STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	35

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *CRAVEN*

PROJECT DESCRIPTION *US 70 (Havelock Bypass) from North of Pine Grove to North of Carteret County Line*

SITE DESCRIPTION *MSE Retaining Walls 3 & 4: Site No. 9 – Dual Bridges on US 70 over 70 Business between SR 1747 and SR 1176 – Station 516+87.37 –L– / 69+02.79 –RP2AC–*

REFERENCE: R-1015

PROJECT: 34360

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A	CONSOLIDATION & TRIAXIAL TESTS RESULTS	7-35

CAUTION NOTICE

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

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

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

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

PERSONNEL

P.M. WEAVER

C.R. PASTRANA

GET Solutions

INVESTIGATED BY *ESP Associates, INC.*

DRAWN BY *C.R. PASTRANA*

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DATE *August 2018*

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Paul M. Weaver 8/28/2018
01847D3739B40AC...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-1015	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [X] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BM-26: RR SPIKE IN TREE STA. 520+57.00 -L- 308' LEFT AND "r1015_ls_tin.tin" WAS USED TO DETERMINE GROUND ELEVATIONS AT BORINGS ELEVATION: 26.38 FEET

NOTES:

F.I.A.D. = FILLED IMMEDIATELY AFTER DRILLING

STATIONS AND OFFSETS FOR -WALL_3- AND -WALL_4- WERE MEASURED FROM "R-1015 MSE WALL_END BENT 1_Site 9.dgn" AND "R-1015 MSE WALL_END BENT 2_Site 9.dgn" FILES. NO GPK FILE WAS PROVIDED WITH WALL ALIGNMENTS. ALL BORINGS WERE REFERENCED TO -L- TO OBTAIN BORING ELEVATIONS. THE -L- STATION AND OFFSET EQUIVALENT FOR THE BORING LOCATIONS ARE PROVIDED ON THE BORING LOGS.

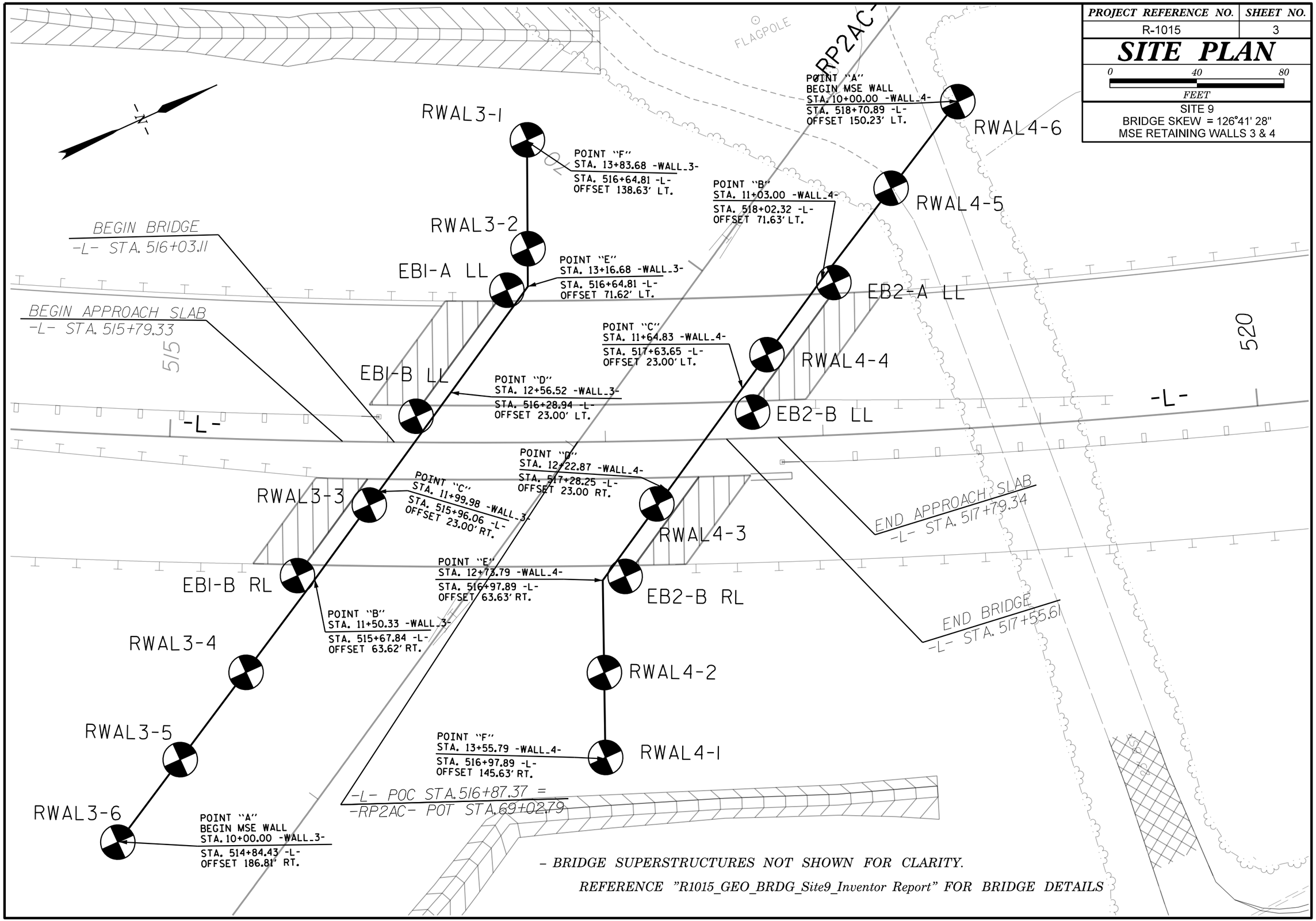
DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
R-1015	3

SITE PLAN

0 40 80
FEET

SITE 9
BRIDGE SKEW = 126°41' 28"
MSE RETAINING WALLS 3 & 4



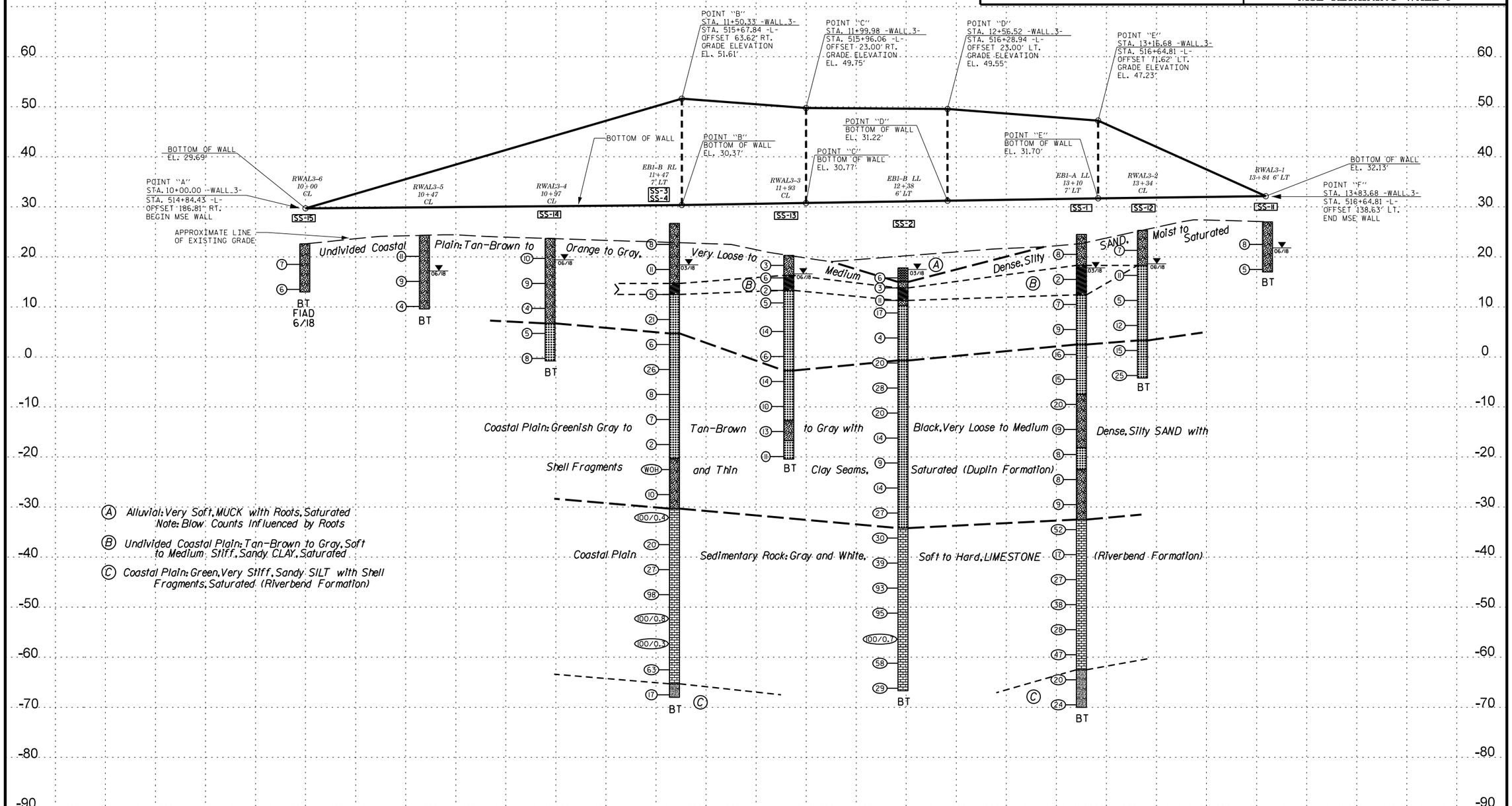
– BRIDGE SUPERSTRUCTURES NOT SHOWN FOR CLARITY.

REFERENCE "R1015_GEO_BRDG_Site9_Inventor Report" FOR BRIDGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-1015	4

SITE 9: END BENT 1
PROFILE ALONG
MSE RETAINING WALL 3

0 40 80
FEET
VE = 2



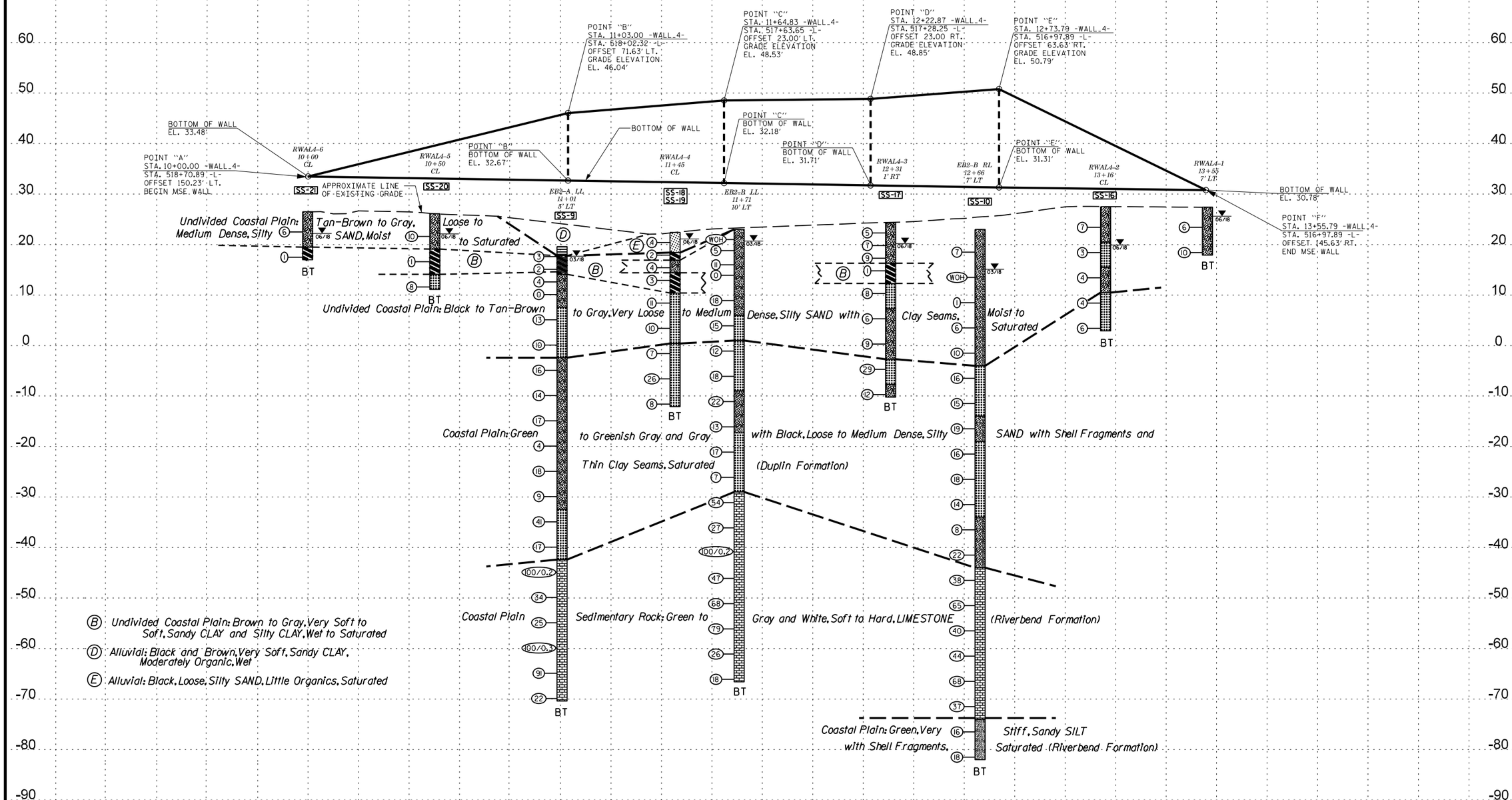
- GROUNDLINE AND WALL PROFILE TAKEN FROM "R-1015 MSE WALL_END BENT 1_Site 9.dgn" FILE PROVIDED BY NCDOT DATED 5/21/2018.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE WALL PROFILE.
- ALL DIMENSIONS AND STATIONS ARE ALONG FRONT FACE OF WALL.

-WALL_3-

PROJECT REFERENCE NO.	SHEET NO.
R-1015	5

SITE 9: END BENT 2
PROFILE ALONG
MSE RETAINING WALL 4

0 40 80
FEET
VE = 2



- GROUNDLINE AND WALL PROFILE TAKEN FROM "R-1015 MSE WALL_END BENT 2_Site 9.dgn" FILE PROVIDED BY NCDOT DATED 5/21/2018.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE WALL PROFILE.
- ALL DIMENSIONS AND STATIONS ARE ALONG FRONT FACE OF WALL.

-WALL_4-

SOILS LABORATORY TESTS RESULTS

WBS NO.: 34360.1.1

TIP NO.: R-1015

COUNTY: Craven

SITE DESCRIPTION: Site #9 - Dual Bridges on US 70 (Havelock Bypass) over US 70 Business - MSE Wall Abutments

BORING NO.	SAMPLE NO.	Boring Location			DEPTH INTERVAL (FT)	AASHTO	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
		Alignment	Station	Offset						CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A LL	SS-1	-WALL_3-	13+10	7' LT	53.0-54.5	A-2-4 (0)	9	NP	NP	29	50	6	15	80	67	18	30.8	-
EB1-B LL	SS-2	-WALL_4-	12+38	6' LT	13.0-14.5	A-3 (1)	4	NP	NP	27	66	2	5	100	98	8	-	-
EB1-B RL	SS-3	-WALL_3-	11+47	7' LT	3.2-4.7	A-2-4 (0)	8	NP	NP	36	50	2	12	100	79	15	-	-
EB1-B RL	SS-4	-WALL_3-	11+47	7' LT	48.2-49.7	A-2-4 (0)	0	NP	NP	68	21	3	8	99	64	11	26.1	0.5
EB2-A LL	SS-9	-WALL_4-	11+01	5' LT	48.5-50.0	A-2-4 (0)	9	NP	NP	12	67	7	14	100	93	27	31.0	-
EB2-B RL	SS-10	-WALL_4-	12+66	7' LT	18.5-20.0	A-2-4 (0)	6	NP	NP	7	79	5	9	100	97	17	31.1	-
RWAL3-1	SS-11	-WALL_3-	13+84	CL	3.5-5.0	A-2-4 (0)	8	NP	NP	13	65	11	11	100	98	23	14.2	-
RWAL3-2	SS-12	-WALL_3-	13+34	CL	3.0-4.5	A-2-4 (0)	7	NP	NP	11	72	10	7	100	98	18	13.1	-
RWAL3-3	SS-13	-WALL_3-	11+93	CL	14.2-15.7	A-3 (1)	14	NP	NP	29	68	0	3	100	89	5	21.8	-
RWAL3-4	SS-14	-WALL_3-	10+97	CL	13.0-14.5	A-2-4 (0)	4	24	10	18	48	22	12	99	92	35	29.8	-
RWAL3-6	SS-15	-WALL_3-	10+00	CL	3.1-4.6	A-2-4 (0)	7	NP	NP	7	70	2	21	100	99	24	19.4	-
RWAL4-2	SS-16	-WALL_4-	13+16	CL	3.1-4.6	A-2-4 (0)	7	NP	NP	9	69	3	19	100	98	23	16.8	-
RWAL4-3	SS-17	-WALL_4-	12+31	1' LT	1.0-2.5	A-2-4 (0)	5	24	8	6	66	16	12	100	99	29	20.4	-
RWAL4-4	SS-18	-WALL_4-	11+45	CL	1.0-2.5	A-2-4 (0)	4	NP	NP	7	71	8	14	100	99	24	25.7	3.9
RWAL4-4	SS-19	-WALL_4-	11+45	CL	28.0-29.5	A-3 (1)	26	NP	NP	62	32	2	4	100	65	8	17.9	-
RWAL4-5	SS-20	-WALL_4-	10+50	CL	8.5-10.0	A-7-6 (17)	1	41	21	2	17	61	20	100	99	84	68.6	-
RWAL4-6	SS-21	-WALL_4-	10+00	CL	3.0-4.5	A-2-4 (0)	6	NP	NP	8	74	2	16	100	98	19	21.6	-
-	ST-1	-L-	516+16	16'LT	4.0-6.0	A-6 (7)	N/A	31	18	6	39	20	35	100	98	57	34.6	-
-	ST-2	-L-	517+11	59' RT	11.0-13.0	A-2-4 (0)	N/A	NP	NP	6	84	1	9	100	98	11	23.6	-
-	ST-3	-L-	517+15	23' RT	9.8-11.8	A-7-6 (36)	N/A	65	44	2	20	27	51	100	99	79	64.2	-

Tony Dunsmore

Certification No. 121-01-1108

For all test samples but ST-3

Signed:

NCDOT Certification No. 129-04-0411

For test sample ST-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
CONSOLIDATION & TRIAXIAL TESTS RESULTS

REFERENCE: R-1015

PROJECT: 34360

ESP

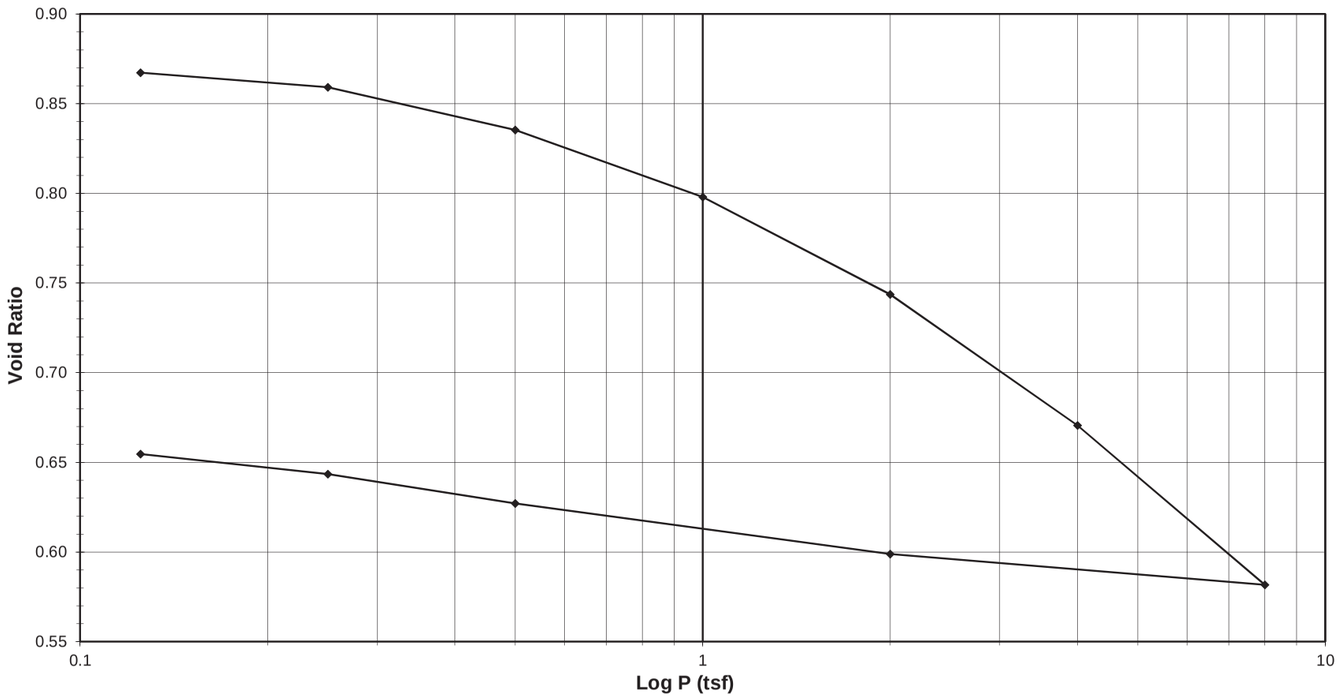
ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM

ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By *129-04-0411* *Date* *4/10/18* *Approved By* *MPS* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-002 GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT*

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ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R409
1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	SS-6	800
Wt. Tare & WS (g)	313.18	232.09
Wt. Tare & DS (g)	267.85	206.50
Wt. Water (g)	45.33	25.59
Wt. Tare (g)	100.77	103.09
Wt. DS (g)	167.08	103.41
Water Content (%)	27.13	24.75
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.8822
Sample Volume (cc)	80.44	70.96
Wt. Wet Sample + Ring (g)	247.89	245.20
Wt. of Ring (g)	104.49	104.49
Wt. of Wet Sample (g)	143.40	140.71
Wet Density (pcf)	111.24	123.73
Wet Density (g/cc)	1.78	1.98
Water Content (%)	27.13	24.75
Wt. of Dry Sample (g)	112.80	112.80
Dry Density (pcf)	87.50	99.19
Dry Density (g/cc)	1.40	1.59
Void Ratio	0.8755	0.6546
Saturation (%)	81.50	99.42
Specific Gravity	2.63	*Measured*

Test Data Summary

Applied Pressure (tsf)	**Final Dial Reading** (div)	**Machine Deflection** (div)	**Corrected Reading** (div)	**Height of Sample** (mm)	**Volume** (cc)	**Dry Density** (g/cc)	**Void Ratio**
Seating	0	0	0	25.400	80.440	1.40226	**0.87555**
0.125	51.5	7.5	44.1	25.288	80.085	1.40846	**0.86728**
0.25	106.2	18.6	87.6	25.178	79.735	1.41465	**0.85912**
0.5	247.8	33.9	214.0	24.856	78.719	1.43292	**0.83541**
1	469.4	55.5	413.9	24.349	77.111	1.46280	**0.79793**
2	789.6	86.4	703.2	23.614	74.783	1.50832	**0.74366**
4	1218.3	125.8	1092.4	22.625	71.652	1.57423	**0.67066**
8	1734.8	168.6	1566.2	21.422	67.841	1.66267	**0.58179**
2	1584.7	109.7	1475.0	21.654	68.575	1.64487	**0.59891**
0.5	1391.9	67.4	1324.5	22.036	69.785	1.61634	**0.62713**
0.25	1297.5	60.3	1237.2	22.258	70.488	1.60024	**0.64351**
0.125	1238.4	60.3	1178.1	22.408	70.963	1.58951	**0.65459**

Tested By *129-04-0411* *Date* *4/10/18* *Input Checked By* *GEM* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-002 GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT*

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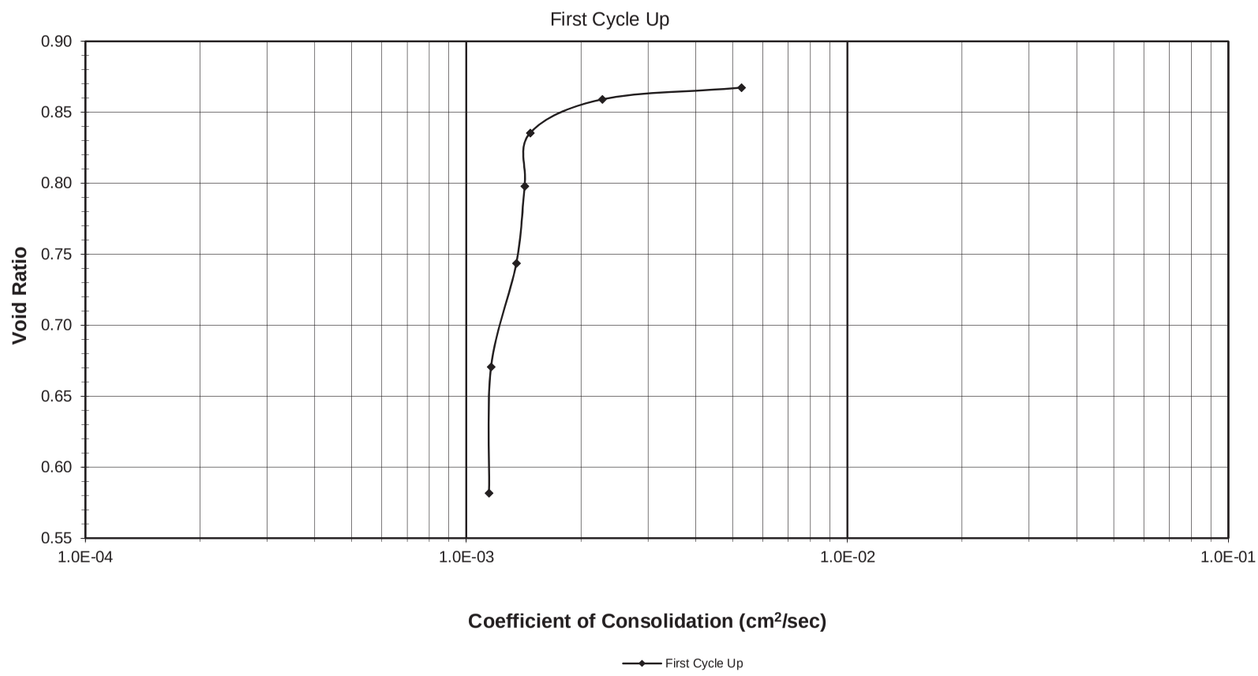
SHEET 8

ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 *Date* 4/10/18 *Input Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-002 GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT*

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ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409

1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	SS-6	800
Wt. Tare & WS (g)	313.18	232.09
Wt. Tare & DS (g)	267.85	206.50
Wt. Water (g)	45.33	25.59
Wt. Tare (g)	100.77	103.09
Wt. DS (g)	167.08	103.41
Water Content (%)	27.13	24.75
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.882
Sample Volume (cc)	80.44	70.96
Wt. Wet Sample + Ring (g)	247.89	245.20
Wt. of Ring (g)	104.49	104.49
Wt. of Wet Sample (g)	143.40	140.71
Wet Density (pcf)	111.24	123.73
Wet Density (g/cc)	1.78	1.98
Water Content (%)	27.13	24.75
Wt. of Dry Sample (g)	112.80	112.80
Dry Density (pcf)	87.50	99.19
Dry Density (g/cc)	1.40	1.59
Void Ratio	0.8755	0.6546
Saturation (%)	81.50	99.42
Specific Gravity	*2.63*	*Measured*

C_v Test Data Summary

Load Increment (tsf)	**Dial Reading @ t_{50}** (div)	**Machine Deflection** (div)	**Corrected Dial Reading @ t_{50}** (div)	**Sample Height @ t_{50}** (cm)	**Time t_{50}** (min.)	**C_v** (cm²/sec)
0.0 - 0.125	25.0	7.5	17.5	2.536	**1.00**	**0.00528**
0.125 - 0.25	75.4	18.6	56.8	2.526	**2.30**	**0.00228**
0.25 - 0.5	173.7	33.9	139.8	2.504	**3.50**	**0.00147**
0.5 - 1	358.5	55.5	303.0	2.463	**3.50**	**0.00142**
1 - 2	627.9	86.4	541.4	2.402	**3.50**	**0.00135**
2 - 4	995.3	125.8	869.4	2.319	**3.80**	**0.00116**
4 - 8	1462.1	168.6	1293.5	2.211	**3.50**	**0.00115**
8 - 2	NA	109.7	NA	NA	**NA**	**NA**
2 - 0.5	NA	67.4	NA	NA	**NA**	**NA**
0.5 - 0.25	NA	60.3	NA	NA	**NA**	**NA**
0.25 - 0.125	NA	60.3	NA	NA	**NA**	**NA**

Tested By 129-04-0411 *Date* 4/10/18 *Input Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-002 GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT*

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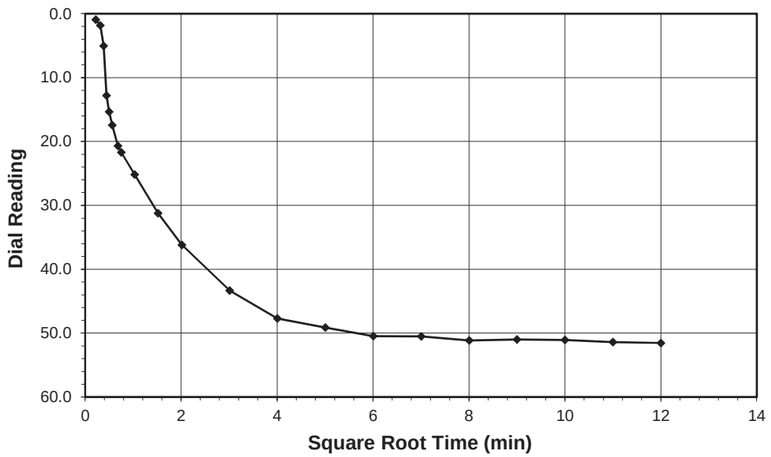
SHEET 9

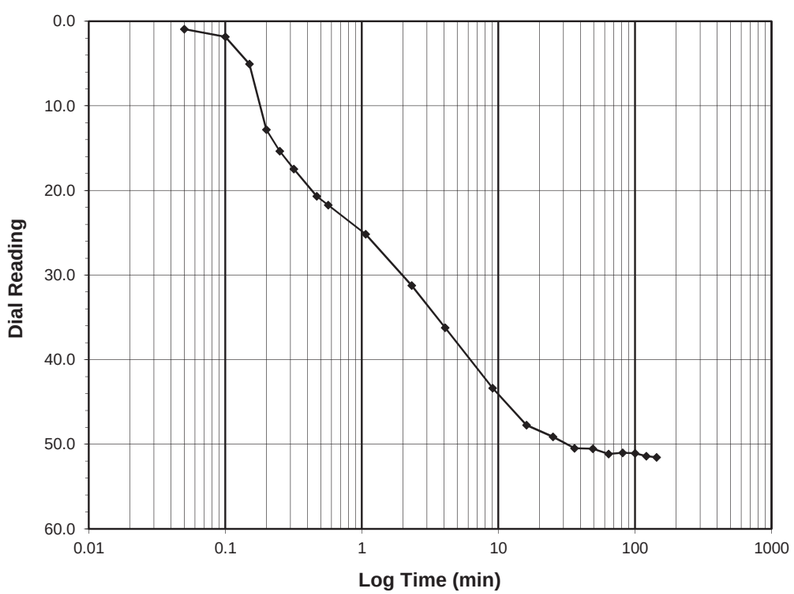
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.0-0.125**
Final Reading	**(div)**	**51.5**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/10/18
Start Time		17:10:38

Elapsed Time (min)	Dial Reading (div)
Initial	**0.0**
0.05	0.9
0.10	1.8
0.15	5.1
0.20	12.8
0.25	15.3
0.32	17.5
0.47	20.7
0.57	21.7
1.07	25.2
2.32	31.2
4.07	36.2
9.07	43.4
16.07	47.7
25.07	49.1
36.07	50.5
49.07	50.5
64.07	51.2
81.07	51.0
100.07	51.1
121.07	51.4
144.07	51.5

Tested By 129-04-0411 *Date* 4/10/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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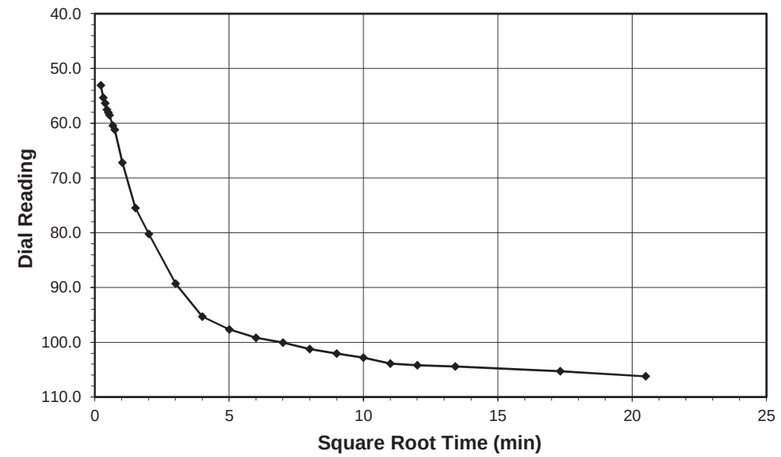
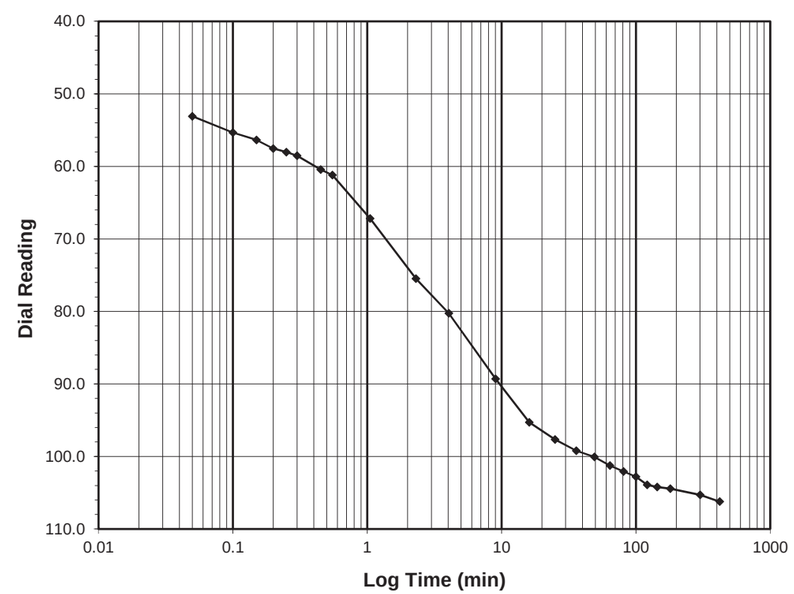
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.125-0.25**
Final Reading	**(div)**	**106.2**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/11/18
Start Time		0:11:01

Elapsed Time (min)	Dial Reading (div)
Initial	**51.5**
0.05	53.1
0.10	55.3
0.15	56.3
0.20	57.5
0.25	58.0
0.30	58.5
0.45	60.4
0.55	61.2
1.05	67.2
2.30	75.5
4.05	80.2
9.05	89.3
16.05	95.3
25.05	97.7
36.05	99.2
49.05	100.1
64.05	101.3
81.05	102.1
100.05	102.8
121.07	103.9
144.07	104.2
180.07	104.4
300.07	105.3
420.33	106.2

Tested By 129-04-0411 *Date* 4/11/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 2

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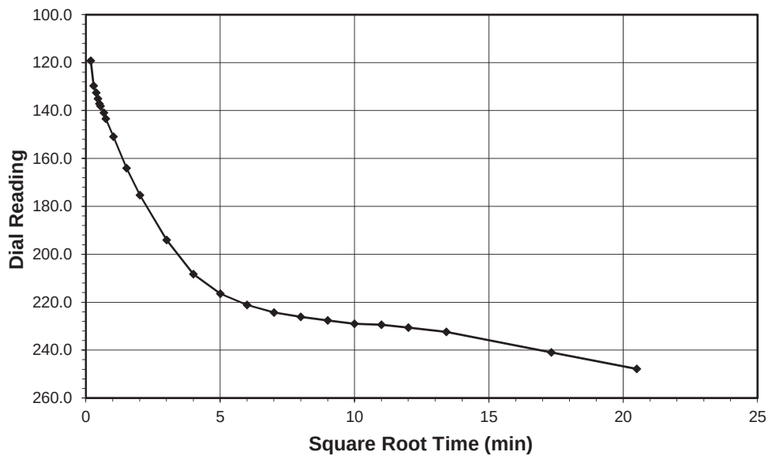
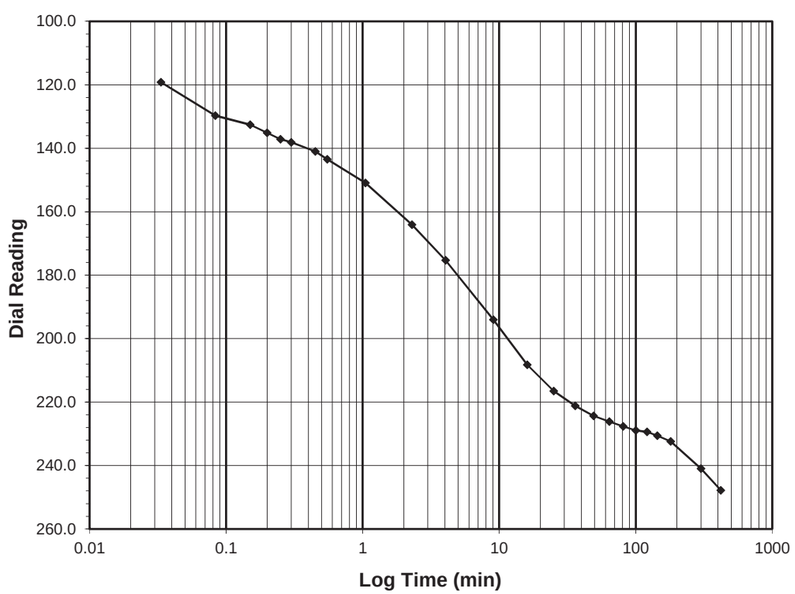
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.25-0.5**
Final Reading	**(div)**	**247.8**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/11/18
Start Time		7:11:21

Elapsed Time (min)	Dial Reading (div)
Initial	**106.2**
0.03	119.2
0.08	129.7
0.15	132.6
0.20	135.1
0.25	137.1
0.30	138.1
0.45	141.0
0.55	143.5
1.05	150.9
2.30	164.1
4.05	175.3
9.05	194.1
16.05	208.3
25.05	216.5
36.05	221.2
49.05	224.3
64.05	226.1
81.05	227.7
100.05	229.0
121.05	229.4
144.05	230.6
180.05	232.4
300.05	241.0
420.38	247.8

Tested By *129-04-0411* *Date* *4/11/18* *Checked By* *GEM* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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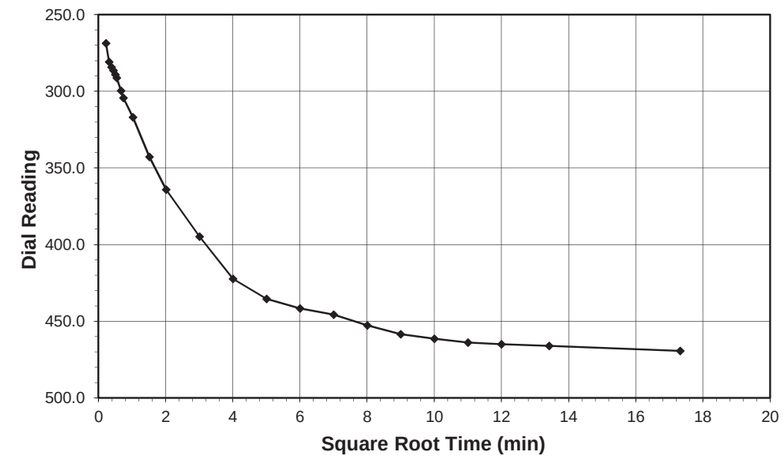
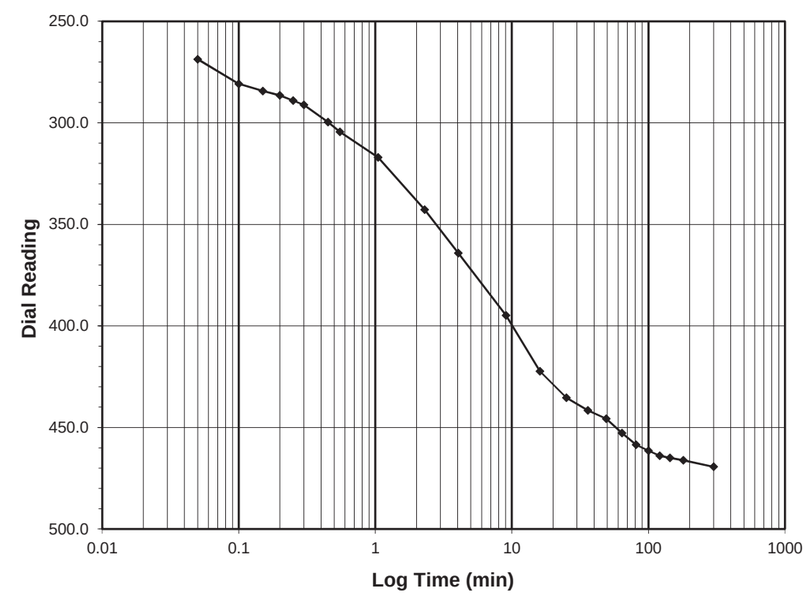
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-1.0**
Final Reading	**(div)**	**469.4**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/11/18
Start Time		14:11:46

Elapsed Time (min)	Dial Reading (div)
Initial	**247.8**
0.05	268.6
0.10	280.8
0.15	284.3
0.20	286.4
0.25	289.0
0.30	291.2
0.45	299.6
0.55	304.4
1.05	317.0
2.30	342.7
4.05	364.2
9.05	394.8
16.05	422.3
25.05	435.3
36.05	441.5
49.05	445.7
64.07	452.7
81.07	458.5
100.07	461.5
121.07	463.9
144.07	465.0
180.07	466.1
300.07	469.4

Tested By *129-04-0411* *Date* *4/11/18* *Checked By* *GEM* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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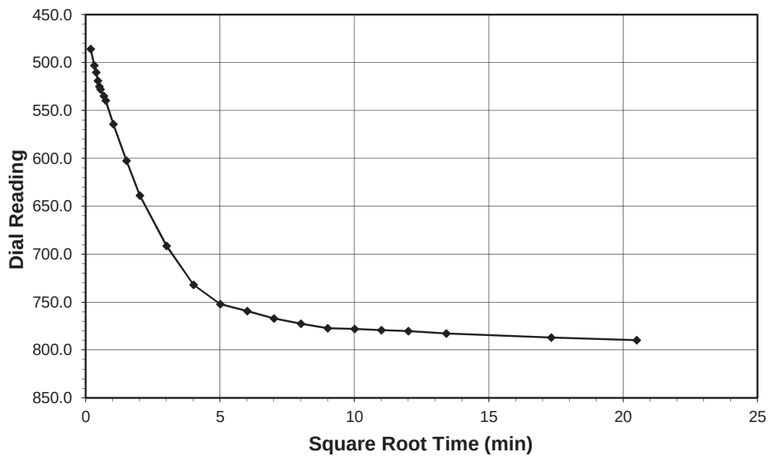
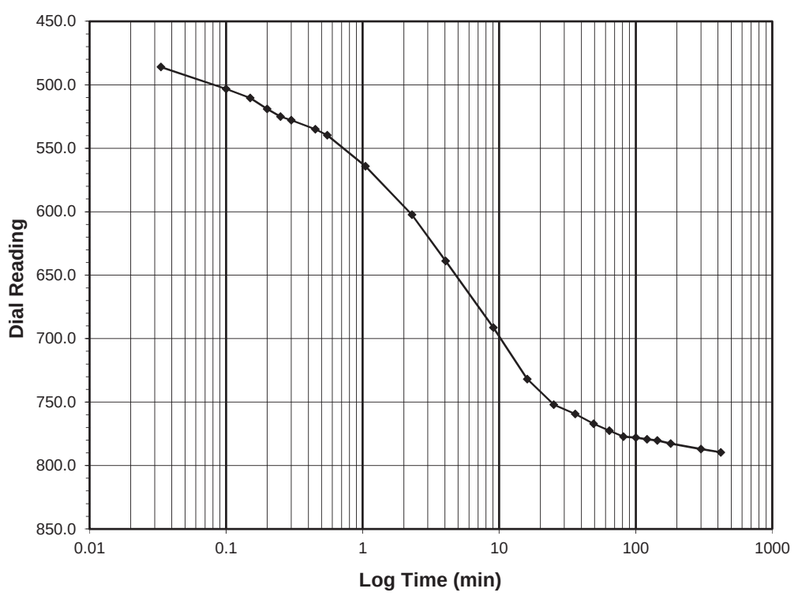
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**1.0-2.0**
Final Reading	**(div)**	**789.6**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/11/18
Start Time		21:12:10

Elapsed Time (min)	Dial Reading (div)
Initial	**469.4**
0.03	486.0
0.10	503.2
0.15	510.3
0.20	519.1
0.25	525.0
0.30	527.9
0.45	535.0
0.55	539.6
1.05	564.3
2.30	602.3
4.05	638.8
9.07	691.3
16.07	732.0
25.07	752.0
36.07	759.4
49.07	767.0
64.07	772.5
81.07	777.2
100.07	778.1
121.07	779.3
144.07	780.3
180.07	782.7
300.07	786.9
420.35	789.6

Tested By *129-04-0411* *Date* *4/11/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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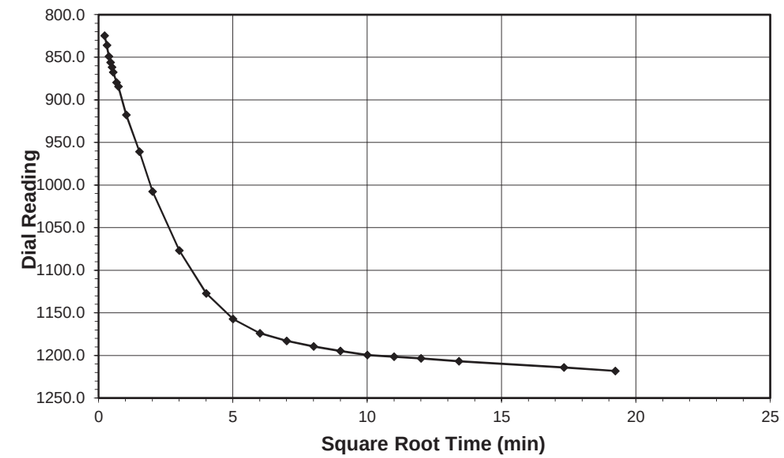
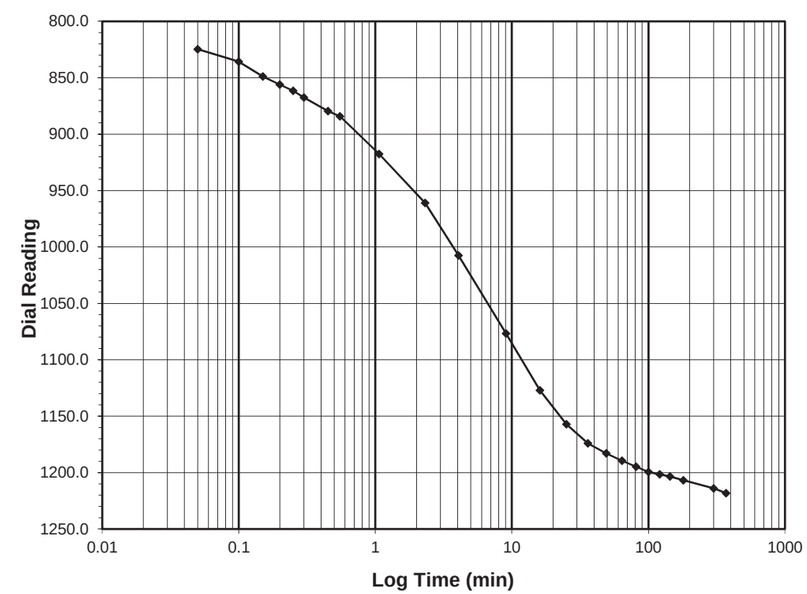
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-4.0**
Final Reading	**(div)**	**1218.3**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/12/18
Start Time		4:12:32

Elapsed Time (min)	Dial Reading (div)
Initial	**789.6**
0.05	824.7
0.10	835.9
0.15	849.0
0.20	856.1
0.25	861.6
0.30	867.5
0.45	879.6
0.55	884.3
1.07	917.7
2.32	960.9
4.07	1007.6
9.07	1076.8
16.07	1127.2
25.07	1157.1
36.07	1174.0
49.07	1183.0
64.07	1189.5
81.07	1194.8
100.07	1199.5
121.07	1201.6
144.07	1203.5
180.07	1206.8
300.07	1214.1
370.07	1218.3

Tested By *129-04-0411* *Date* *4/12/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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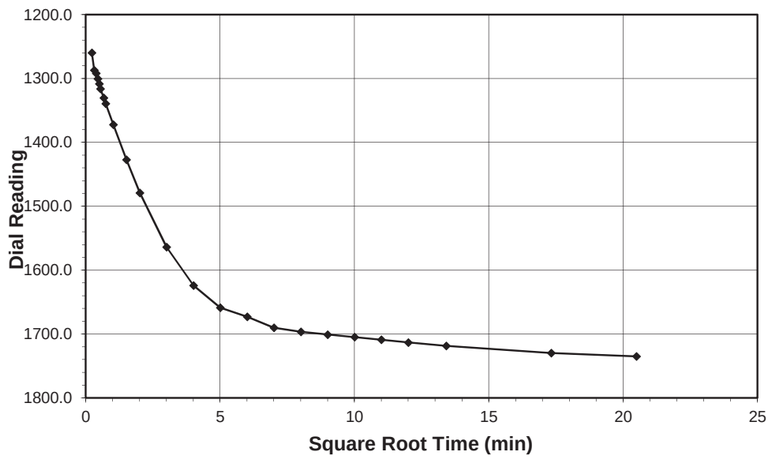
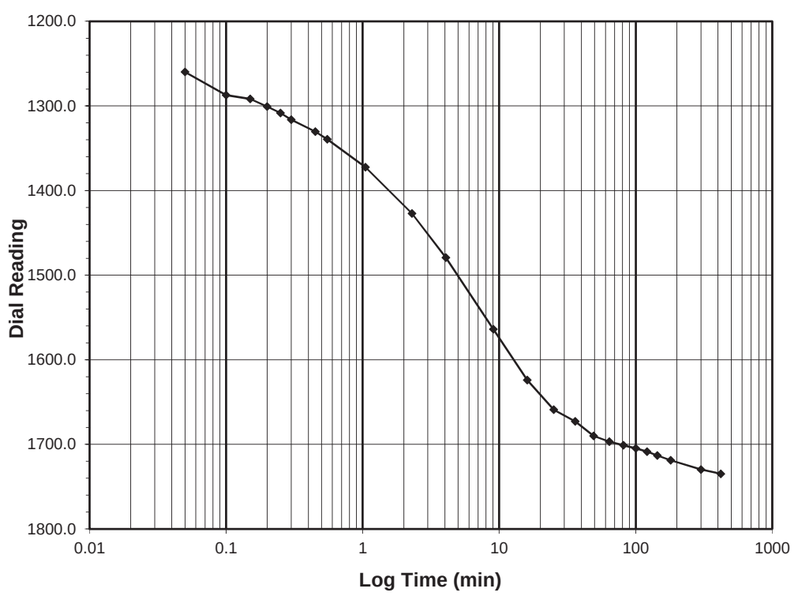
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**4.0-8.0**
Final Reading	**(div)**	**1734.8**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/12/18
Start Time		10:22:37

Elapsed Time (min)	Dial Reading (div)
Initial	**1218.3**
0.05	1259.8
0.10	1287.1
0.15	1291.8
0.20	1300.6
0.25	1308.3
0.30	1316.3
0.45	1330.3
0.55	1339.3
1.05	1372.4
2.30	1427.1
4.07	1479.2
9.07	1564.0
16.07	1624.1
25.07	1658.9
36.07	1672.8
49.07	1690.1
64.07	1696.7
81.07	1700.9
100.07	1704.6
121.07	1708.6
144.07	1713.2
180.07	1718.7
300.07	1729.9
420.22	1734.8

Tested By *129-04-0411* *Date* *4/12/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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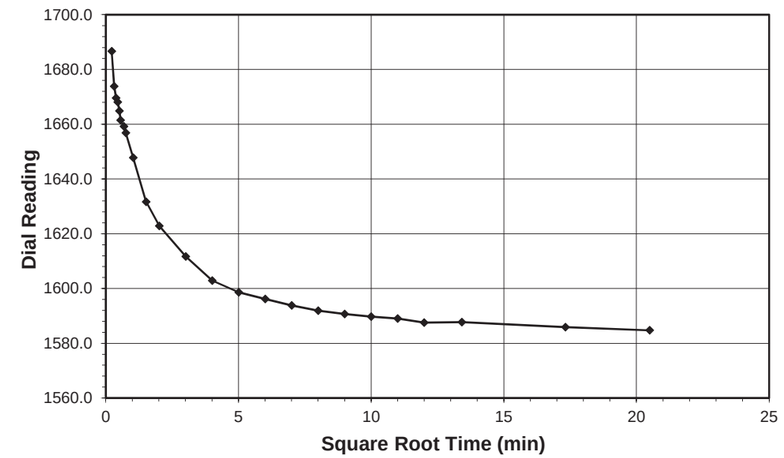
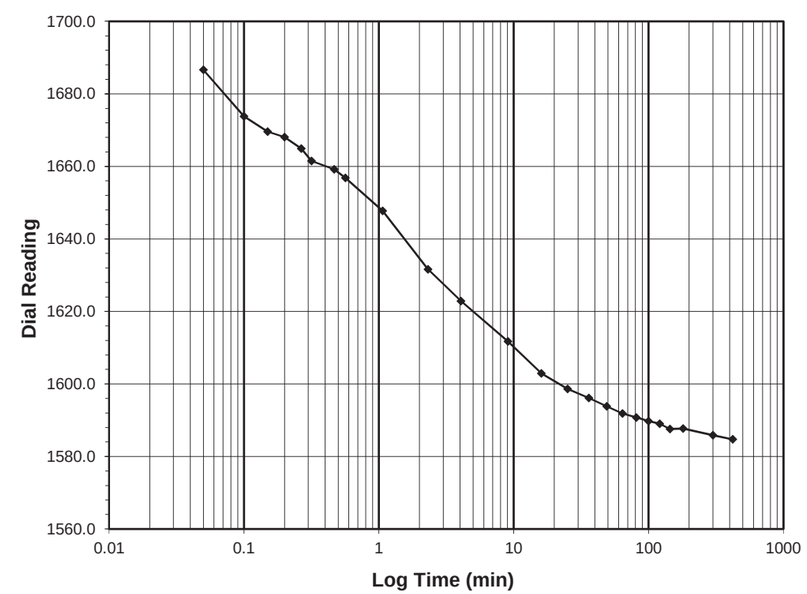
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**8.0-2.0**
Final Reading	**(div)**	**1584.7**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/12/18
Start Time		17:22:50

Elapsed Time (min)	Dial Reading (div)
Initial	**1734.8**
0.05	1686.6
0.10	1673.8
0.15	1669.6
0.20	1668.1
0.27	1664.9
0.32	1661.5
0.47	1659.2
0.57	1656.8
1.07	1647.8
2.32	1631.6
4.07	1622.9
9.07	1611.7
16.07	1602.9
25.07	1598.7
36.07	1596.2
49.07	1593.8
64.07	1591.9
81.07	1590.7
100.07	1589.7
121.07	1589.0
144.08	1587.6
180.08	1587.7
300.08	1585.9
420.20	1584.7

Tested By *129-04-0411* *Date* *4/12/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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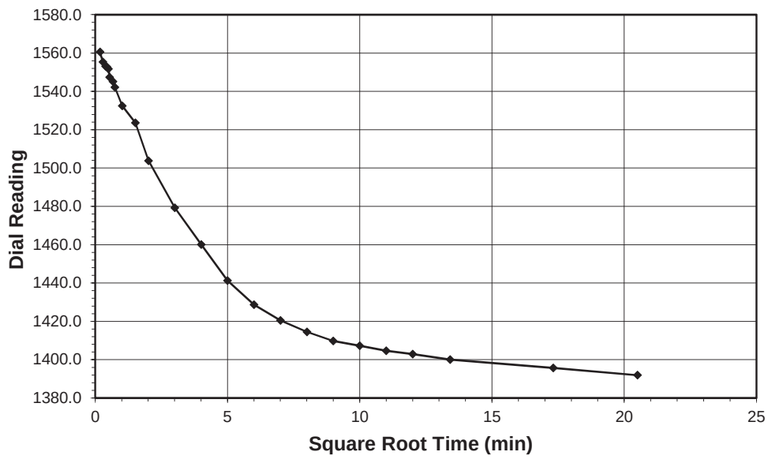
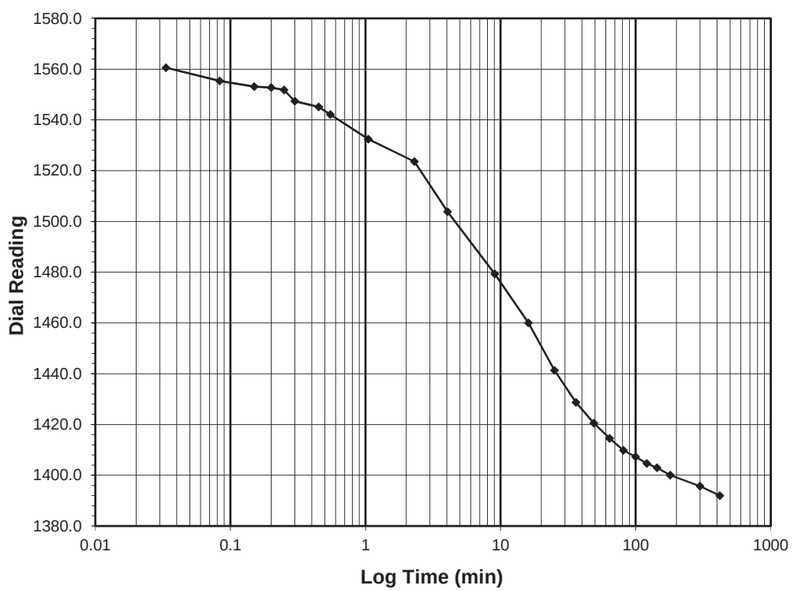
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-0.5**
Final Reading	**(div)**	**1391.9**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/13/18
Start Time		0:23:02

Elapsed Time (min)	Dial Reading (div)
Initial	**1584.7**
0.03	1560.5
0.08	1555.4
0.15	1553.1
0.20	1552.7
0.25	1551.8
0.30	1547.3
0.45	1545.1
0.55	1542.1
1.05	1532.5
2.30	1523.5
4.05	1503.8
9.05	1479.3
16.05	1460.0
25.05	1441.3
36.05	1428.7
49.05	1420.5
64.05	1414.5
81.05	1409.8
100.05	1407.3
121.05	1404.6
144.05	1402.9
180.05	1400.0
300.05	1395.7
420.33	1391.9

Tested By 129-04-0411 *Date* 4/13/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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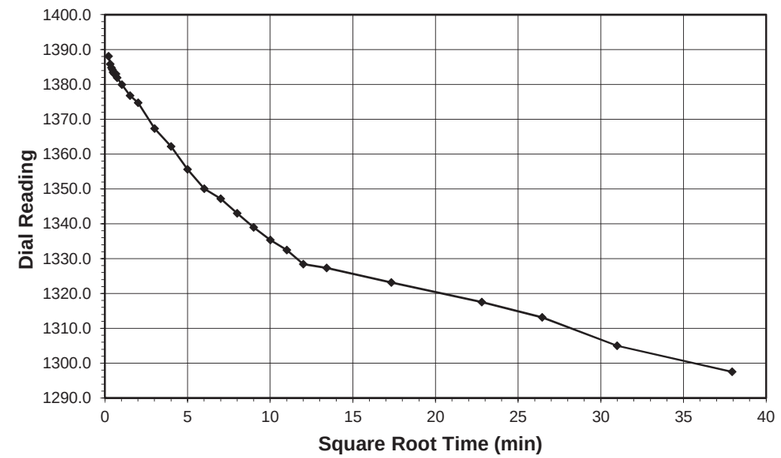
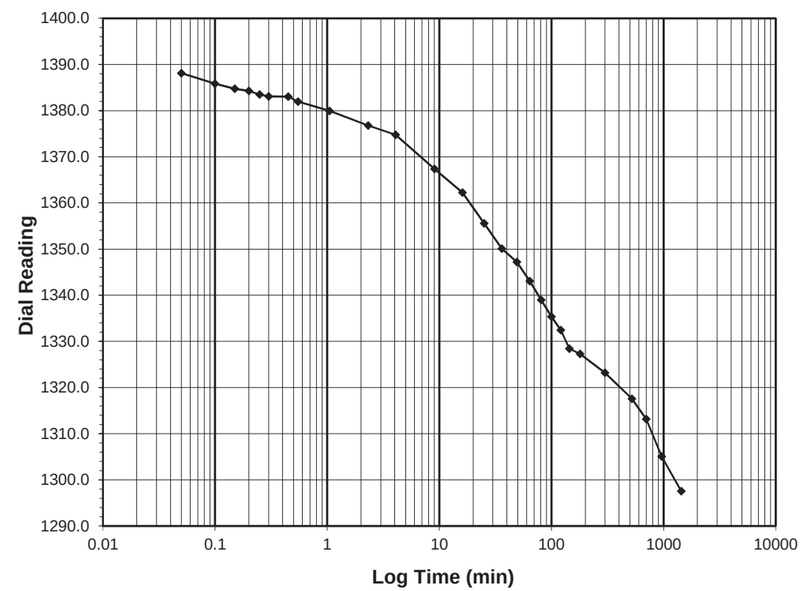
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-0.25**
Final Reading	**(div)**	**1297.5**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		4/13/18
Start Time		7:23:23

Elapsed Time (min)	Dial Reading (div)
Initial	**1391.9**
0.05	1388.1
0.10	1385.8
0.15	1384.8
0.20	1384.3
0.25	1383.5
0.30	1383.1
0.45	1383.0
0.55	1381.9
1.05	1379.9
2.32	1376.8
4.07	1374.7
9.07	1367.3
16.07	1362.2
25.07	1355.6
36.07	1350.1
49.07	1347.2
64.07	1343.0
81.07	1339.0
100.07	1335.3
121.07	1332.4
144.07	1328.4
180.07	1327.3
300.07	1323.2
520.07	1317.6
700.08	1313.2
960.08	1305.0
1440.02	1297.5

Tested By 129-04-0411 *Date* 4/13/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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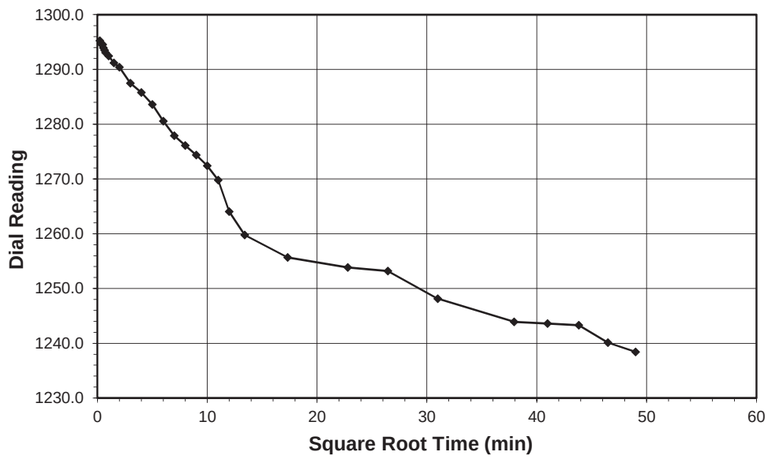
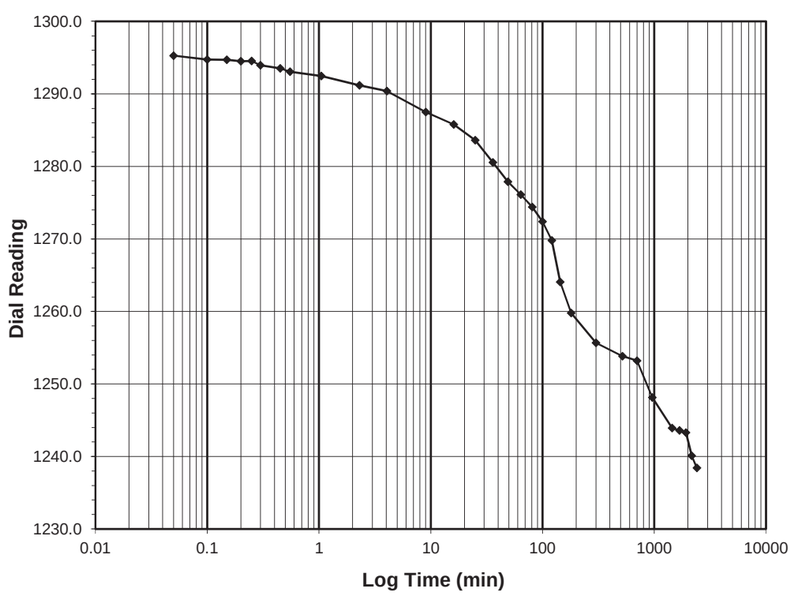
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 516+16, 16'LT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	4.0-6.0
Project No.	R-2018-095-001	Sample No.	ST-1
Lab ID	R-2018-095-001-002	Visual Description	LIGHT BROWN / GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load (tsf)	**0.25-0.125**
Final Reading (div)	**1238.4**
Consolidometer No.	**R409**
1 Division (in)	0.0001
Start Date	4/14/18
Start Time	7:23:25

Elapsed Time (min)	Dial Reading (div)
Initial	**1297.5**
0.05	1295.3
0.10	1294.7
0.15	1294.7
0.20	1294.5
0.25	1294.6
0.30	1294.0
0.45	1293.5
0.55	1293.1
1.05	1292.5
2.30	1291.2
4.05	1290.4
9.05	1287.5
16.05	1285.8
25.05	1283.6
36.05	1280.6
49.05	1277.9
64.05	1276.1
81.05	1274.4
100.05	1272.4
121.05	1269.8
144.05	1264.1
180.05	1259.8
300.05	1255.7
520.05	1253.8
700.05	1253.2
960.05	1248.1
1440.05	1243.9
1680.07	1243.6
1920.05	1243.3
2160.07	1240.1
2400.07	1238.4

Tested By *129-04-0411* *Date* *4/14/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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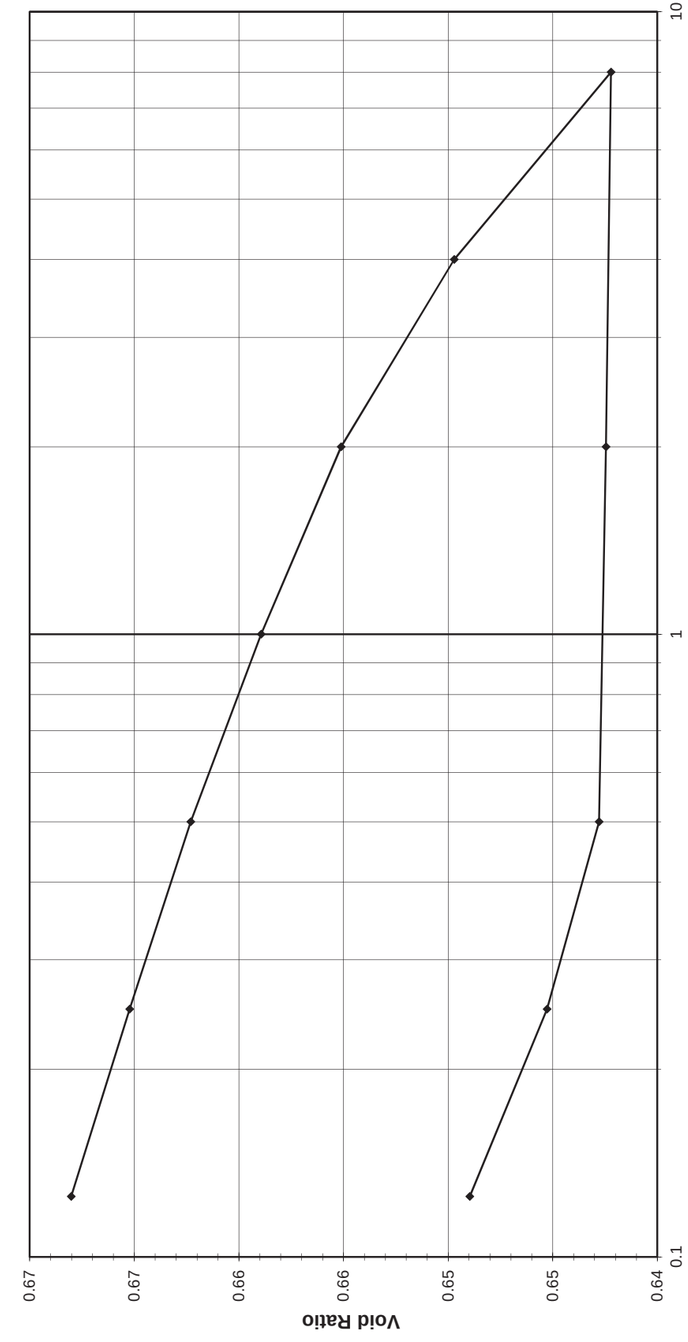
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By *129-04-0411* *Date* *4/17/18* *Approved By* *MPS* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 6

Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-011 GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT

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ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R470
1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	TB-08	815
Wt. Tare & WS (g)	485.43	287.95
Wt. Tare & DS (g)	418.64	259.52
Wt. Water (g)	66.79	28.43
Wt. Tare (g)	135.33	135.83
Wt. DS (g)	283.31	123.69
Water Content (%)	23.57	22.98
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9866
Sample Volume (cc)	80.44	79.36
Wt. Wet Sample + Ring (g)	371.31	370.56
Wt. of Ring (g)	214.30	214.30
Wt. of Wet Sample (g)	157.01	156.26
Wet Density (pcf)	121.80	122.87
Wet Density (g/cc)	1.95	1.97
Water Content (%)	23.57	22.98
Wt. of Dry Sample (g)	127.06	127.06
Dry Density (pcf)	98.56	99.90
Dry Density (g/cc)	1.58	1.60
Void Ratio	0.6714	0.6490
Saturation (%)	92.70	93.50
Specific Gravity	2.64	*Measured*

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.57952	**0.67139**
0.125	24.4	4.2	20.2	25.349	80.278	1.58272	**0.66802**
0.25	49.9	13.1	36.9	25.306	80.143	1.58537	**0.66523**
0.5	81.7	27.4	54.3	25.262	80.003	1.58815	**0.66231**
1	125.6	51.0	74.5	25.211	79.840	1.59138	**0.65893**
2	184.5	87.1	97.4	25.153	79.656	1.59506	**0.65511**
4	254.4	124.7	129.7	25.071	79.396	1.60028	**0.64971**
8	337.6	163.1	174.5	24.957	79.036	1.60758	**0.64222**
2	276.1	103.0	173.1	24.960	79.047	1.60734	**0.64246**
0.5	227.0	55.9	171.1	24.965	79.063	1.60703	**0.64279**
0.25	204.7	48.4	156.3	25.003	79.183	1.60460	**0.64527**
0.125	182.6	48.4	134.2	25.059	79.361	1.60100	**0.64897**

Tested By 129-04-0411 *Date* 4/17/18 *Input Checked By* GEM *Date* 5/15/18

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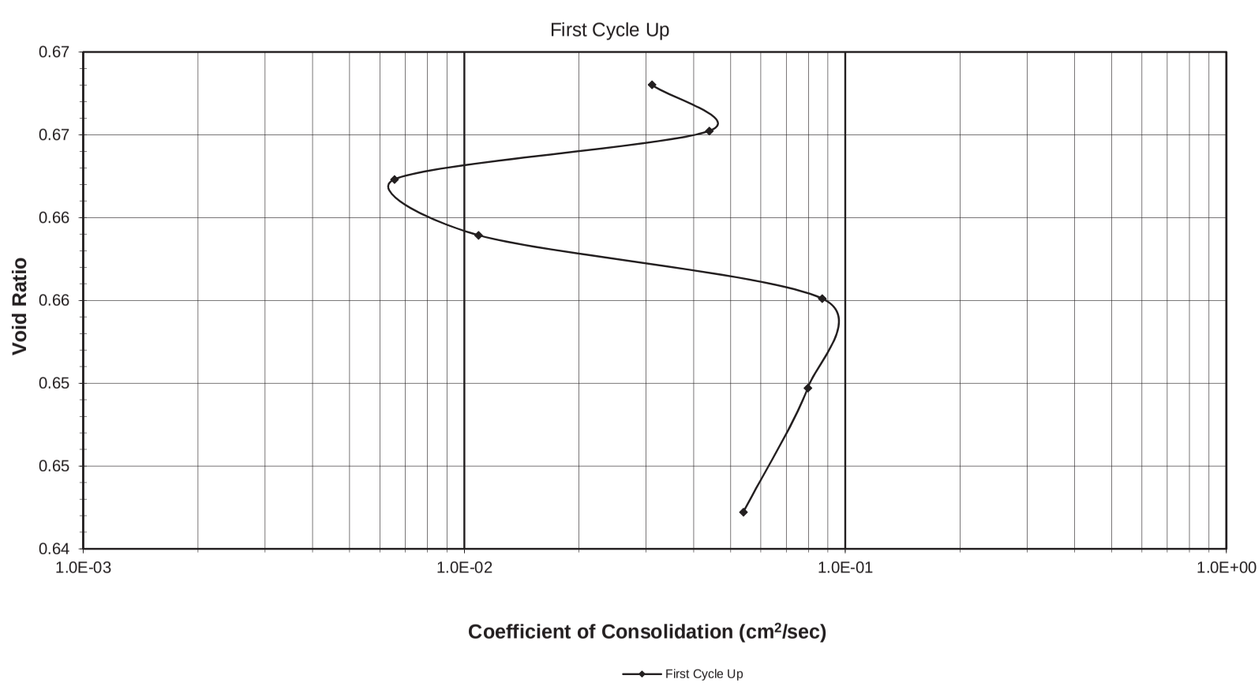
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 *Date* 4/17/18 *Input Checked By* GEM *Date* 5/15/18

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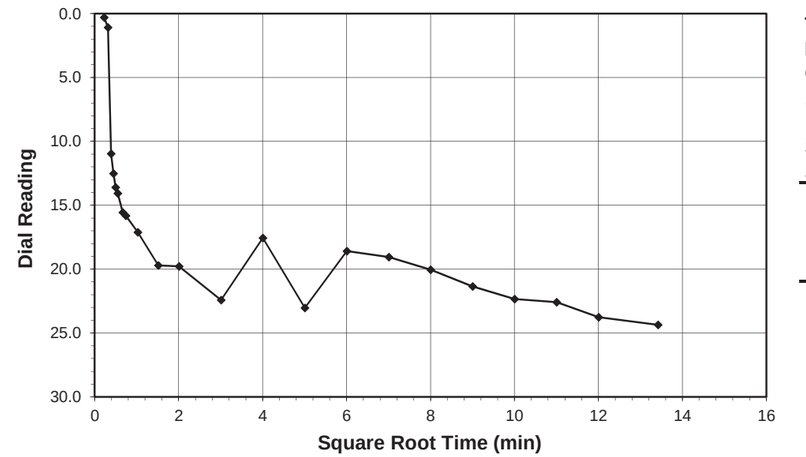
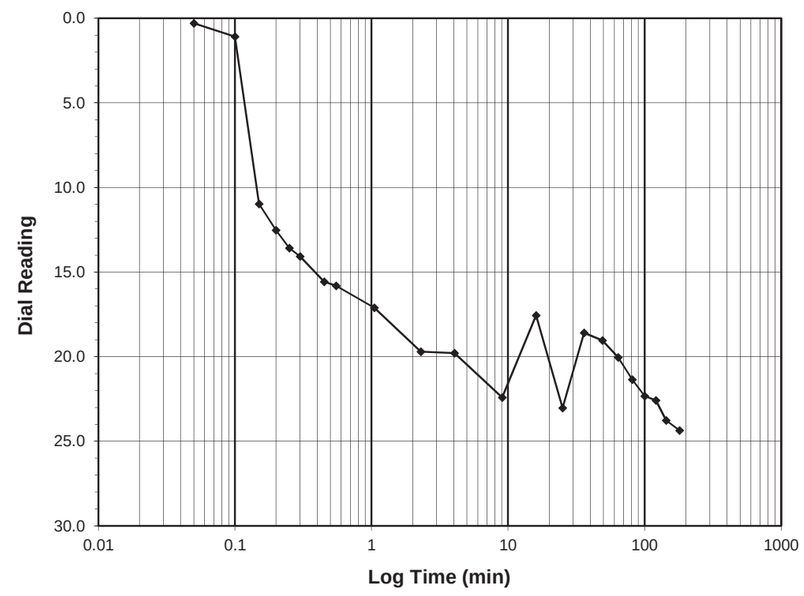
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load (tsf)	**0.0-0.125**
Final Reading (div)	**24.4**
Consolidometer No.	**R470**
1 Division (in)	0.0001
Start Date	4/17/18
Start Time	10:32:22

Elapsed Time (min)	Dial Reading (div)
Initial	**0.0**
0.05	0.3
0.10	1.1
0.15	11.0
0.20	12.5
0.25	13.6
0.30	14.1
0.45	15.6
0.55	15.8
1.05	17.1
2.30	19.7
4.05	19.8
9.05	22.4
16.05	17.6
25.05	23.0
36.05	18.6
49.07	19.0
64.07	20.0
81.07	21.4
100.07	22.3
121.07	22.6
144.07	23.8
180.07	24.4

Tested By *129-04-0411* *Date* *4/17/18* *Checked By* *GEM* *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Reference	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R470
1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	TB-08	815
Wt. Tare & WS (g)	485.43	287.95
Wt. Tare & DS (g)	418.64	259.52
Wt. Water (g)	66.79	28.43
Wt. Tare (g)	135.33	135.83
Wt. DS (g)	283.31	123.69
Water Content (%)	23.57	22.98
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.987
Sample Volume (cc)	80.44	79.36
Wt. Wet Sample + Ring (g)	371.31	370.56
Wt. of Ring (g)	214.30	214.30
Wt. of Wet Sample (g)	157.01	156.26
Wet Density (pcf)	121.80	122.87
Wet Density (g/cc)	1.95	1.97
Water Content (%)	23.57	22.98
Wt. of Dry Sample (g)	127.06	127.06
Dry Density (pcf)	98.56	99.90
Dry Density (g/cc)	1.58	1.60
Void Ratio	0.6714	0.6490
Saturation (%)	92.70	93.50
Specific Gravity	*2.64*	*Measured*

Load Increment (tsf)	**Dial Reading @ t_{50} (div)**	**Machine Deflection (div)**	**C_v Test Data Summary: Corrected Dial Reading @ t_{50} (div)**	**Sample Height @ t_{50} (cm)**	**Time t_{50} (min.)**	**C_v (cm²/sec)**
0.0 - 0.125	12.2	4.2	8.0	2.538	**0.17**	**0.03110**
0.125 - 0.25	38.7	13.1	25.6	2.534	**0.12**	**0.04391**
0.25 - 0.5	74.2	27.4	46.8	2.528	**0.80**	**0.00656**
0.5 - 1	117.3	51.0	66.2	2.523	**0.48**	**0.01089**
1 - 2	164.8	87.1	77.6	2.520	**0.06**	**0.08690**
2 - 4	235.6	124.7	110.9	2.512	**0.07**	**0.07968**
4 - 8	321.7	163.1	158.6	2.500	**0.10**	**0.05399**
8 - 2	NA	103.0	NA	NA	**NA**	**NA**
2 - 0.5	NA	55.9	NA	NA	**NA**	**NA**
0.5 - 0.25	NA	48.4	NA	NA	**NA**	**NA**
0.25 - 0.125	NA	48.4	NA	NA	**NA**	**NA**

Tested By *129-04-0411* *Date* *4/17/18* *Input Checked By* *GEM* *Date* *5/15/18*

DCN: CT-24E Date: 5/3/12 Revision: 6

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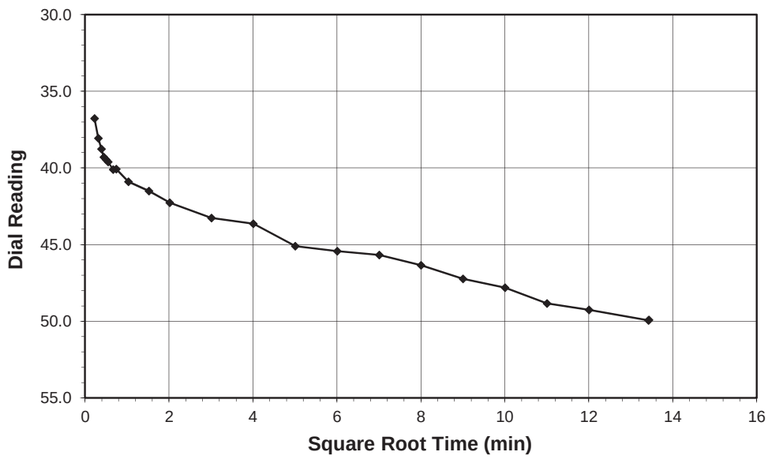
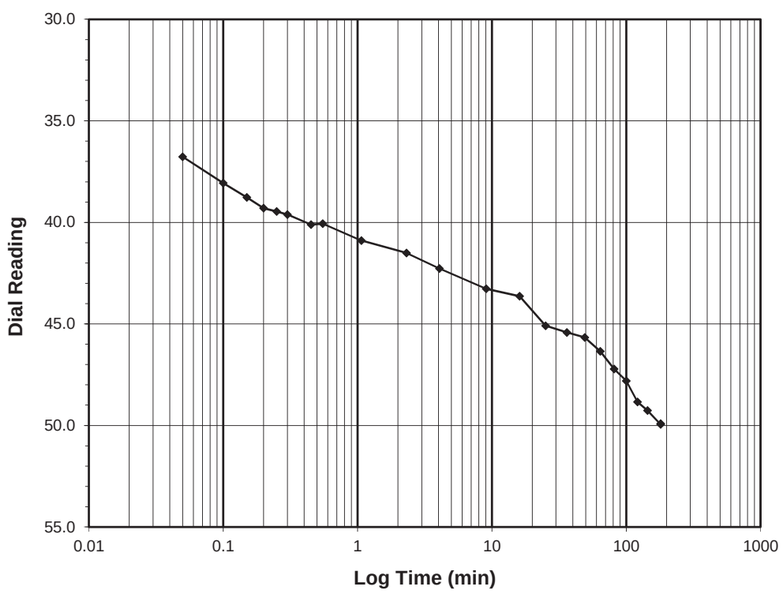
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.125-0.25**
Final Reading	**(div)**	**49.9**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/17/18
Start Time		13:32:46

Elapsed Time (min)	Dial Reading (div)
Initial	**24.4**
0.05	36.8
0.10	38.1
0.15	38.8
0.20	39.3
0.25	39.5
0.30	39.6
0.45	40.1
0.55	40.1
1.07	40.9
2.32	41.5
4.07	42.3
9.07	43.3
16.07	43.6
25.07	45.1
36.07	45.4
49.07	45.7
64.07	46.4
81.07	47.2
100.07	47.8
121.07	48.8
144.07	49.3
180.07	49.9
180.42	49.9

Tested By *129-04-0411* *Date* *4/17/18* *Checked By* *GEM* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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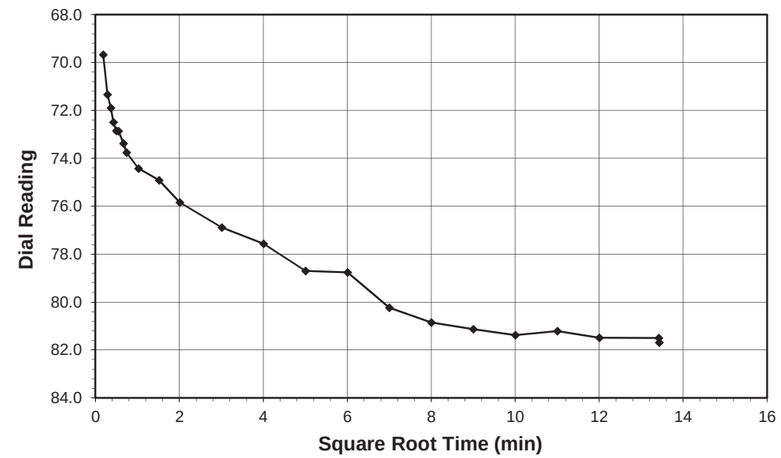
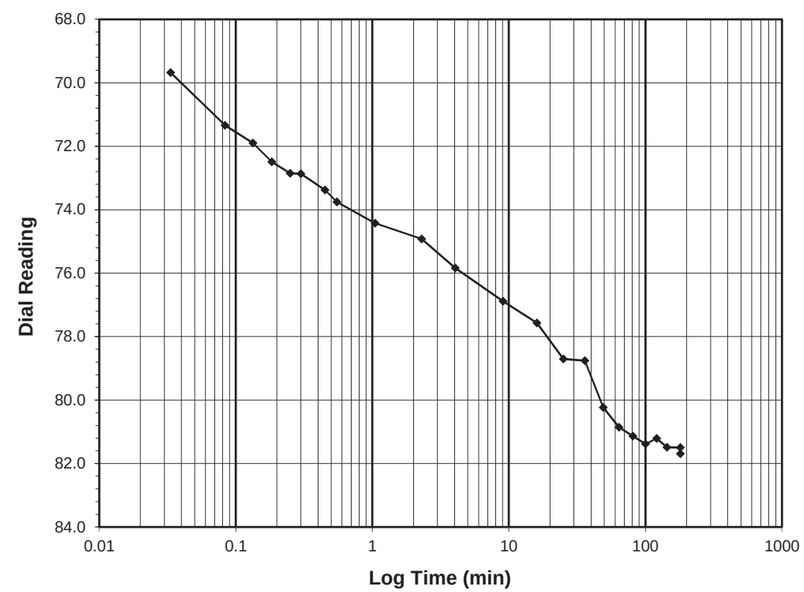
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.25-0.5**
Final Reading	**(div)**	**81.7**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/17/18
Start Time		16:33:11

Elapsed Time (min)	Dial Reading (div)
Initial	**49.9**
0.03	69.7
0.08	71.3
0.13	71.9
0.18	72.5
0.25	72.9
0.30	72.9
0.45	73.4
0.55	73.8
1.05	74.4
2.30	74.9
4.05	75.8
9.05	76.9
16.05	77.6
25.05	78.7
36.05	78.8
49.05	80.2
64.05	80.9
81.05	81.1
100.05	81.4
121.05	81.2
144.05	81.5
180.05	81.5
180.32	81.7

Tested By *129-04-0411* *Date* *4/17/18* *Checked By* *GEM* *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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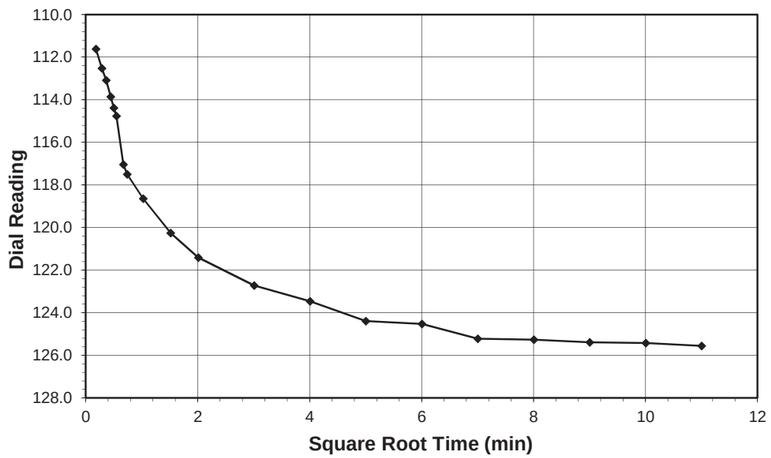
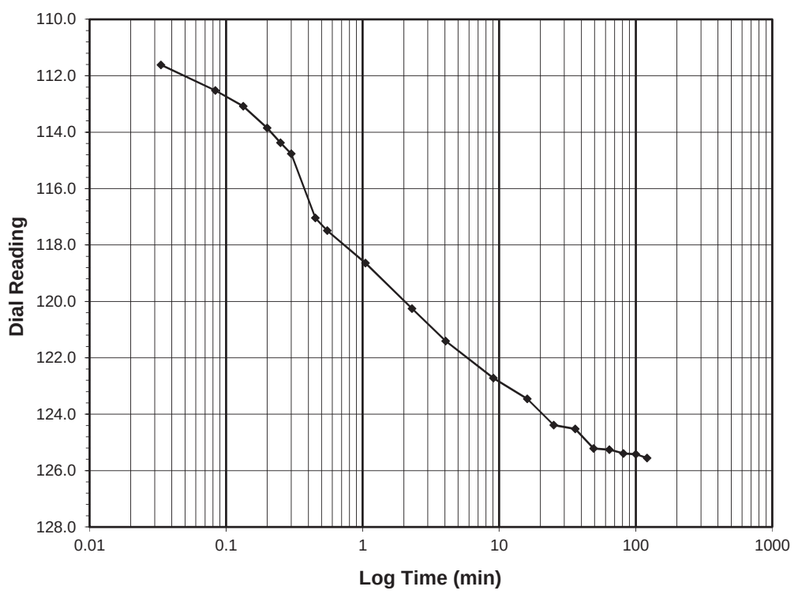
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-1.0**
Final Reading	**(div)**	**125.6**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/17/18
Start Time		19:33:31

Elapsed Time (min)	Dial Reading (div)
Initial	**81.7**
0.03	111.6
0.08	112.5
0.13	113.1
0.20	113.9
0.25	114.4
0.30	114.8
0.45	117.0
0.55	117.5
1.05	118.6
2.30	120.3
4.05	121.4
9.05	122.7
16.05	123.5
25.05	124.4
36.05	124.5
49.07	125.2
64.07	125.3
81.07	125.4
100.07	125.4
121.07	125.6

Tested By 129-04-0411 *Date* 4/17/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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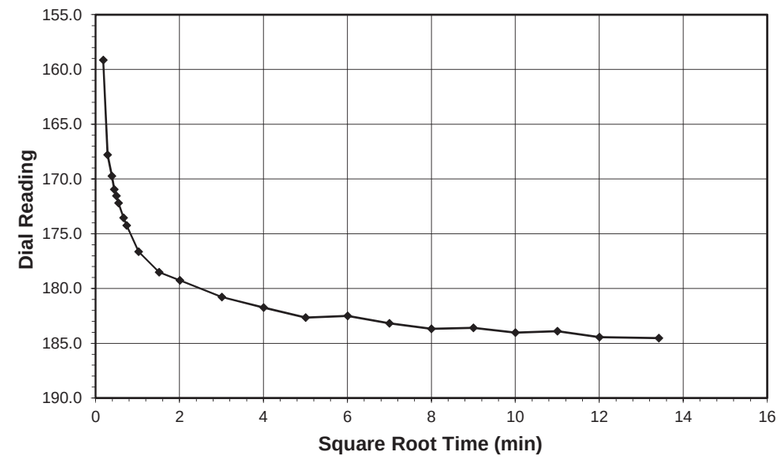
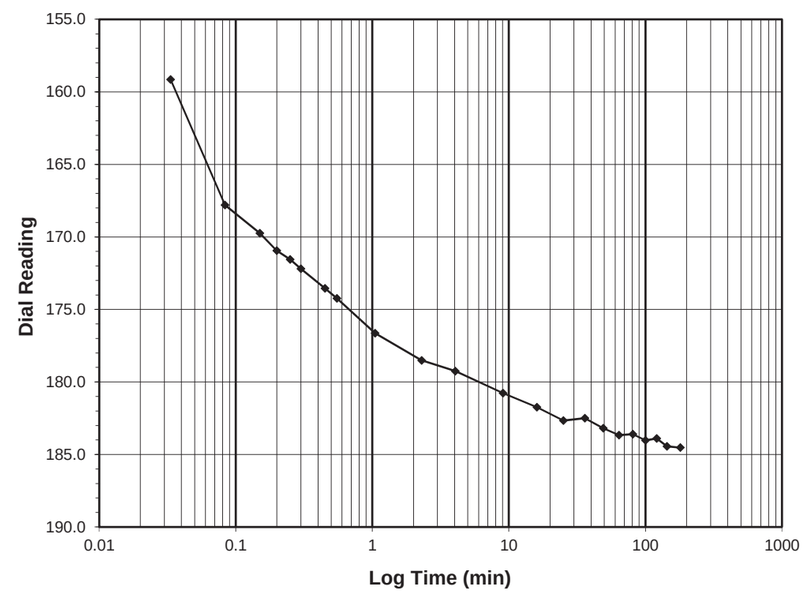
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**1.0-2.0**
Final Reading	**(div)**	**184.5**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/17/18
Start Time		22:33:55

Elapsed Time (min)	Dial Reading (div)
Initial	**125.6**
0.03	159.1
0.08	167.8
0.15	169.7
0.20	170.9
0.25	171.5
0.30	172.2
0.45	173.5
0.55	174.2
1.05	176.6
2.30	178.5
4.05	179.3
9.05	180.8
16.05	181.7
25.05	182.7
36.05	182.5
49.05	183.2
64.05	183.7
81.05	183.6
100.07	184.0
121.07	183.9
144.07	184.4
180.07	184.5

Tested By 129-04-0411 *Date* 4/17/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

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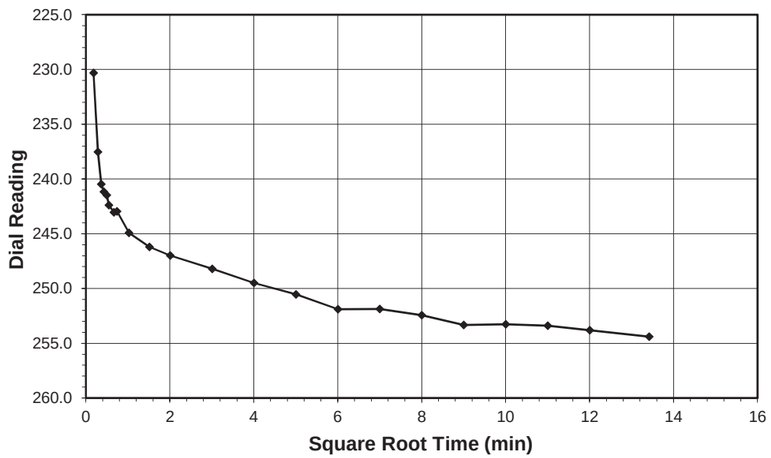
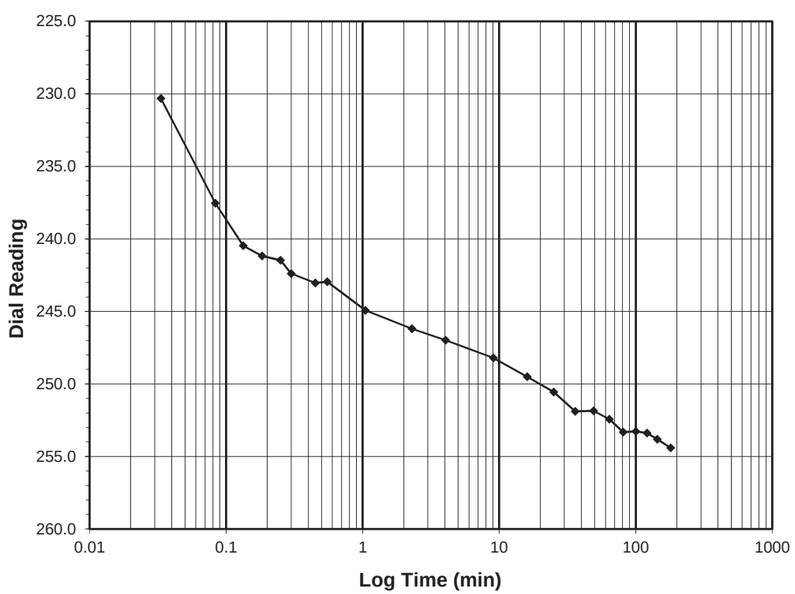
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-4.0**
Final Reading	**(div)**	**254.4**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		1:34:20

Elapsed Time (min)	Dial Reading (div)
Initial	**184.5**
0.03	230.3
0.08	237.5
0.13	240.5
0.18	241.2
0.25	241.5
0.30	242.4
0.45	243.0
0.55	242.9
1.05	244.9
2.30	246.2
4.05	247.0
9.05	248.2
16.05	249.5
25.05	250.5
36.05	251.9
49.05	251.9
64.05	252.4
81.05	253.3
100.05	253.3
121.05	253.4
144.05	253.8
180.05	254.4

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-011 GEOJAC-16TSF1 Cv.xlsm]STEP 6

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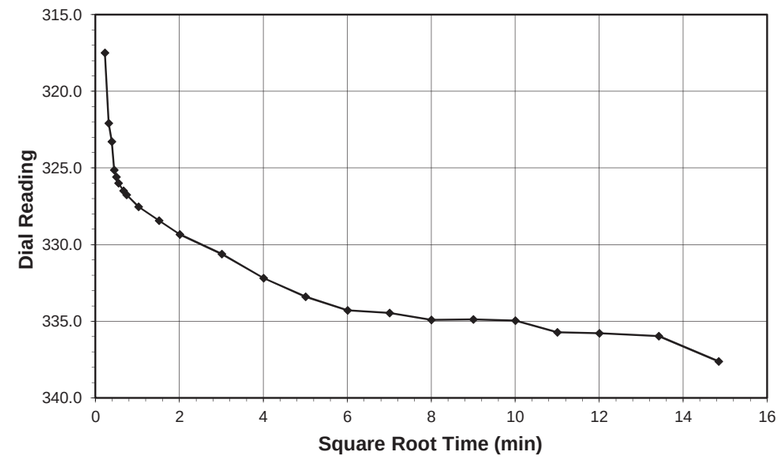
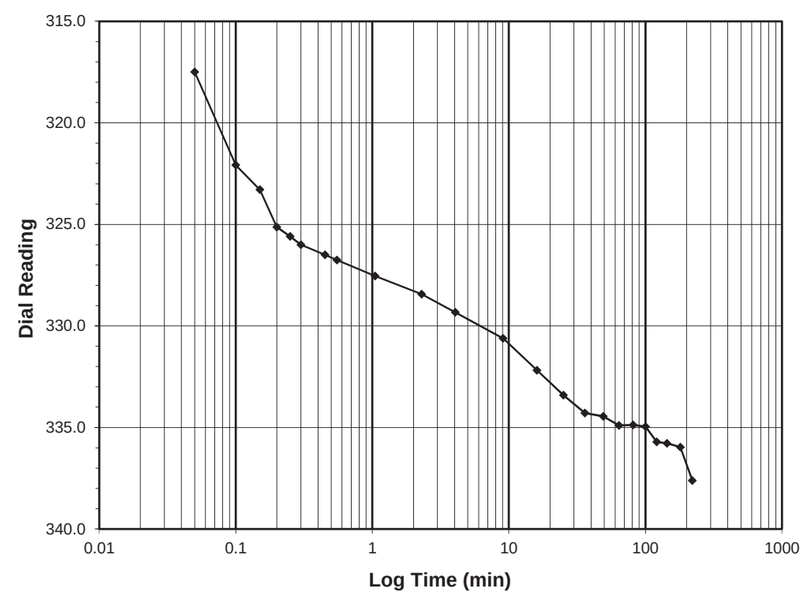
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**4.0-8.0**
Final Reading	**(div)**	**337.6**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		4:34:44

Elapsed Time (min)	Dial Reading (div)
Initial	**254.4**
0.05	317.5
0.10	322.1
0.15	323.3
0.20	325.1
0.25	325.6
0.30	326.0
0.45	326.5
0.55	326.8
1.05	327.5
2.30	328.4
4.05	329.3
9.07	330.6
16.07	332.2
25.07	333.4
36.07	334.3
49.07	334.5
64.07	334.9
81.07	334.9
100.07	335.0
121.07	335.7
144.07	335.8
180.07	336.0
220.47	337.6

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-095 ESP - R-1015 SITE 9\[2018-095-001-011 GEOJAC-16TSF1 Cv.xlsm]STEP 7

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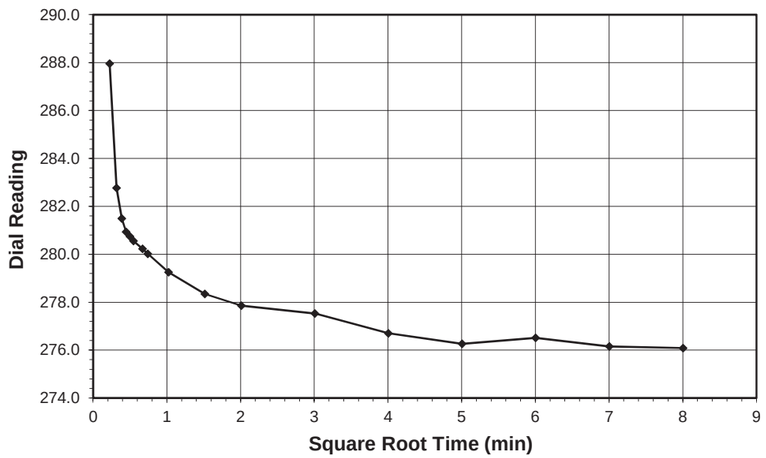
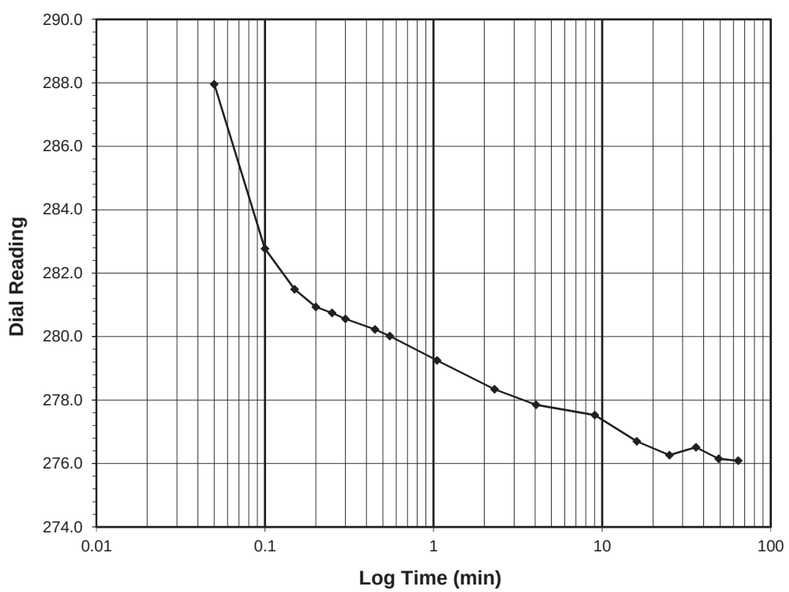
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**8.0-2.0**
Final Reading	**(div)**	**276.1**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		8:15:13

Elapsed Time (min)	Dial Reading (div)
Initial	**337.6**
0.05	288.0
0.10	282.8
0.15	281.5
0.20	280.9
0.25	280.7
0.30	280.6
0.45	280.2
0.55	280.0
1.05	279.3
2.30	278.3
4.05	277.9
9.05	277.5
16.05	276.7
25.05	276.3
36.05	276.5
49.05	276.1
64.05	276.1

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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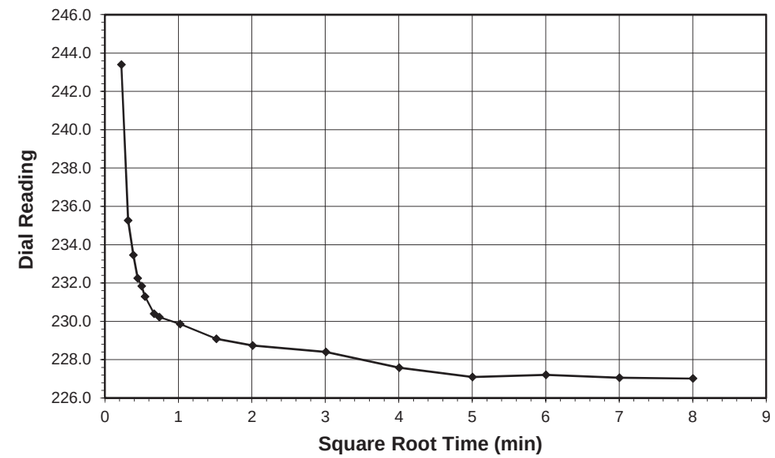
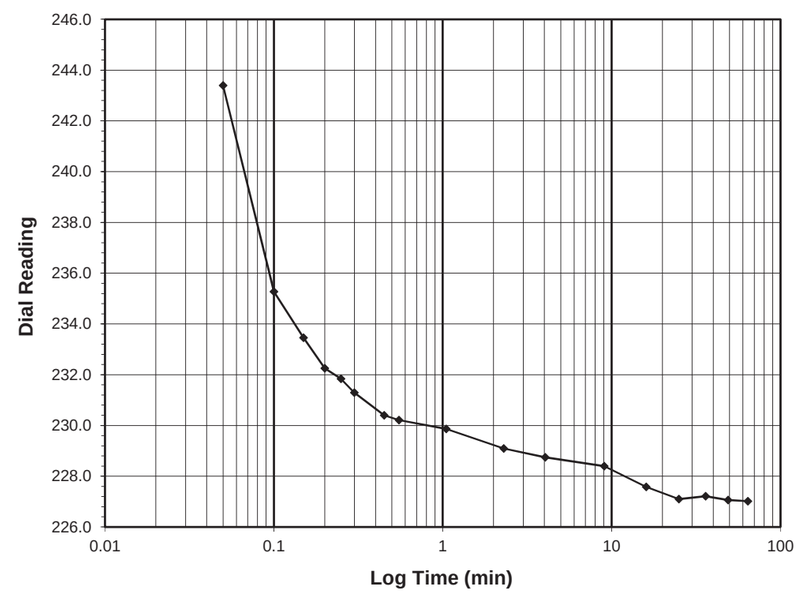
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-0.5**
Final Reading	**(div)**	**227.0**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		11:15:34

Elapsed Time (min)	Dial Reading (div)
Initial	**276.1**
0.05	243.4
0.10	235.3
0.15	233.5
0.20	232.3
0.25	231.8
0.30	231.3
0.45	230.4
0.55	230.2
1.05	229.9
2.30	229.1
4.05	228.7
9.05	228.4
16.05	227.6
25.05	227.1
36.05	227.2
49.05	227.1
64.07	227.0

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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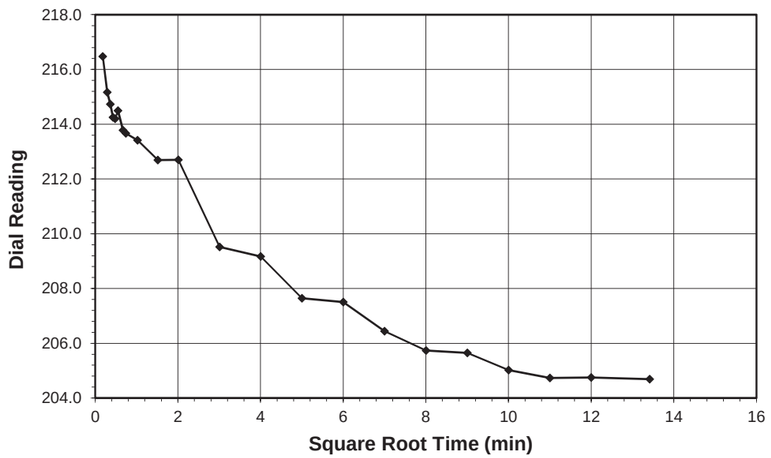
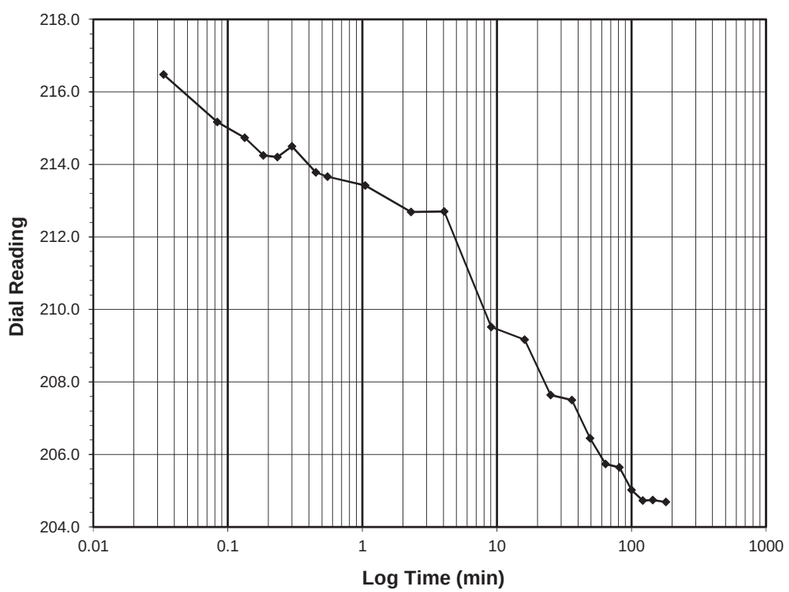
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-0.25**
Final Reading	**(div)**	**204.7**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		14:15:59

Elapsed Time (min)	Dial Reading (div)
Initial	**227.0**
0.03	216.5
0.08	215.2
0.13	214.7
0.18	214.3
0.23	214.2
0.30	214.5
0.45	213.8
0.55	213.7
1.05	213.4
2.30	212.7
4.05	212.7
9.05	209.5
16.05	209.2
25.05	207.6
36.05	207.5
49.05	206.4
64.05	205.7
81.05	205.6
100.05	205.0
121.05	204.7
144.07	204.7
180.07	204.7

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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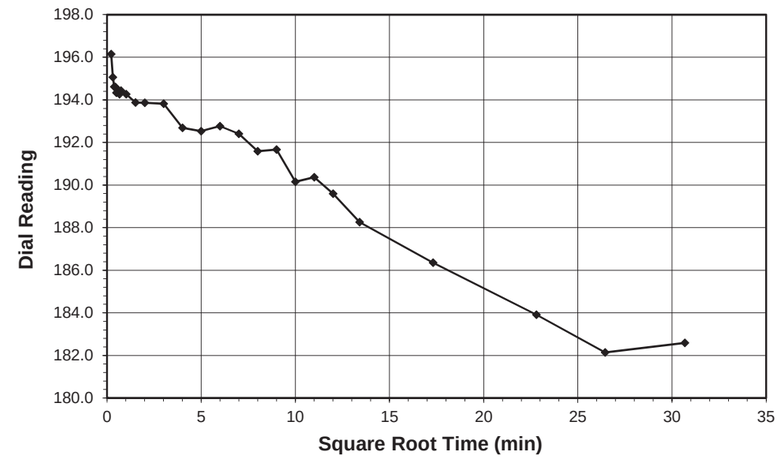
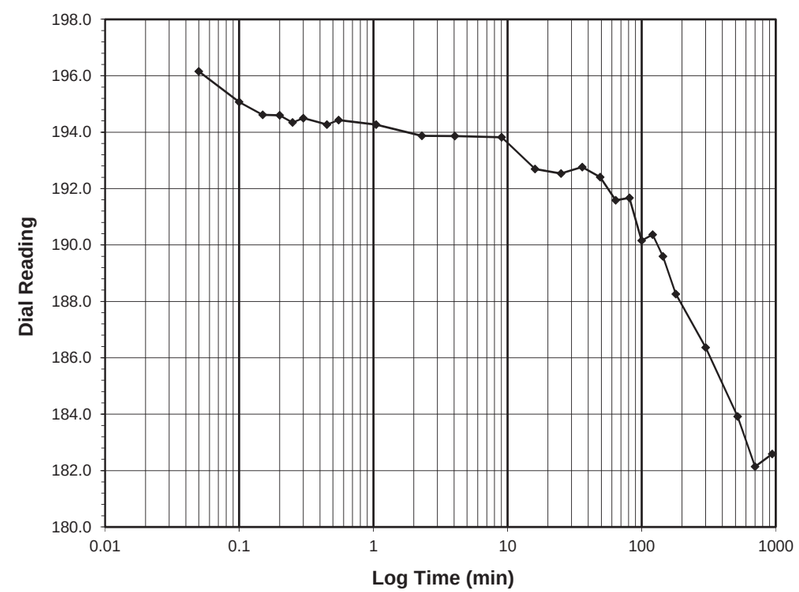
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 517+11, 59'RT
Client Project	R-1015 Site 9 - CS34.327.00	Depth (ft)	11.0-13.0
Project No.	R-2018-095-001	Sample No.	ST-2
Lab ID	R-2018-095-001-011	Visual Description	GRAY SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.25-0.125**
Final Reading	**(div)**	**182.6**
Consolidometer No.		**R470**
1 Division	(in)	0.0001
Start Date		4/18/18
Start Time		17:16:22

Elapsed Time (min)	Dial Reading (div)
Initial	**204.7**
0.05	196.2
0.10	195.1
0.15	194.6
0.20	194.6
0.25	194.3
0.30	194.5
0.45	194.3
0.55	194.4
1.05	194.3
2.30	193.9
4.05	193.9
9.05	193.8
16.05	192.7
25.05	192.5
36.05	192.8
49.05	192.4
64.07	191.6
81.07	191.7
100.07	190.2
121.07	190.4
144.07	189.6
180.07	188.3
300.07	186.4
520.07	183.9
700.07	182.1
941.73	182.6

Tested By 129-04-0411 *Date* 4/18/18 *Checked By* GEM *Date* 5/15/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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SPECIFIC GRAVITY

AASHTO T-100-15

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-2015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	**GRAY**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 280	R 347
Weight of Pycnometer + Soil + Water (gm)	718.53	711.58
Temperature, T (°Celsius)	28.1	27.8
Weight of Pycnometer + Water (gm)	685.04	668.72
Tare Number	280	347
Weight of Tare + Dry Soil (gm)	241.14	239.34
Weight of Tare (gm)	187.33	170.75
Weight of Dry Soil (gm)	53.81	68.59
Specific Gravity of Soil @ T	2.649	2.666
Specific Gravity of Water @ T	0.9962	0.9963
Conversion Factor for Temperature T	0.9980	0.9981
Specific Gravity @ 20° Celsius	2.654	2.671

Average Specific Gravity @ 20° Celsius	2.66

Tested By 129-04-0411 *Date* 7/3/18 *Checked By* GEM *Date* 7/3/18

DCN: CT-S5 Date: 03/24/05 Revision: 10E:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 rename DOTSp. Gravity.xlsm]Sheet1

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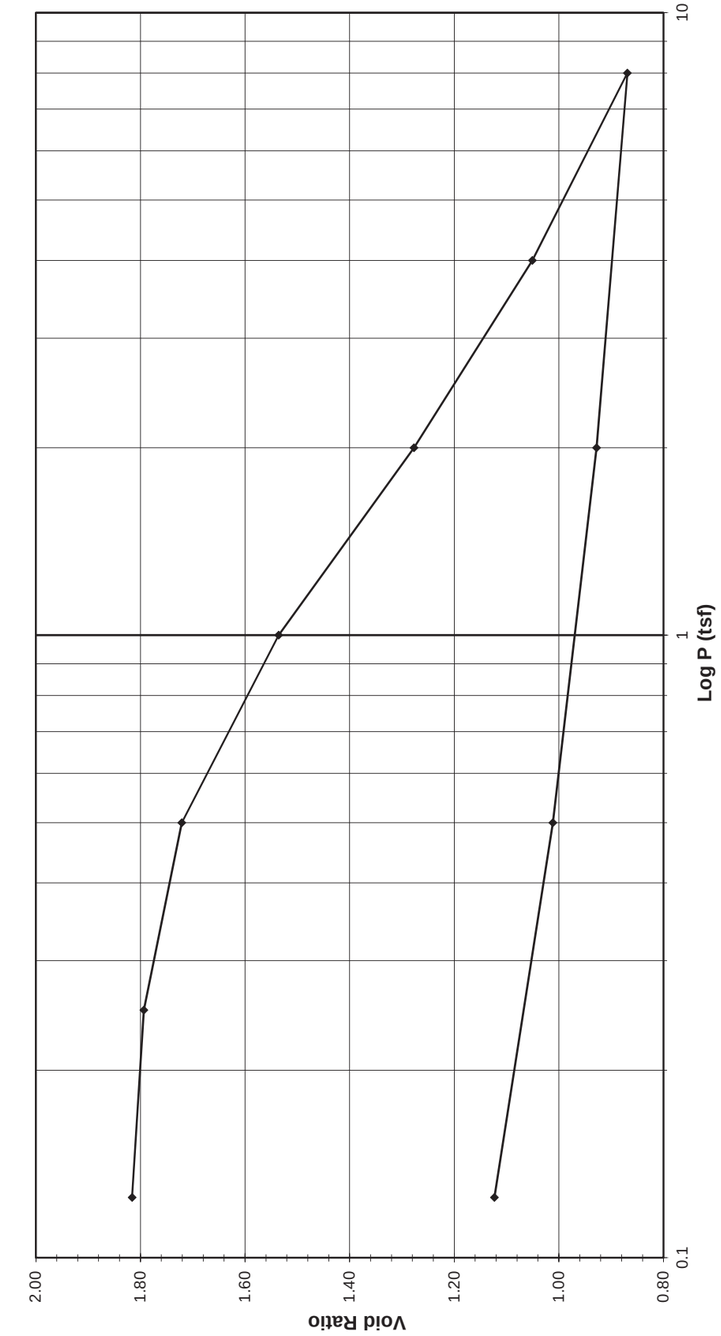
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 *Date* 6/26/18 *Approved By* *MPS* *Date* 7/6/18

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT

DCN: CT-24E Date: 5/3/12 Revision: 6

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ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R487
1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	912	826
Wt. Tare & WS (g)	335.79	237.23
Wt. Tare & DS (g)	244.03	205.02
Wt. Water (g)	91.76	32.21
Wt. Tare (g)	101.01	133.76
Wt. DS (g)	143.02	71.26
Water Content (%)	64.16	45.20
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	1.0000
Sample Volume (cc)	80.44	80.44
Wt. Wet Sample + Ring (g)	337.93	323.70
Wt. of Ring (g)	214.69	214.69
Wt. of Wet Sample (g)	123.24	109.01
Wet Density (pcf)	95.60	84.56
Wet Density (g/cc)	1.53	1.36
Water Content (%)	64.16	45.20
Wt. of Dry Sample (g)	75.07	75.07
Dry Density (pcf)	58.24	58.24
Dry Density (g/cc)	0.93	0.93
Void Ratio	1.8501	1.8501
Saturation (%)	92.24	64.99
Specific Gravity	2.66	*Measured*

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	0.93329	**1.85013**
0.125	123.7	3.6	120.1	25.095	79.474	0.94463	**1.81591**
0.25	207.3	9.0	198.3	24.896	78.844	0.95218	**1.79360**
0.5	474.4	21.0	453.4	24.248	76.793	0.97762	**1.72091**
1	1143.0	40.0	1103.0	22.598	71.567	1.04900	**1.53575**
2	2071.0	59.6	2011.4	20.291	64.260	1.16828	**1.27685**
4	2889.6	85.0	2804.6	18.276	57.880	1.29707	**1.05078**
8	3565.8	123.4	3442.5	16.656	52.749	1.42323	**0.86898**
2	3350.2	114.6	3235.6	17.182	54.413	1.37970	**0.92795**
0.5	3027.2	84.0	2943.2	17.924	56.765	1.32254	**1.01129**
0.125	2626.5	76.4	2550.1	18.923	59.927	1.25276	**1.12332**

Tested By 129-04-0411 *Date* 6/26/18 *Input Checked By* GEM *Date* 7/6/18

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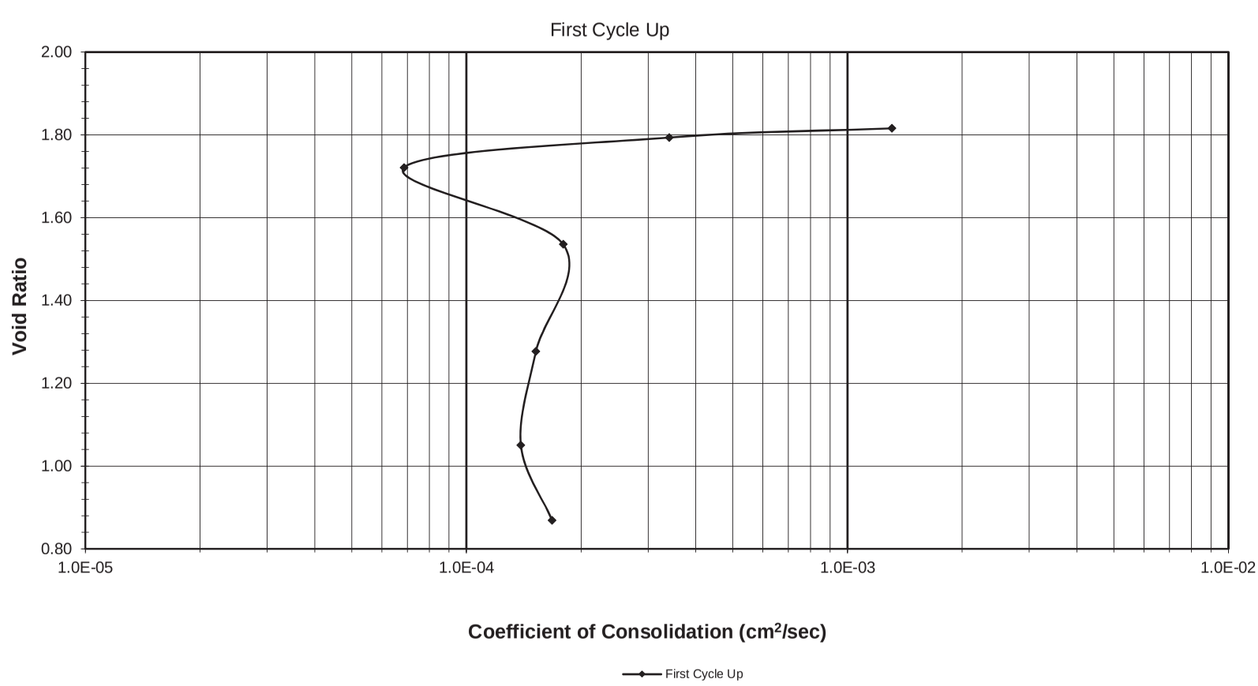
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-1015 Site 9 MSE Wall CS34.368	Depth (ft) Sample	9.8-11.8
Project No.	R-2018-181-001	No. Visual	ST-3
Lab ID	R-2018-181-001-001	Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 *Date* 6/26/18 *Input Checked By* GEM *Date* 7/6/18

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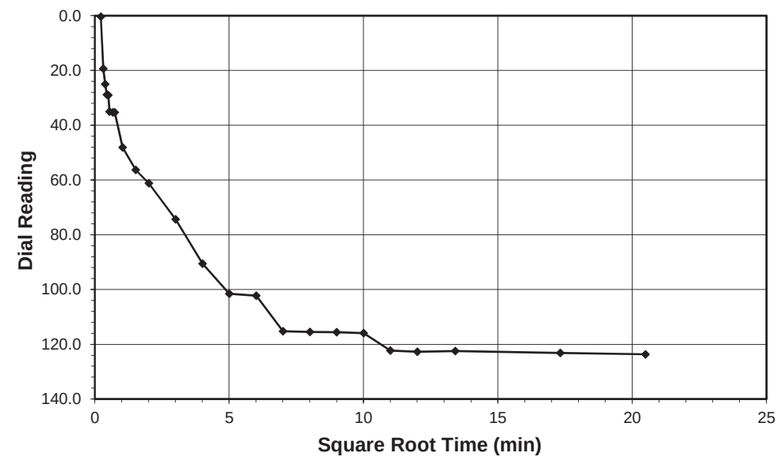
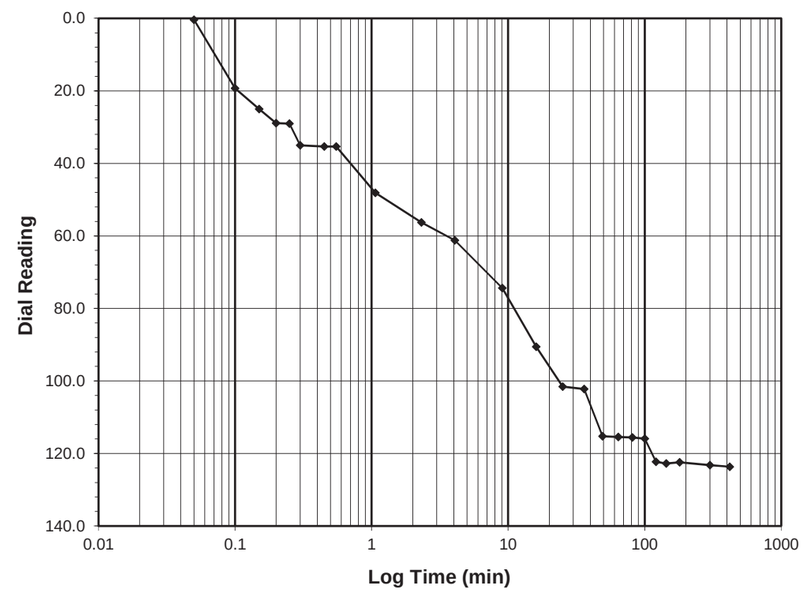
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load (tsf)	**0.0-0.125**
Final Reading (div)	**123.7**
Consolidometer No.	**R487**
1 Division (in)	0.0001
Start Date	6/26/18
Start Time	17:27:35

Elapsed Time (min)	Dial Reading (div)
Initial	**0.0**
0.05	0.4
0.10	19.3
0.15	25.0
0.20	28.9
0.25	29.0
0.30	35.0
0.45	35.3
0.55	35.3
1.07	48.1
2.32	56.3
4.07	61.2
9.07	74.4
16.07	90.5
25.07	101.6
36.07	102.2
49.07	115.2
64.07	115.5
81.07	115.6
100.07	115.9
121.07	122.3
144.07	122.8
180.07	122.4
300.07	123.2
420.05	123.7

Tested By *129-04-0411* *Date* *6/26/18* *Checked By* *GEM* *Date* *7/6/18*

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 1

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ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Reference	R-1015 Site 9 MSE Wall CS34.368	Depth (ft) Sample	9.8-11.8
Project No.	R-2018-181-001	No. Visual	ST-3
Lab ID	R-2018-181-001-001	Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R487
1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	912	826
Wt. Tare & WS (g)	335.79	237.23
Wt. Tare & DS (g)	244.03	205.02
Wt. Water (g)	91.76	32.21
Wt. Tare (g)	101.01	133.76
Wt. DS (g)	143.02	71.26
Water Content (%)	64.16	45.20
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	1.000
Sample Volume (cc)	80.44	80.44
Wt. Wet Sample + Ring (g)	337.93	323.70
Wt. of Ring (g)	214.69	214.69
Wt. of Wet Sample (g)	123.24	109.01
Wet Density (pcf)	95.60	84.56
Wet Density (g/cc)	1.53	1.36
Water Content (%)	64.16	45.20
Wt. of Dry Sample (g)	75.07	75.07
Dry Density (pcf)	58.24	58.24
Dry Density (g/cc)	0.93	0.93
Void Ratio	1.8501	1.8501
Saturation (%)	92.24	64.99
Specific Gravity	*2.66 Measured*	

Load Increment (tsf)	**Dial Reading @ t_{50} (div)**	**Machine Deflection (div)**	**C_v Test Data Summary: Corrected Dial Reading @ t_{50} (div)**	**Sample Height @ t_{50} (cm)**	**Time t_{50} (min.)**	**C_v (cm^2/sec)**
0.0 - 0.125	60.3	3.6	56.7	2.526	**4.00**	**0.00131**
0.125 - 0.25	184.2	9.0	175.2	2.495	**15.00**	**0.00034**
0.25 - 0.5	360.8	21.0	339.8	2.454	**72.00**	**0.00007**
0.5 - 1	817.6	40.0	777.6	2.342	**25.10**	**0.00018**
1 - 2	1565.5	59.6	1505.9	2.157	**25.10**	**0.00015**
2 - 4	2486.4	85.0	2401.4	1.930	**22.00**	**0.00014**
4 - 8	3228.8	123.4	3105.4	1.751	**15.00**	**0.00017**
8 - 2	NA	114.6	NA	NA	**NA**	**NA**
2 - 0.5	NA	84.0	NA	NA	**NA**	**NA**
0.5 - 0.125	NA	76.4	NA	NA	**NA**	**NA**

Tested By *129-04-0411* *Date* *6/26/18* *Input Checked By* *GEM* *Date* *7/6/18*

DCN: CT-24E Date: 5/3/12 Revision: 6

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]FINAL PLOT

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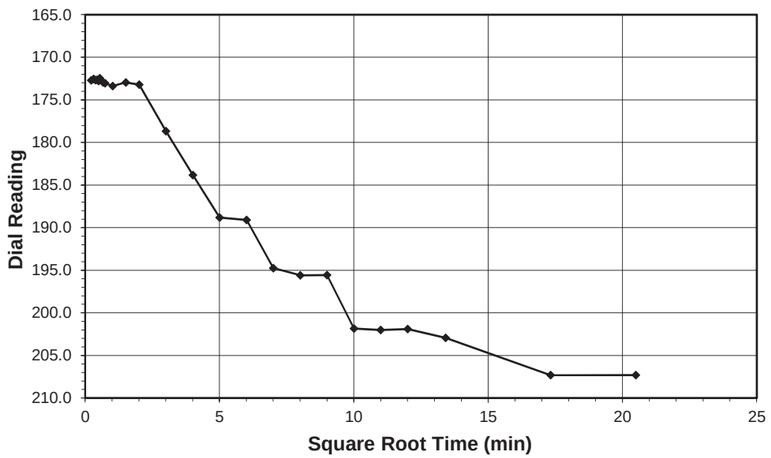
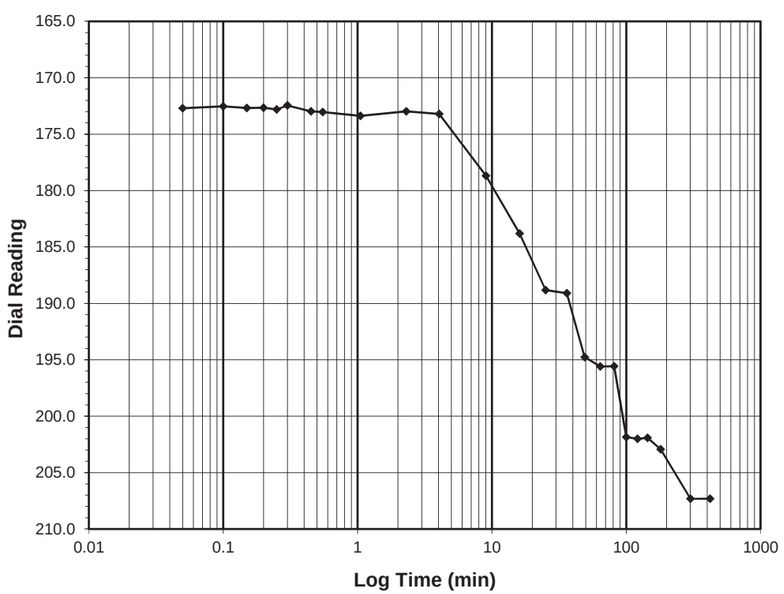
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.125-0.25**
Final Reading	**(div)**	**207.3**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/27/18
Start Time		0:27:38

Elapsed Time (min)	Dial Reading (div)
Initial	**123.7**
0.05	172.7
0.10	172.5
0.15	172.7
0.20	172.7
0.25	172.8
0.30	172.5
0.45	173.0
0.55	173.0
1.05	173.4
2.30	173.0
4.05	173.2
9.05	178.7
16.07	183.8
25.07	188.8
36.07	189.1
49.07	194.8
64.07	195.6
81.07	195.6
100.07	201.9
121.07	202.0
144.07	201.9
180.07	202.9
300.07	207.3
420.25	207.3

Tested By *129-04-0411* *Date* *6/27/18* *Checked By* *GEM* *Date* 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 2

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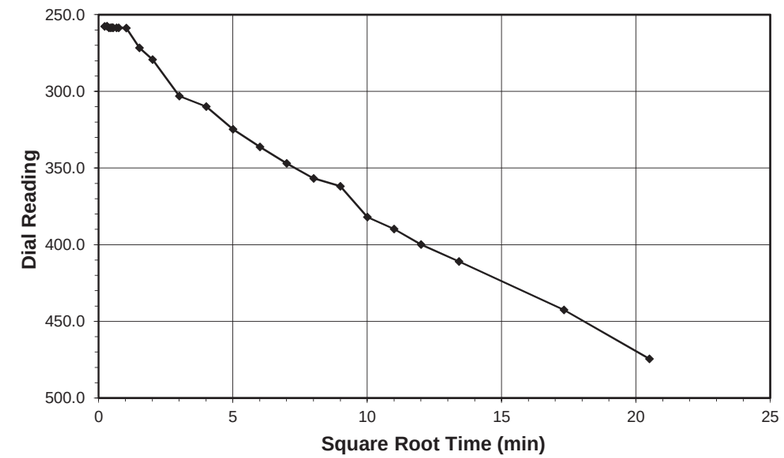
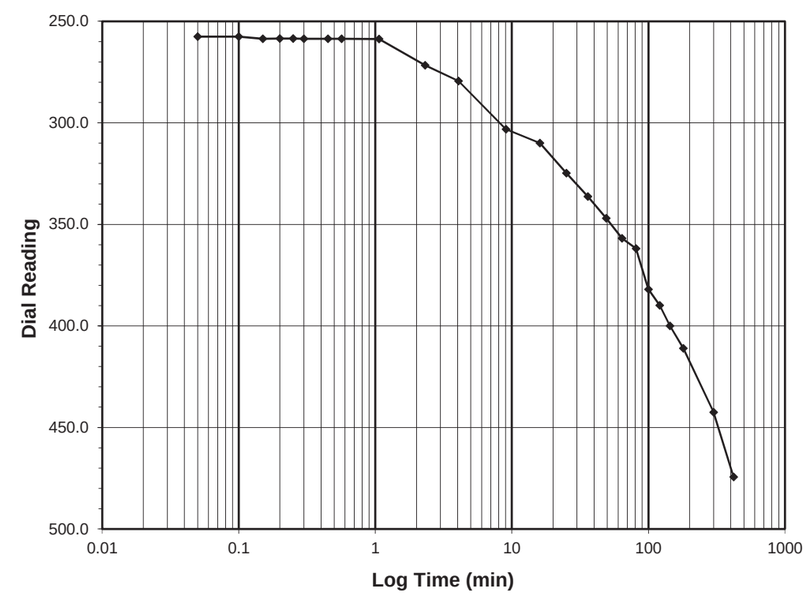
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location.	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.25-0.5**
Final Reading	**(div)**	**474.4**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/27/18
Start Time		7:27:53

Elapsed Time (min)	Dial Reading (div)
Initial	**207.3**
0.05	257.6
0.10	257.5
0.15	258.6
0.20	258.5
0.25	258.5
0.30	258.6
0.45	258.5
0.57	258.5
1.07	258.7
2.32	271.7
4.07	279.3
9.07	303.1
16.07	310.0
25.07	324.7
36.07	336.3
49.07	347.0
64.07	356.8
81.07	361.9
100.07	382.0
121.07	389.9
144.07	400.0
180.08	411.0
300.08	442.6
420.50	474.4

Tested By *129-04-0411* *Date* *6/27/18* *Checked By* *GEM* *Date* 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 3

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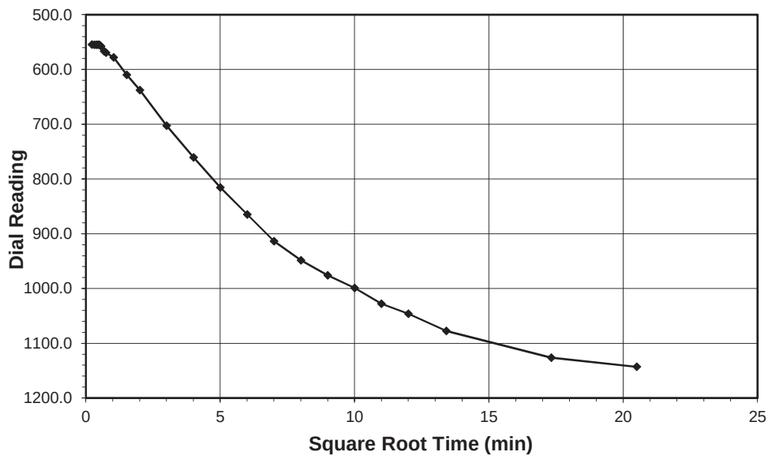
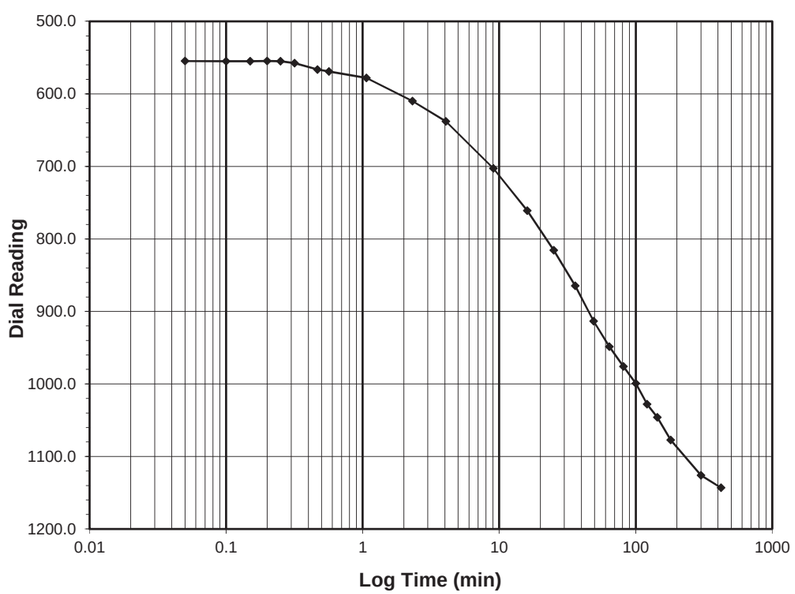
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-1.0**
Final Reading	**(div)**	**1143.0**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/27/18
Start Time		14:28:23

Elapsed Time (min)	Dial Reading (div)
Initial	**474.4**
0.05	554.7
0.10	554.8
0.15	555.0
0.20	554.8
0.25	554.9
0.32	557.6
0.47	566.6
0.57	569.3
1.07	578.0
2.32	609.9
4.07	638.0
9.07	702.9
16.07	760.9
25.07	815.7
36.07	864.8
49.07	913.5
64.07	948.5
81.07	976.1
100.07	999.1
121.07	1027.9
144.07	1046.0
180.07	1077.3
300.08	1126.1
420.50	1143.0

Tested By *129-04-0411* *Date* *6/27/18* *Checked By* *GEM* *Date* 7/6/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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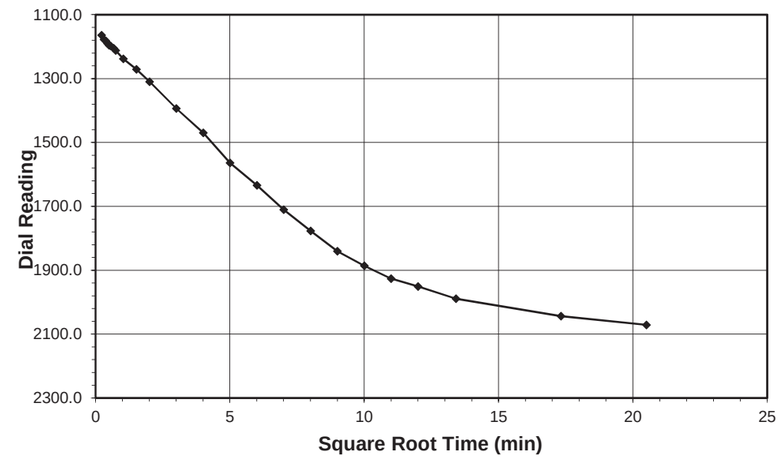
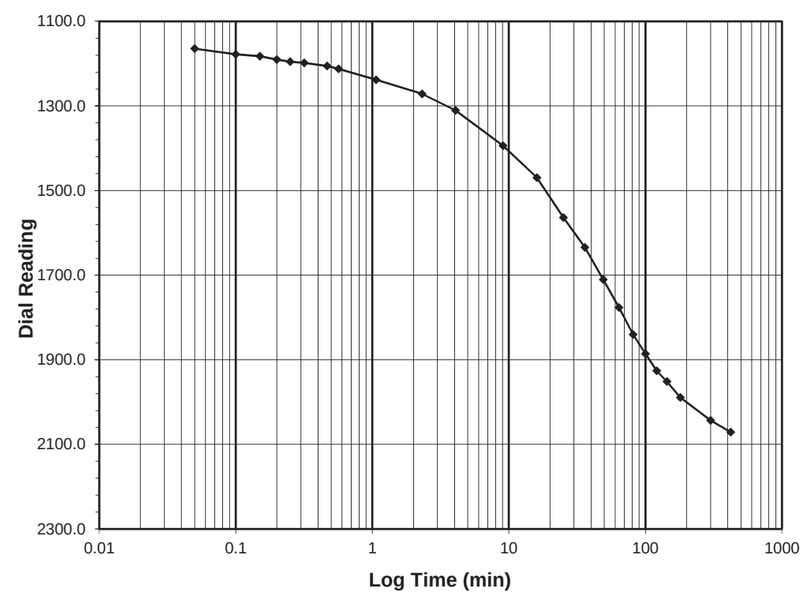
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**1.0-2.0**
Final Reading	**(div)**	**2071.0**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/27/18
Start Time		21:28:53

Elapsed Time (min)	Dial Reading (div)
Initial	**1143.0**
0.05	1164.5
0.10	1177.9
0.15	1182.6
0.20	1190.2
0.25	1195.3
0.32	1198.2
0.47	1205.6
0.57	1212.2
1.07	1238.0
2.32	1271.4
4.07	1310.2
9.07	1393.9
16.07	1469.5
25.07	1563.9
36.07	1634.3
49.07	1710.4
64.07	1776.7
81.07	1840.5
100.07	1885.8
121.07	1926.1
144.07	1951.3
180.08	1989.4
300.08	2043.6
420.47	2071.0

Tested By *129-04-0411* *Date* *6/27/18* *Checked By* *GEM* *Date* 7/6/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

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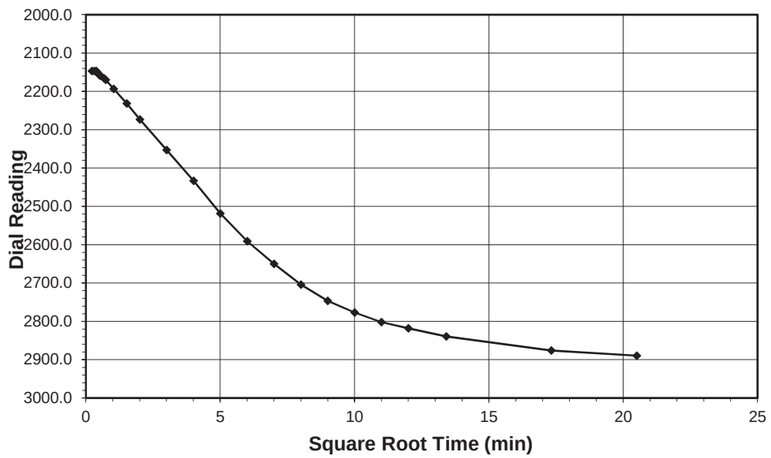
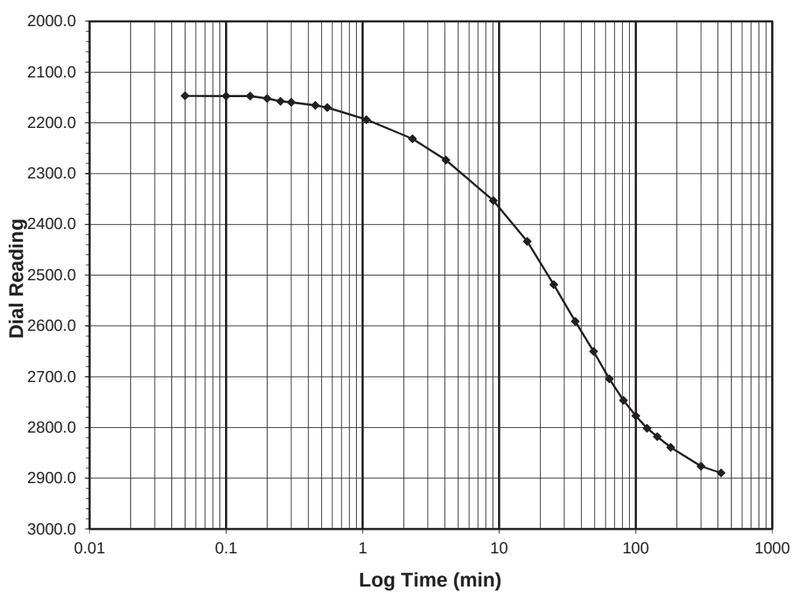
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-4.0**
Final Reading	**(div)**	**2889.6**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/28/18
Start Time		4:29:21

Elapsed Time (min)	Dial Reading (div)
Initial	**2071.0**
0.05	2146.9
0.10	2147.0
0.15	2147.1
0.20	2152.0
0.25	2157.7
0.30	2159.6
0.45	2165.7
0.55	2169.8
1.07	2193.9
2.32	2231.5
4.07	2273.1
9.07	2353.0
16.07	2433.4
25.07	2518.7
36.07	2590.8
49.07	2650.2
64.07	2704.3
81.08	2746.5
100.08	2777.2
121.08	2801.8
144.08	2817.9
180.08	2839.1
300.08	2876.3
420.48	2889.6

Tested By 129-04-0411 *Date* 6/28/18 *Checked By* GEM *Date* 7/6/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 6

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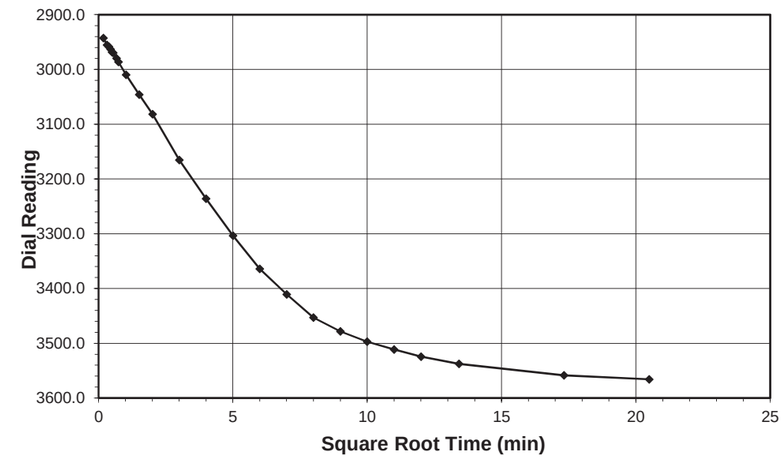
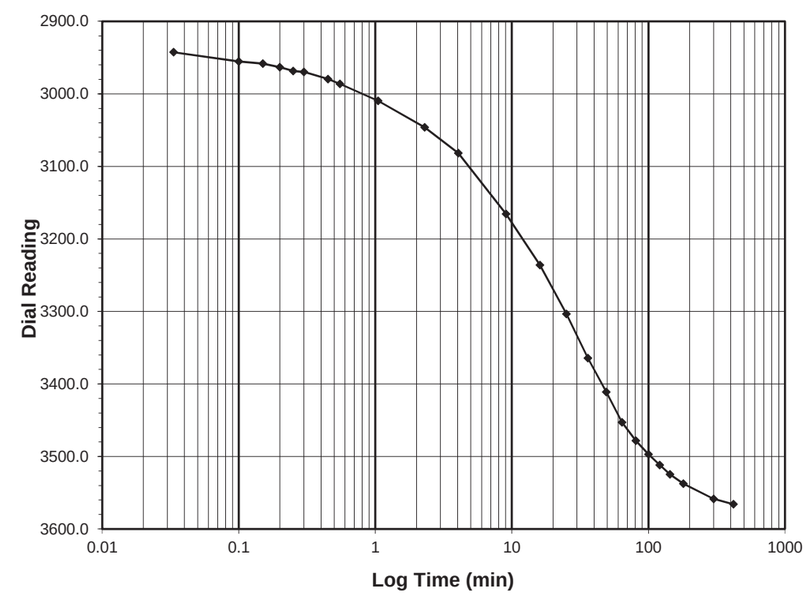
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**4.0-8.0**
Final Reading	**(div)**	**3565.8**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/28/18
Start Time		11:29:50

Elapsed Time (min)	Dial Reading (div)
Initial	**2889.6**
0.03	2942.6
0.10	2955.3
0.15	2958.2
0.20	2963.4
0.25	2968.4
0.30	2969.8
0.45	2979.7
0.55	2986.4
1.05	3009.7
2.30	3046.0
4.05	3081.7
9.05	3165.5
16.05	3235.9
25.05	3303.6
36.05	3364.4
49.05	3411.0
64.05	3452.9
81.05	3478.3
100.05	3496.9
121.05	3511.7
144.05	3524.5
180.05	3537.5
300.05	3558.4
420.05	3565.8

Tested By 129-04-0411 *Date* 6/28/18 *Checked By* GEM *Date* 7/6/18

 DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 7

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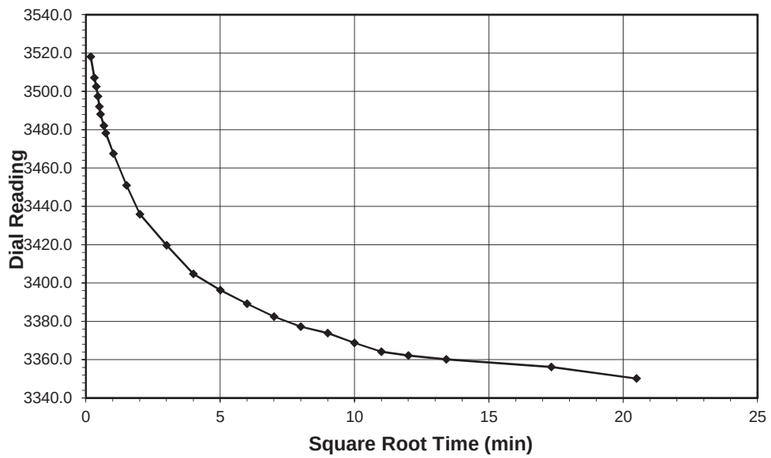
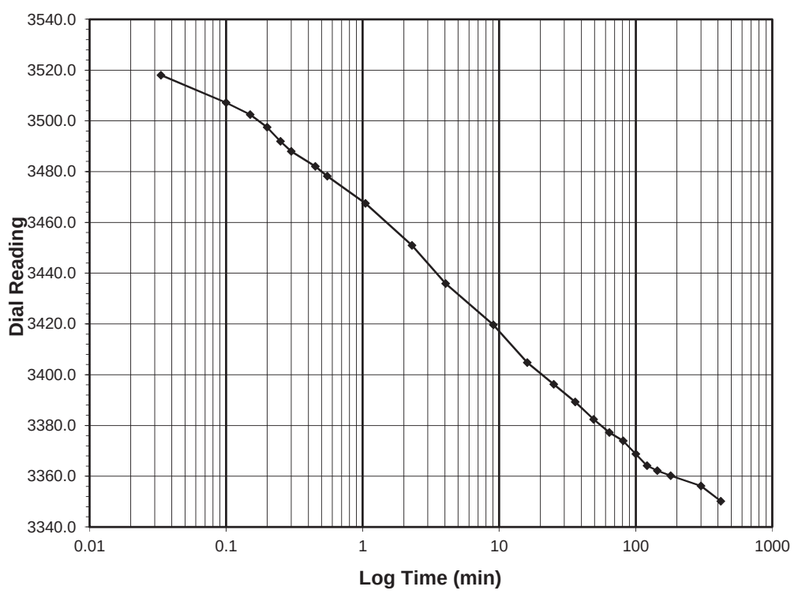
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**8.0-2.0**
Final Reading	**(div)**	**3350.2**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/28/18
Start Time		18:29:54

Elapsed Time (min)	Dial Reading (div)
Initial	**3565.8**
0.03	3518.0
0.10	3507.1
0.15	3502.5
0.20	3497.5
0.25	3492.0
0.30	3488.0
0.45	3482.0
0.55	3478.2
1.05	3467.5
2.30	3451.0
4.05	3435.9
9.05	3419.6
16.05	3404.8
25.05	3396.2
36.05	3389.2
49.05	3382.4
64.05	3377.2
81.05	3373.9
100.05	3368.8
121.05	3364.2
144.05	3362.2
180.07	3360.2
300.07	3356.1
420.08	3350.2

Tested By 129-04-0411 *Date* 6/28/18 *Checked By* GEM *Date* 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 8

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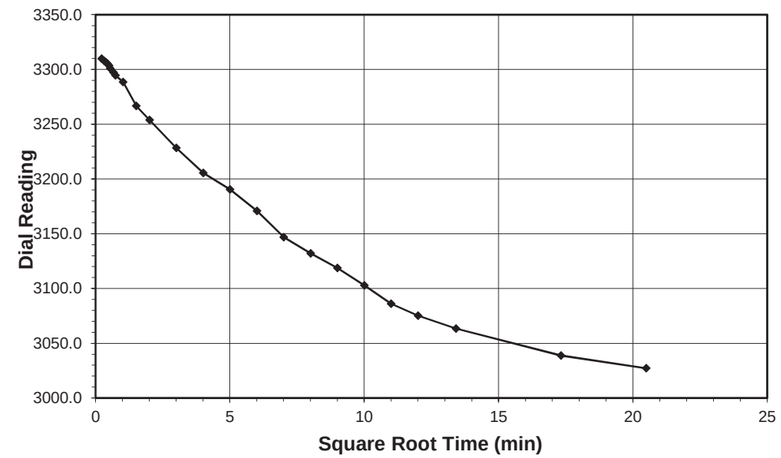
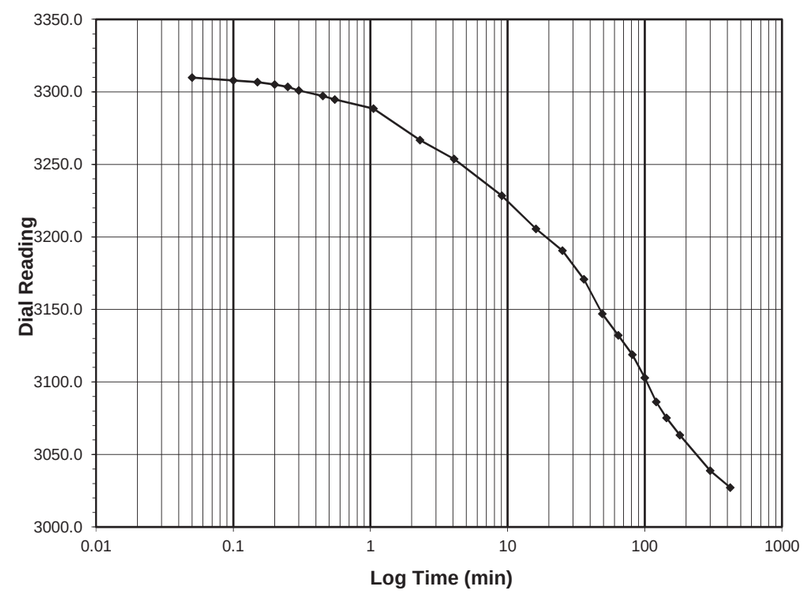
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-0.5**
Final Reading	**(div)**	**3027.2**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/29/18
Start Time		1:30:00

Elapsed Time (min)	Dial Reading (div)
Initial	**3350.2**
0.05	3309.8
0.10	3307.9
0.15	3306.7
0.20	3305.0
0.25	3303.5
0.30	3300.9
0.45	3297.2
0.55	3294.7
1.05	3288.4
2.30	3266.7
4.07	3253.8
9.07	3228.3
16.07	3205.5
25.07	3190.5
36.07	3170.8
49.07	3147.0
64.07	3132.1
81.07	3118.8
100.07	3102.8
121.07	3086.2
144.07	3075.2
180.07	3063.4
300.07	3038.8
420.10	3027.2

Tested By 129-04-0411 *Date* 6/29/18 *Checked By* GEM *Date* 7/6/18

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2018 PROJECTS\ESP Associates\2018-181 ESP - R-1015 SITE 9 MSE WALL\[2018-181-001-001 DOT GEOJAC-16TSF1 Cv.xlsm]STEP 9

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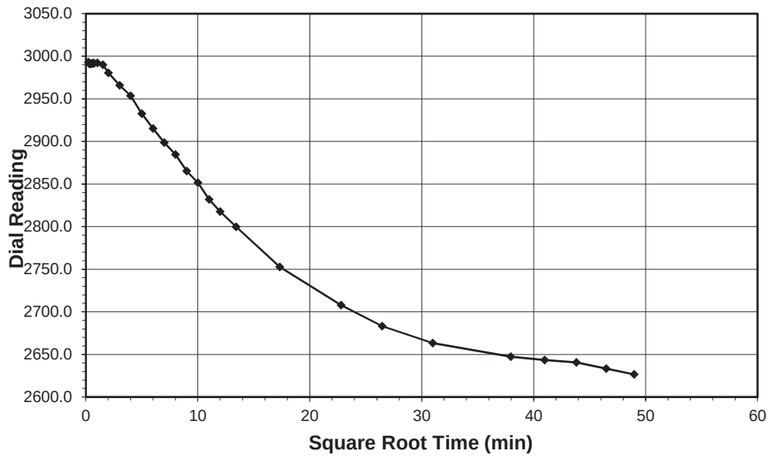
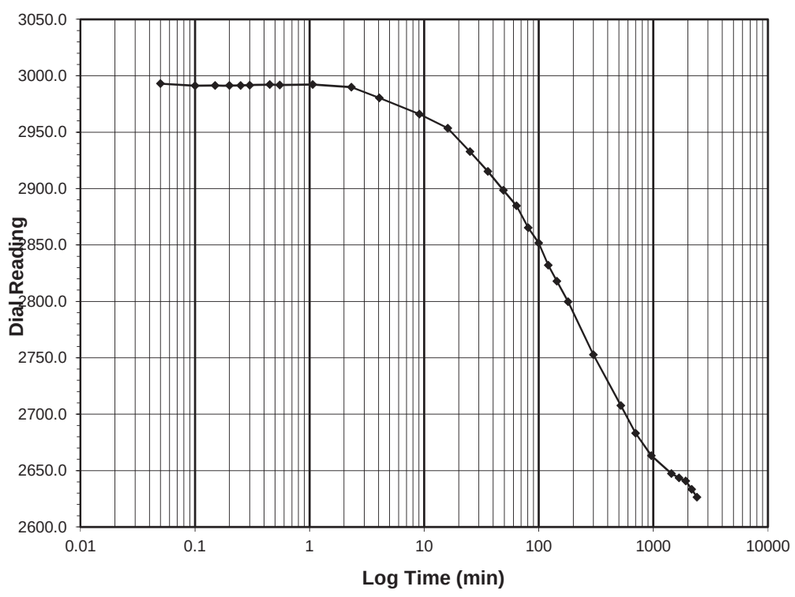
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client	ESP Associates	Location	-L-STA.217+15,23'RT
Client Project	R-1015 Site 9 MSE Wall CS34.368	Depth (ft)	9.8-11.8
Project No.	R-2018-181-001	Sample No.	ST-3
Lab ID	R-2018-181-001-001	Visual Description	GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-0.125**
Final Reading	**(div)**	**2626.5**
Consolidometer No.		**R487**
1 Division	(in)	0.0001
Start Date		6/29/18
Start Time		8:30:06

Elapsed Time (min)	Dial Reading (div)
Initial	**3027.2**
0.05	2993.0
0.10	2991.3
0.15	2991.4
0.20	2991.4
0.25	2991.4
0.30	2991.5
0.45	2992.2
0.55	2991.7
1.07	2992.3
2.32	2989.9
4.07	2980.5
9.07	2965.9
16.07	2953.5
25.07	2932.7
36.07	2915.3
49.07	2898.6
64.07	2884.7
81.07	2865.3
100.07	2851.7
121.07	2832.1
144.07	2817.8
180.07	2799.7
300.07	2752.8
520.08	2707.8
700.08	2683.2
960.08	2663.3
1440.08	2647.4
1680.08	2643.5
1920.08	2640.8
2160.08	2633.4
2400.08	2626.5

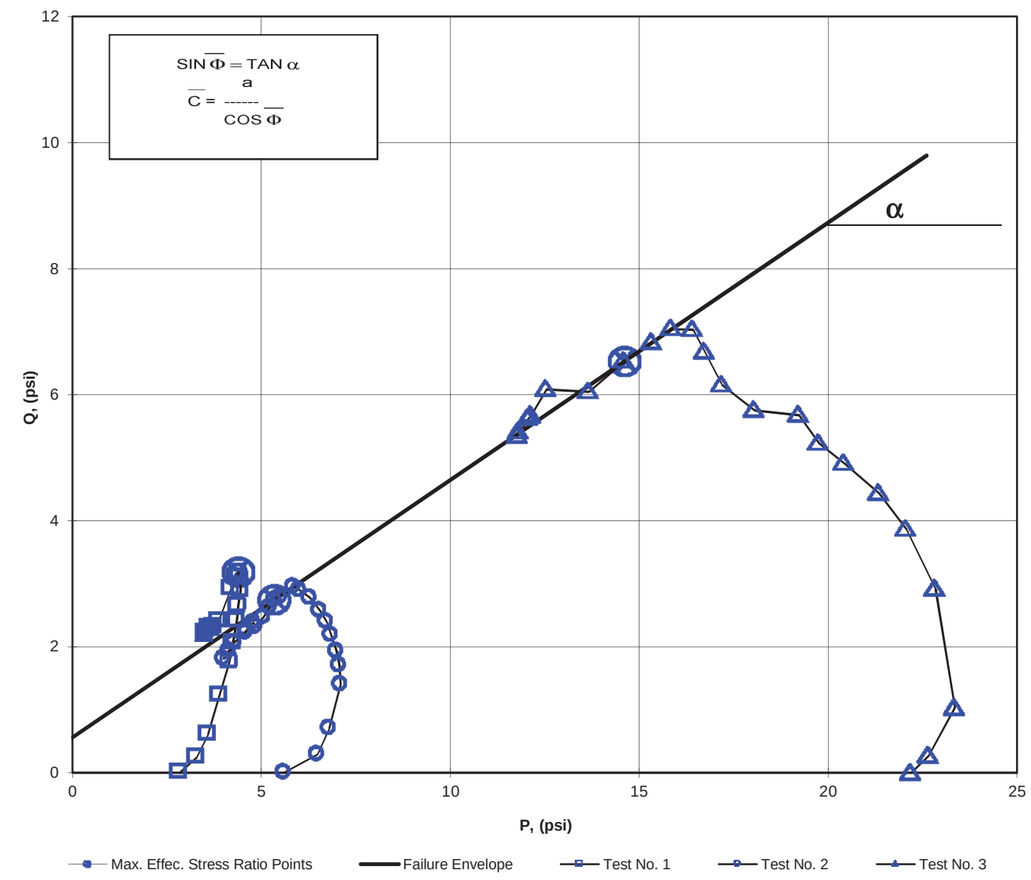
Tested By *129-04-0411* *Date* *6/29/18* *Checked By* *GEM* *Date* 7/6/18

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE READINGS

AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Consolidated Undrained Triaxial Test with Pore Pressure



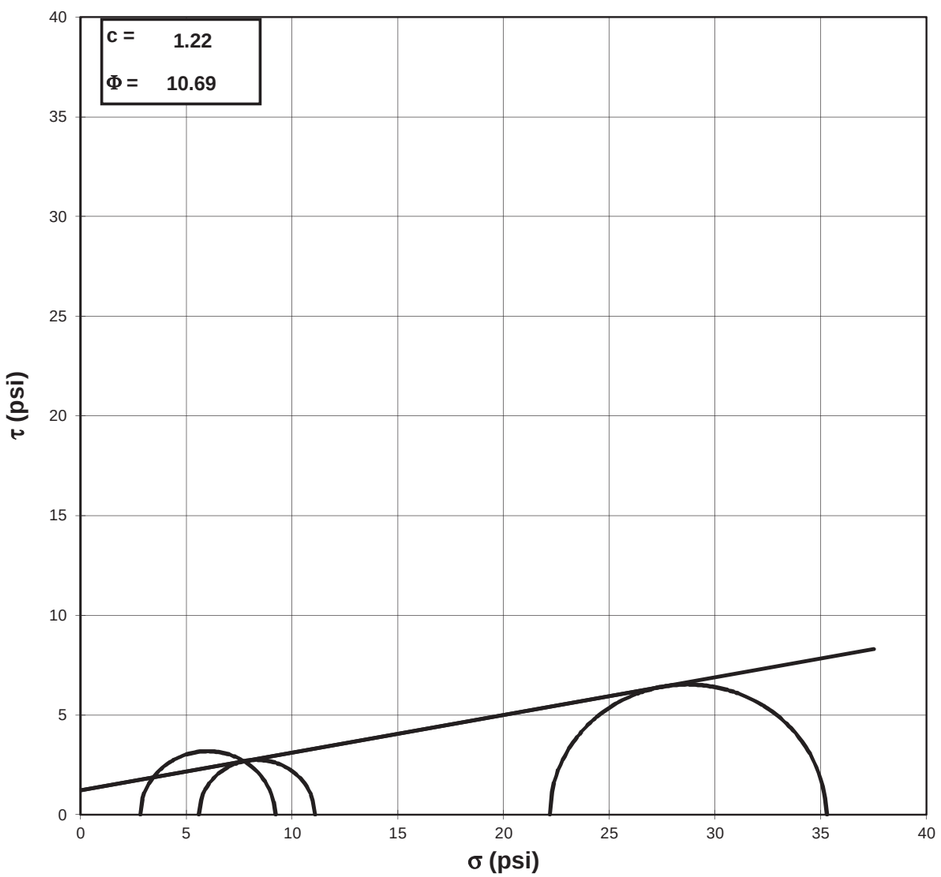
a	**=**	**0.56**	**$\bar{C}$**	**=**	**0.61**
α	**=**	**22.2**	**$\bar{\Phi}$**	**=**	**24.10**

Tested By: 129-04-0411 Date: 7/2/18 Approved By: MPS Date: 7/16/18

MOHR TOTAL STRENGTH ENVELOPE

AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		
Visual Description:	TAN CLAYEY SAND (UNDISTURBED)		



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-04-0411 *Date:* 7/2/18 *Approved By:* MPS *Date:* 7/16/18

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CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE READINGS

AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		
Visual Description:	TAN CLAYEY SAND (UNDISTURBED)		

Stage No.	1
Test No.	1

PRESSURES (psi)

Cell Pressure (psi)	42.8
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	2.8
Pore Pressure Response (%)	100

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	4.40
Q	=	3.18

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.097	Diameter 1:	2.838
Length 2:	6.097	Diameter 2:	2.869
Length 3:	6.071	Diameter 3:	2.852
Length 4:	6.087	Diameter 4:	2.874
Avg. Length:	6.088	*Avg. Diam.:*	2.858

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	20.1
Final Change (ml)	3.9

Initial Dial Reading (mil)	55
Dial Reading After Saturation (mil)	99
Dial Reading After Consolidation (mil)	115

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
10.7	0.000	40.0
13.8	0.001	39.8
18.3	0.003	39.8
26.2	0.009	40.2
32.9	0.015	40.4
36.8	0.021	40.6
41.2	0.030	40.9
44.4	0.039	41.1
47.5	0.052	41.3
50.4	0.073	41.5
51.5	0.105	41.6
50.8	0.141	41.6
48.7	0.177	41.6
42.2	0.220	41.4
41.1	0.251	41.4
40.9	0.293	41.4
41.1	0.351	41.5
43.8	0.754	41.5
43.5	0.768	41.5
43.8	0.782	41.5
44.0	0.796	41.5
42.8	0.818	41.5
43.5	0.872	41.5
43.0	0.924	41.5

Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	2.8	*Stage No.*	1
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	6.09
Initial Sample Diameter (in)	2.86
Initial Sample Area (in^2)	6.42
Initial Sample Volume (in^3)	39.06

VOLUME CHANGE

Volume After Consolidation (in^3)	37.98
Length After Consolidation (in)	6.03
Area After Consolidation (in^2)	6.300

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma}_1$	$\overline{\sigma}_3$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.48	-0.21	3.53	3.0	1.159	-0.43	3.28	0.24
0.05	1.21	-0.16	4.20	3.0	1.403	-0.13	3.59	0.60
0.15	2.46	0.17	5.13	2.7	1.922	0.07	3.90	1.23
0.25	3.51	0.43	5.92	2.4	2.459	0.12	4.16	1.76
0.35	4.13	0.64	6.32	2.2	2.887	0.16	4.26	2.07
0.51	4.81	0.89	6.75	1.9	3.481	0.19	4.35	2.41
0.65	5.31	1.10	7.05	1.7	4.057	0.21	4.39	2.66
0.86	5.80	1.28	7.35	1.6	4.737	0.22	4.45	2.90
1.22	6.22	1.51	7.54	1.3	5.688	0.24	4.44	3.11
1.74	6.36	1.61	7.59	1.2	6.199	0.25	4.40	3.18
2.33	6.21	1.61	7.43	1.2	6.094	0.26	4.32	3.11
2.94	5.85	1.55	7.13	1.3	5.578	0.27	4.20	2.92
3.66	4.82	1.38	6.28	1.5	4.309	0.29	3.87	2.41
4.17	4.63	1.40	6.06	1.4	4.237	0.30	3.75	2.32
4.86	4.56	1.42	5.97	1.4	4.226	0.31	3.69	2.28
5.83	4.55	1.45	5.93	1.4	4.299	0.32	3.65	2.27
12.51	4.60	1.50	5.93	1.3	4.450	0.33	3.63	2.30
12.75	4.55	1.50	5.87	1.3	4.420	0.33	3.60	2.27
12.97	4.57	1.50	5.91	1.3	4.425	0.33	3.62	2.29
13.20	4.58	1.50	5.91	1.3	4.449	0.33	3.62	2.29
13.57	4.40	1.52	5.71	1.3	4.364	0.35	3.51	2.20
14.47	4.45	1.52	5.76	1.3	4.400	0.34	3.54	2.23
15.33	4.34	1.49	5.68	1.3	4.235	0.34	3.51	2.17

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	2

PRESSURES (psi)

Cell Pressure (psi)	45.6
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	5.6
Pore Pressure Response (%)	100

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	5.35
Q	=	2.75

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.265	Diameter 1:	2.869
Length 2:	6.235	Diameter 2:	2.865
Length 3:	6.234	Diameter 3:	2.860
Length 4:	6.200	Diameter 4:	2.848
Avg. Length:	6.234	*Avg. Diam.:*	2.861

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	25.6
Final Change (ml)	22.4
Initial Dial Reading (mil)	8
Dial Reading After Saturation (mil)	31
Dial Reading After Consolidation (mil)	77

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
19.2	0.000	40.0
22.8	0.001	39.4
28.0	0.003	39.5
36.7	0.008	39.9
40.4	0.015	40.2
43.3	0.022	40.5
46.6	0.032	40.9
49.2	0.042	41.3
51.5	0.056	41.6
54.2	0.081	42.1
55.9	0.117	42.5
56.9	0.161	42.7
55.0	0.202	42.9
54.8	0.252	43.0
53.5	0.288	43.0
51.7	0.339	43.0
50.1	0.424	43.1
51.6	0.519	43.2
49.8	0.590	43.2
50.9	0.684	43.2
48.5	0.757	43.4
46.8	0.826	43.4
47.5	0.912	43.4
45.7	0.932	43.4

Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

DCN: CT-S28 DATE: 4/12/13 REVISION: 3
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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
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Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	5.6	*Stage No.*	1
		Test No	2

INITIAL DIMENSIONS

Initial Sample Length (in)	6.23
Initial Sample Diameter (in)	2.86
Initial Sample Area (in^2)	6.43
Initial Sample Volume (in^3)	40.06

VOLUME CHANGE

Volume After Consolidation (in^3)	38.25
Length After Consolidation (in)	6.16
Area After Consolidation (in^2)	6.205

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma}_1$	$\overline{\sigma}_3$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.57	-0.60	6.77	6.2	1.092	-1.05	6.48	0.29
0.05	1.40	-0.50	7.50	6.1	1.230	-0.35	6.80	0.70
0.12	2.80	-0.10	8.50	5.7	1.492	-0.04	7.10	1.40
0.24	3.41	0.23	8.78	5.4	1.635	0.07	7.07	1.70
0.35	3.87	0.54	8.92	5.1	1.765	0.14	6.99	1.93
0.52	4.38	0.94	9.04	4.7	1.941	0.21	6.85	2.19
0.68	4.80	1.27	9.12	4.3	2.108	0.27	6.73	2.40
0.91	5.16	1.63	9.13	4.0	2.298	0.32	6.55	2.58
1.32	5.56	2.09	9.07	3.5	2.586	0.38	6.29	2.78
1.90	5.80	2.50	8.90	3.1	2.871	0.43	6.00	2.90
2.61	5.91	2.70	8.80	2.9	3.039	0.46	5.85	2.95
3.28	5.58	2.89	8.28	2.7	3.060	0.52	5.50	2.79
4.08	5.49	2.99	8.10	2.6	3.105	0.54	5.35	2.75
4.68	5.26	3.00	7.86	2.6	3.028	0.57	5.23	2.63
5.49	4.94	3.01	7.53	2.6	2.911	0.61	5.06	2.47
6.87	4.64	3.07	7.17	2.5	2.836	0.66	4.85	2.32
8.41	4.78	3.20	7.18	2.4	2.991	0.67	4.79	2.39
9.58	4.45	3.24	6.81	2.4	2.887	0.73	4.58	2.23
11.10	4.53	3.24	6.89	2.4	2.926	0.72	4.62	2.27
12.28	4.14	3.38	6.36	2.2	2.868	0.82	4.29	2.07
13.40	3.84	3.38	6.06	2.2	2.732	0.88	4.14	1.92
14.80	3.87	3.39	6.09	2.2	2.753	0.87	4.15	1.94
15.12	3.61	3.40	5.81	2.2	2.647	0.94	4.00	1.81

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

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Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Stage No.	1
Test No.	3

PRESSURES (psi)

Cell Pressure (psi)	62.2
Back Pressure (psi)	40.0
Eff. Conf. Pressure (psi)	22.2
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	14.61
Q	=	6.53

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.114	Diameter 1:	2.853
Length 2:	6.192	Diameter 2:	2.857
Length 3:	6.167	Diameter 3:	2.883
Length 4:	6.134	Diameter 4:	2.844
Avg. Length:	6.152	*Avg. Diam.:*	2.859

VOLUME CHANGE

Initial Burette Reading (ml)	72.0
Final Burette Reading (ml)	14.5
Final Change (ml)	57.5
Initial Dial Reading (mil)	31
Dial Reading After Saturation (mil)	88
Dial Reading After Consolidation (mil)	429

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
16.3	0.000	40.0
19.6	0.001	39.8
28.8	0.002	39.9
51.7	0.008	42.3
63.3	0.014	44.0
70.2	0.019	45.3
76.2	0.028	46.7
80.1	0.036	47.7
85.7	0.049	48.6
86.9	0.070	49.9
92.3	0.100	51.1
99.2	0.138	52.1
104.3	0.175	52.8
105.1	0.218	53.4
102.9	0.249	53.7
99.7	0.293	54.1
94.4	0.352	54.6
101.2	0.756	55.7
95.7	0.769	55.7
95.8	0.783	55.7
95.5	0.797	55.8
92.0	0.823	55.8
93.7	0.878	55.8

Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

DCN: CT-S28 DATE: 4/12/13 REVISION: 3
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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

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Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

Effective Confining Pressure (psi)	22.2	*Stage No.*	1
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in)	6.15
Initial Sample Diameter (in)	2.86
Initial Sample Area (in^2)	6.42
Initial Sample Volume (in^3)	39.50

VOLUME CHANGE

Volume After Consolidation (in^3)	34.89
Length After Consolidation (in)	5.75
Area After Consolidation (in^2)	6.064

Strain (%)	Deviation Stress	Δ U	$\overline{\sigma}_1$	$\overline{\sigma}_3$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.54	-0.20	22.94	22.4	1.024	-0.37	22.67	0.27
0.04	2.06	-0.13	24.39	22.3	1.092	-0.07	23.36	1.03
0.14	5.83	2.26	25.76	19.9	1.292	0.39	22.85	2.91
0.24	7.73	3.99	25.94	18.2	1.425	0.52	22.08	3.87
0.33	8.85	5.28	25.78	16.9	1.523	0.60	21.35	4.43
0.49	9.82	6.68	25.35	15.5	1.633	0.69	20.43	4.91
0.63	10.46	7.67	24.99	14.5	1.720	0.74	19.76	5.23
0.84	11.34	8.63	24.91	13.6	1.836	0.77	19.24	5.67
1.21	11.50	9.89	23.81	12.3	1.934	0.87	18.06	5.75
1.74	12.30	11.15	23.36	11.1	2.113	0.92	17.20	6.15
2.40	13.34	12.13	23.41	10.1	2.325	0.92	16.74	6.67
3.05	14.06	12.81	23.46	9.4	2.497	0.92	16.42	7.03
3.80	14.08	13.38	22.90	8.8	2.597	0.96	15.86	7.04
4.32	13.65	13.68	22.17	8.5	2.603	1.01	15.34	6.83
5.09	13.05	14.12	21.13	8.1	2.614	1.09	14.61	6.53
6.11	12.09	14.57	19.72	7.6	2.584	1.22	13.67	6.04
13.13	12.16	15.73	18.63	6.5	2.880	1.31	12.55	6.08
13.37	11.34	15.73	17.81	6.5	2.753	1.40	12.14	5.67
13.60	11.32	15.72	17.80	6.5	2.748	1.40	12.14	5.66
13.85	11.24	15.76	17.69	6.4	2.745	1.42	12.06	5.62
14.30	10.69	15.76	17.13	6.4	2.659	1.49	11.79	5.34
15.26	10.81	15.79	17.22	6.4	2.687	1.48	11.82	5.41

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

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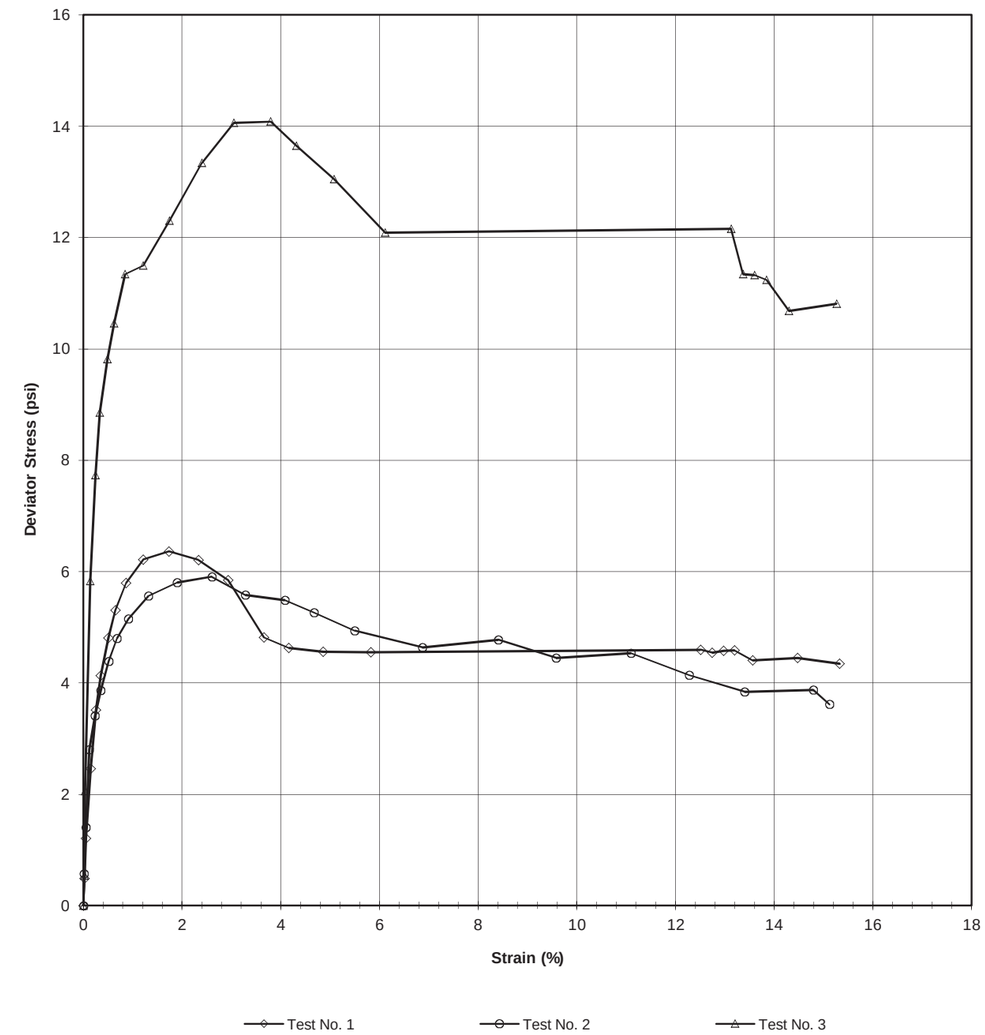
Client:	ESP Associates	Location:	-L-STA 217+15, 23' RT
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		
Visual Description:	TAN CLAYEY SAND (UNDISTURBED)		



Tested By: 129-04-0411 Date: 7/2/18 Approved By: MPS Date: 7/16/18

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	ESP Associates		
Client Reference:	R-1015 Site 9 MSE Wall CS34.368		
Project No.:	R-2018-181-001		
Lab ID:	R-2018-181-001-001	Specific Gravity (Measured)	2.66

Visual Description: TAN CLAYEY SAND (UNDISTURBED)

SAMPLE CONDITION SUMMARY

Location:	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT	-L-STA 217+15, 23' RT
Depth (ft):	9.8-11.8	9.8-11.8	9.8-11.8
Sample No.:	ST-3	ST-3	ST-3
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.0006	0.0006	0.0006
Back Pressure (psi)	40.0	40.0	40.0
Consolidation Time (days)	2	2	2
Moisture Content (%) (INITIAL)	64.2	64.2	64.2
Total Unit Weight (pcf)	99.7	99.3	100.8
Dry Unit Weight (pcf)	60.7	60.5	61.4
Moisture Content (%) (FINAL)	67.1	63.1	52.4
Initial State Void Ratio,e	1.735	1.745	1.705
Void Ratio at Shear, e	1.659	1.621	1.390

Tested By: 129-04-0411 Date: 7/2/18 Input Checked By: GEM Date: 7/16/18

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297

Client:	ESP Associates	Location:	-L-STA 217+15, 23
Client Reference:	R-1015 Site 9 MSE Wall CS34.368	Depth (ft):	9.8-11.8
Project No.:	R-2018-181-001	Sample No.:	ST-3
Lab ID:	R-2018-181-001-001		

TEST 1 INITIAL

TEST 1 FINAL

TEST 2 INITIAL

TEST 2 FINAL

TEST 3 INITIAL

TEST 3 FINAL

Tested By 129-04-0411 *Date* 7/2/18 *Approved By* MPS *Date* 7/16/18

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