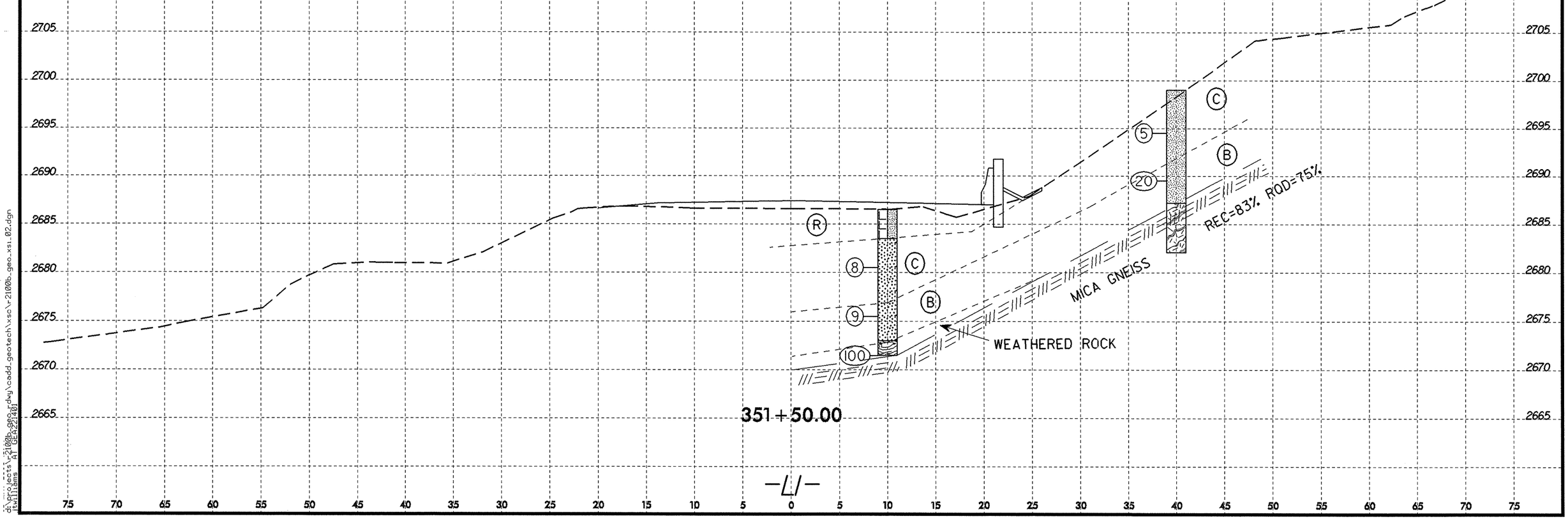
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	162

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

(R) ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL

(C) COLLUVIUM : DARK BROWN SILT AND SAND WITH A LITTLE GRAVEL AND COBBLES

(B) SAPROLITE : BROWN MICACEOUS SILTY SAND AND SANDY SILT



351+50.00

-L/-

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

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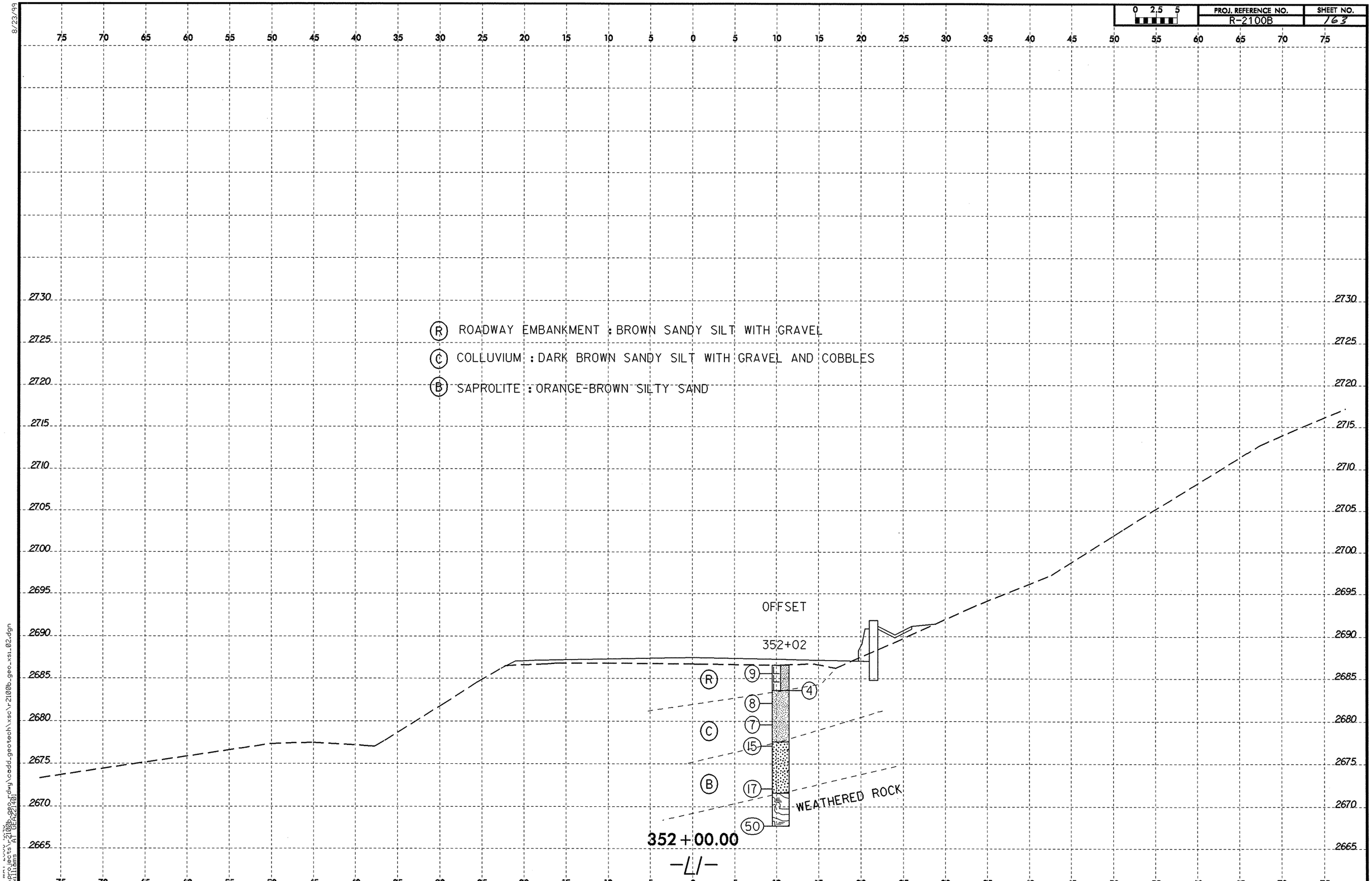
ltw11hems
AT GEA 221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
163
8/23/99
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
C COLLUVIUM : DARK BROWN SANDY SILT WITH GRAVEL AND COBBLES
B SAPROLITE : ORANGE-BROWN SILTY SAND
OFFSET
352+02
WEATHERED ROCK
352+00.00
-L/-
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

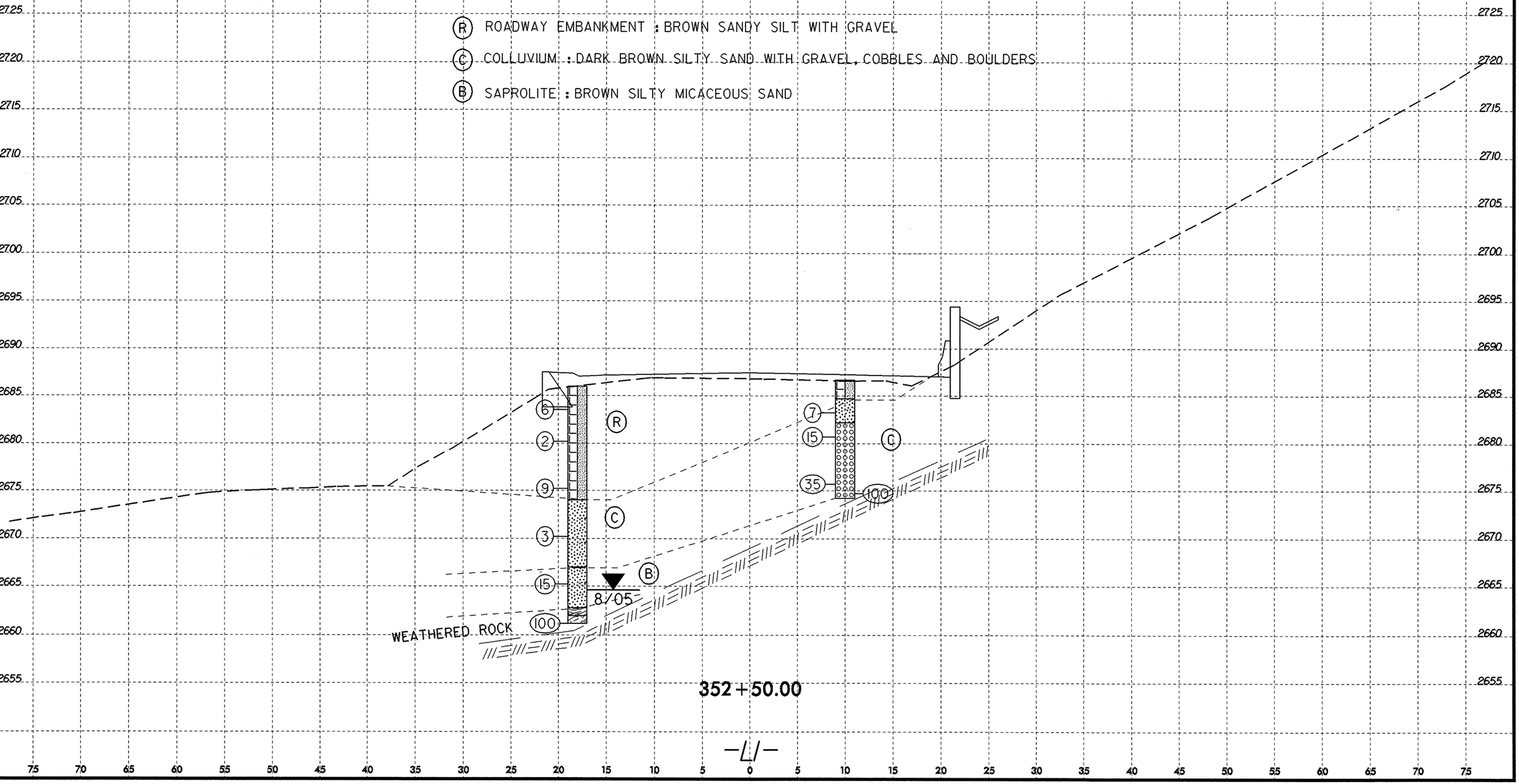
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	164

(R) ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL

(C) COLLUVIUM : DARK BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS

(B) SAPROLITE : BROWN SILTY MICACEOUS SAND



352+50.00

-L/-

03-MAY-2006 13:49
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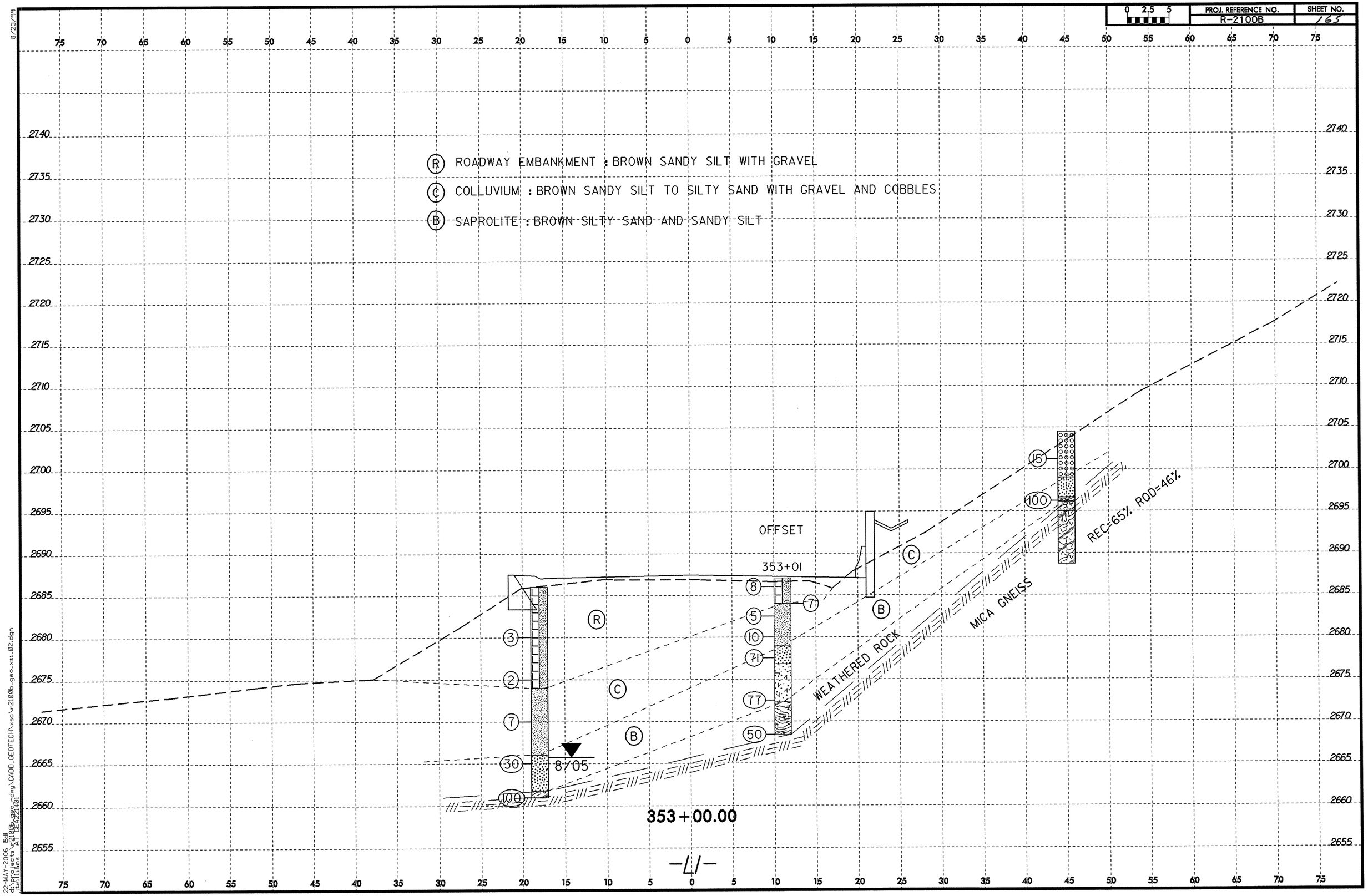
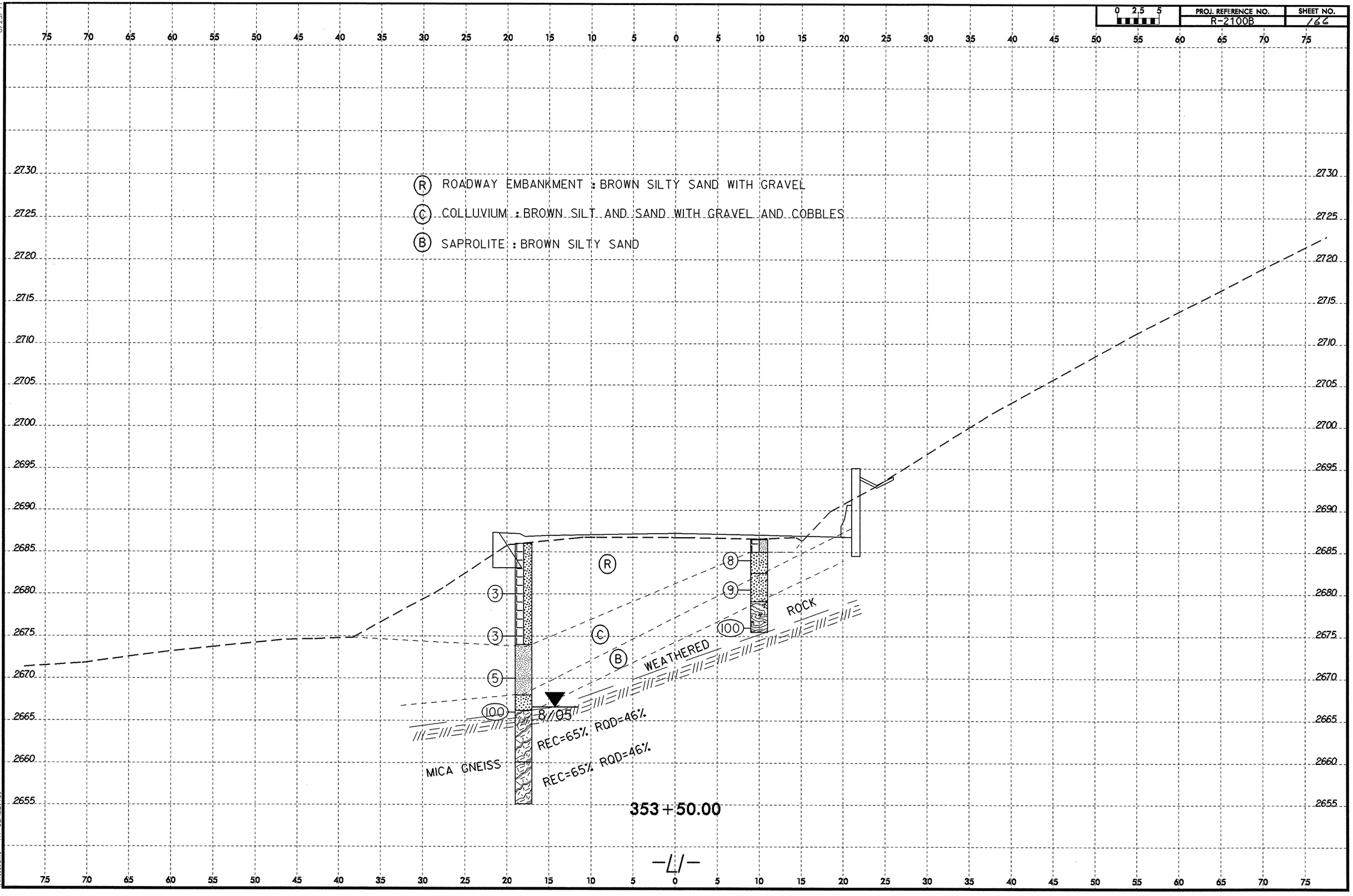
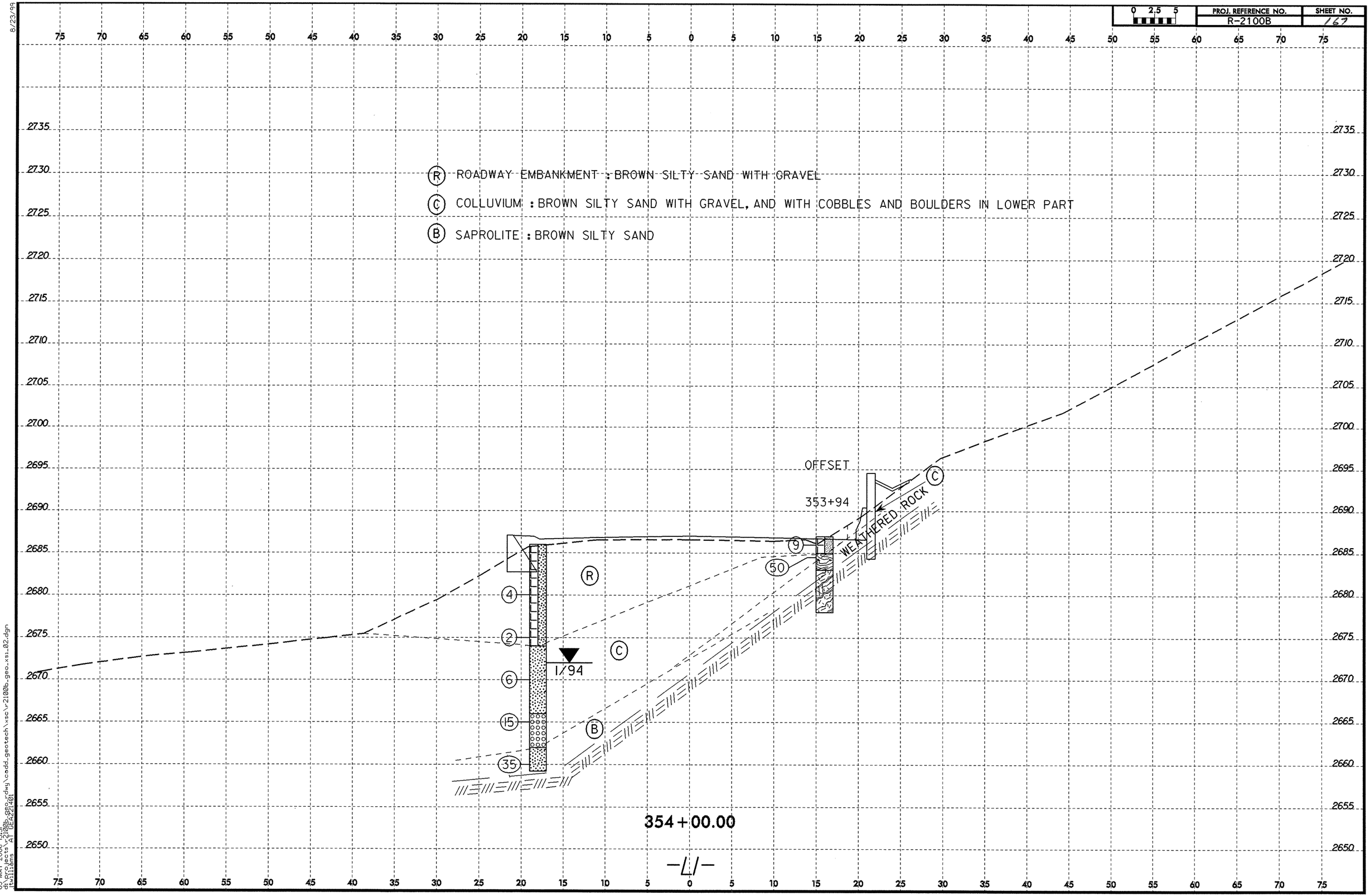
ltwilliams AT GEA22140



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
165
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
C COLLUVIUM : BROWN SANDY SILT TO SILTY SAND WITH GRAVEL AND COBBLES
B SAPROLITE : BROWN SILTY SAND AND SANDY SILT
OFFSET
353+01
8/05
WEATHERED ROCK
MICA GNEISS
REC=65% RQD=46%
353+00.00
-L/-



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
166
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL
C COLLUVIUM : BROWN SILT AND SAND WITH GRAVEL AND COBBLES
B SAPROLITE : BROWN SILTY SAND
WEATHERED ROCK
MICA GNEISS
REC=65% RQD=46%
REC=65% RQD=46%
8/05
353+50.00
-L1-



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
167
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL
C COLLUVIUM : BROWN SILTY SAND WITH GRAVEL, AND WITH COBBLES AND BOULDERS IN LOWER PART
B SAPROLITE : BROWN SILTY SAND
OFFSET
353+94
WEATHERED ROCK
1/94
354+00.00
-L1-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	16B

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

(R) ROADWAY EMBANKMENT : BROWN AND ORANGE SILTY SAND WITH GRAVEL

(C) COLLUVIUM : BROWN-GRAY SILTY SAND AND SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS

(B) SAPROLITE : ORANGE, BROWN OR GRAY, MICACEOUS SILTY SAND

2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665 2660 2655

354+50.00

-L/-

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

03-MAY-2006 13:51
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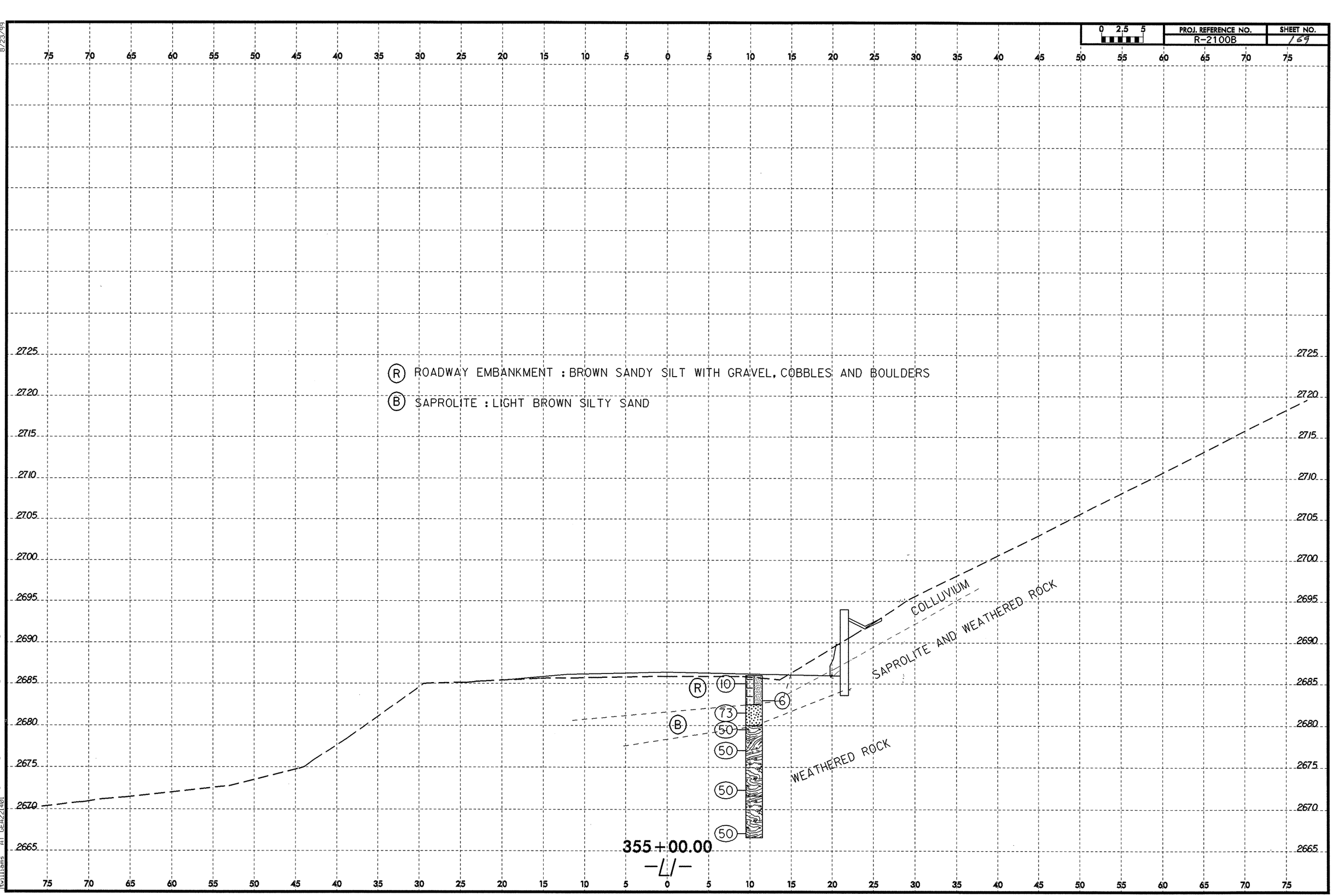
twilliams AT GEA22140



8/23/99

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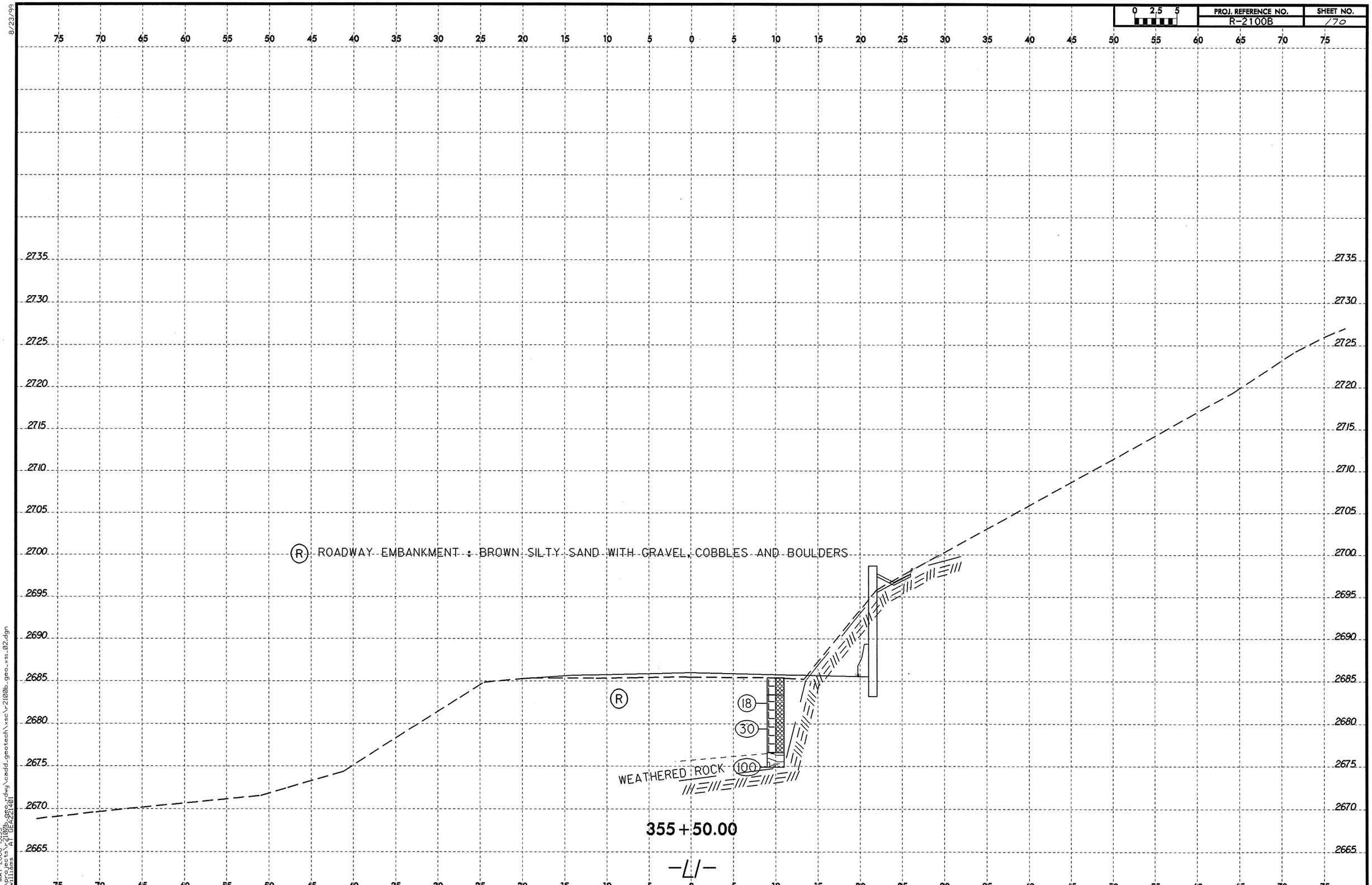
jtwilliams AT GEA221401



8/23/99

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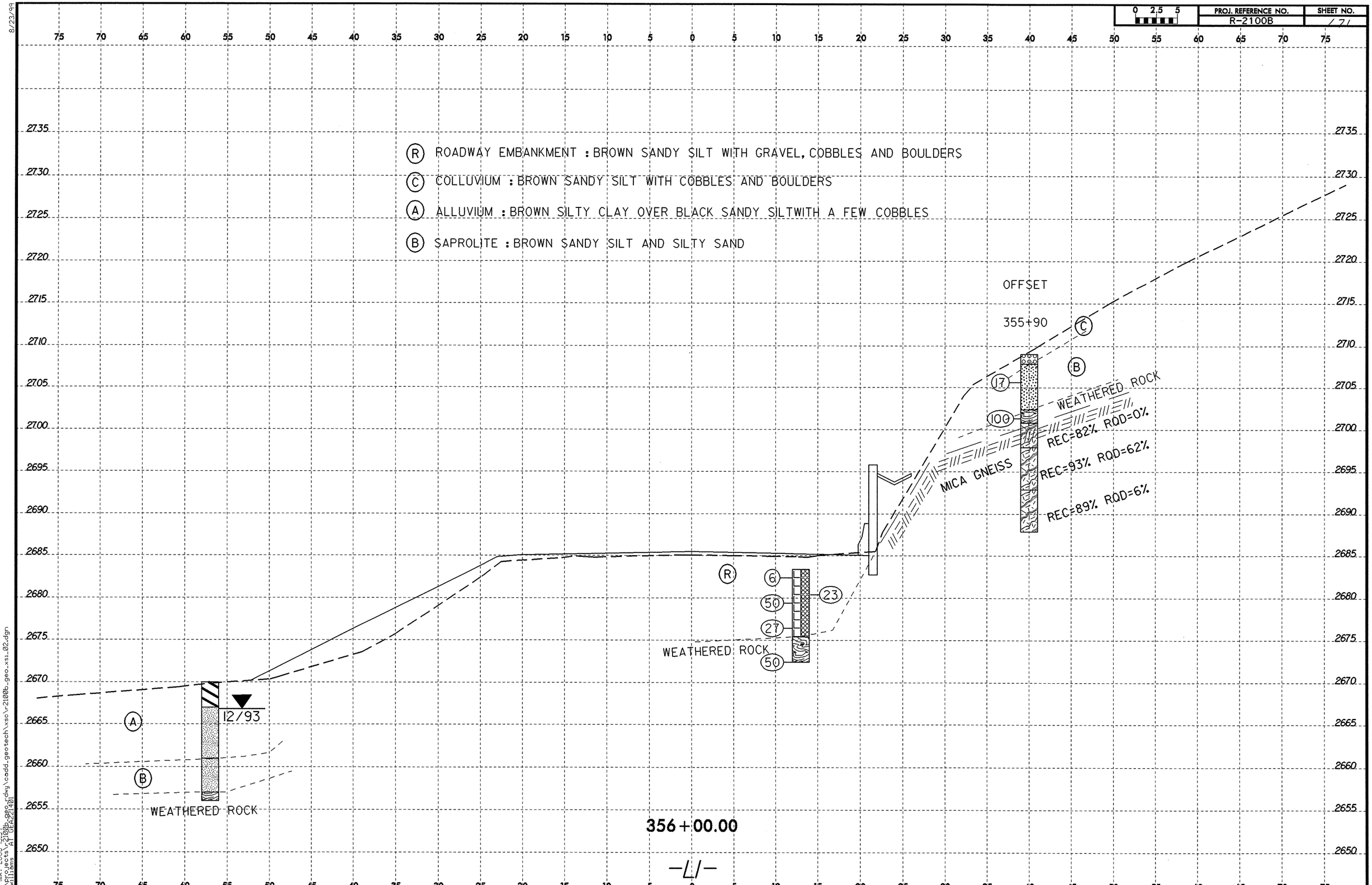
jtwilliams AT GEA221401



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
171
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SANDY SILT WITH COBBLES AND BOULDERS
A ALLUVIUM : BROWN SILTY CLAY OVER BLACK SANDY SILTWITH A FEW COBBLES
B SAPROLITE : BROWN SANDY SILT AND SILTY SAND
OFFSET
355+90
WEATHERED ROCK
REC=82% RQD=0%
REC=93% RQD=62%
REC=89% RQD=6%
MICA GNEISS
WEATHERED ROCK
12/93
WEATHERED ROCK
356+00.00
-L1-

8/23/99

0 2,5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	172

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

2740 2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

Ⓡ ROADWAY EMBANKMENT : GRAY-BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS

Ⓡ

15

4

100

356+50.00

—L/—

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

2740 2735 2730 2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665

03-MAY-2006 13:55
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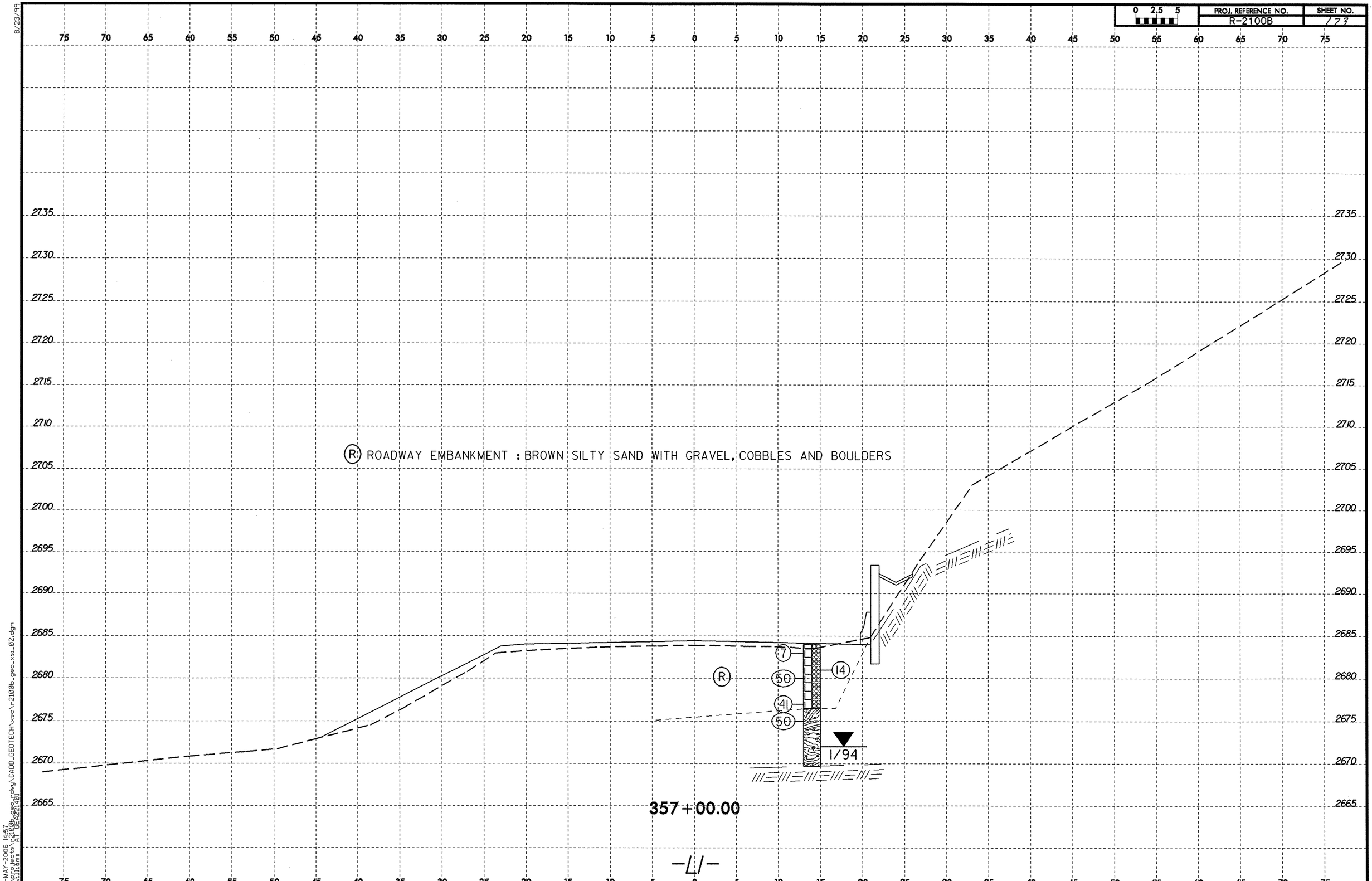

0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
173
8/23/99
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
7
50
41
50
14
R
1/94
357+00.00
-L1-
22-MAY-2006 14:57
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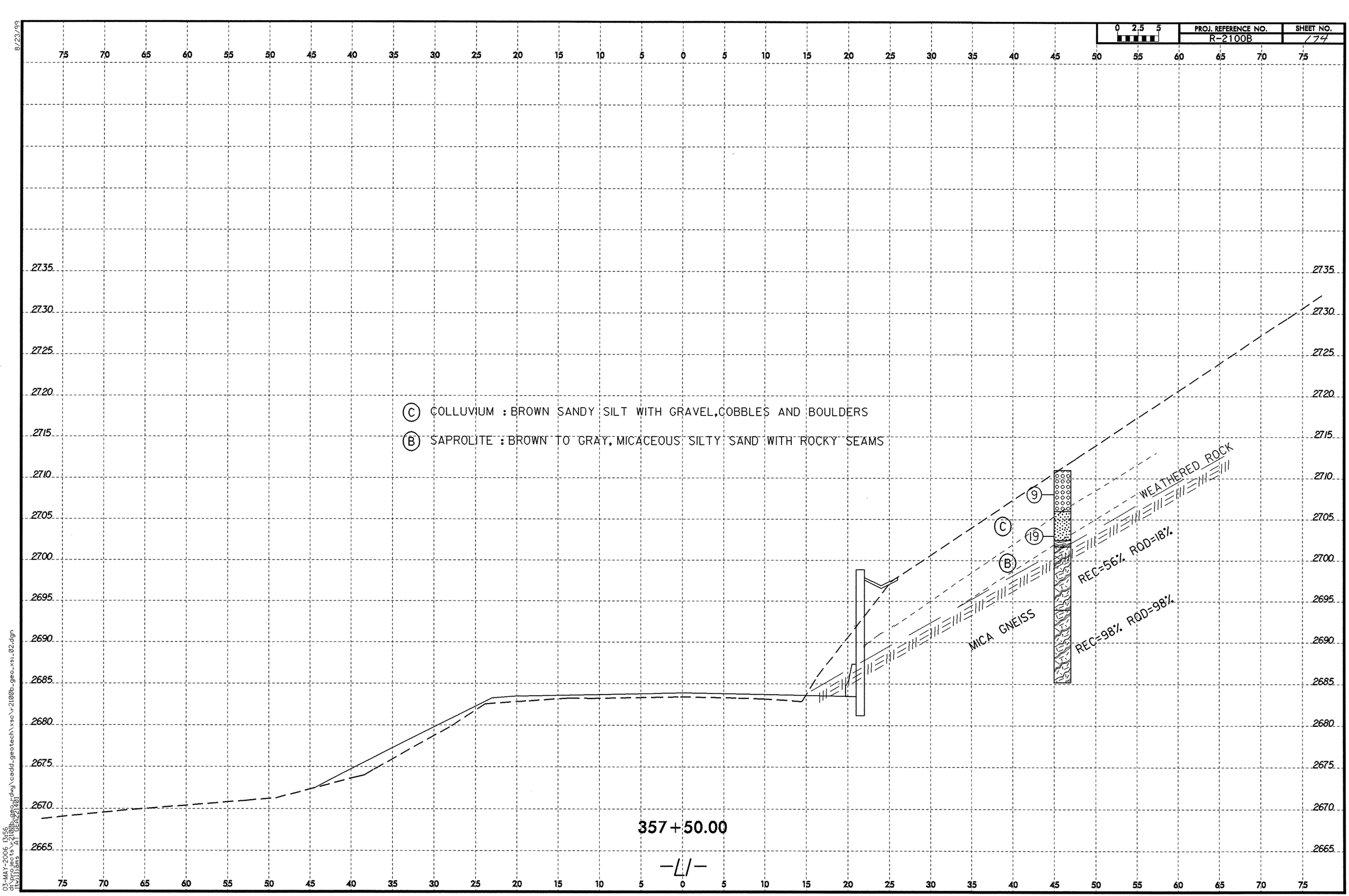
jtwilliams AT GEA221401



8/23/99

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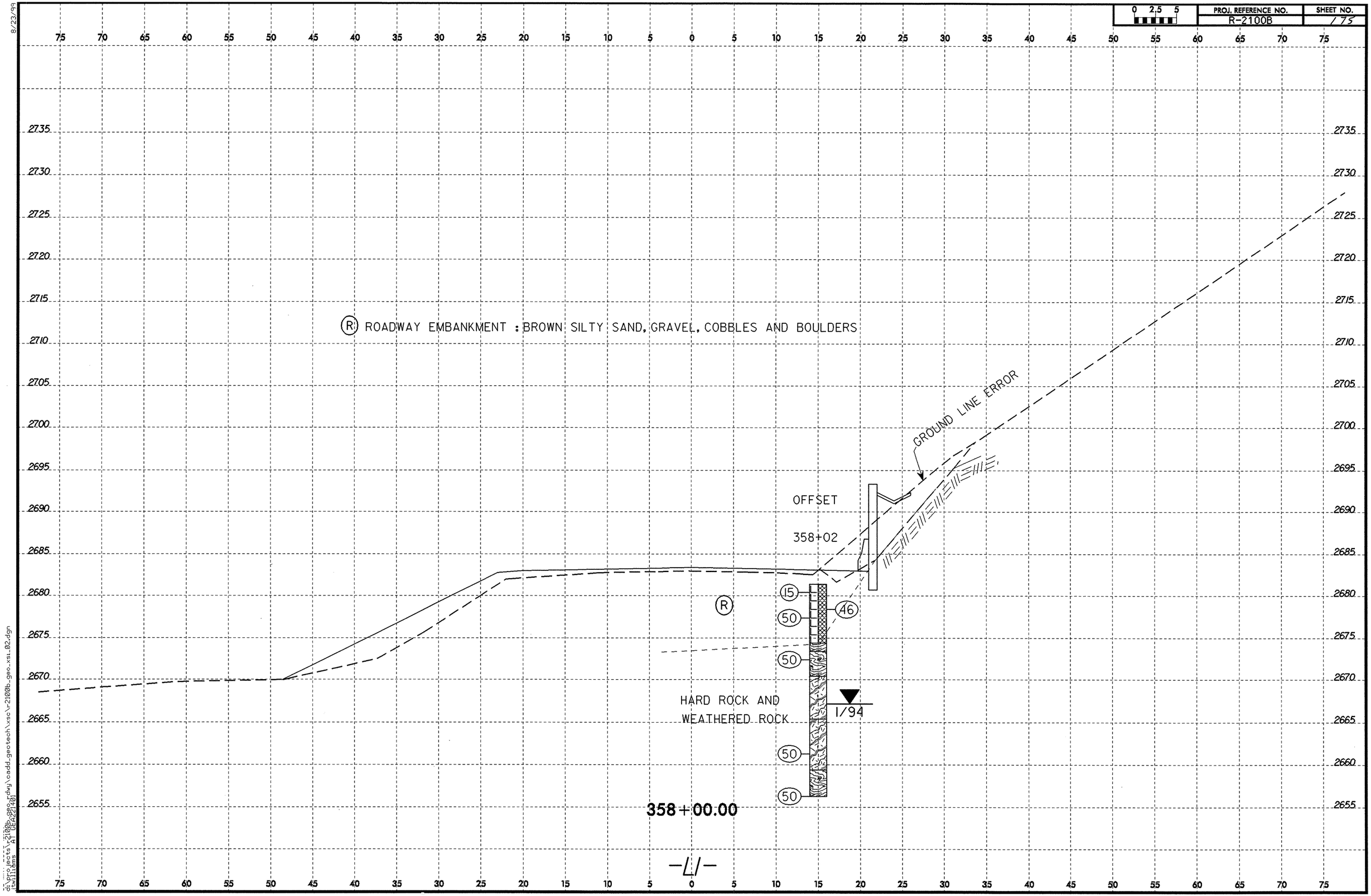
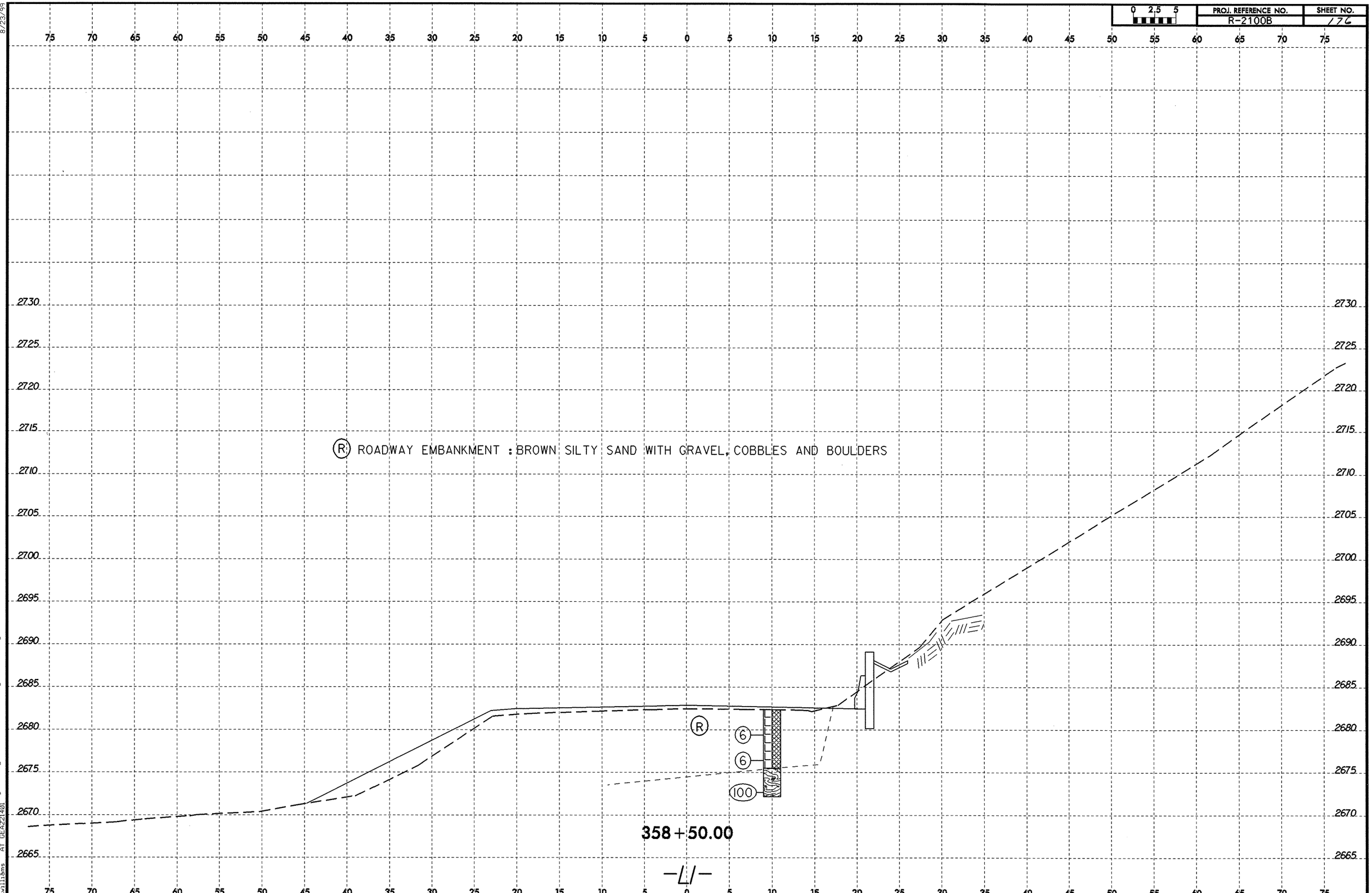
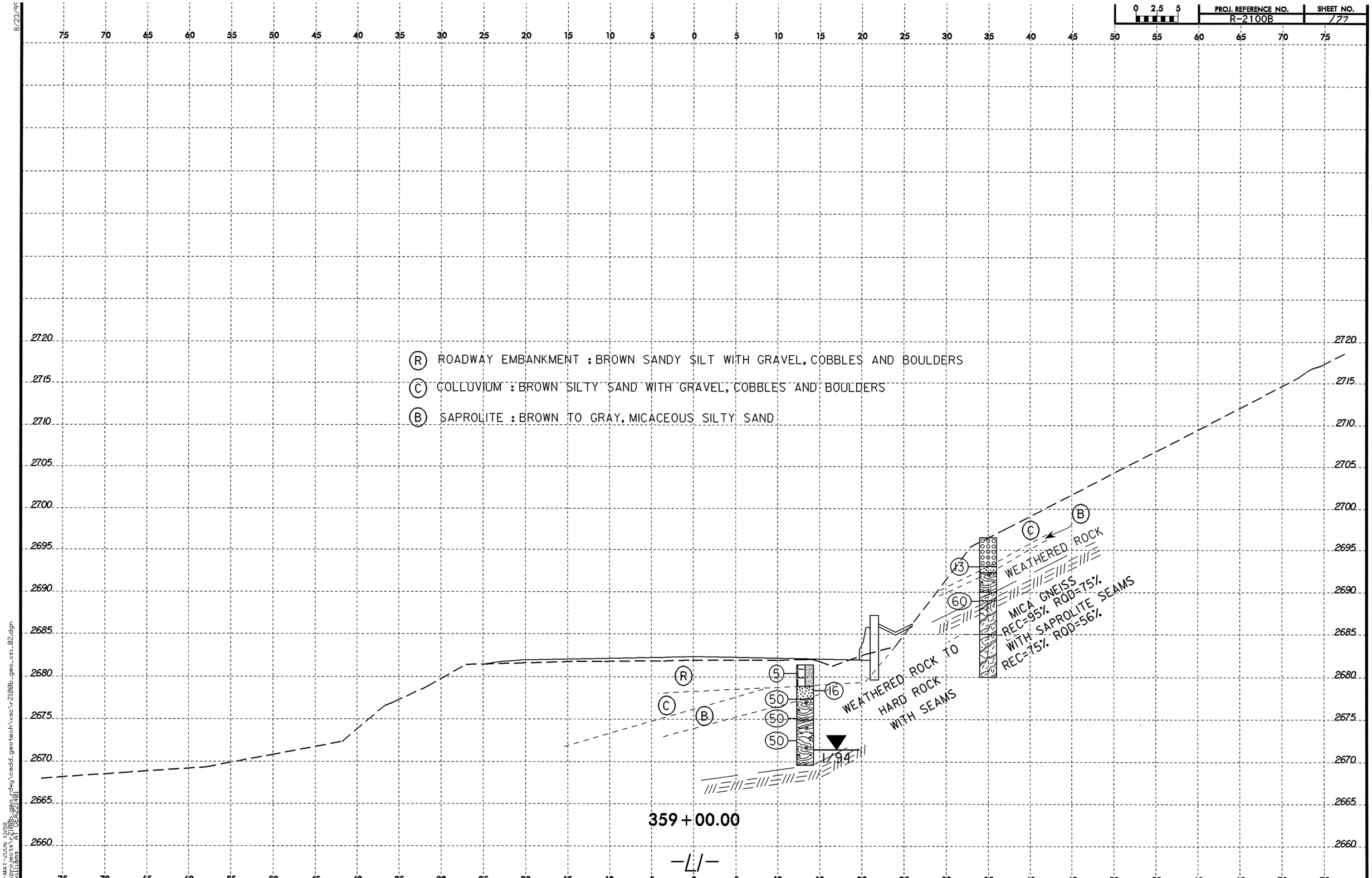


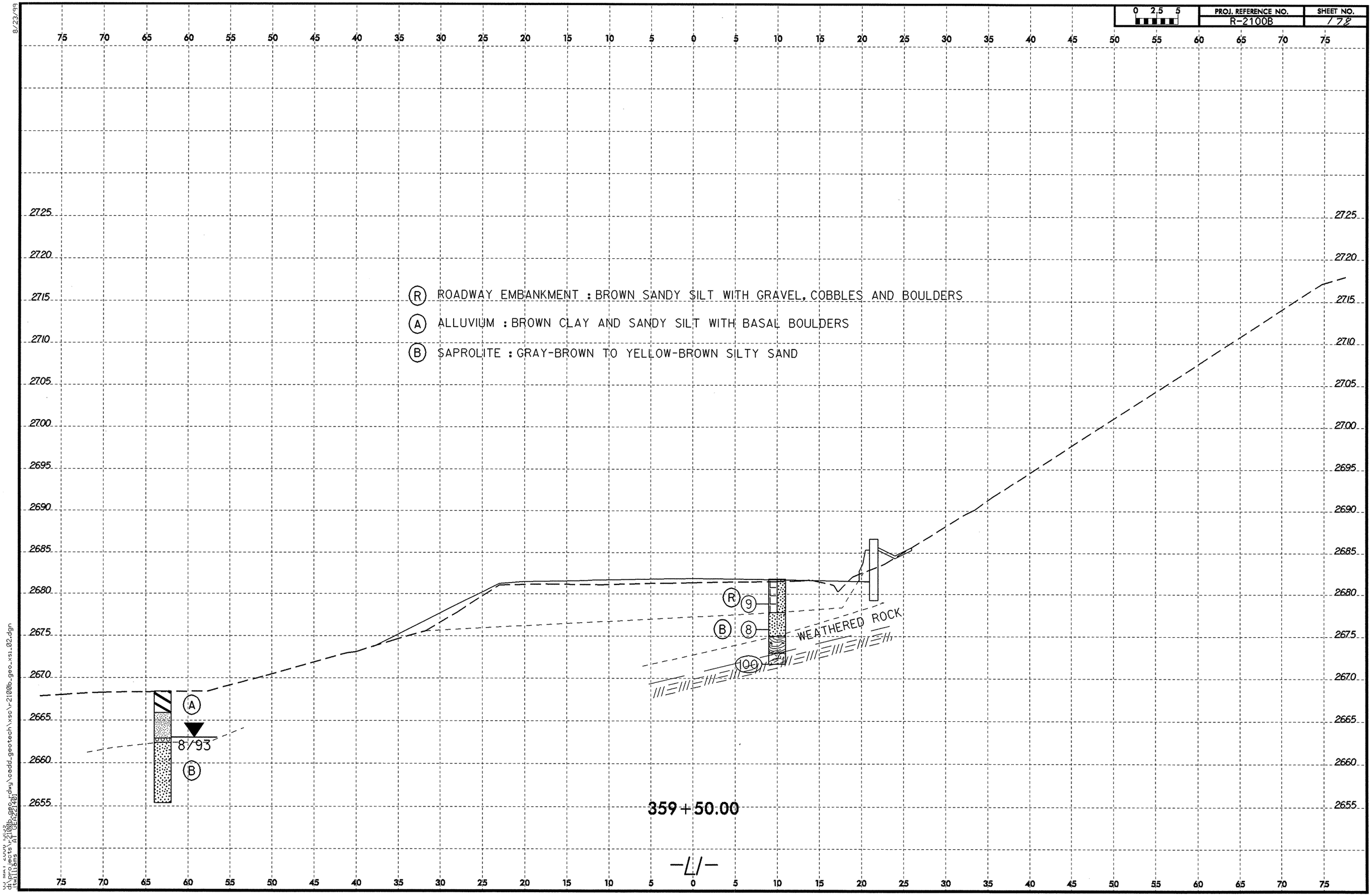
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
175
8/23/99
R ROADWAY EMBANKMENT : BROWN SILTY SAND, GRAVEL, COBBLES AND BOULDERS
GROUND LINE ERROR
OFFSET
358+02
15
50
46
50
HARD ROCK AND
WEATHERED ROCK
1/94
50
50
358+00.00
-L1-



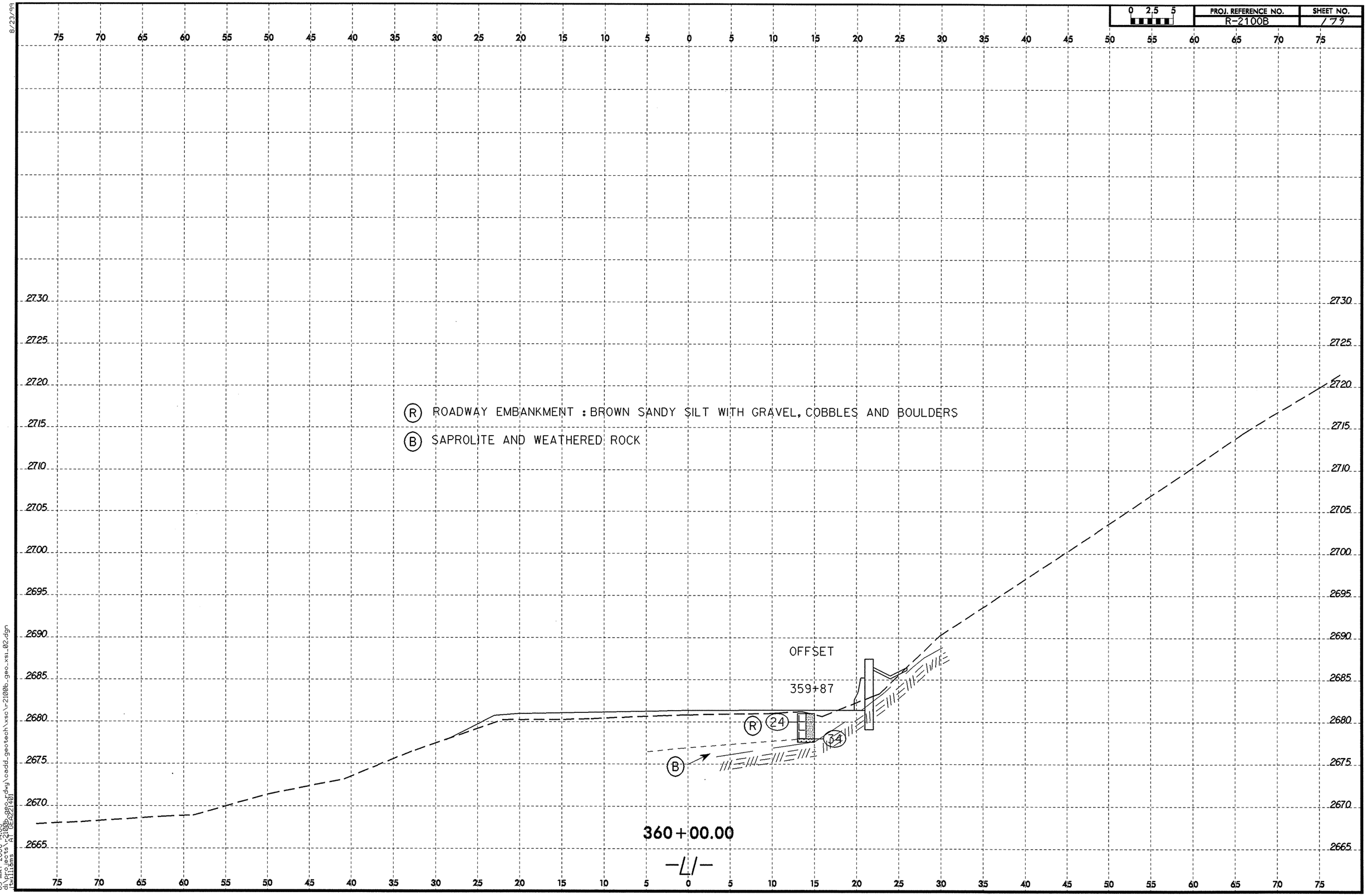
0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
176
8/23/99
R ROADWAY EMBANKMENT : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
R
6
6
100
358+50.00
-L1-
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
03-MAY-2006 13:58
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
177
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
C COLLUVIUM : BROWN SILTY SAND WITH GRAVEL, COBBLES AND BOULDERS
B SAPROLITE : BROWN TO GRAY, MICACEOUS SILTY SAND
WEATHERED ROCK
MICA GNEISS
REC=95% RQD=75%
WITH SAPROLITE SEAMS
REC=75% RQD=56%
WEATHERED ROCK TO
HARD ROCK
WITH SEAMS
13
60
5
16
50
50
50
1/94
359+00.00
-L1-



PROJ. REFERENCE NO.
R-2100B
SHEET NO.
178
0 2.5 5
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
A ALLUVIUM : BROWN CLAY AND SANDY SILT WITH BASAL BOULDERS
B SAPROLITE : GRAY-BROWN TO YELLOW-BROWN SILTY SAND
WEATHERED ROCK
8/93
359+50.00
-L1-



8/23/99

03-MAY-2006 14:00
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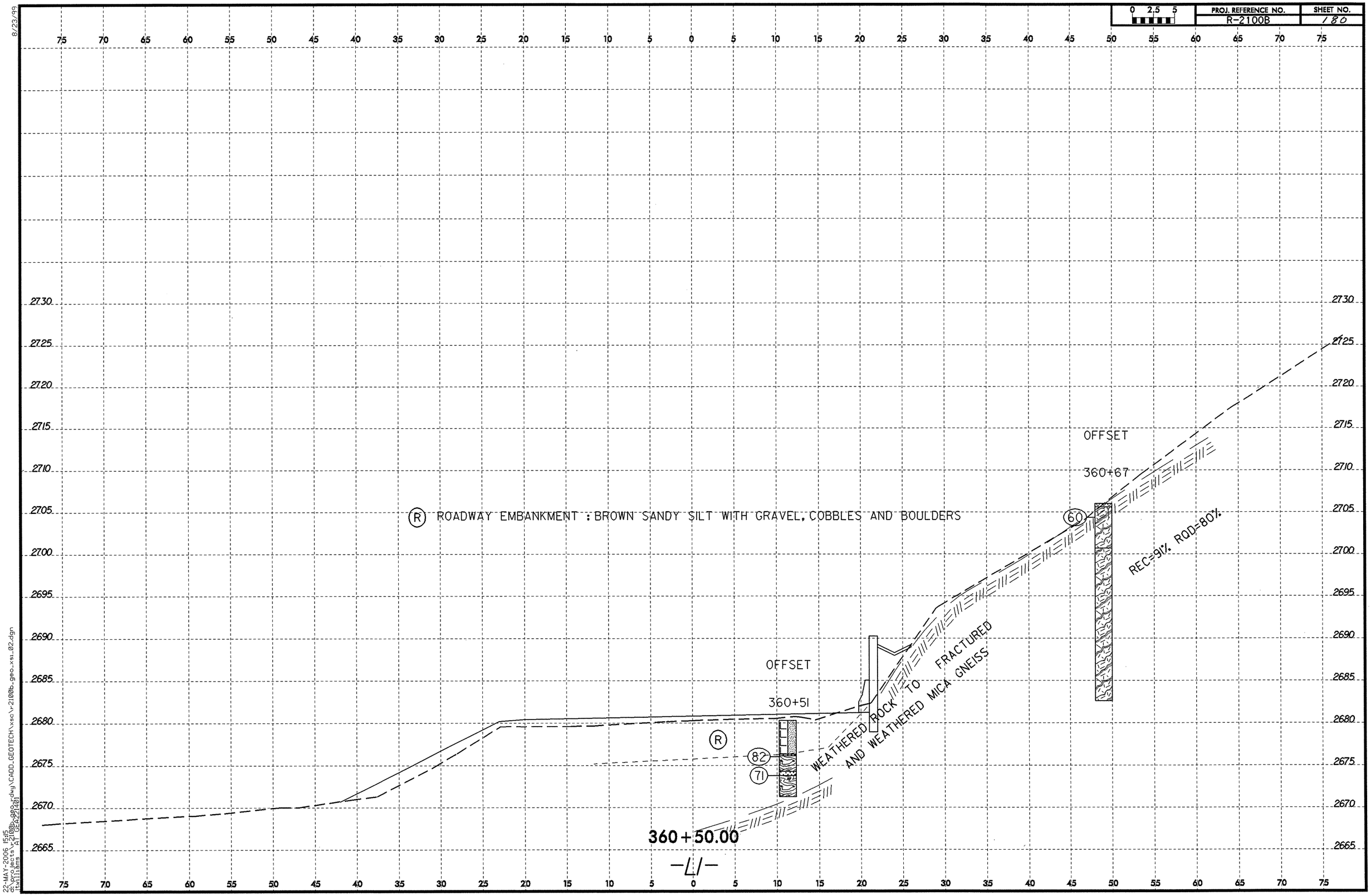
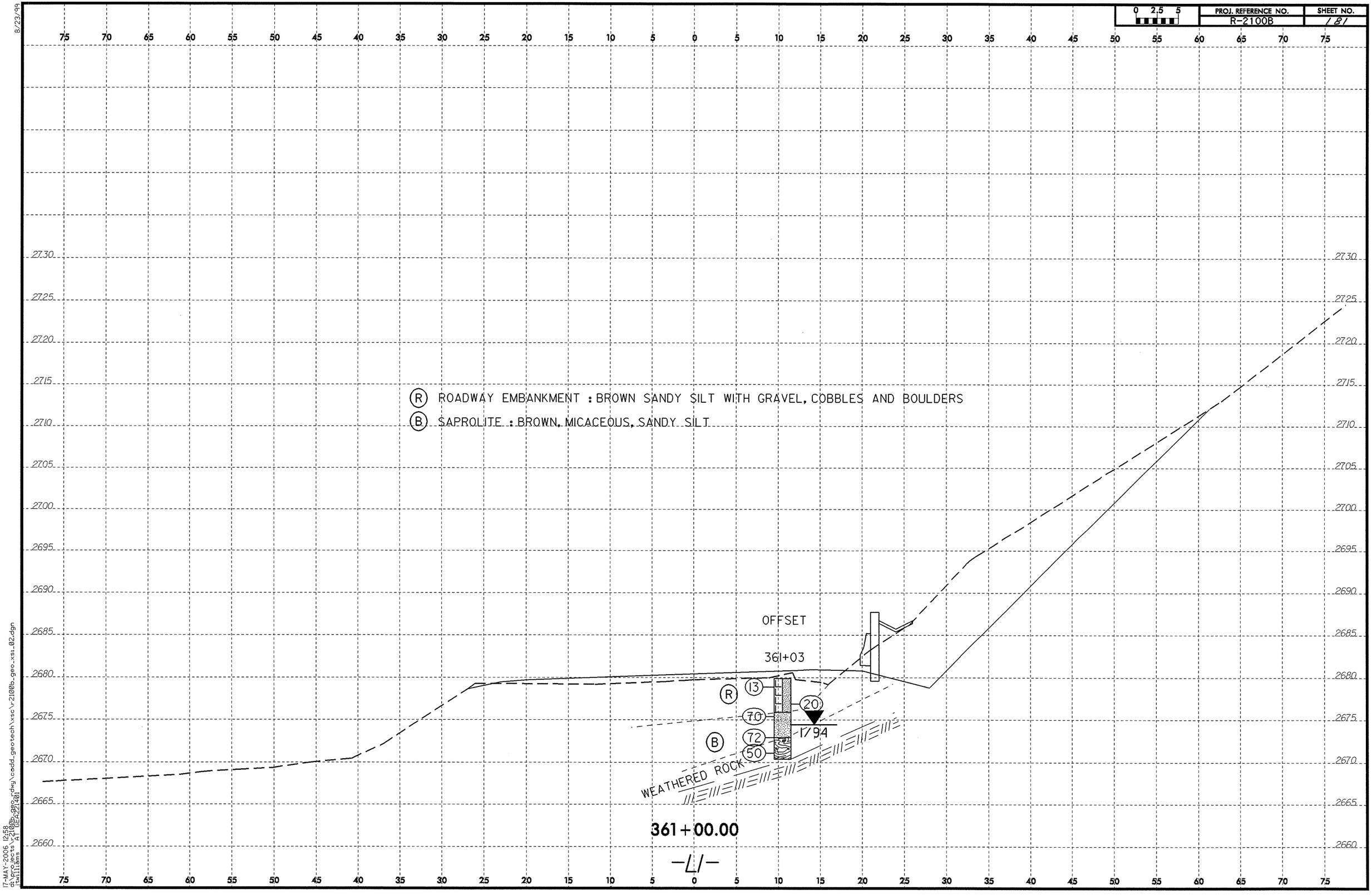
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
180
8/23/99
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
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
OFFSET
360+67
60
REC=91% RQD=80%
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
360+51
R
82
71
WEATHERED ROCK TO FRACTURED AND WEATHERED MICA GNEISS
360+50.00
-L1-
22-MAY-2006 15:15
d:\projects\r2100b_geo.rdwy\CADD_GEOTECH\xsc\r2100b_geo_xs1_02.dgn
itwilliams AT GEA221401



8/23/99

17-MAY-2006 12:58
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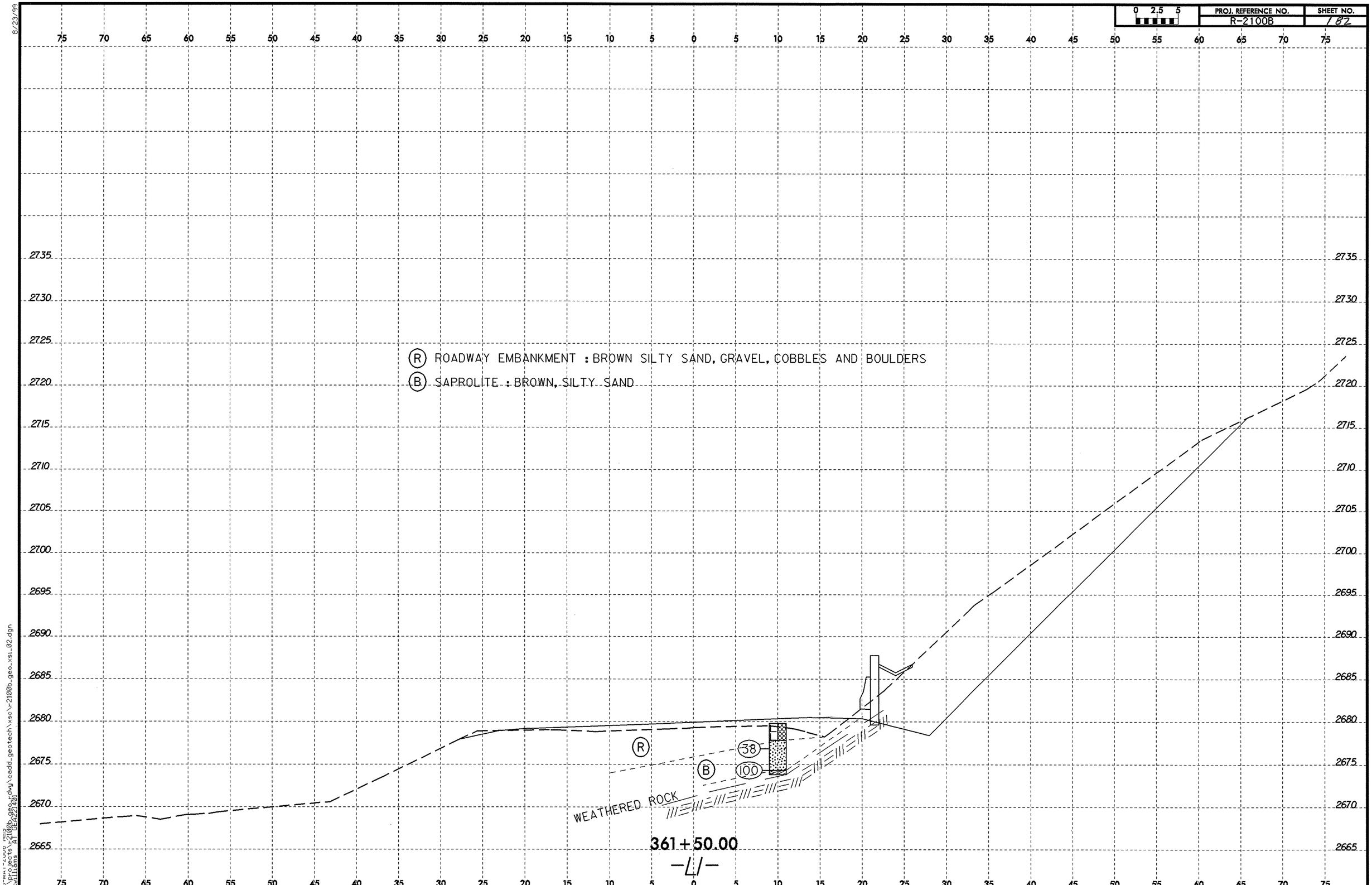
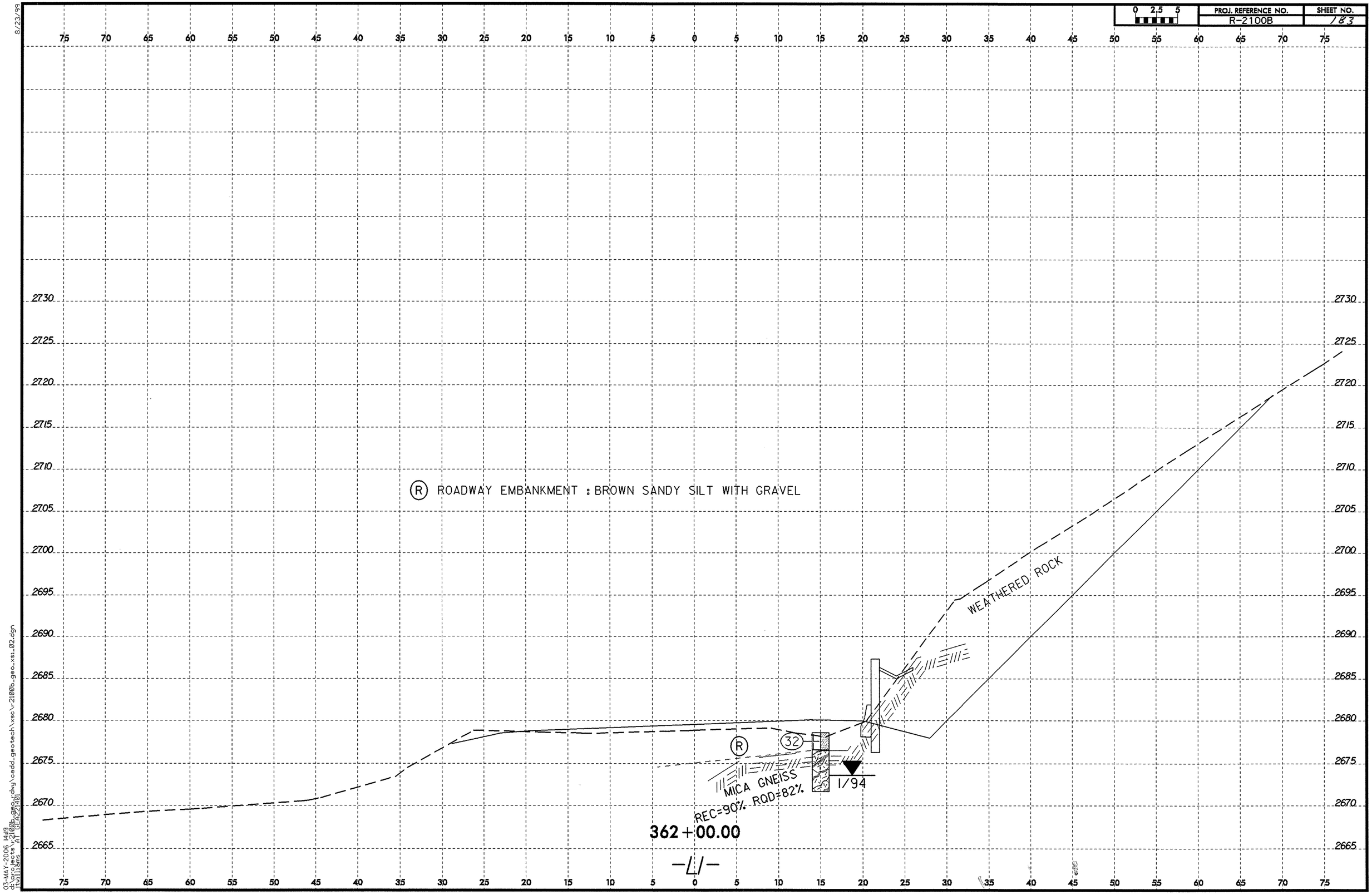
twilliams AT GEA221401

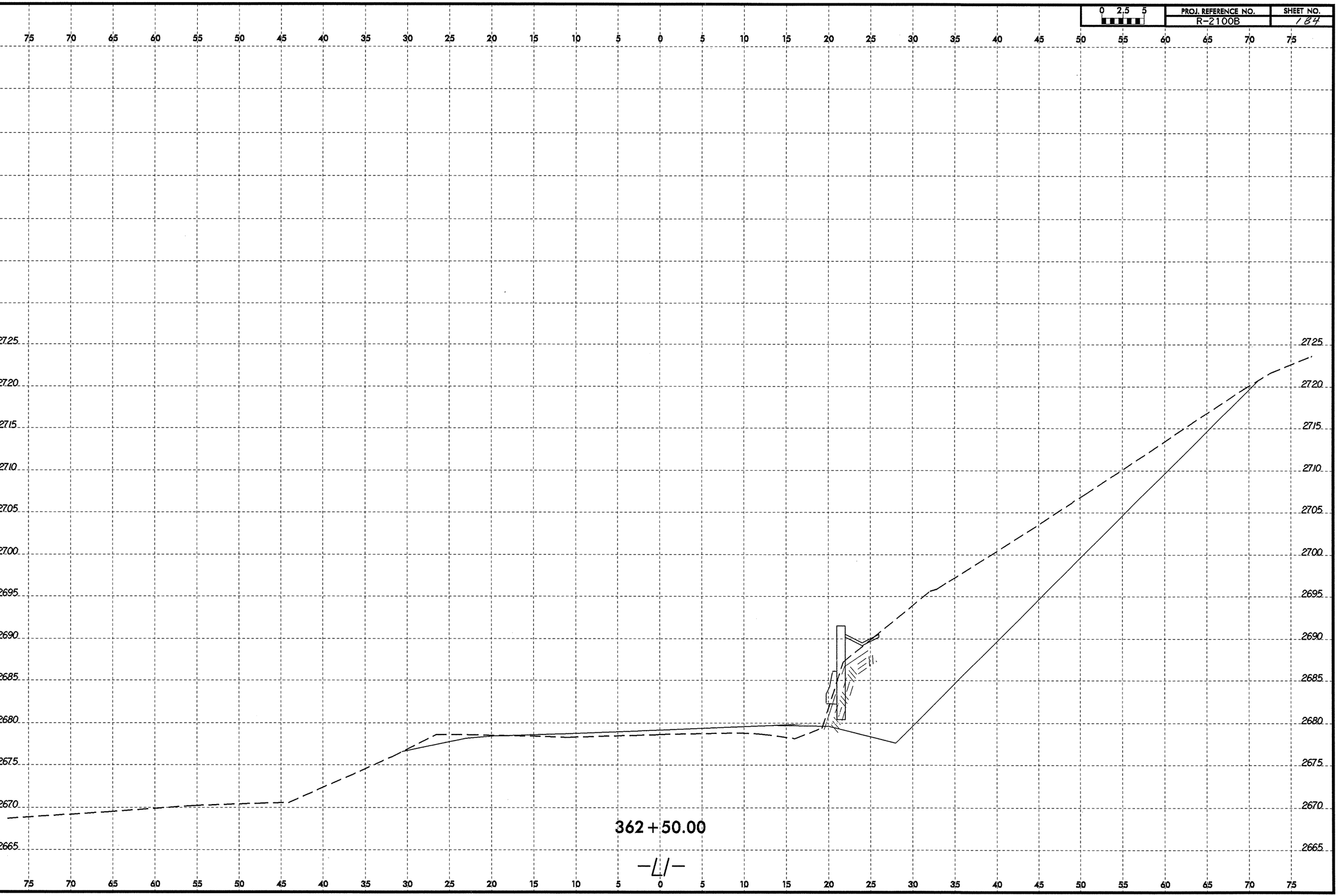


8/23/99

d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
183
8/23/99
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
WEATHERED ROCK
R
32
MICA GNEISS
REC=90% RQD=82%
1/94
362+00.00
-L/-
03-MAY-2006 14:19
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn



8/23/99

05-MAY-2006 14:20
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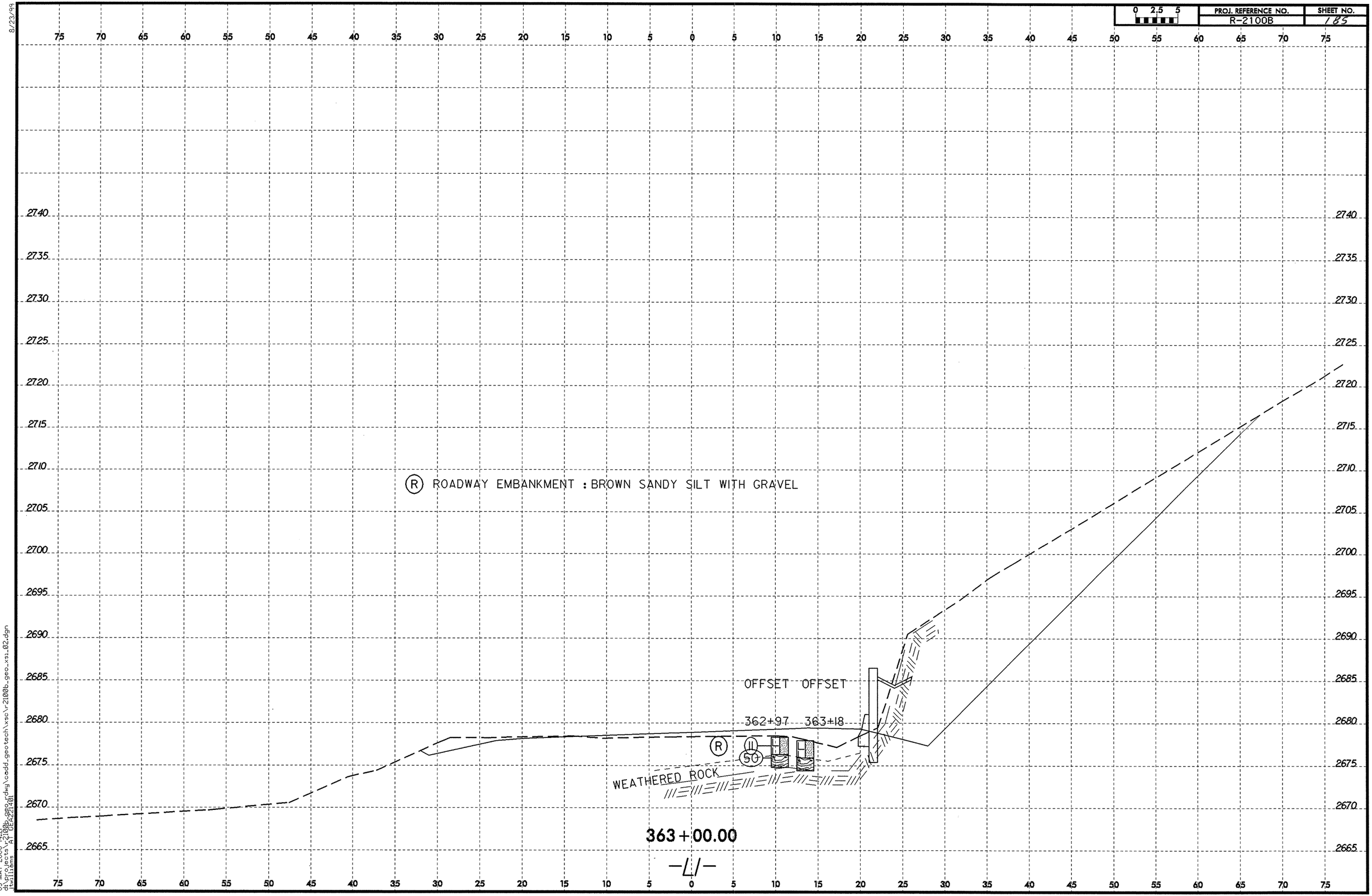
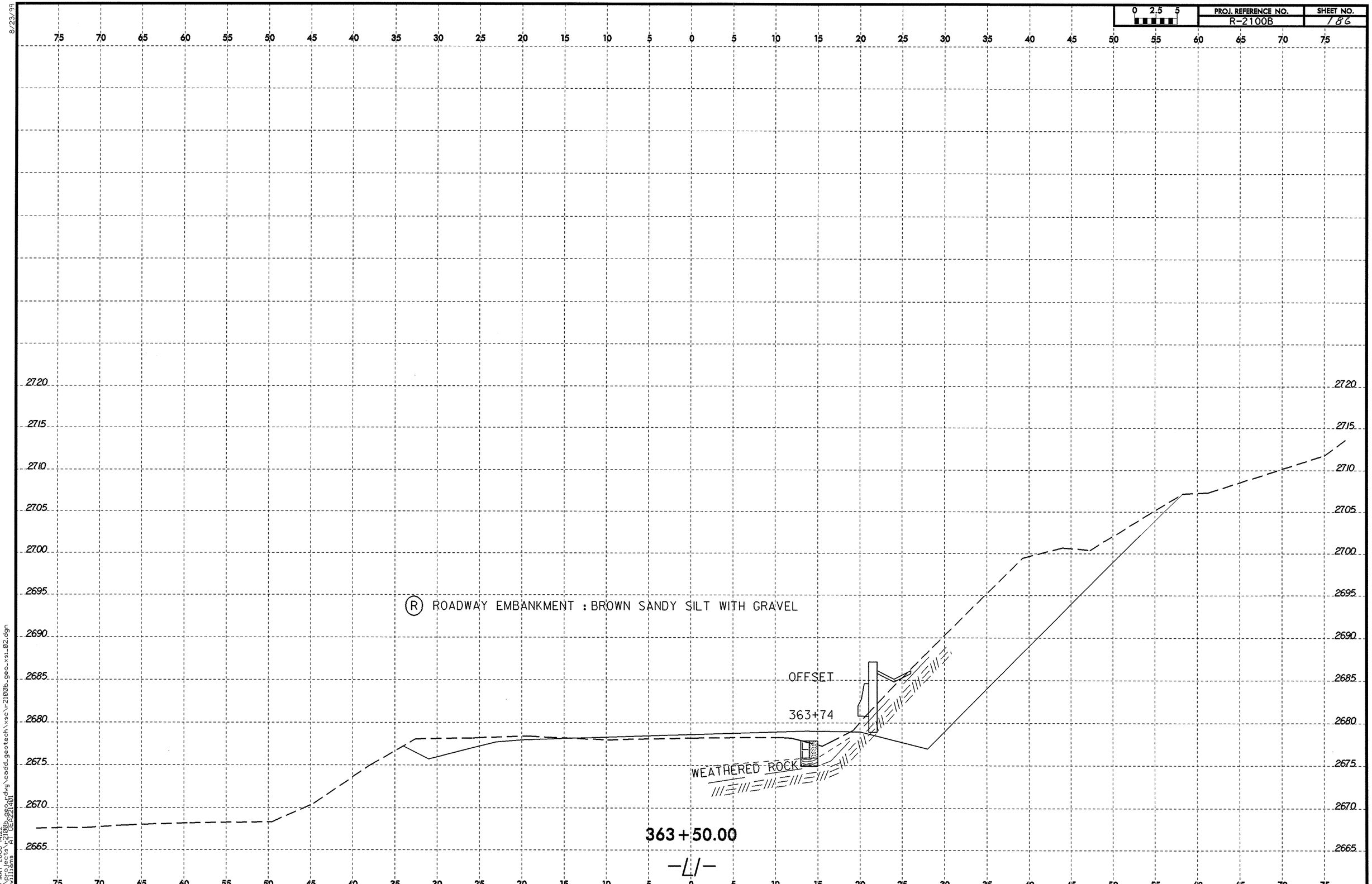
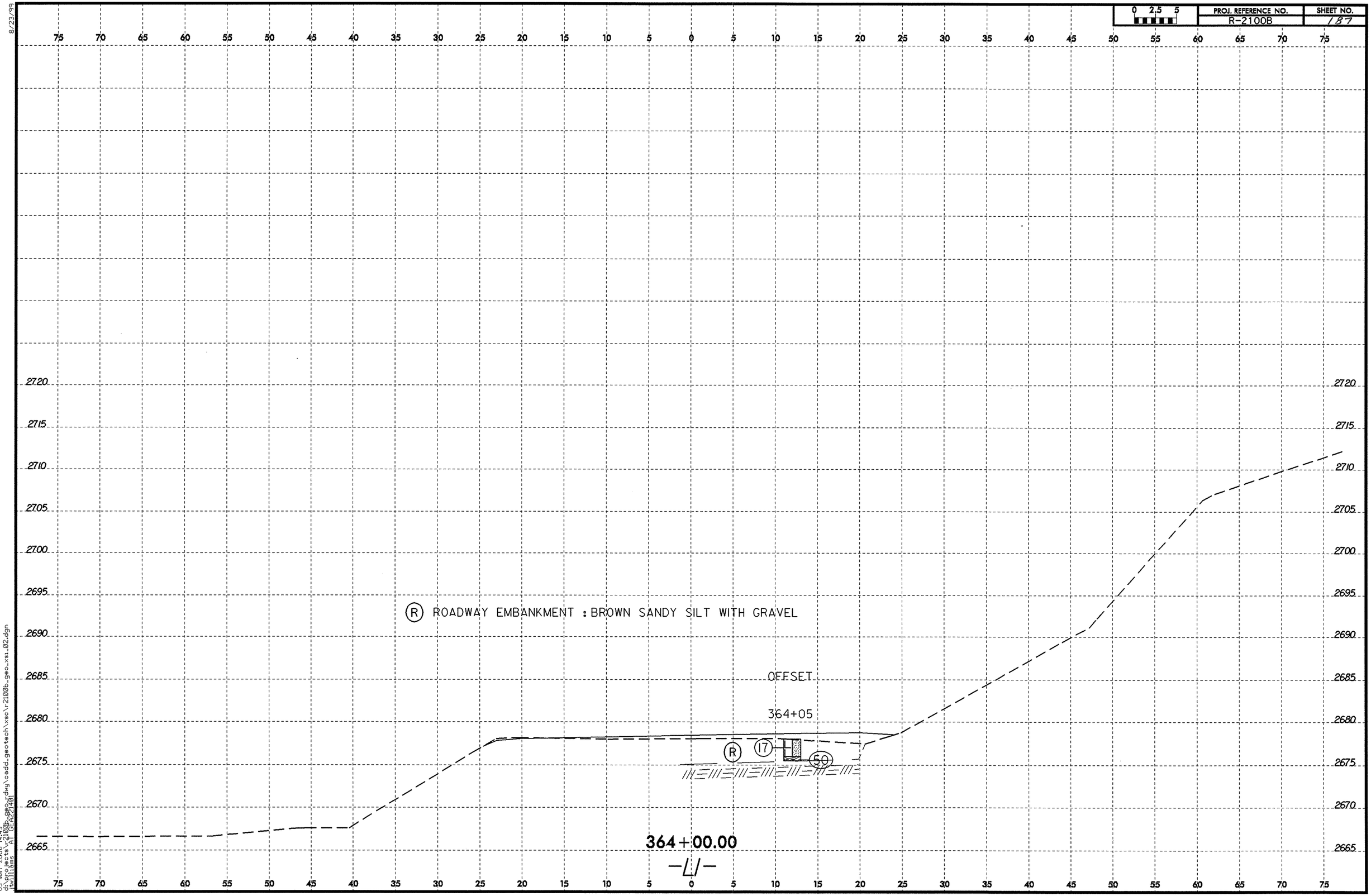
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
185
8/23/99
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
OFFSET OFFSET
362+97 363+18
R
11
50
WEATHERED ROCK
363+00.00
-L1-
03-MAY-2006 14:21
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
186
8/23/99
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
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
(R) ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
OFFSET
363+74
WEATHERED ROCK
363+50.00
-L/-



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
187
8/23/99
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
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
R ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL
OFFSET
364+05
R
17
50
364+00.00
-L/-
03-MAY-2006 14:49
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	188

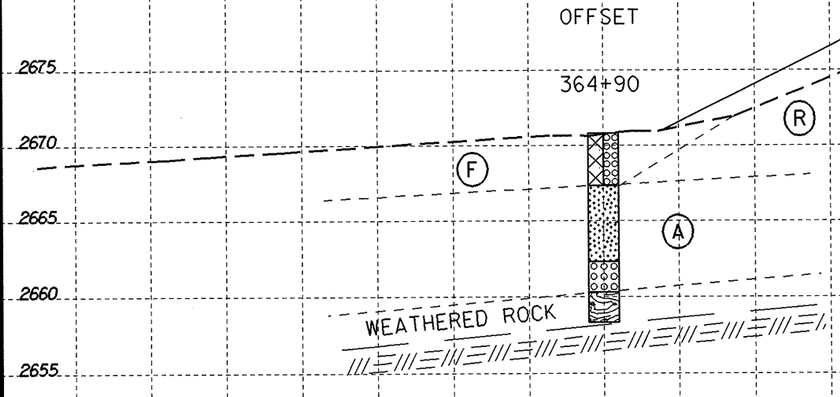
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2705 2700 2695 2690 2685 2680 2675 2670 2665 2660 2655 2650

(R) ROADWAY EMBANKMENT

(F) ARTIFICIAL FILL: BROWN SILTY SAND WITH GRAVEL AND COBBLES

(A) ALLUVIUM : BROWN SILTY SAND, WITH BASAL SAND AND GRAVEL



365+00.00

—L/—

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

22-MAY-2006 15:21
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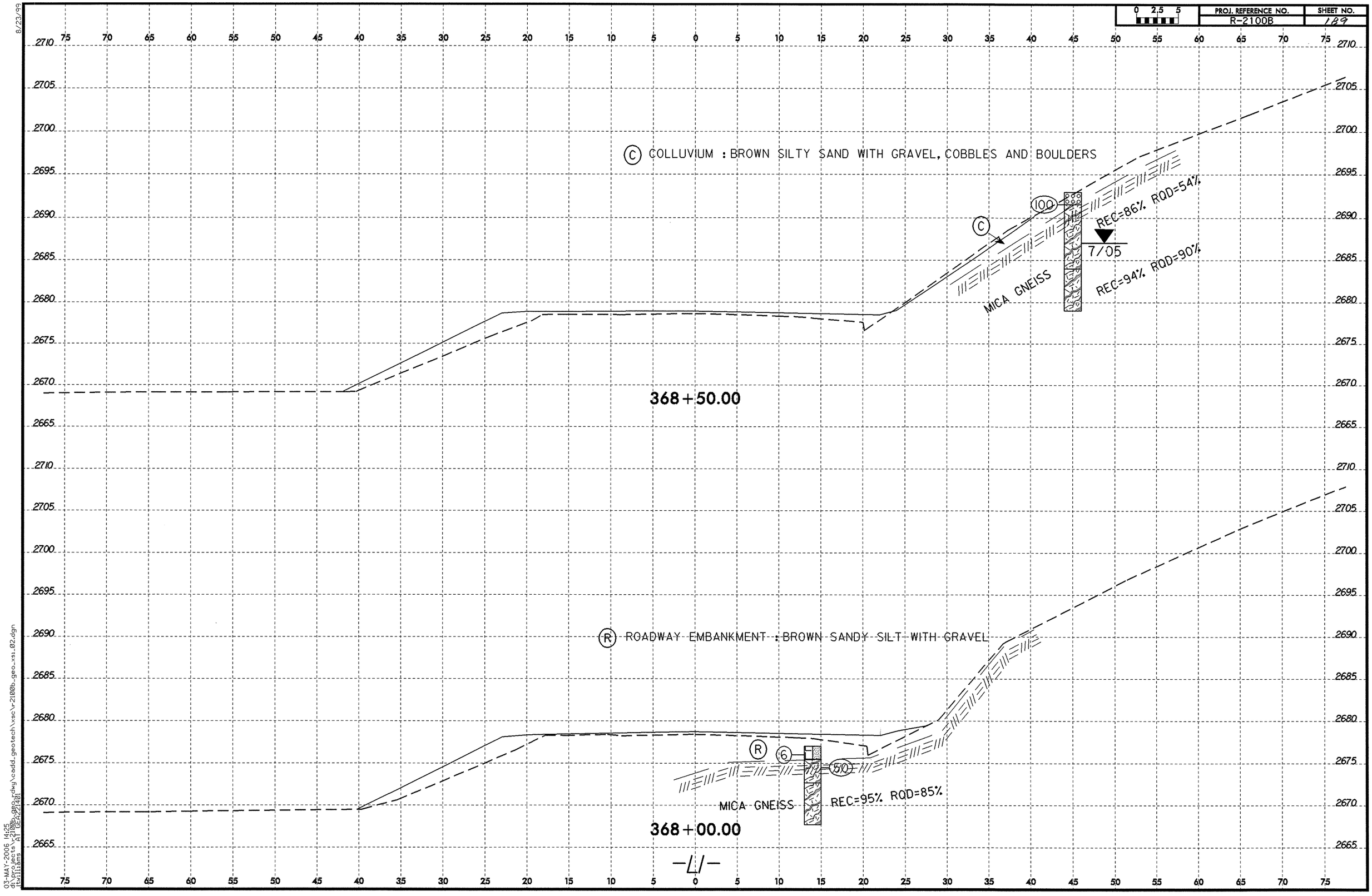
twilliams



8/23/99

03-MAY-2006 14:25
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn
jtwilliams AT GEA221401

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	190

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

2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

Ⓡ ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL

OFFSET

369+10

Ⓡ Ⓘ

369+00.00

-L/-

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

2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

13-MAY-2000 14:26
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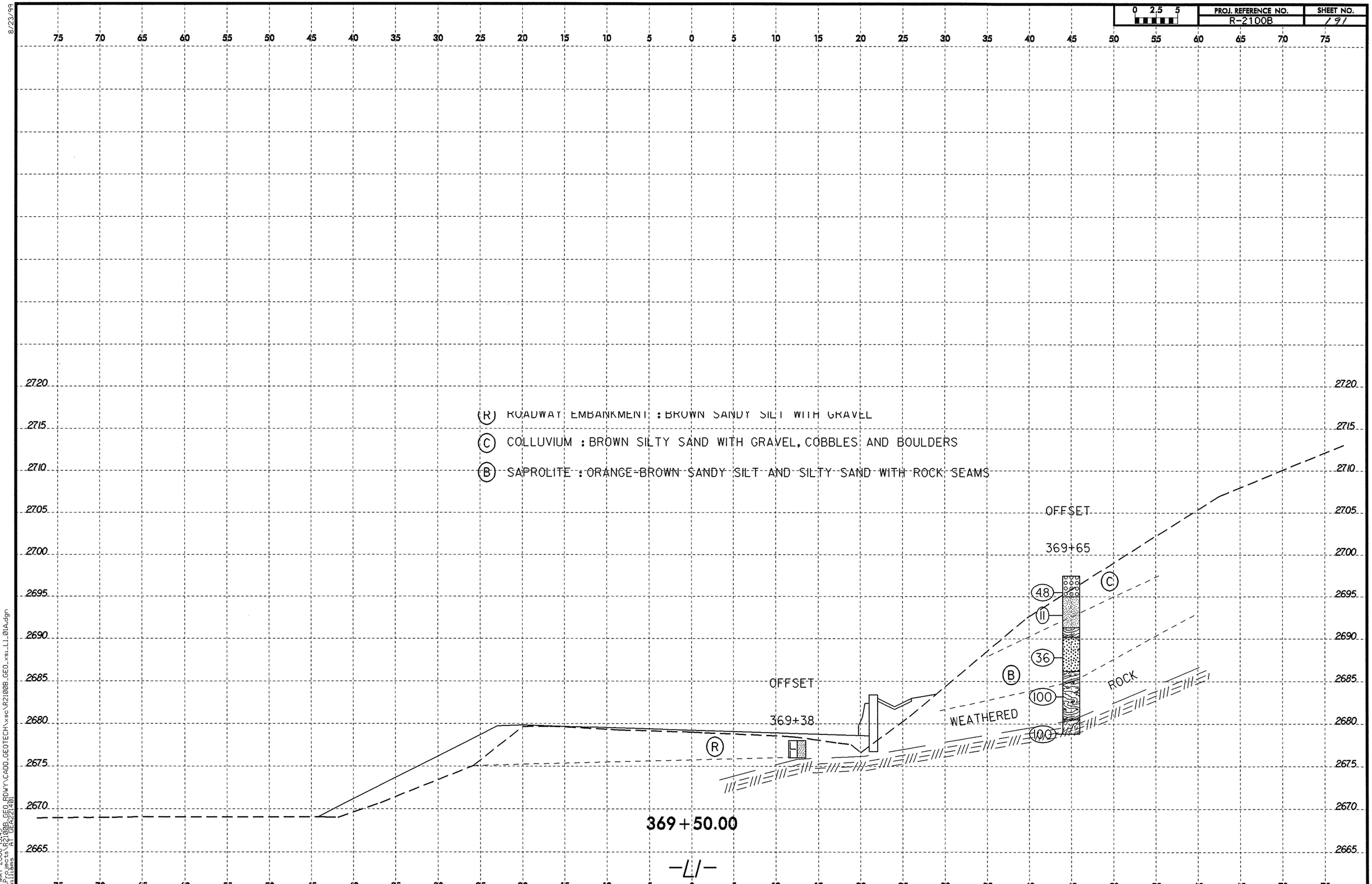
twilliams
Al GEA22401



8/23/99

26-MAY-2006 13:45
D:\Projects\R2100B_GEO_RDWY\CADD_GEOTECH\xsc\R2100B_GEO_xsi_L1_01A.dgn
jtwilliams AT GEA221401

8/23/99

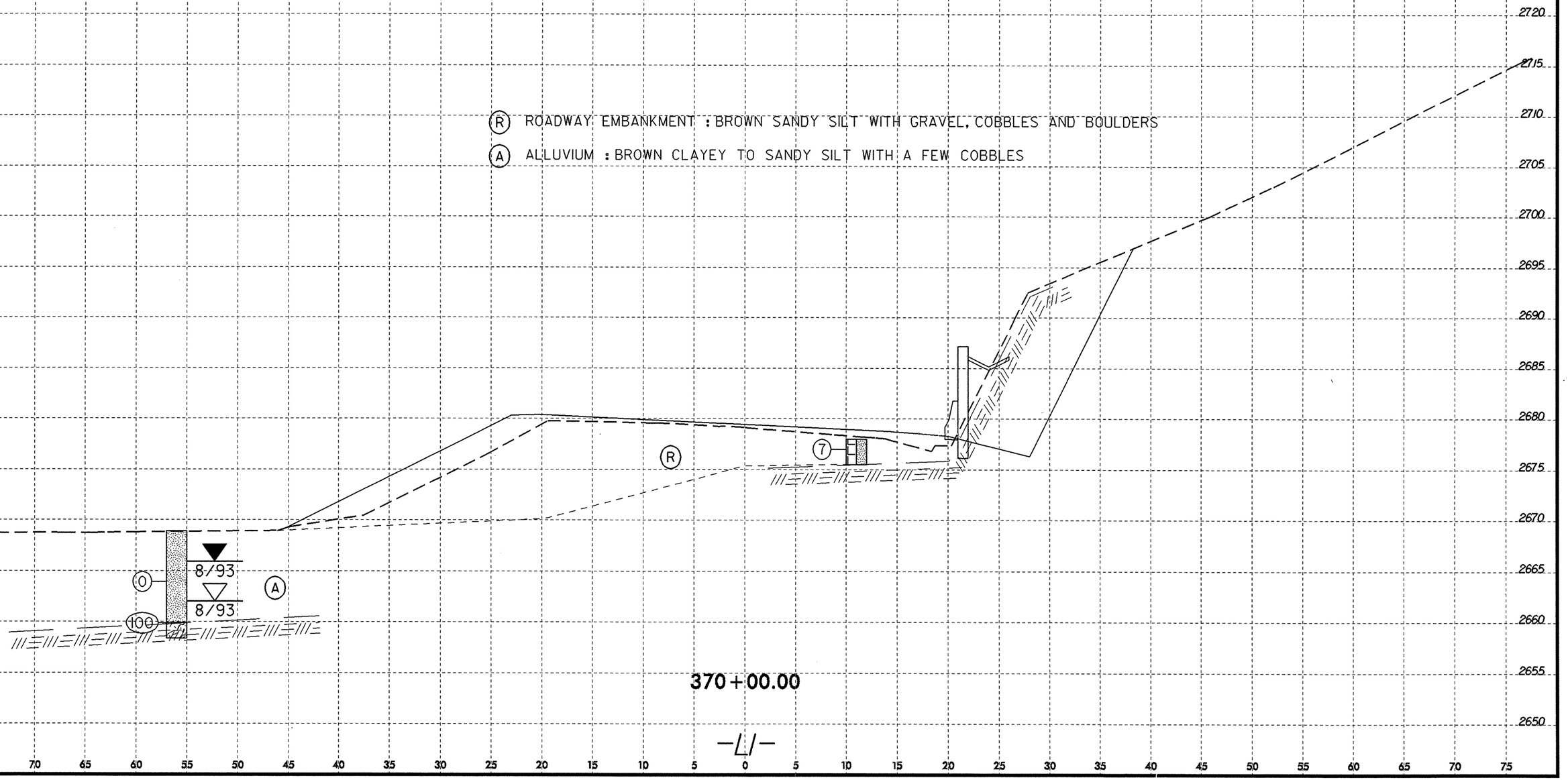
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-2100B	192

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

2725 2720 2715 2710 2705 2700 2695 2690 2685 2680 2675 2670 2665 2660 2655 2650

(R) ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS

(A) ALLUVIUM : BROWN CLAYEY TO SANDY SILT WITH A FEW COBBLES



370+00.00

$-\mathit{L}/-$

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

03-MAY-2006 14:36
dh:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xs1_02.dgn
tbwilliams
AT GEA221401

8/23/99

	R-2100B	193

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

2715

2710

2705

2700

2695

2690

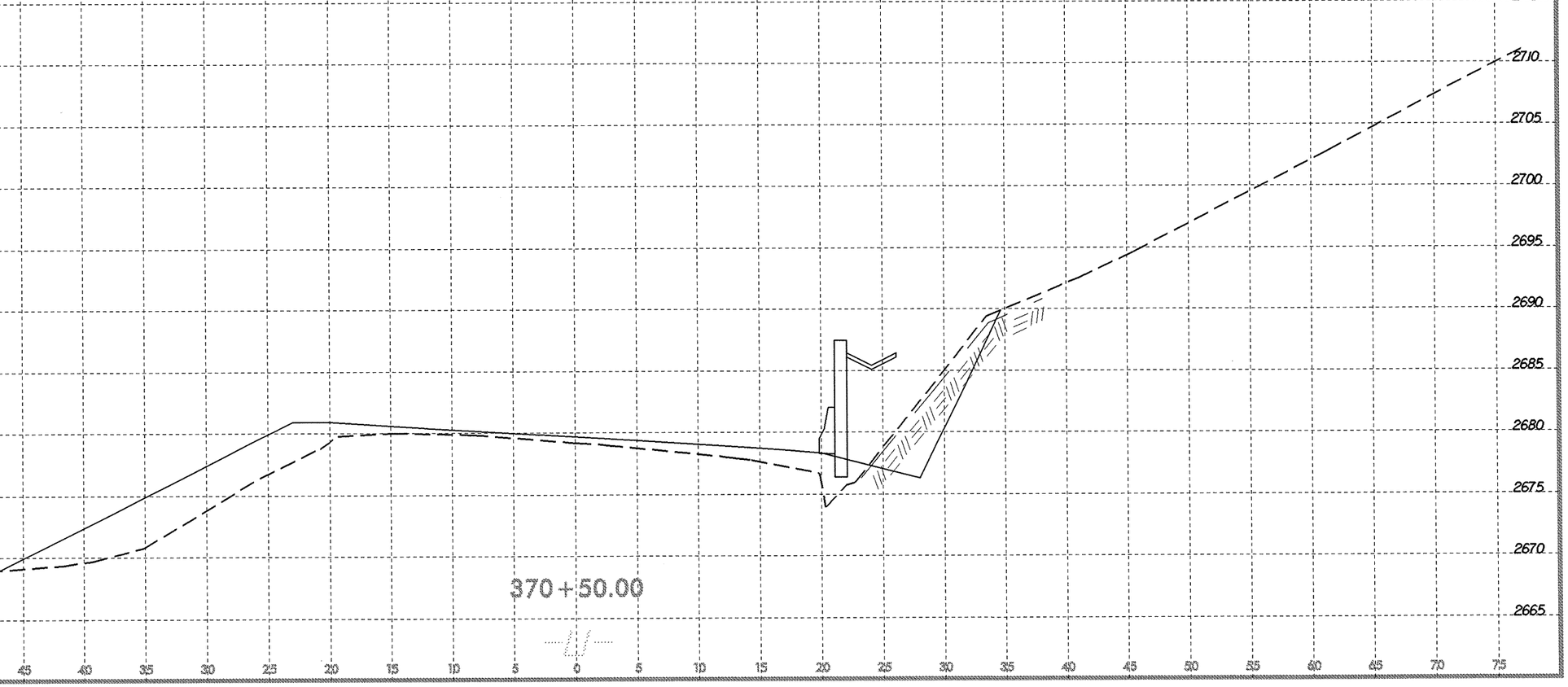
2685

2680

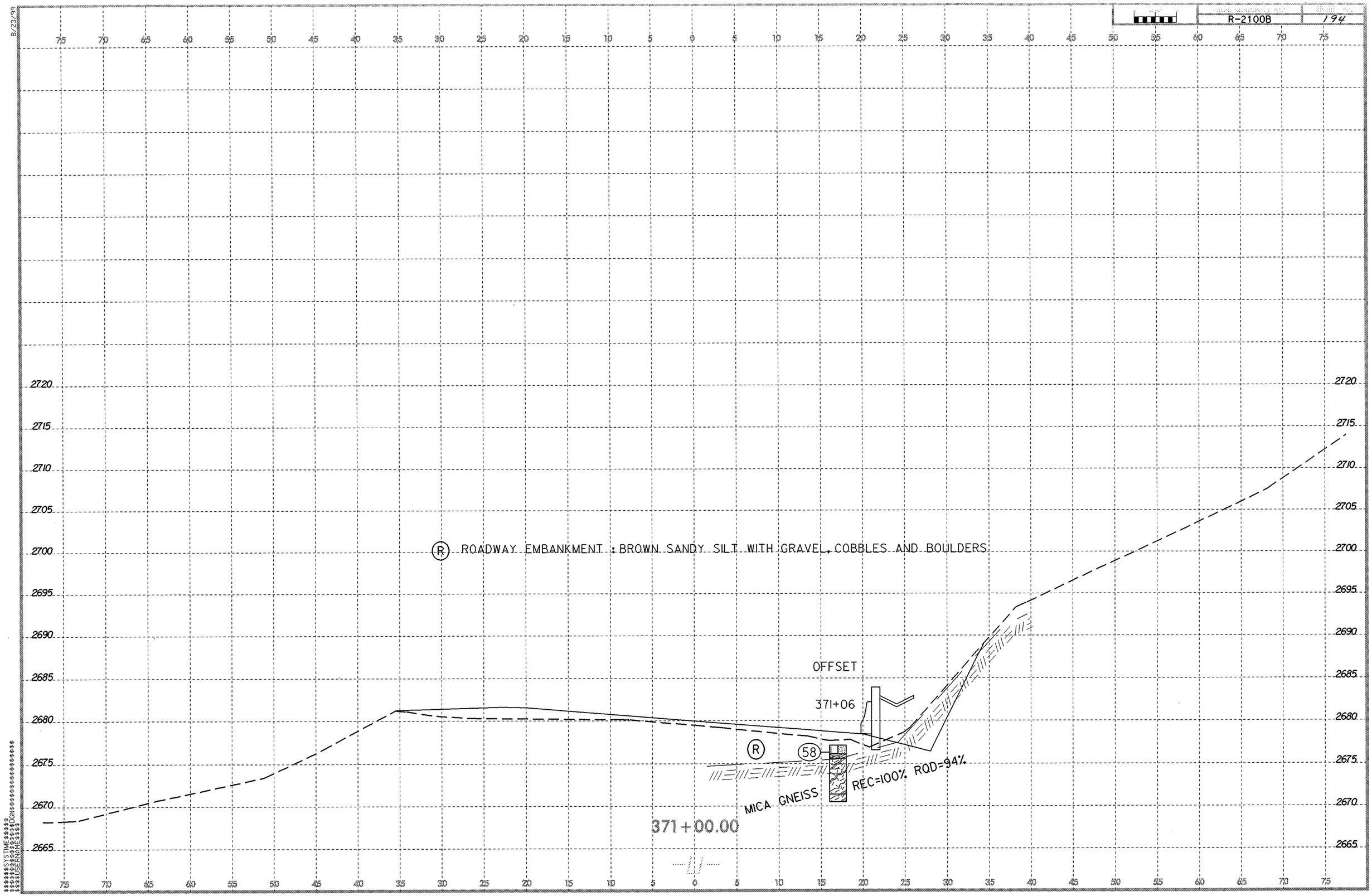
2675

2670

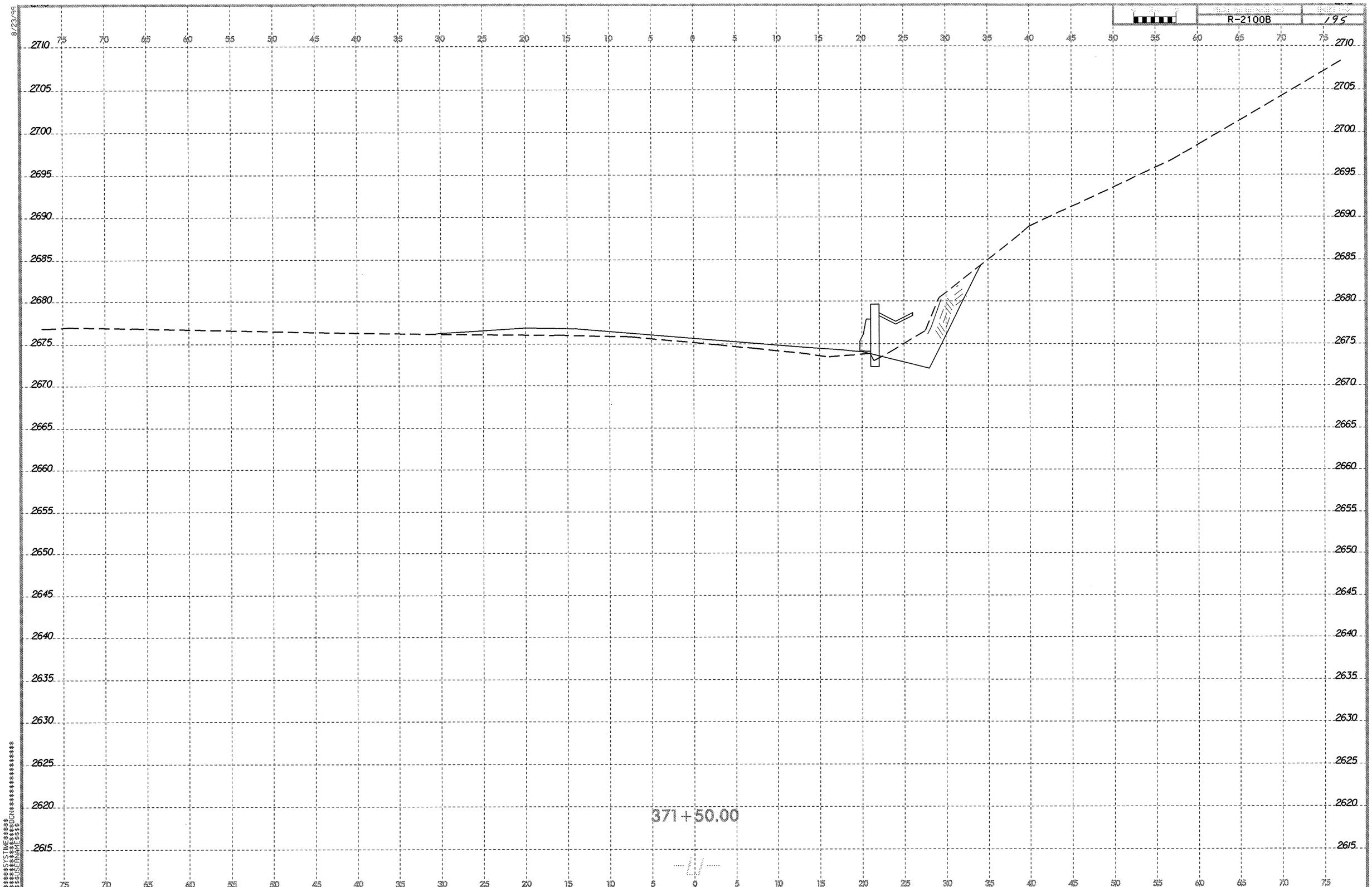
2665

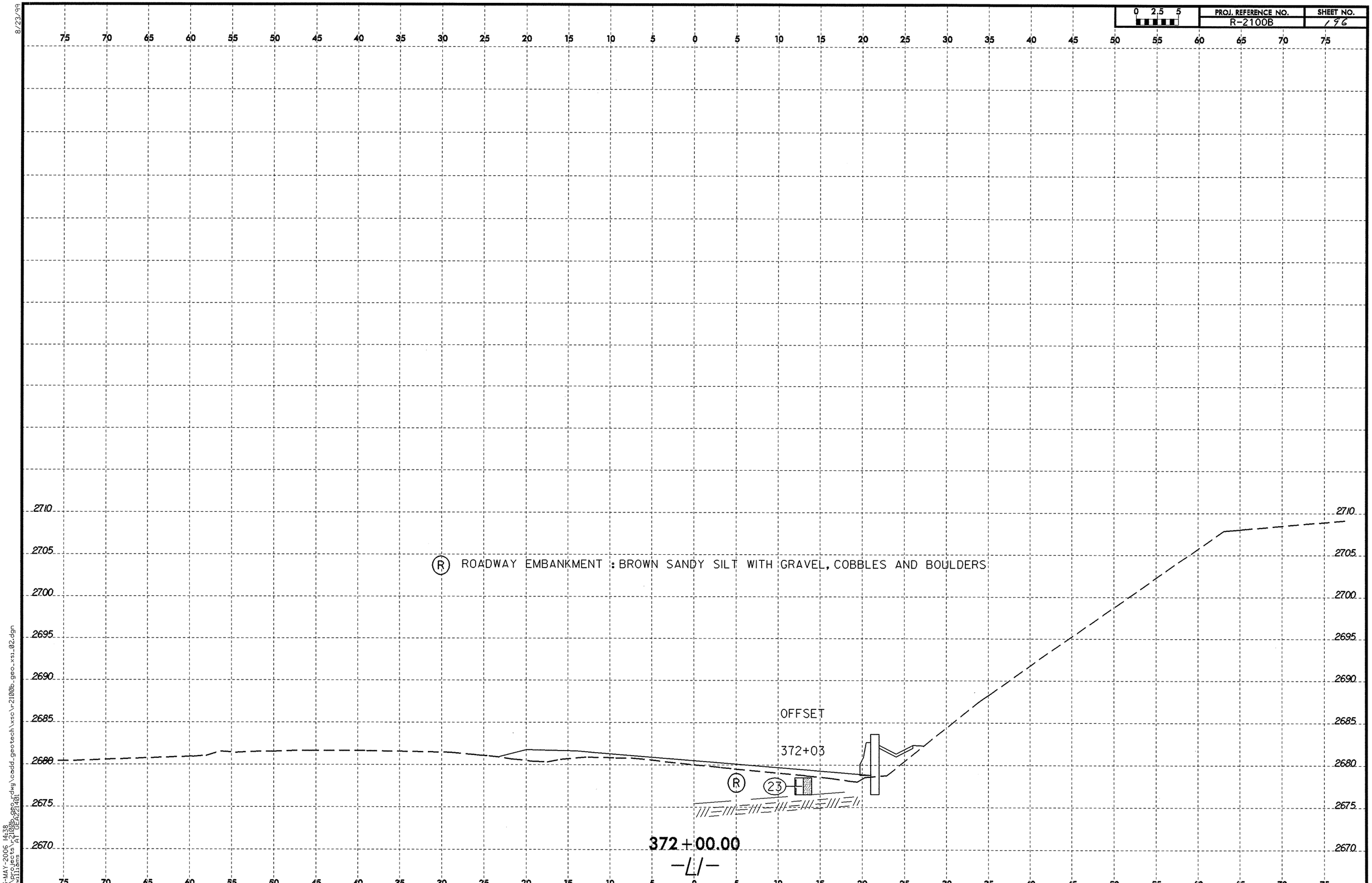


$$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$
$$$$USERNAME$$$$

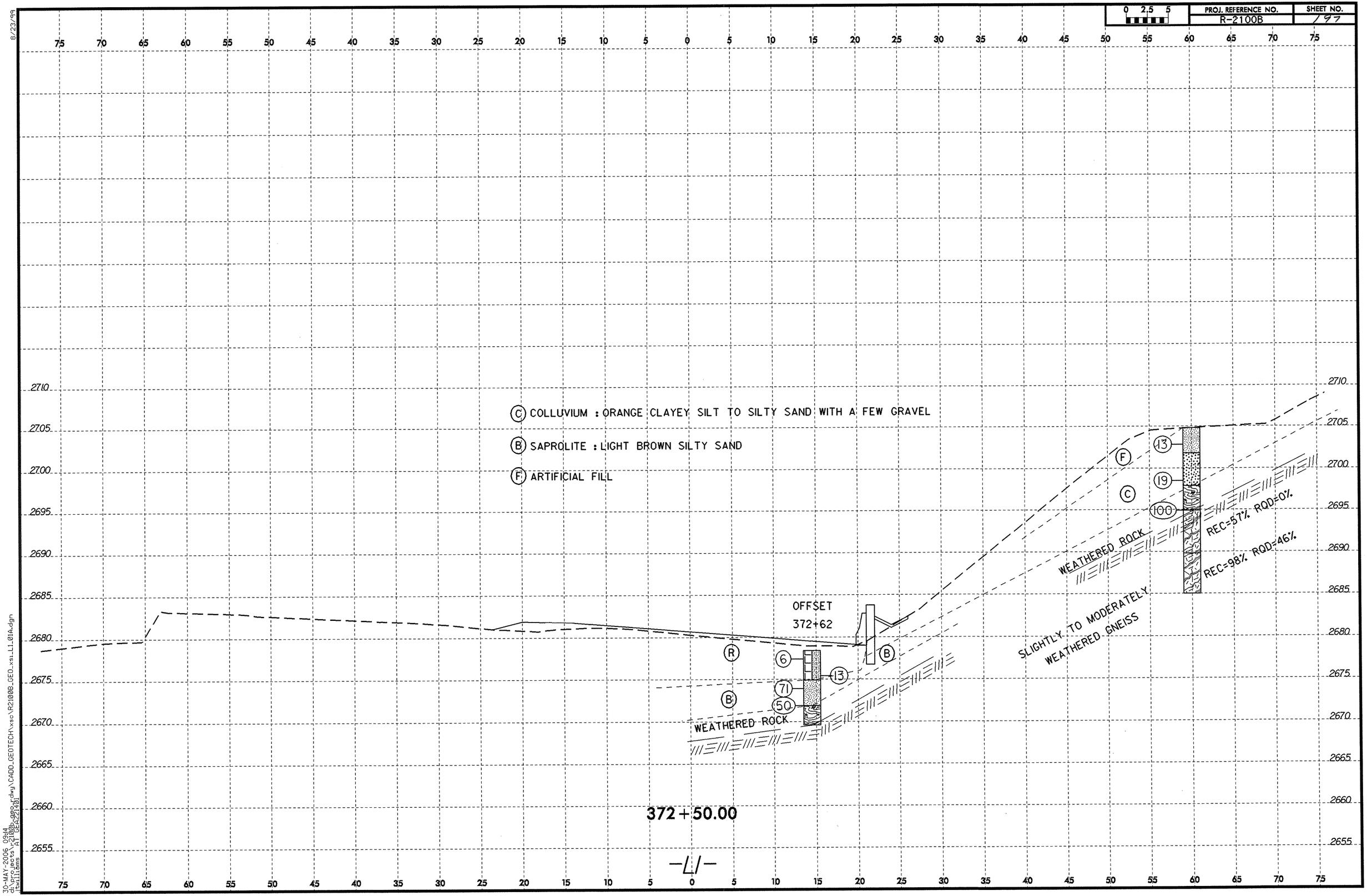


R-2100B
194
8/23/99
ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
371+06
58
MICA GNEISS
REC=100% RQD=94%
371+00.00
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665

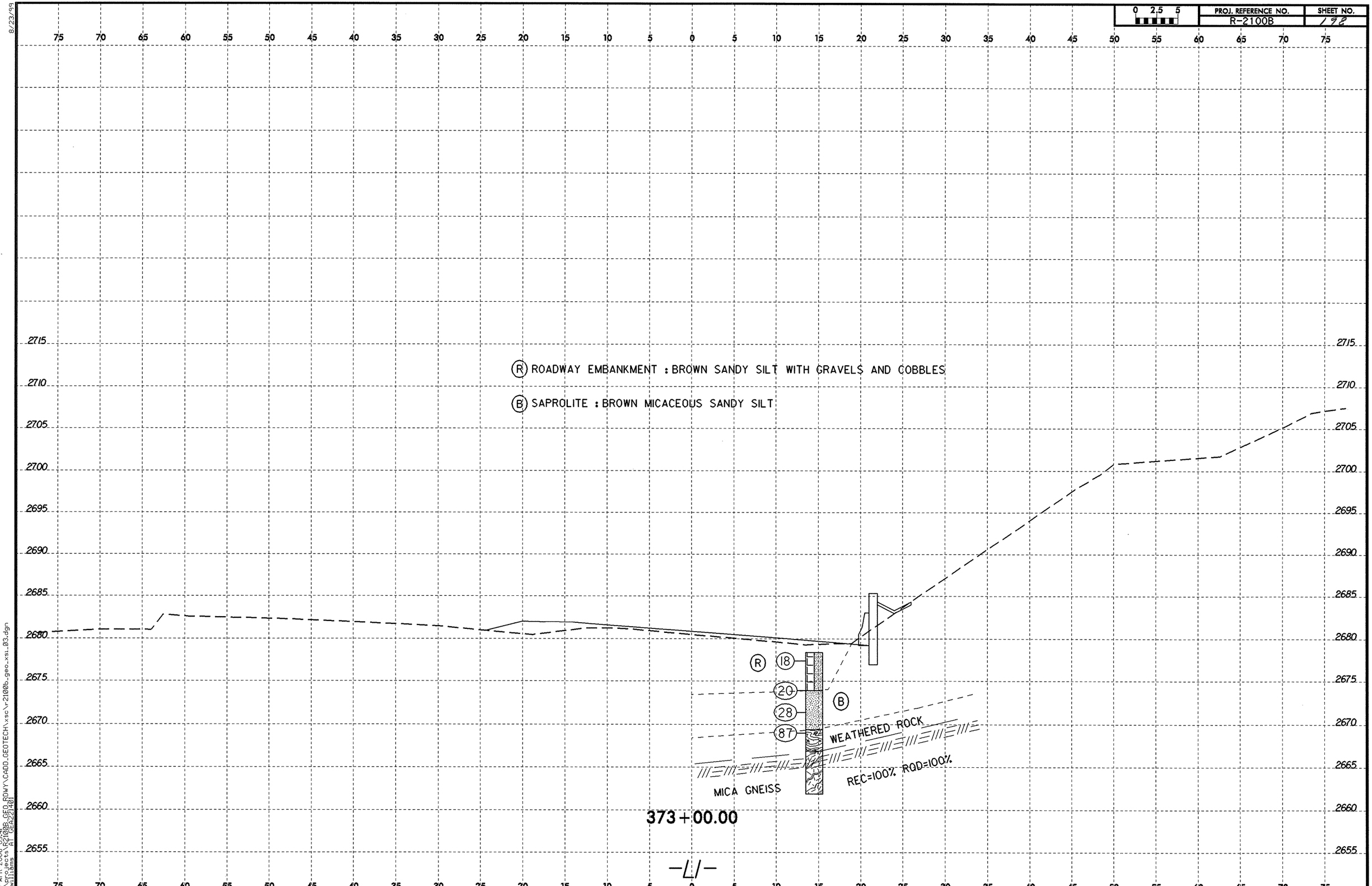

R-2100B
195
371+50.00
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
2660
2655
2650
2645
2640
2635
2630
2625
2620
2615
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
196
8/23/99
ROADWAY EMBANKMENT : BROWN SANDY SILT WITH GRAVEL, COBBLES AND BOULDERS
OFFSET
372+03
23
372+00.00
-L/-
2710
2705
2700
2695
2690
2685
2680
2675
2670
03-MAY-2006 14:38
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_02.dgn



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
197
C COLLUVIUM : ORANGE CLAYEY SILT TO SILTY SAND WITH A FEW GRAVEL
B SAPROLITE : LIGHT BROWN SILTY SAND
F ARTIFICIAL FILL
OFFSET
372+62
WEATHERED ROCK
SLIGHTLY TO MODERATELY WEATHERED GNEISS
REC=57% RQD=0%
REC=98% RQD=46%
372+50.00
-L1-



8/23/99

26-APR-2006 09:41
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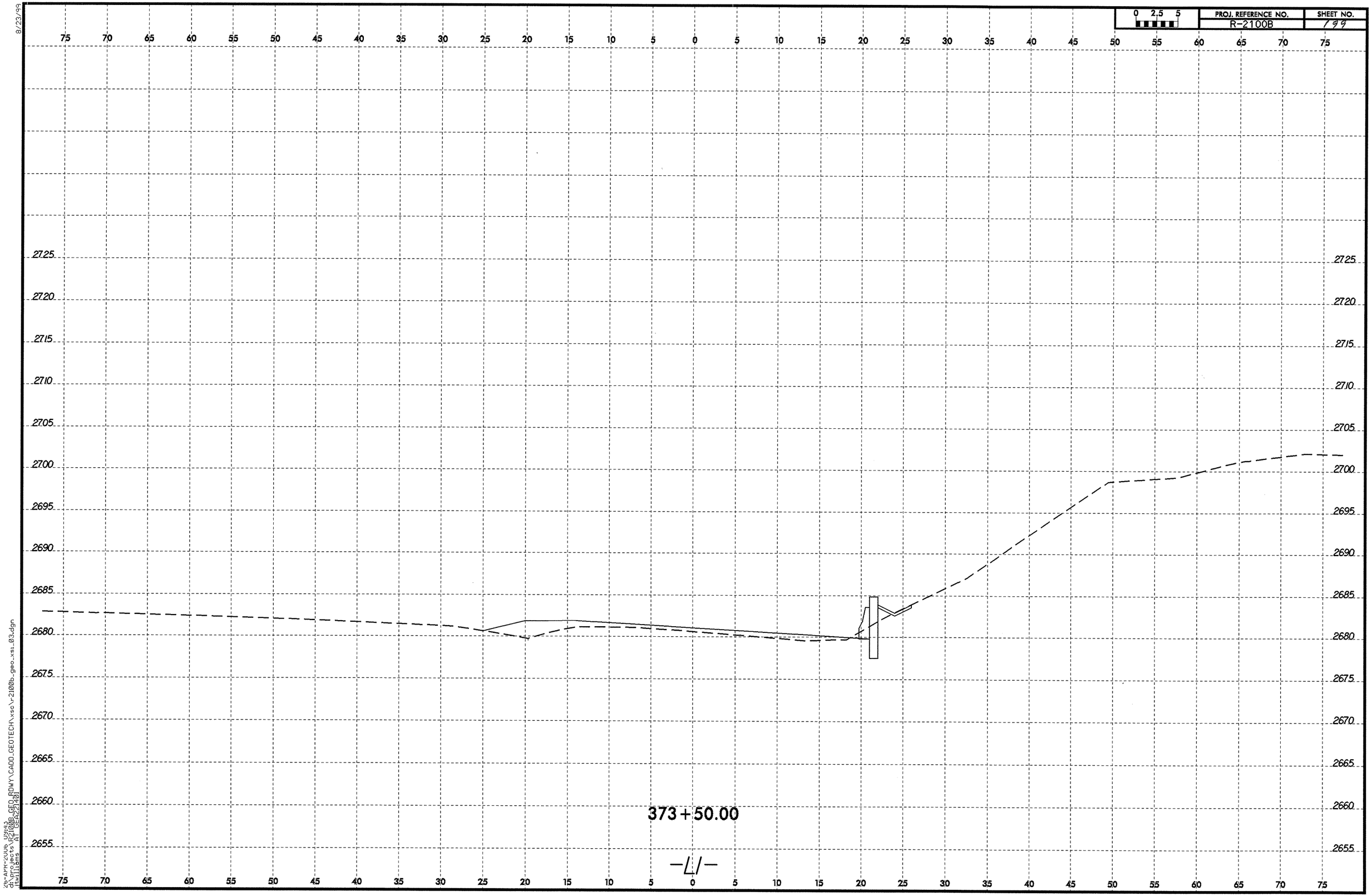
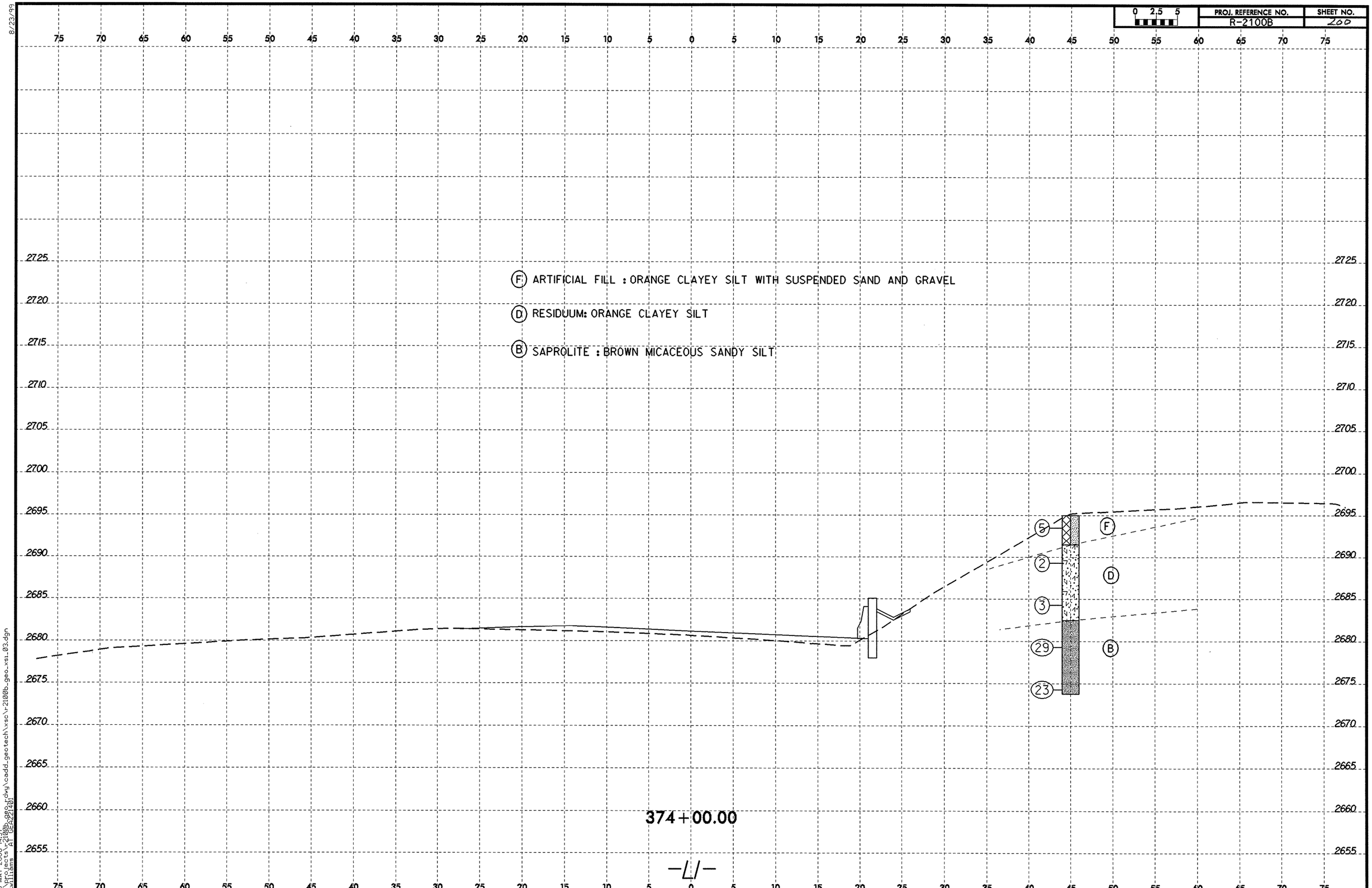
jtwilliams AT GEA221401

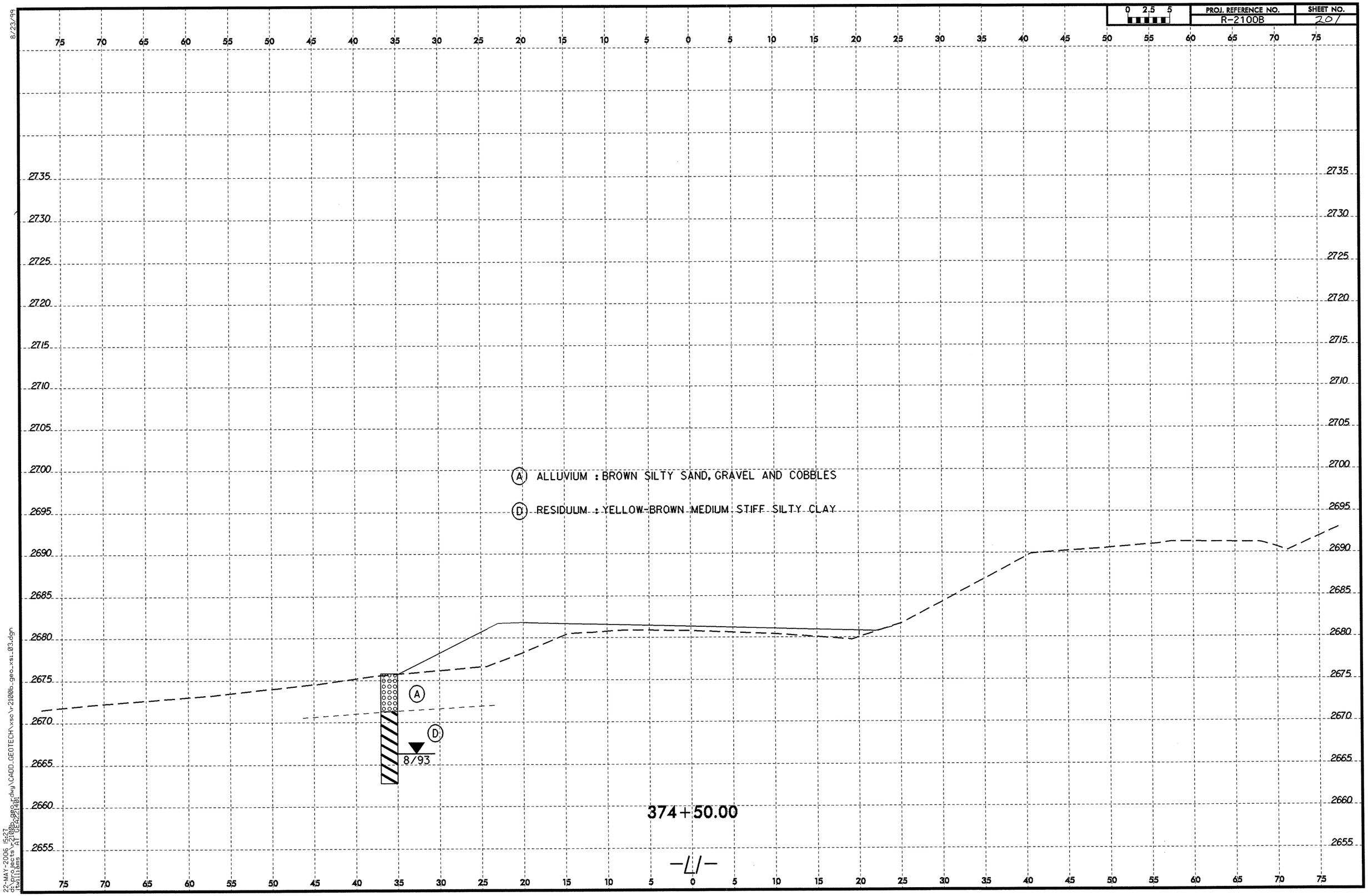


0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
199
373+50.00
-L/-

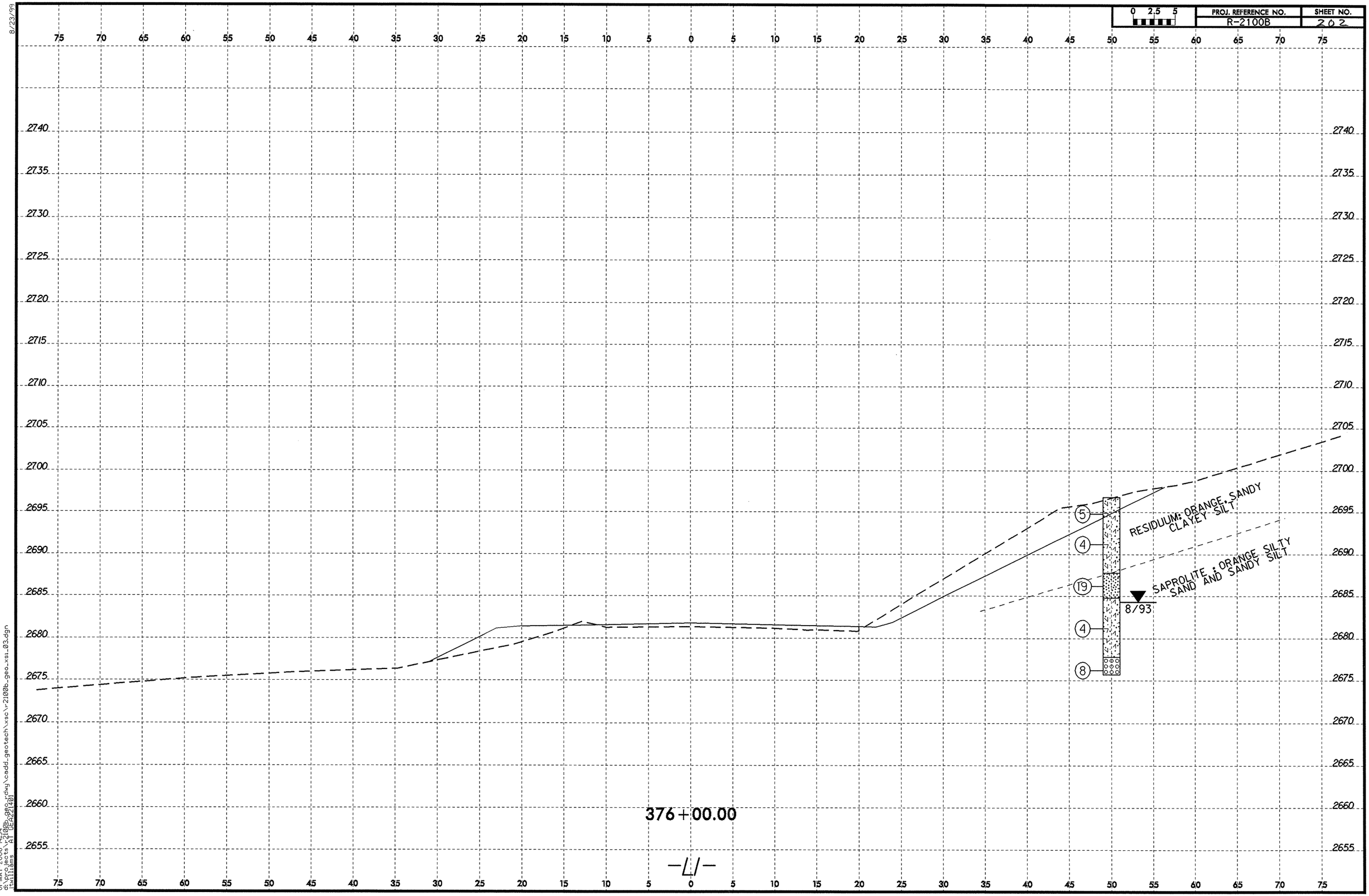


8/23/99

03-MAY-2006 14:57
d:\projects\r2100b_geo_rdwy\cadd_geotech\xsc\r2100b_geo_xsi_03.dgn
ltwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
201
8/23/99
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
2735
2730
2725
2720
2715
2710
2705
2700
2695
2690
2685
2680
2675
2670
2665
2660
2655
A ALLUVIUM : BROWN SILTY SAND, GRAVEL AND COBBLES
D RESIDUUM : YELLOW-BROWN MEDIUM STIFF SILTY CLAY
A
D
8/93
374+50.00
-L/-
22-MAY-2006 15:27
d:\projects\r2100b_geo_rdwy\CADD_GEOTECH\xsc\r2100b_geo_xsi_03.dgn
jtwilliams AT GEA221401



8/23/99

01-MAY-2006 14:54
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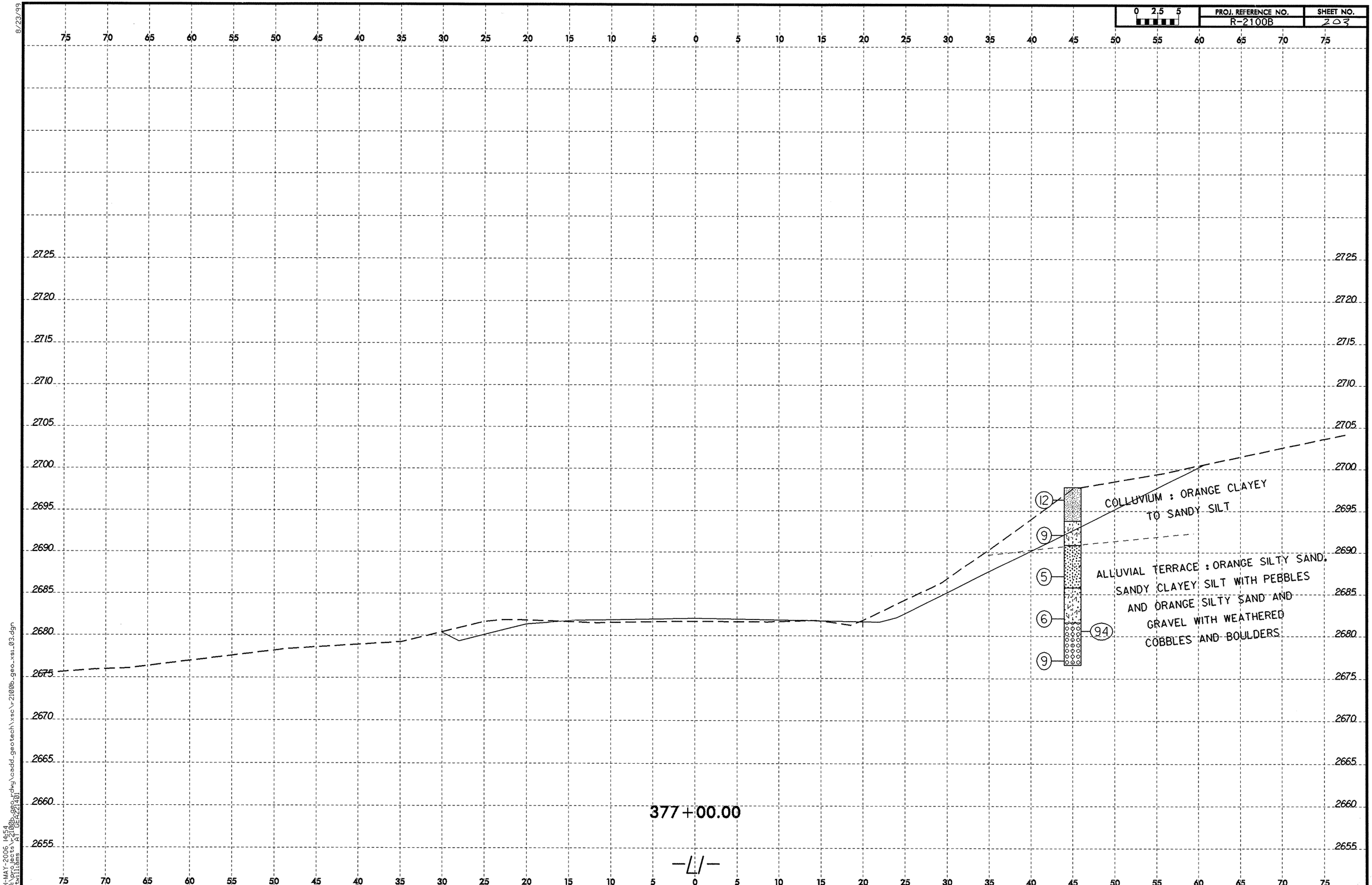
jtwilliams AT GEA221401



8/23/99

01-MAY-2006 14:54
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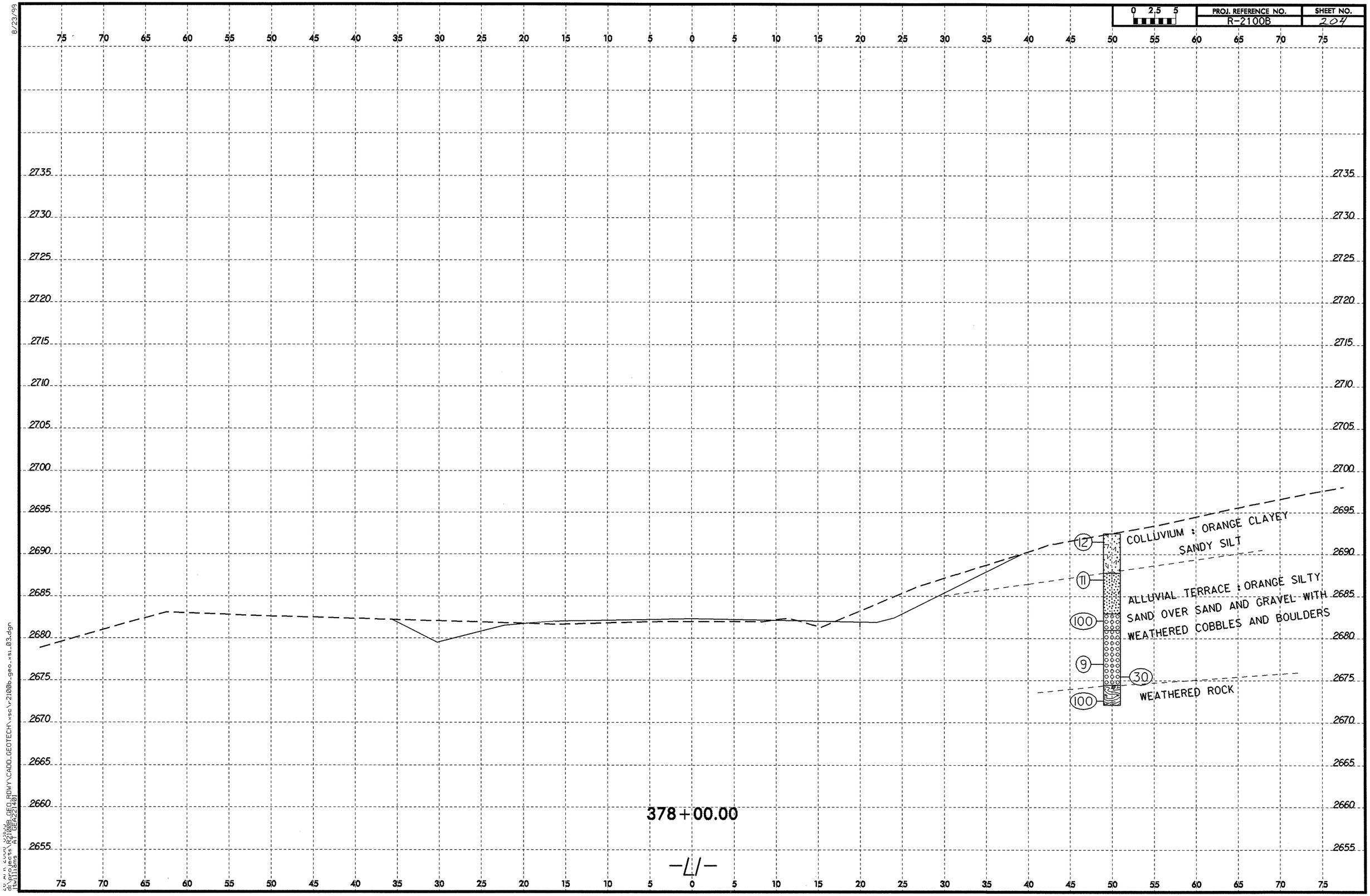
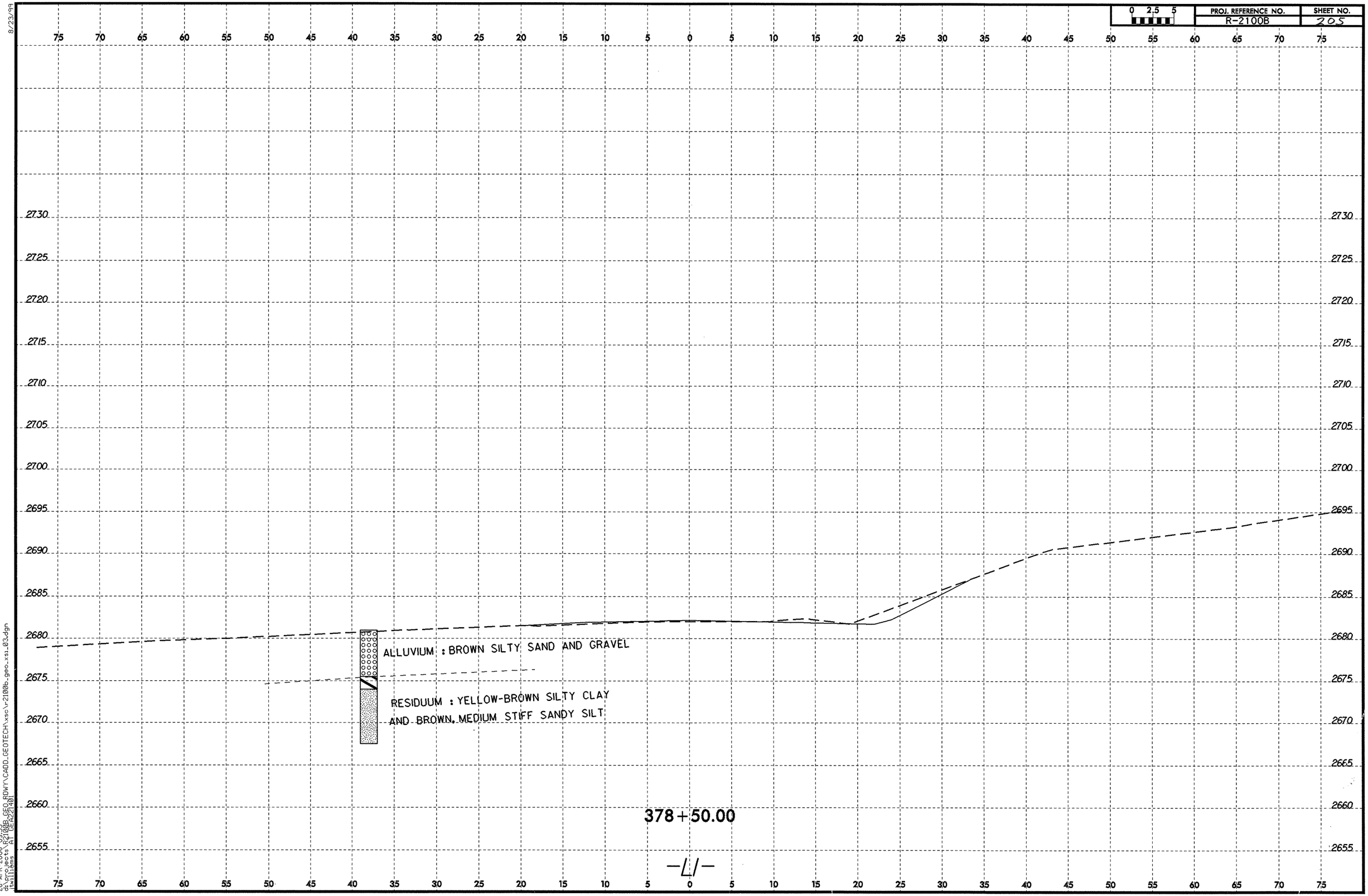
jtwilliams AT GEA221401



0 2.5 5
PROJ. REFERENCE NO.
R-2100B
SHEET NO.
204
COLLUVIUM : ORANGE CLAYEY SANDY SILT
ALLUVIAL TERRACE : ORANGE SILTY SAND OVER SAND AND GRAVEL WITH WEATHERED COBBLES AND BOULDERS
WEATHERED ROCK
12
11
100
9
30
100
378+00.00
-L/-



8/23/99

26-APR-2006 09:55
d:\projects\R2100B_GEO_RDWY\CADD_GEOTECH\xsc\r2100b_geo_xs1_03.dgn
jtwilliams AT GEA221401

JJL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	--

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--		
DATE SAMPLED:	7.05	DATE RECEIVED:	7.29.05	DATE REPORTED:	8.4.05		
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker				
SUBMITTED BY:	W. D. Frye			2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	ss-1	ss-2	ss-3	ss-4	ss-5	ss-1000	ss-1001	ss-1002
Lab Sample No. A	149840	149841	149842	149843	149844	149845	149846	149847
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	61	100	95	87	52	72	70	90
Passing #40 Sieve %	55	94	87	78	44	64	53	77
Passing #200 Sieve %	28	45	37	39	18	22	21	33

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	21	20	21	20	27	26	37	26
Fine Sand - Ret. #270	39	42	47	42	49	50	40	48
Silt 0.05-0.005 mm %	12	4	2	4	2	0	1	10
Clay < 0.005 mm %	28	34	30	34	22	24	22	16
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	43	37	33	39	32	29	38	41
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-5 (0)	A-4 (2)	A-4 (0)	A-4 (1)	A-1-b (0)	A-2-4 (0)	A-2-4 (0)	A-2-5 (0)
Quantity								
Texture								
Station	293+50	295+00	297+50	299+00	299+00	351+50	348+54	348+54
Hole No.								
Depth (ft) From:	1.0	1.0	1.0	1.0	4.7	8.5	3.0	8.0
To:	1.9	2.5	2.5	2.5	6.2	10.0	4.5	9.5

Remarks:

A-149840 - 149847

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

JJL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	--

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--		
DATE SAMPLED:	7.05	DATE RECEIVED:	7.29.05	DATE REPORTED:	8.4.05		
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker				
SUBMITTED BY:	W. D. Frye			2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	ss-1003	ss-1004						
Lab Sample No. A	149848	149849						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	--	--						
Passing #10 Sieve %	88	89						
Passing #40 Sieve %	77	82						
Passing #200 Sieve %	30	31						

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	24	21						
Fine Sand - Ret. #270	50	58						
Silt 0.05-0.005 mm %	10	9						
Clay < 0.005 mm %	16	12						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						

Liquid Limit	41	37						
Plastic Index	NP	NP						
AASHTO Classification	A-2-5 (0)	A-2-4 (0)						
Quantity								
Texture								
Station	348+54	348+54						
Hole No.								
Depth (ft) From:	23.0	25.0						
To:	24.5	26.5						

Remarks:

A-149848 & 149849

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

G:/Everyone. . . /M&T Forms/Regional Lab Statesville/Soils Test Report M&T 503E 8-19-2000

M&T 503E

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.19.05	DATE REPORTED:	8.29.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-7	SS-8	SS-10	SS-11	SS-13	SS-14	SS-532	SS-533
Lab Sample No. A	150061	150062	150063	150064	150065	150066	150067	150068
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	59	49	77	58	56	34	72	70
Passing #40 Sieve %	50	40	69	47	38	28	59	62
Passing #200 Sieve %	24	15	39	18	21	15	19	27

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	26	31	20	26	32	27	27	24
Fine Sand - Ret. #270	41	47	36	51	41	36	54	48
Silt 0.05-0.005 mm %	21	20	28	19	25	25	15	20
Clay < 0.005 mm %	12	2	16	4	2	12	4	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	32	31	32	30	33	35	31	28
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-1-b (0)	A-1-b (0)	A-4 (1)	A-2-4 (0)	A-1-b (0)	A-1-a (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	300+50	300+50	301+50	301+50	302+50	303+50	341+50	341+50
Hole No.								
Depth (ft) From:	1.7	4.8	0.8	5.4	5.2	1.8	5.0	10.0
To:	3.2	6.3	2.3	6.9	6.7	3.3	6.5	11.5

Remarks:

A-150061 - 150068

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

JJL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	--

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	7.05	DATE RECEIVED:	7.29.05	DATE REPORTED:	8.4.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	ss-1003	ss-1004						
Lab Sample No. A	149848	149849						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	--	--						
Passing #10 Sieve %	88	89						
Passing #40 Sieve %	77	82						
Passing #200 Sieve %	30	31						

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	24	21						
Fine Sand - Ret. #270	50	58						
Silt 0.05-0.005 mm %	10	9						
Clay < 0.005 mm %	16	12						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						

Liquid Limit	41	37						
Plastic Index	NP	NP						
AASHTO Classification	A-2-5 (0)	A-2-4 (0)						
Quantity								
Texture								
Station	348+54	348+54						
Hole No.								
Depth (ft) From:	23.0	25.0						
To:	24.5	26.5						

Remarks:

A-149848 & 149849

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	7.05	DATE RECEIVED:	8.19.05	DATE REPORTED:	8.29.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-558	SS-559	SS-1005	SS-1006	SS-1007			
Lab Sample No. A	150085	150086	150087	150088	150089			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	78	83	91	59	81			
Passing #40 Sieve %	71	74	84	56	72			
Passing #200 Sieve %	37	24	41	14	21			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	20	29	19	18	27			
Fine Sand - Ret. #270	39	49	42	67	57			
Silt 0.05-0.005 mm %	19	18	21	15	16			
Clay < 0.005 mm %	22	4	18	0	0			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	34	31	33	30	39			
Plastic Index	8	NP	NP	NP	NP			
AASHTO Classification	A-4 (1)	A-2-4 (0)	A-4 (1)	A-2-4 (0)	A-2-4 (0)			
Quantity								
Texture								
Station	339+00	339+00	354+50	354+50	354+50			
Hole No.								
Depth (ft) From:	2.5	5.0	2.7	7.7	16.6			
To:	4.0	6.5	4.2	9.2	18.1			

Remarks:

A-150085 - 150089

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--		
DATE SAMPLED:	8.05	DATE RECEIVED:	9.8.05	DATE REPORTED:	9.14.05		
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker				
SUBMITTED BY:	W. D. Frye			2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	SS-1008	SS-16	SS-17	SS-21	SS-22			
Lab Sample No. A	150296	150297	150298	150299	150300			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	87	35	59	53	66			
Passing #40 Sieve %	79	30	51	44	56			
Passing #200 Sieve %	33	13	19	18	21			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	26	28	28	28	25			
Fine Sand - Ret. #270	46	44	48	48	52			
Silt 0.05-0.005 mm %	14	10	8	8	11			
Clay < 0.005 mm %	14	18	16	16	12			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	34	39	36	33	32			
Plastic Index	NP	NP	NP	NP	NP			
AASHTO Classification	A-2-4 (0)	A-1-a (0)	A-2-4 (0)	A-1-b (0)	A-2-4 (0)			
Quantity								
Texture								
Station	357+50	306+00	306+00	310+00	310+00			
Hole No.								
Depth (ft) From:	2.0	2.1	4.9	2.3	4.6			
To:	3.5	3.6	6.4	3.8	6.1			

Remarks:

A-150296 - 150300

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--		
DATE SAMPLED:	8.05	DATE RECEIVED:	8.12.05	DATE REPORTED:	8.23.05		
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker				
SUBMITTED BY:	W. D. Frye			2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	SS-501	SS-502	SS-506	SS-507	SS-508	SS-509	SS-510	SS-511
Lab Sample No. A	150001	150002	150003	150004	150005	150006	150007	150008
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	92	96	87	84	96	84	59	30
Passing #40 Sieve %	86	94	78	77	94	81	55	24
Passing #200 Sieve %	65	35	43	58	53	27	36	16

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	10	15	19	10	8	21	11	27
Fine Sand - Ret. #270	25	54	44	27	46	52	36	30
Silt 0.05-0.005 mm %	26	17	35	34	22	15	29	33
Clay < 0.005 mm %	39	14	2	29	24	12	24	10
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	41	34	22	35	43	32	59	29
Plastic Index	6	NP	NP	9	NP	NP	9	3
AASHTO Classification	A-5 (6)	A-2-4 (0)	A-4 (1)	A-4 (5)	A-5 (4)	A-2-4 (0)	A-5 (0)	A-1-b (0)
Quantity								
Texture								
Station	378+00	378+00	378+00	377+00	377+00	377+00	377+00	377+00
Hole No.								
Depth (ft) From:	0.0	4.5	19.5	0.5	4.7	9.7	14.7	16.2
To:	1.5	6.0	20.4	2.0	6.2	11.2	16.2	17.7

Remarks:

A-150001 - 150008

CC:

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File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1 (cont.)	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.12.05	DATE REPORTED:	8.23.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-512	SS-513	SS-514	SS-515	SS-516	SS-517	SS-518	SS-519
Lab Sample No. A	150009	150010	150011	150012	150013	150014	150015	150016
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	48	32	100	100	100	99	63	31
Passing #40 Sieve %	38		98	98	97	92	56	25
Passing #200 Sieve %	22		74	73	49	51	43	17

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	31		5	4	9	13	16	25
Fine Sand - Ret. #270	32		31	34	57	51	22	29
Silt 0.05-0.005 mm %	29		37	42	32	34	35	30
Clay < 0.005 mm %	8		27	20	2	2	27	16
Passing # 40 Sieve %	--		--	--	--	--	--	--
Passing # 200 Sieve %	--		--	--	--	--	--	--

Liquid Limit	40		59	68	33	33	39	41
Plastic Index	NP		3	NP	NP	NP	8	5
AASHTO Classification	A-1-b (0)		A-5 (12)	A-5 (12)	A-4 (3)	A-4 (3)	A-4 (2)	A-2-5 (0)
Quantity								
Texture								
Station	377+00		374+00	374+00	374+00	374+00	372+50	372+50
Hole No.								
Depth (ft) From:	19.7		4.7	9.7	14.7	19.7	1.0	5.3
To:	21.2		6.2	11.2	16.2	21.2	2.5	6.8

Remarks:

A-150009 – 150016, Sample SS-513 did not have enough material to finish test.

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1 (cont.)	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.12.05	DATE REPORTED:	8.23.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-521	SS-522	SS-523	SS-524	SS-525			
Lab Sample No. A	150017	150018	150019	150020	150021			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	92	98	79	96	57			
Passing #40 Sieve %	85	95	67	87	48			
Passing #200 Sieve %	46	70	32	38	25			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	13	7	29	16	23			
Fine Sand - Ret. #270	45	32	40	57	47			
Silt 0.05-0.005 mm %	20	28	27	25	22			
Clay < 0.005 mm %	22	33	4	2	8			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	48	64	40	62	45			
Plastic Index	NP	2	NP	NP	NP			
AASHTO Classification	A-5 (3)	A-5 (10)	A-2-4 (0)	A-5 (1)	A-1-b (0)			
Quantity								
Texture								
Station	376+00	376+00	376+00	376+00	376+00			
Hole No.								
Depth (ft) From:	1.0	4.6	9.6	14.6	19.6			
To:	2.5	6.1	11.2	16.2	21.2			

Remarks:

A-150017 - 150021

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.19.05	DATE REPORTED:	8.29.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-7	SS-8	SS-10	SS-11	SS-13	SS-14	SS-532	SS-533
Lab Sample No. A	150061	150062	150063	150064	150065	150066	150067	150068
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	59	49	77	58	56	34	72	70
Passing #40 Sieve %	50	40	69	47	38	28	59	62
Passing #200 Sieve %	24	15	39	18	21	15	19	27

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	26	31	20	26	32	27	27	24
Fine Sand - Ret. #270	41	47	36	51	41	36	54	48
Silt 0.05-0.005 mm %	21	20	28	19	25	25	15	20
Clay < 0.005 mm %	12	2	16	4	2	12	4	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	32	31	32	30	33	35	31	28
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-1-b (0)	A-1-b (0)	A-4 (1)	A-2-4 (0)	A-1-b (0)	A-1-a (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	300+50	300+50	301+50	301+50	302+50	303+50	341+50	341+50
Hole No.								
Depth (ft) From:	1.7	4.8	0.8	5.4	5.2	1.8	5.0	10.0
To:	3.2	6.3	2.3	6.9	6.7	3.3	6.5	11.5

Remarks:

A-150061 - 150068

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1 (cont.)	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.19.05	DATE REPORTED:	8.29.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-534	SS-535	SS-537	SS-539	SS-540	SS-544	SS-545	SS-546
Lab Sample No. A	150069	150070	150071	150072	150073	150074	150075	150076
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	93	96	81	94	80	85	94	91
Passing #40 Sieve %	88	88	73	90	72	76	88	87
Passing #200 Sieve %	54	30	27	41	36	37	44	33

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	12	20	24	12	21	23	17	10
Fine Sand - Ret. #270	38	57	51	54	42	40	44	62
Silt 0.05-0.005 mm %	32	19	19	24	23	23	25	20
Clay < 0.005 mm %	18	4	6	10	14	14	14	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	41	32	34	39	30	33	33	31
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-5 (4)	A-2-4 (0)	A-2-4 (0)	A-4 (1)	A-4 (0)	A-4 (1)	A-4 (2)	A-2-4 (0)
Quantity								
Texture								
Station	341+50	341+50	341+00	341+00	341+00	352+50	352+50	352+50
Hole No.								
Depth (ft) From:	15.0	20.0	5.0	15.0	20.0	1.5	9.7	14.8
To:	16.5	21.5	6.5	16.5	21.5	3.0	10.3	16.3

Remarks:

A-150069 - 150076

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1 (cont.)	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	8.19.05	DATE REPORTED:	8.29.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-547	SS-549	SS-550	SS-552	SS-553	SS-554	SS-555	SS-556
Lab Sample No. A	150077	150078	150079	150080	150081	150082	150083	150084
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	85	88	67	79	94	90	41	39
Passing #40 Sieve %	74	82	59	71	88	81	32	28
Passing #200 Sieve %	21	45	25	37	49	28	13	8

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	28	18	17	21	17	25	34	42
Fine Sand - Ret. #270	60	38	54	40	38	35	43	43
Silt 0.05-0.005 mm %	12	28	21	23	31	17	19	15
Clay < 0.005 mm %	0	16	8	16	14	6	4	0
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	46	34	32	32	34	37	25	29
Plastic Index	NP	4	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-5 (0)	A-4 (2)	A-2-4 (0)	A-4 (1)	A-4 (3)	A-2-4 (0)	A-1-b (0)	A-1-b (0)
Quantity								
Texture								
Station	352+50	340+00	340+00	339+50	339+50	339+50	338+50	338+50
Hole No.								
Depth (ft) From:	19.8	10.0	15.0	4.8	9.8	14.8	1.0	2.9
To:	21.3	11.5	16.5	6.3	11.3	16.3	2.5	4.4

Remarks:

A-150077 - 150084

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	**R-2100B**

REPORT ON SAMPLES OF:	**Soils for Classification**

PROJECT:	**34369.1.1**	**COUNTY:**	**Ashe**		**Owner:**	**--**	
DATE SAMPLED:	**7.05**	**DATE RECEIVED:**	**8.19.05**		**DATE REPORTED:**	**8.29.05**	
SAMPLED FROM:	**Roadway**		**SAMPLED BY:**	**L. L. Acker**			
SUBMITTED BY:	**W. D. Frye**			**2002**	**STANDARD SPECIFICATION**		
LABORATORY:	**Asheville**						

TEST RESULTS

Project Sample No.	SS-558	SS-559	SS-1005	SS-1006	SS-1007			
Lab Sample No. A	150085	150086	150087	150088	150089			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	78	83	91	59	81			
Passing #40 Sieve %	71	74	84	56	72			
Passing #200 Sieve %	37	24	41	14	21			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	20	29	19	18	27			
Fine Sand - Ret. #270	39	49	42	67	57			
Silt 0.05-0.005 mm %	19	18	21	15	16			
Clay < 0.005 mm %	22	4	18	0	0			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	34	31	33	30	39			
Plastic Index	8	NP	NP	NP	NP			
AASHTO Classification	A-4 (1)	A-2-4 (0)	A-4 (1)	A-2-4 (0)	A-2-4 (0)			
Quantity								
Texture								
Station	339+00	339+00	354+50	354+50	354+50			
Hole No.								
Depth (ft) From:	2.5	5.0	2.7	7.7	16.6			
To:	4.0	6.5	4.2	9.2	18.1			

Remarks:

A-150085 - 150089

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

KHJ

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R2100B

REPORT ON SAMPLES OF:	SOILS FOR CLASSIFICATION

PROJECT:	34369.1.1	COUNTY:	ASHE	Owner:	--
DATE SAMPLED:	07/05	DATE RECEIVED:	08/19/05	DATE REPORTED:	08/30/05
SAMPLED FROM:	ROADWAY	SAMPLED BY:	L.L. ACKER		
SUBMITTED BY:	W.D. FRYE		2002	STANDARD SPECIFICATION	
LABORATORY:	ASHEVILLE				

TEST RESULTS

Project Sample No.	SS-526	SS-527	SS-528	SS-542	SS-560	SS-561	SS-562	SS-563
Lab Sample No. A	150095	150096	150097	150098	150099	150100	150101	150102
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	38	85	54	48	65	62	63	72
Passing #40 Sieve %	32	80	48	40	60	57	56	65
Passing #200 Sieve %	20	51	30	13	35	27	18	31

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	21	10	17	24	19	20	27	20
Fine Sand - Ret. #270	38	47	40	56	34	44	53	47
Silt 0.05-0.005 mm %	33	35	29	16	31	24	18	19
Clay < 0.005 mm %	8	8	14	4	16	12	2	14
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	25	39	43	29	35	33	32	40
Plastic Index	NP	NP	NP	NP	4	NP	NP	NP
AASHTO Classification	A-1-b(0)	A-4(3)	A-1-b(0)	A-1-b(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)
Quantity								
Texture								
Station	369+65	369+65	369+65	340+50	340+00	340+00	340+00	324+00
Hole No.								
Depth (ft) From:	1.0	3.7	8.7	15.0	2.5	5.0	10.0	2.5
To:	2.5	5.2	10.2	16.5	4.0	6.5	11.5	4.0

Remarks:

A150095-150102

CC:

L.L. ACKER	
FILE	

SOILS ENGINEER:	

KHJ

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
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SUBMITTED BY:	W.D. FRYE		2002	STANDARD SPECIFICATION	
LABORATORY:	ASHEVILLE				

TEST RESULTS

Project Sample No.	SS-564	SS-565	SS-566	SS-567	SS-568	SS-569	SS-570	SS-571
Lab Sample No.	150103	150104	150105	150106	150107	150108	150109	150110
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	87	82	84	91	86	80	64	82
Passing #40 Sieve %	75	69	77	83	79	76	58	75
Passing #200 Sieve %	29	24	36	26	40	37	20	34

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	25	21	20	21	20	15	22	12
Fine Sand - Ret. #270	53	60	47	61	40	46	56	53
Silt 0.05-0.005 mm %	20	19	19	18	26	23	16	19
Clay < 0.005 mm %	2	0	14	0	14	16	6	16
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	41	43	52	46	36	32	31	29
Plastic Index	NP	NP	NP	NP	NP	NP	NP	2
AASHTO Classification	A-2-5(0)	A-2-5(0)	A-5(0)	A-2-5(0)	A-4(1)	A-4(0)	A-2-4(0)	A-2-4(0)
Quantity								
Texture								
Station	324+00	324+00	324+50	324+50	353+00	353+00	353+00	353+50
Hole No.								
Depth (ft) From:	5.0	10.0	5.0	10.0	5.0	15.0	20.0	5.0
To:	6.5	11.5	6.5	11.5	6.5	16.5	21.5	6.5

Remarks:

A150103-150110

CC:

L. L. ACKER	
FILE	

SOILS ENGINEER:	

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SUBMITTED BY:	W.D. FRYE	2002	STANDARD SPECIFICATION		
LABORATORY:	ASHEVILLE				

TEST RESULTS

Project Sample No.	SS-572	SS-574	SS-575	SS-576	SS-578	SS-579	SS-580	SS-581
Lab Sample No.	150111	150112	150113	150114	150115	150116	150117	150118
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	100	80	54	85	53	89	76	80
Passing #40 Sieve %	98	74	49	78	44	83	68	76
Passing #200 Sieve %	46	30	18	23	16	27	25	47

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	2	22	22	20	34	18	23	13
Fine Sand - Ret. #270	63	49	54	64	40	63	53	34
Silt 0.05-0.005 mm %	19	15	16	14	14	15	14	23
Clay < 0.005 mm %	16	14	8	2	12	4	10	30
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	33	35	31	44	30	40	46	39
Plastic Index	NP	NP	NP	NP	NP	NP	NP	3
AASHTO Classification	A-4(2)	A-2-4(0)	A-1-b(0)	A-2-5(0)	A-1-b(0)	A-2-4(0)	A-2-5(0)	A-4(2)
Quantity								
Texture								
Station	353+50	354+00	354+00	354+00	354+50	354+50	330+50	326+50
Hole No.								
Depth (ft) From:	15.0	15.0	20.0	25.0	15.0	20.0	2.5	2.6
To:	16.5	16.5	21.5	26.5	16.5	21.5	4.6	4.1

Remarks:

A150111-150118

CC:

L.L. ACKER	
FILE	

SOILS ENGINEER:	

M&T 503E

KHJ

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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T.I.P. ID #:	R2100B

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SUBMITTED BY:	W.D. FRYE	2002	STANDARD SPECIFICATION		
LABORATORY:	ASHEVILLE				

TEST RESULTS

Project Sample No.	SS-586	SS-587						
Lab Sample No.	150119	150120						
HiCAMS Sample #	--	--						
Retained #4 Sieve %	--	--						
Passing #10 Sieve %	83	96						
Passing #40 Sieve %	76	89						
Passing #200 Sieve %	32	22						

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	22	13						
Fine Sand - Ret. #270	45	74						
Silt 0.05-0.005 mm %	13	11						
Clay < 0.005 mm %	20	2						
Passing # 40 Sieve %	--	--						
Passing # 200 Sieve %	--	--						

Liquid Limit	39	44						
Plastic Index	3	NP						
AASHTO Classification	A-2-4(0)	a-2-5(0)						
Quantity								
Texture								
Station	326+50	326+50						
Hole No.								
Depth (ft) From:	4.8	9.8						
To:	6.3	11.3						

Remarks:

A150119-150120

CC:

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SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
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DATE SAMPLED:	8.05	DATE RECEIVED:	9.23.05	DATE REPORTED:	10.5.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-24	SS-26	SS-582	SS-583	SS-584	SS-592	SS-593	SS-594
Lab Sample No. A	150464	150465	150466	150467	150468	150469	150470	150471
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	72	73	84	95	91	89	74	87
Passing #40 Sieve %	60	60	78	80	78	82	62	75
Passing #200 Sieve %	22	21	49	31	25	49	24	23

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30	31	16	31	29	17	29	30
Fine Sand - Ret. #270	48	51	31	46	53	34	46	50
Silt 0.05-0.005 mm %	20	16	23	19	16	21	17	12
Clay < 0.005 mm %	2	2	30	4	2	28	8	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	28	36	36	44	38	35	39	37
Plastic Index	NP	NP	5	NP	NP	5	NP	NP
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-4 (3)	A-2-5 (0)	A-2-4 (0)	A-4 (3)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	311+50	312+00	326+00	326+00	326+00	324+62	324+62	324+62
Hole No.								
Depth (ft) From:	4.4	4.7	2.8	9.8	19.8	4.7	9.7	14.7
To:	5.9	6.2	4.3	11.3	21.3	6.2	11.2	16.2

Remarks:

A-150464 - 150471

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
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SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-595	SS-596	SS-597	SS-598	SS-599	SS-600	SS-602	SS-603
Lab Sample No. A	150472	150473	150474	150475	150476	150477	150478	150479
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	90	92	95	93	75	73	87	93
Passing #40 Sieve %	80	83	83	81	64	59	78	83
Passing #200 Sieve %	22	17	22	39	29	24	43	30

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	27	28	29	25	26	31	23	24
Fine Sand - Ret. #270	56	60	57	40	46	47	35	53
Silt 0.05-0.005 mm %	11	10	12	19	18	20	24	13
Clay < 0.005 mm %	6	2	2	16	10	2	18	10
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	46	38	47	42	43	33	32	36
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-5 (0)	A-2-4 (0)	A-2-5 (0)	A-5 (1)	A-2-5 (0)	A-2-4 (0)	A-4 (2)	A-2-4 (0)
Quantity								
Texture								
Station	326+40	326+40	326+40	319+80	319+80	319+80	321+40	321+40
Hole No.								
Depth (ft) From:	2.5	4.1	9.1	2.0	4.8	9.0	2.0	4.5
To:	4.0	5.6	10.6	3.5	6.3	10.5	3.5	6.0

Remarks:

A-150472 - 150479

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-604	SS-605	SS-606	SS-607	SS-608	SS-610	SS-611	SS-613
Lab Sample No. A	150480	150481	150482	150483	150484	150485	150486	150487
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	90	91	73	52	63	91	36	80
Passing #40 Sieve %	79	80	58	42	49	84	30	68
Passing #200 Sieve %	37	26	19	13	17	36	11	31

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	23	27	35	31	36	17	25	28
Fine Sand - Ret. #270	46	53	47	52	47	53	56	40
Silt 0.05-0.005 mm %	25	16	16	15	17	20	19	24
Clay < 0.005 mm %	6	4	2	2	0	10	0	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	40	37	36	32	39	35	32	36
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-4 (0)	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-1-b (0)	A-4 (0)	A-1-a (0)	A-2-4 (0)
Quantity								
Texture								
Station	321+40	321+40	321+40	282+00	282+00	278+00	280+50	284+00
Hole No.								
Depth (ft) From:	9.5	14.5	19.5	5.0	10.0	2.0	5.0	2.0
To:	11.0	16.0	21.0	6.5	11.5	3.0	6.5	3.5

Remarks:

A-150480 - 150487

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-614	SS-618	SS-619	SS-621	SS-622	SS-623	SS-624	SS-625
Lab Sample No. A	150488	150489	150490	150491	150492	150493	150494	150495
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	91	78	55	30	65	61	55	82
Passing #40 Sieve %	78	72	48	23	55	55	41	76
Passing #200 Sieve %	21	40	21	10	20	22	14	28

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30	17	23	33	27	22	40	18
Fine Sand - Ret. #270	55	41	47	40	53	51	40	59
Silt 0.05-0.005 mm %	13	32	22	21	16	23	16	21
Clay < 0.005 mm %	2	10	8	6	4	4	4	2
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	44	43	32	34	34	32	31	45
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-5 (0)	A-5 (1)	A-1-b (0)	A-1-a (0)	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-2-5 (0)
Quantity								
Texture								
Station	284+00	294+50	280+30	280+00	280+00	269+50	266+50	266+50
Hole No.								
Depth (ft) From:	9.5	5.0	5.0	5.0	10.0	5.0	4.5	9.5
To:	11.0	6.5	6.5	6.5	11.0	6.5	6.0	11.0

Remarks:

A-150488 - 150495

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-627	SS-628	SS-631	SS-632				
Lab Sample No. A	150496	150497	150498	150499				
HiCAMS Sample #	--	--	--	--				
Retained #4 Sieve %	--	--	--	--				
Passing #10 Sieve %	84	75	89	93				
Passing #40 Sieve %	76	61	81	87				
Passing #200 Sieve %	44	22	37	40				

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	17	32	19	16				
Fine Sand - Ret. #270	39	47	49	56				
Silt 0.05-0.005 mm %	24	17	24	24				
Clay < 0.005 mm %	20	4	8	4				
Passing # 40 Sieve %	--	--	--	--				
Passing # 200 Sieve %	--	--	--	--				

Liquid Limit	37	34	34	39				
Plastic Index	NP	NP	NP	NP				
AASHTO Classification	A-4 (2)	A-2-4 (0)	A-4 (0)	A-4 (1)				
Quantity								
Texture								
Station	255+50	255+50	321+00	321+00				
Hole No.								
Depth (ft) From:	5.0	10.0	2.0	5.0				
To:	6.5	11.5	3.5	6.5				

Remarks:

A-150496 - 150499

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-634	SS-635	SS-640	SS-642	SS-644	SS-645	SS-646	SS-647
Lab Sample No. A	150500	150501	150502	150503	150504	150505	150506	150507
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	63	86	44	69	82	91	100	90
Passing #40 Sieve %	53	74	32	56	70	83	97	75
Passing #200 Sieve %	17	25	13	24	29	29	34	37

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30	27	37	31	27	23	16	28
Fine Sand - Ret. #270	53	56	43	41	50	55	57	39
Silt 0.05-0.005 mm %	13	15	18	18	19	18	21	25
Clay < 0.005 mm %	4	2	2	10	4	4	6	8
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	33	33	31	30	30	28	24	31
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-4 (0)
Quantity								
Texture								
Station	339+50	338+50	269+50	271+00	349+50	349+50	349+50	349+50
Hole No.								
Depth (ft) From:	5.0	5.0	2.0	2.0	5.0	10.0	15.0	20.0
To:	6.5	6.5	3.5	3.5	6.5	11.5	16.5	21.5

Remarks:

A-150500 - 150507

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100 B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	9.23.05	DATE REPORTED:	10.6.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-648	SS-700	SS-702	SS-703	SS-705	SS-706	SS-707	SS-709
Lab Sample No. A	150508	150509	150510	150511	150512	150513	150514	150515
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	100	66	77	78	64	59	54	68
Passing #40 Sieve %	92	56	66	69	54	50	46	62
Passing #200 Sieve %	36	21	24	27	20	17	11	29

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	22	29	29	24	30	30	33	21
Fine Sand - Ret. #270	54	48	46	53	45	50	53	43
Silt 0.05-0.005 mm %	20	13	15	19	13	12	10	22
Clay < 0.005 mm %	4	10	10	4	12	8	4	14
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	26	30	41	31	37	32	34	28
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-4 (0)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-1-b (0)	A-2-4 (0)
Quantity								
Texture								
Station	349+50	350+50	351+50	351+50	352+50	352+50	352+50	353+50
Hole No.								
Depth (ft) From:	25.0	5.0	5.0	10.0	2.5	5.0	10.0	1.5
To:	26.5	6.5	6.5	11.5	4.0	6.5	11.5	3.0

Remarks:

A-150508 - 150515

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

M&T 503E

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100 B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	9.23.05	DATE REPORTED:	10.6.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-710	SS-712	SS-713	SS-714	SS-715	SS-717	SS-718	SS-720
Lab Sample No. A	150516	150517	150518	150519	150520	150521	150522	150523
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	89	84	51	92	98	40	35	39
Passing #40 Sieve %	77	77	44	85	91	34	30	34
Passing #200 Sieve %	23	35	18	31	29	12	12	12

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30	21	29	20	19	29	25	27
Fine Sand - Ret. #270	52	46	41	60	62	49	53	51
Silt 0.05-0.005 mm %	14	19	18	18	15	20	20	18
Clay < 0.005 mm %	4	14	12	2	4	2	2	4
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	36	33	26	33	38	28	25	31
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	A-1-a (0)	A-1-b (0)
Quantity								
Texture								
Station	353+50	354+50	354+50	354+50	354+50	355+50	355+50	356+50
Hole No.								
Depth (ft) From:	5.0	1.5	5.0	10.0	15.0	5.0	5.0	1.5
To:	6.5	3.0	6.5	11.5	16.5	6.5	6.5	3.0

Remarks:

A-150516 - 150523

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100 B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	9.23.05	DATE REPORTED:	10.6.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-721	SS-723	SS-724	SS-726	SS-727	SS-729	SS-731	SS-732
Lab Sample No. A	150524	150525	150526	150527	150528	150529	150530	150531
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	67	75	62	60	71	70	96	76
Passing #40 Sieve %	58	67	54	56	67	64	87	68
Passing #200 Sieve %	15	28	19	26	20	20	37	26

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	31	24	28	18	22	21	23	24
Fine Sand - Ret. #270	54	45	50	44	58	61	45	52
Silt 0.05-0.005 mm %	13	21	18	10	6	8	6	4
Clay < 0.005 mm %	2	10	4	28	14	10	26	20
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	33	26	27	29	28	29	35	31
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	356+50	358+50	358+50	359+50	359+50	361+50	330+50	330+00
Hole No.								
Depth (ft) From:	5.0	2.0	5.0	2.0	5.0	2.0	5.0	10.0
To:	6.5	3.5	6.5	3.5	6.5	3.5	6.5	11.5

Remarks:

A-150524 - 150531

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2100 B

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34369.1.1	COUNTY:	Ashe	Owner:	--
DATE SAMPLED:	8.05	DATE RECEIVED:	9.23.05	DATE REPORTED:	10.6.05
SAMPLED FROM:	Roadway	SAMPLED BY:	L. L. Acker		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-734	SS-736	SS-737					
Lab Sample No. A	150532	150533	150534					
HiCAMS Sample #	--	--	--					
Retained #4 Sieve %	--	--	--					
Passing #10 Sieve %	55	45	79					
Passing #40 Sieve %	46	38	69					
Passing #200 Sieve %	15	14	25					

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30	29	29					
Fine Sand - Ret. #270	50	48	47					
Silt 0.05-0.005 mm %	8	7	10					
Clay < 0.005 mm %	12	16	14					
Passing # 40 Sieve %	--	--	--					
Passing # 200 Sieve %	--	--	--					

Liquid Limit	31	31	34					
Plastic Index	NP	NP	NP					
AASHTO Classification	A-1-b (0)	A-1-b (0)	A-2-4 (0)					
Quantity								
Texture								
Station	269+60	270+42	270+42					
Hole No.								
Depth (ft) From:	4.5	4.0	9.0					
To:	6.0	5.5	10.5					

Remarks:

A-150532 - 150534

CC:

L. L. Acker	
File	

SOILS ENGINEER:	

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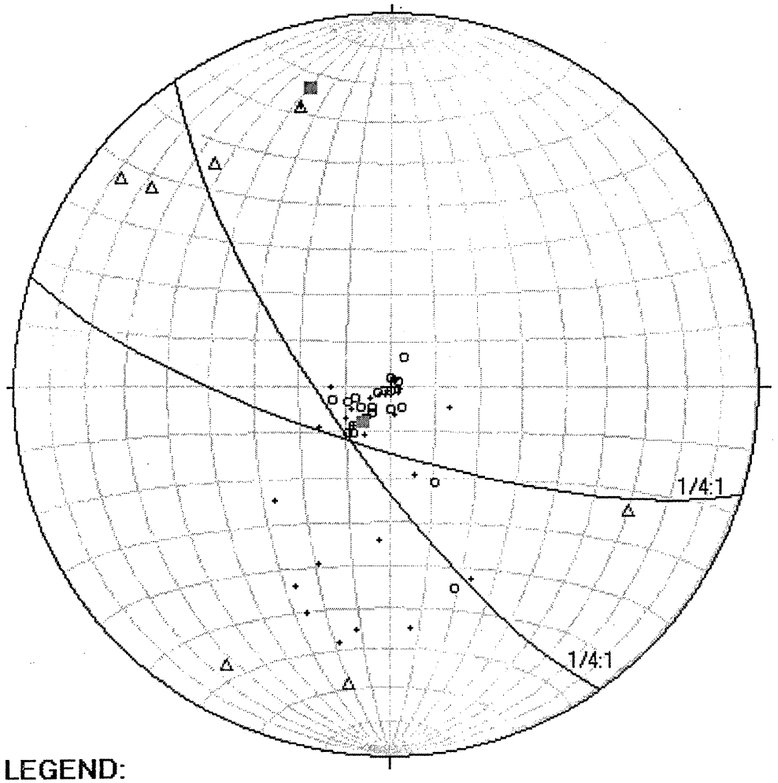
34369.1.1 R-2100 B

STEREONET PLOT
DIP AZIMUTHS
-L- STATIONS 275+50 TO 278+50

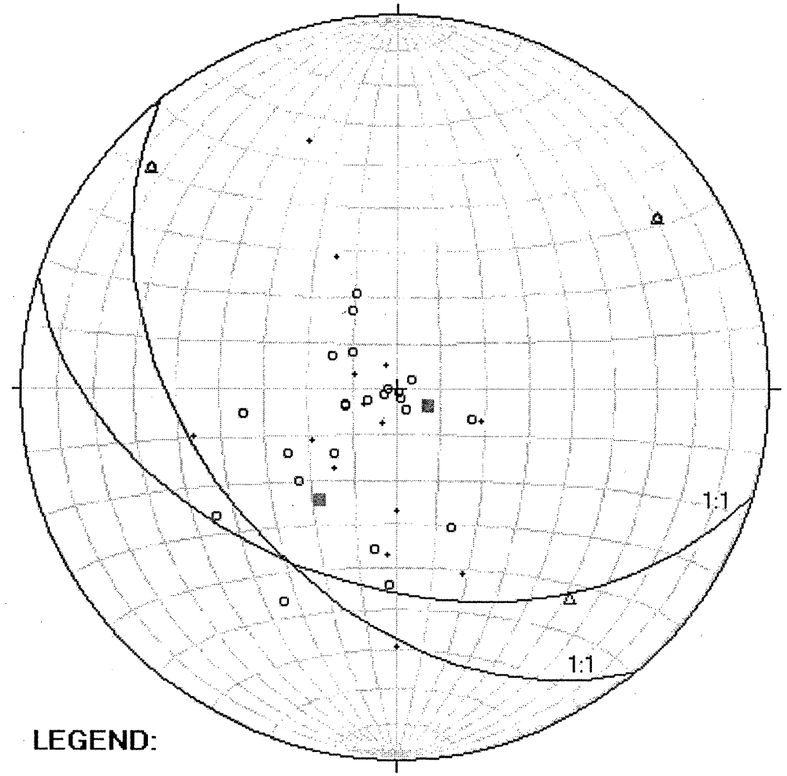


LEGEND:

FOLITATION	△	LARGE JOINTS (5'<P<20')	o
SMALL JOINTS (P<5')	·	VERY LARGE JOINTS (P>20')	■

34369.1.1 R-2100 B

STEREONET PLOT
DIP AZIMUTHS
-L- STATIONS 288+00 TO 290+00



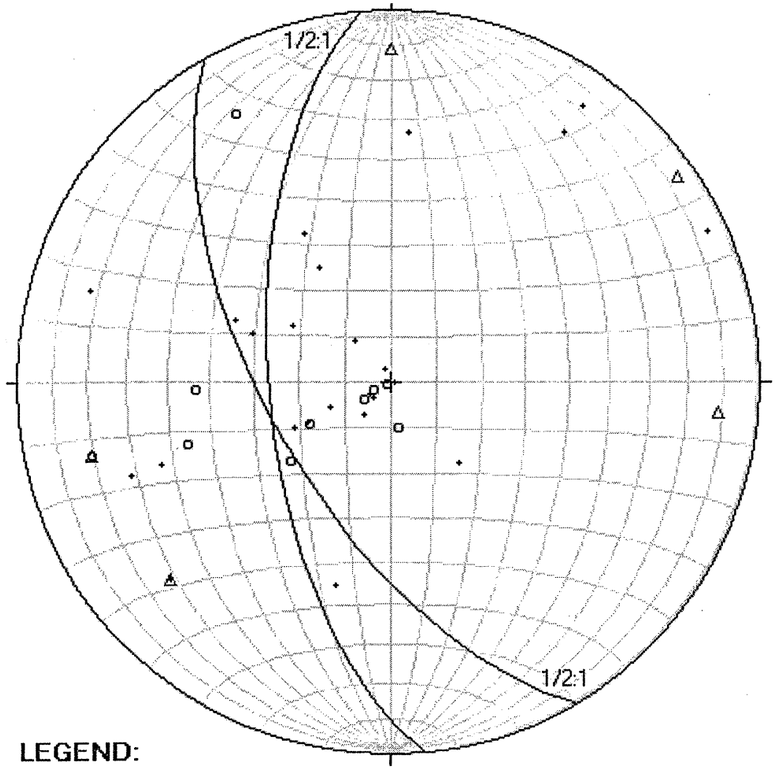
LEGEND:

FOLITATION	△	LARGE JOINTS (5'<P<20')	o
SMALL JOINTS (P<5')	·	VERY LARGE JOINTS (P>20')	■

34369.1.1 R-2100 B

STEREONET PLOT
DIP AZIMUTHS

-L- STATIONS 293+00 TO 296+00



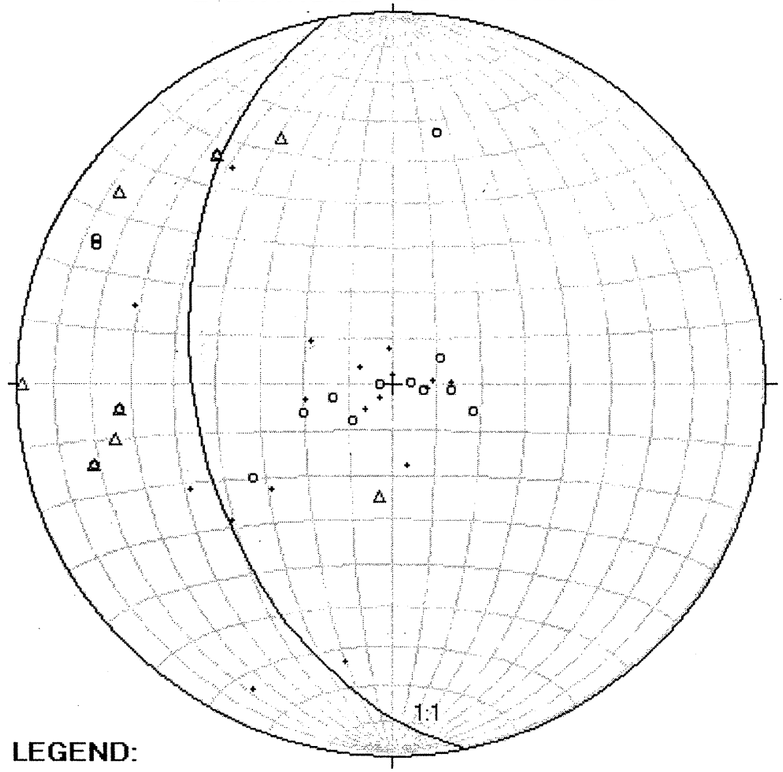
LEGEND:

FOLITATION	△	LARGE JOINTS (5'<P<20')	○
SMALL JOINTS (P<5')	·	VERY LARGE JOINTS (P>20')	■

34369.1.1 R-2100 B

STEREONET PLOT
DIP AZIMUTHS

-L- STATIONS 306+80 TO 309+25



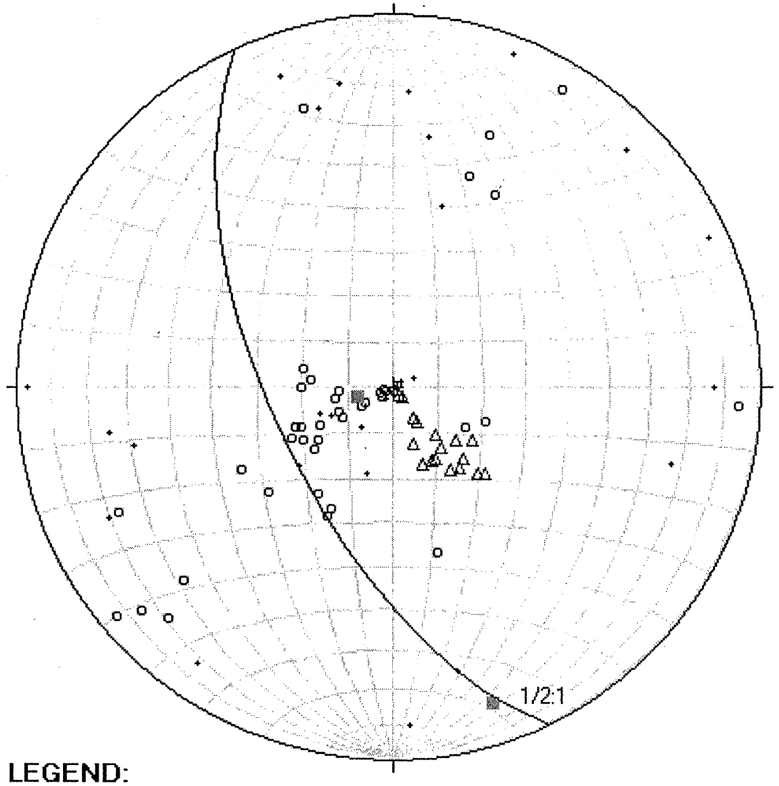
LEGEND:

FOLITATION	△	LARGE JOINTS (5'<P<20')	○
SMALL JOINTS (P<5')	·	VERY LARGE JOINTS (P>20')	■

34369.1.1 R-2100 B

STEREONET PLOT
DIP AZIMUTHS

-L- STATIONS 368+50 TO 371+50



LEGEND:

FOLITATION	△	LARGE JOINTS (5'<P<20')	○
SMALL JOINTS (P<5')	+	VERY LARGE JOINTS (P>20')	■

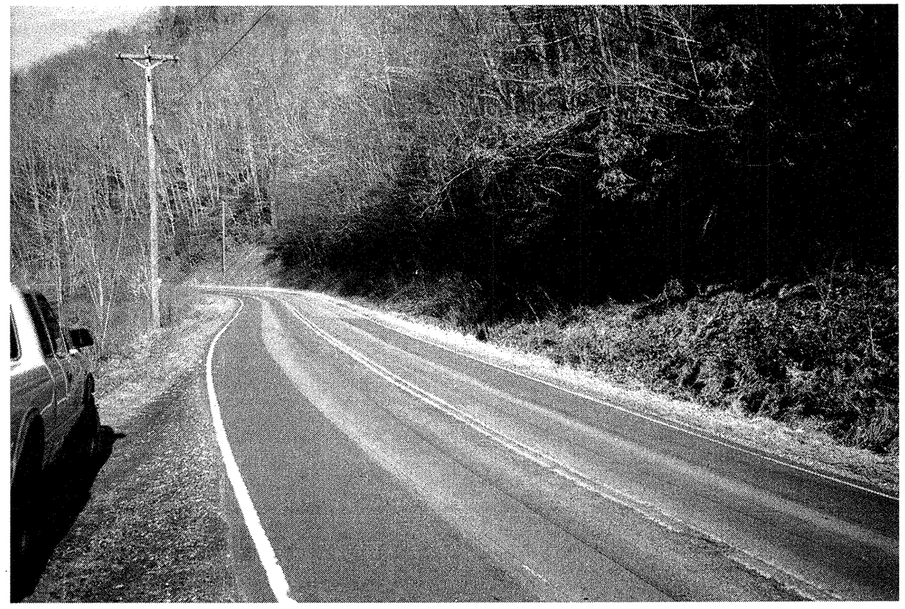
Rock cut, Station 276+00, Right Side. Note steep joints parallel with Roadway.

Rock cut, Station 289+00 RT

34369.1.1 (R-2100B)
Ashe County

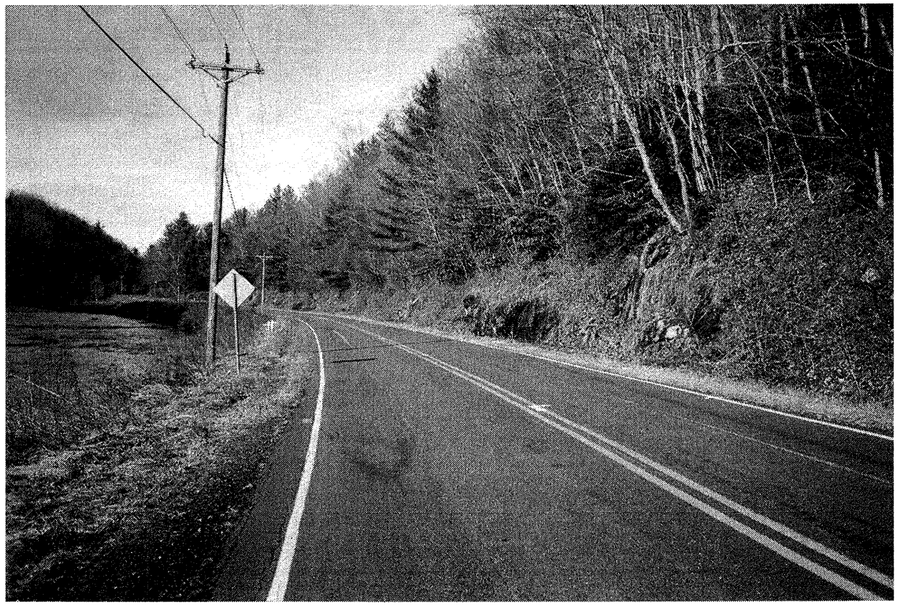
View forward from Station 291+00. Brush creek and wall site on Left Side.

View back from Station 296+00. Low rock cuts on Right Side.

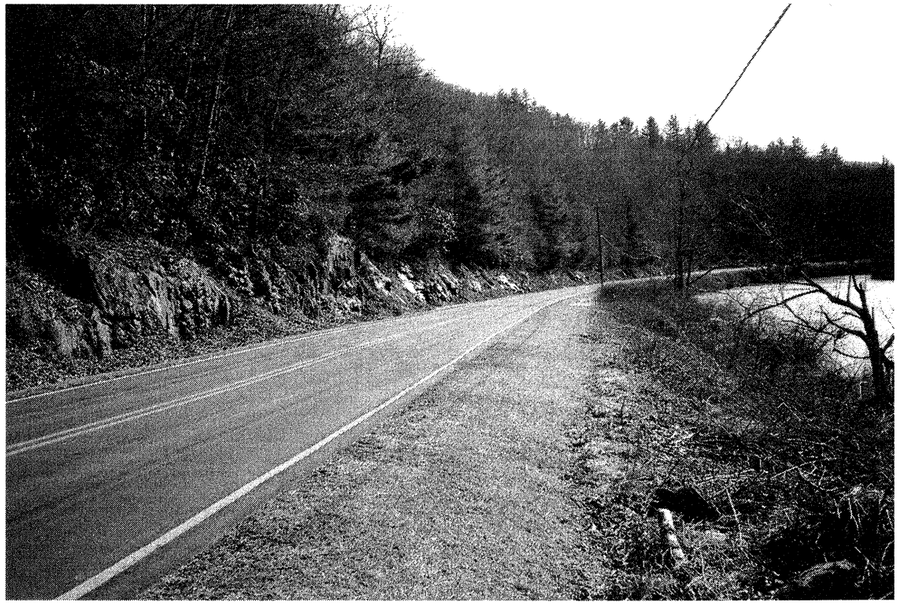


View forward from Station 298+50 across colluvial slope on Right.

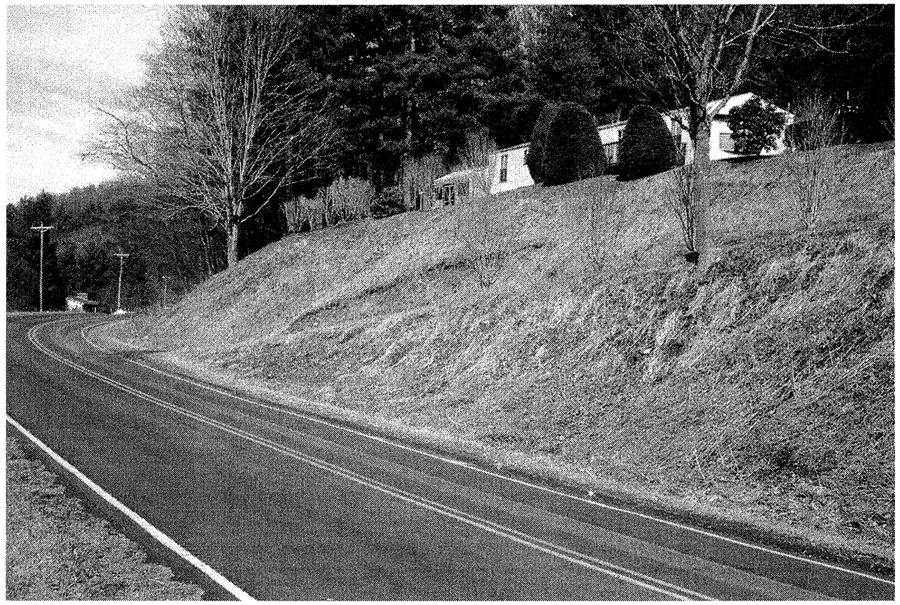
View forward from Station 299+00 at wall site on Left Side.



View forward from Station 306+00.



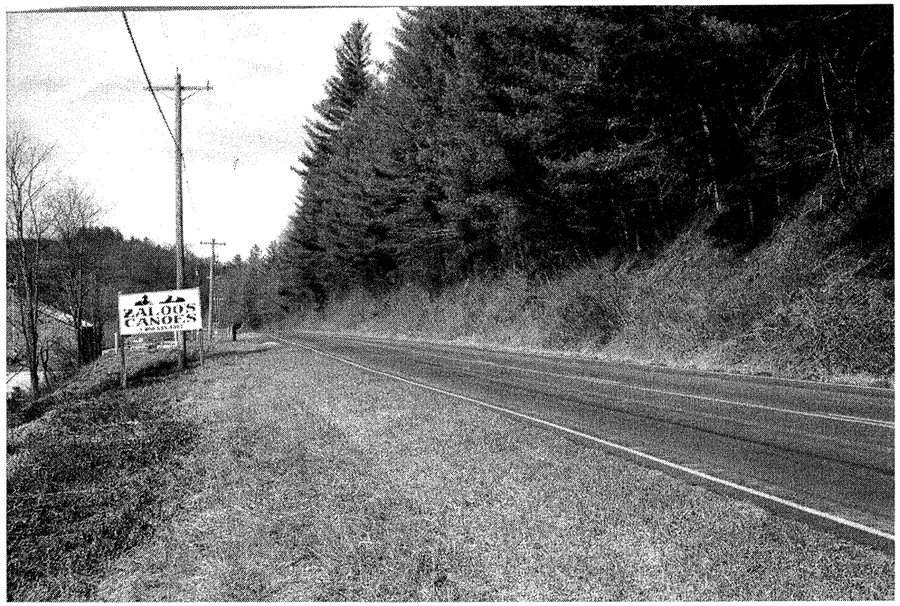
View back from Station 314+00



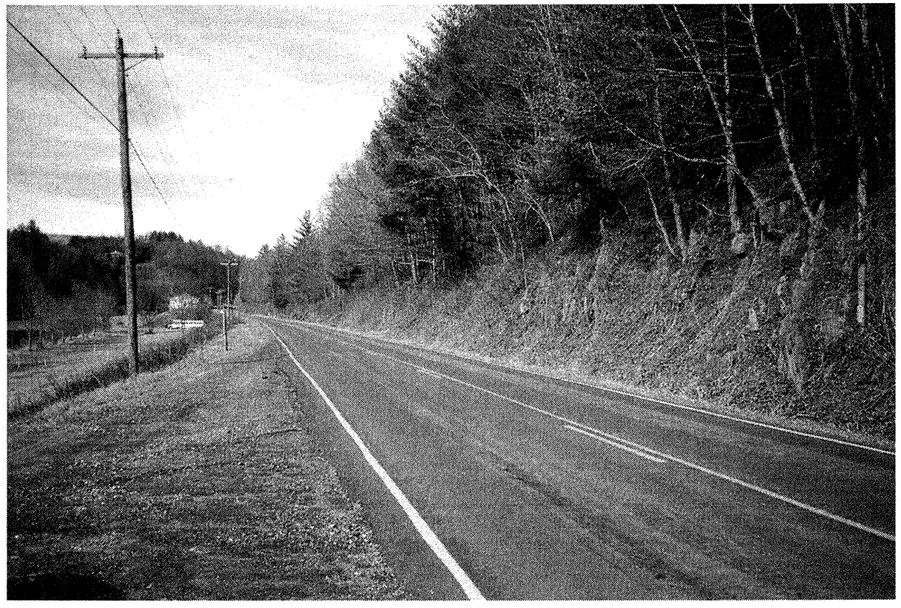
View forward from Station 324+00. Wall site on Right Side.

View back from Station 342+00. Intersection with SR 1630.

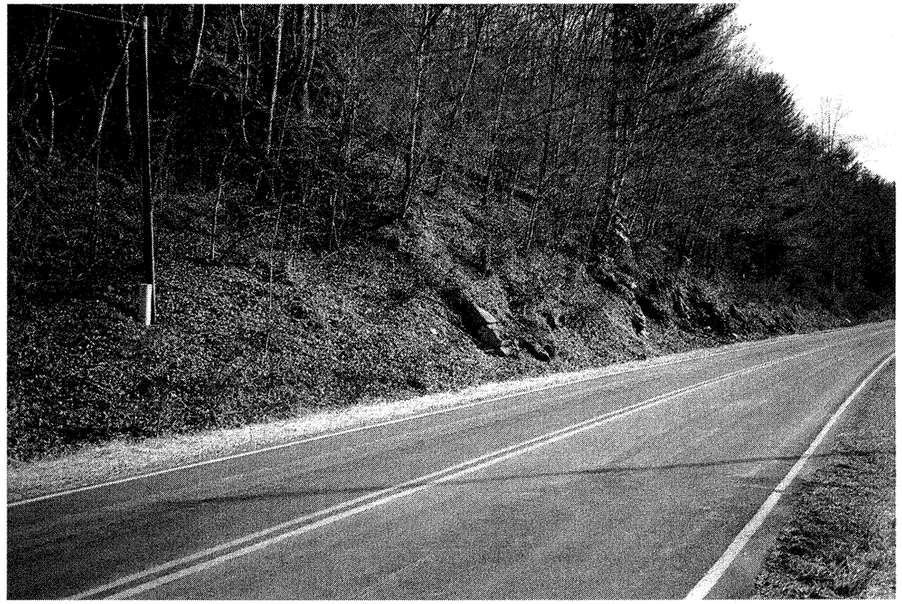
34369.1.1 (R-2100B)
Ashe County



View forward from Station 345+50. Wall on Right Side.



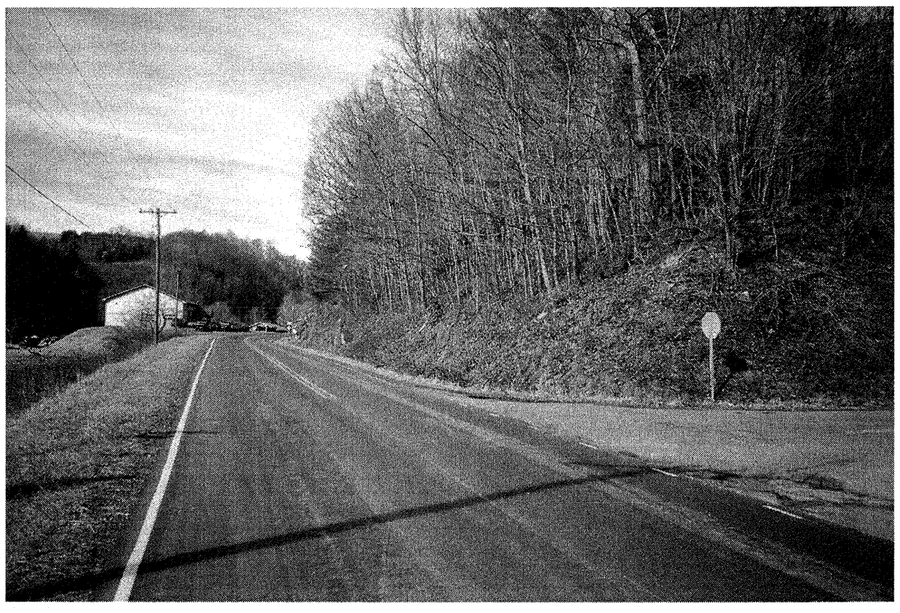
View forward from Station 355+00. Wall on Right Side continues.



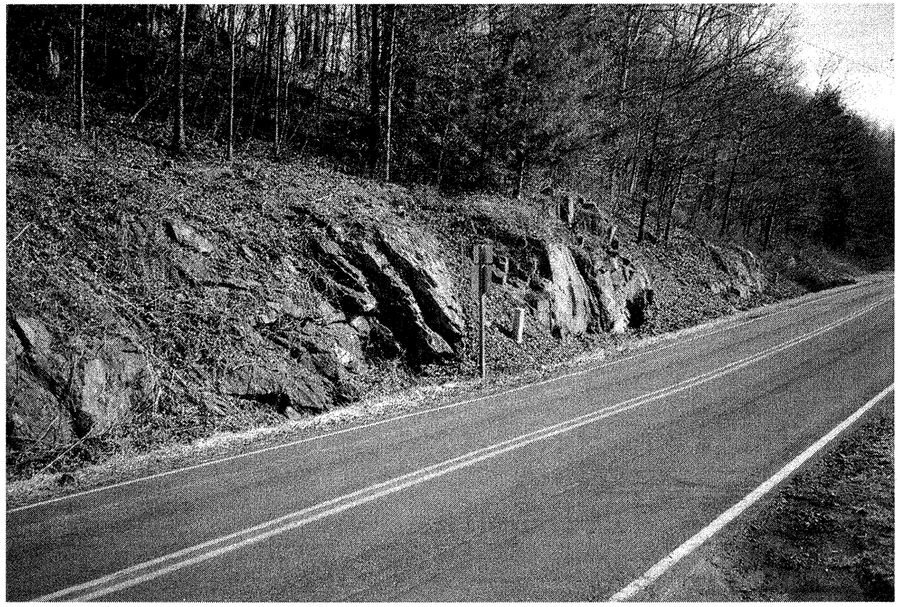
View back from Station 364+50 at end of wall on Right Side.

View back from Station 355+00 at wall site on Left Side.

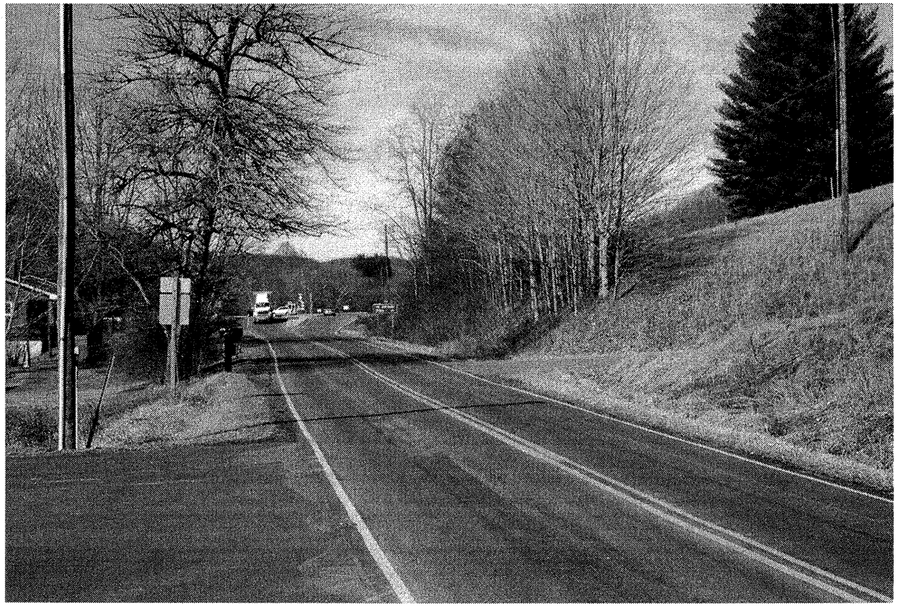
Station 364+50. Crossing at Bare Creek, from Left Side. View upstream.



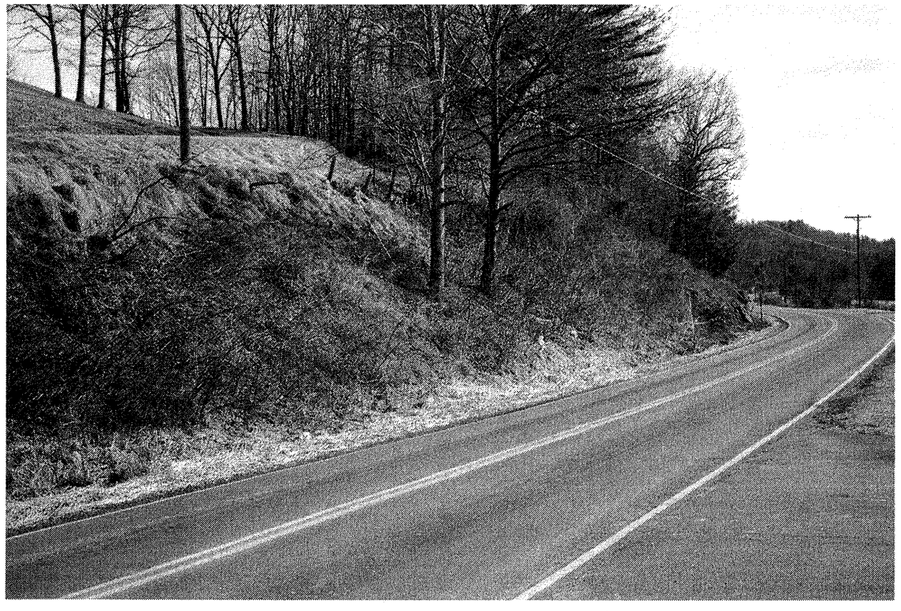
View forward from Station 366+00, intersection with SR 1628.



View back from Station 371+00 at wall on Right Side.



View forward from Station 374+00 towards end of project.



View back from Station 374+00. Wall continues on Right Side.