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	han	d se	veral	time	es. A	positive	e reacti	on consist	s of tl	ne appearance of wate becomes glossy. When	

ADOPTED BY - CORPS OF ENGINEERS AND BUREAU OF RECLAMATION 1952

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		UNIFIED SOIL CLASS INCLUDING IDENTIFICATION AN			
ghts)	GROUP SYMBOLS	TYPICAL NAMES	INFORMATION REQUIRED FOR DESCRIBING SOILS		
ubstantial ticle sizes.	GW	Well graded gravel's, gravel—sand mixtures; little or no fines	Give typical name; indicate approximate percentages of sand and		grain
ge of sizes ssing.	GP	Poorly graded gravel's, gravel—sand mixtures; little or no fines	gravel; max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and	ation	from les coarse W SP
ion	GM	Silty gravels, poorly graded gravel-sand-silt mixtures	other pertinent descriptive information, and symbol in parentheses.	ntific	sand of fir size)
	GC	Clayey gravels, poorly graded gravel—sand—clay mixtures	For undisturbed soils add information on stratification,	eld ide	gravel and percentage 200 sieve d as follows:
ıbstantial cle sizes.	SW	Well graded sands, gravely sands; little or no fines	degree of compactness, cementation, moisture conditions and drainage characteristics.	er fi	of On fie.
	SP	Poorly graded sands, gravely sands; little or no fines	EXAMPLE:- Silty Sand, gravely; about 20% hard,	pun	ntages ending f than e class
tion	SM	Silty sands, poorly graded sand-silt mixtures	angular gravel particles ½ — inch maximum size; rounded and subangular sand grains coarse to fine; about 15% non—plastic fines with low dry strength;	s given	Determine percentages size curve. Depending (fraction smaller than grained soils are classi less than 5%
	SC	Clayey sands, poorly graded sand—clay mixtures	well compacted and moist in place; alluvial sand; (SM).	ns as	etermine ze curv raction ained s
SIEVE SIZE IGHNESS stency near tic Limit)	-			ne fractio	6 0 <u>For class</u> <u>and fine</u>
None	ML	Inorganic silty and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; degree and character of plasticity, amount and maximum size of coarse	/ing th	Equation Horizonta
Medium	CL	Inorganic clays to low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays	grains; color in wet condition, odor in any, local or geologic name, and other pertinent descriptive information;	identifying	40 - Equation Vertical a then Pla
Slight	OL	Organic silts and organic silt-clays of low plasticity	and symbol in parentheses.	curve	
t to medium	МН	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	For undisturbed soils add information on structure, stratification, consistency in	size c	LIOIL20
High	СН	Inorganic clays of high plasticity, fat clays	undisturbed and remolded states. Moisture and drainage conditions.	grain :	
t to medium	он	Inorganic clays of medium to high plasticity	EXAMPLE:— <u>Clayey Silt,</u> brown; slightly plastic. small percentage of fine sand.	Use g	F
el and	PT	Peat and other highly organic soils	numerous vertical root holes, firm and dry in place, loess, (ML).		

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FIELD IDENTIFICATION PROCEDURES FOR FINE GRAINED SOILS OR FRACTIONS

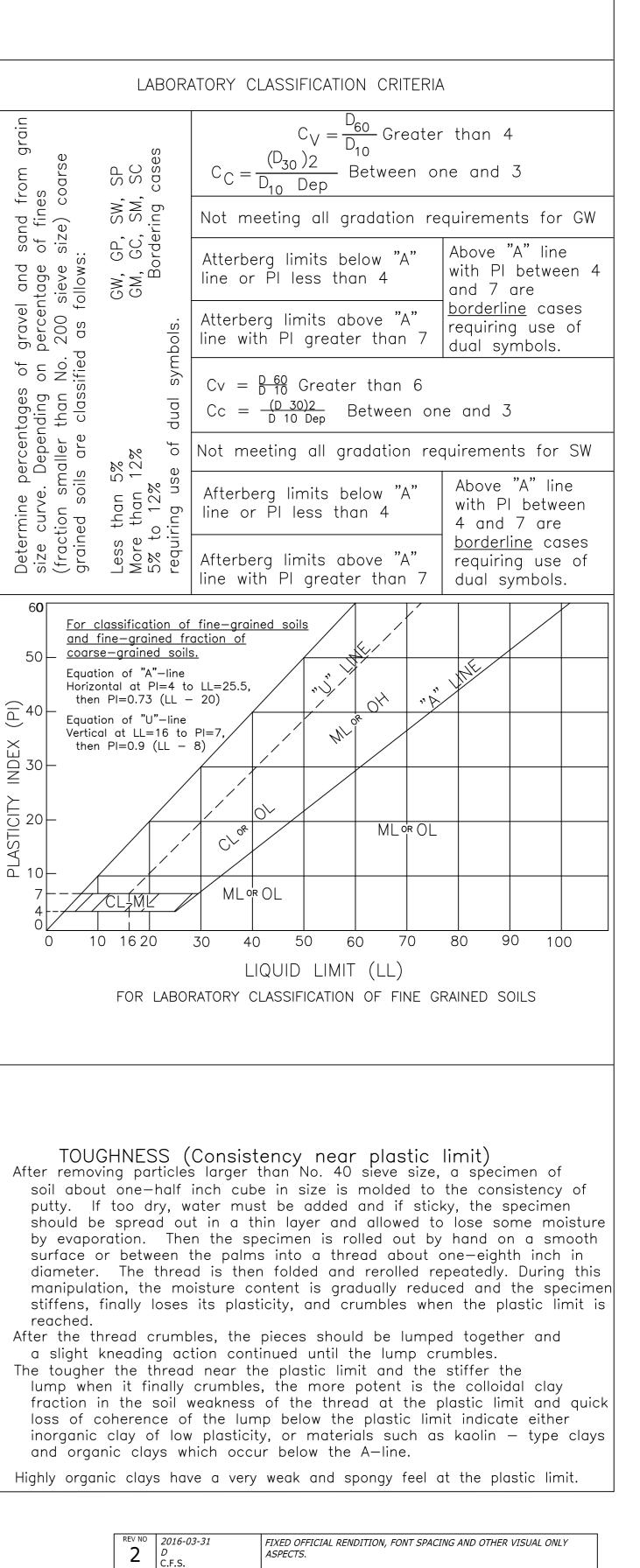
These procedures are to be performed on the minus No. 40 sieve size particles, in for field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

. Add rface of is ot stiffens, and of its pil.	 DRY STRENGTH (Crushing Characteristics) After removing particles larger than No. 40 sieve size, mold a pot of soil to the consistency of putty, adding water if necessary. Allow the pot to dry completely by oven, sun, or air drying and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity. High dry strength is characteristic for clays of the CH group A typical inorganic silt possesses only very slight dry strength Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour. Letter symbols in the logs, are group symbols of the Unified soil classification system based on field indent. Copies of Drawing No. 103–D–347, Unified Soil Classification, may be obtained on request office of Director of Design and Construction. Bureau of Reclamation, Denver, Colorado R0225. 	soil about or putty. If too should be sp by evaporatio surface or b diameter. T manipulation, stiffens, final reached. After the threa a slight knew The tougher th lump when in fraction in th loss of cohe inorganic cla and organic
		Highly organic of

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WEATHERING

FRESH (W1): Body of rock is not exidized or discolored; fracture surfaces are not axidized or discolored*; no separation of grain boundaries; no change of texture and no solutioning. Hammer rings when crystalline rocks are struck.

SLIGHTLY WEATHERED TO FRESH (W2):**

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SLIGHTLY WEATHERED (W3): Discoloration or oxidation is limited to surface of, or short distance from fractures; some feldspar crystals are dull; fracture surfaces have minor to complete discoloration or oxidation; no visible separation of grain boundaries; texture preserved and minor leaching of soluble minerals may be present. Hammer rings when crystalline rocks are struck, body of rock is not weakened by weathering.

MODERATELY TO SLIGHTLY WEATHERED (W4):**

MODERATELY WEATHERED (W5): Discoloration or oxidation extends from fractures, usually throughout body of rock; ferromagnesian minerals are "rusty", feldspar crystals are "cloudy"; all fracture surfaces are discolored or oxidized; partial opening of grain boundaries visible; texture generally preserved, but soluble minerals may be mostly leached. Hammer does not ring when rock is struck, body of rock is slightly weakened.

INTENSELY TO MODERATELY WEATHERED (W6):**

INTENSELY WEATHERED (W7): Body of rock is discolored or oxidized throughout; all feldspars and ferromagnesian minerals are altered to clay to some extent. All fracture surfaces are discolored or oxidized, and friable; partial separation of grain boundaries, rock is friable; in situ disaggregation of granitics common in semi-arid regions; texture altered and leaching of soluble minerals may be complete. Rock has dull sound when struck with hammer; rock is weakened, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness.

VERY INTENSELY WEATHERED (W8):**

DURARTI TTY

DECOMPOSED (W9): Body of rock is discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and ferro-magnesian minerals are completely altered to clay; complete separation of grain boundaries (disaggregated), partial or complete remnant rock structure may be preserved, but resembles a soil.

NOTE: Weathering categories are established primarily for crystalline rocks and those with ferromagnesian minerals, weathering in various sedimentary rocks will not always fit the categories established – weathering categories may be modified for particular site conditions or alteration such as hydrothermal alteration. Where modified criteria are established, they should be identified and described.

* Characteristics of fracture surfaces do not include <u>directional</u> weathering along shears or faults and their associated fracture zones; for example a shear that carries weathering to great depths in a fresh rock mass would not require the whole rock mass to be classified as weathered.

** Combination descriptors are used when equal distribution of both weathering characteristics are present over significant intervals or where characteristics noted are "in between" the diagnostic characteristics.

DURABILITY INDEX

DESCRIPTOR	DESCRIPTIVE CRITERIA
DIØ	Rock specimen or exposure remains intact with no deleterious cracking after exposure longer than 1 year.
DI1	Rock specimen or exposure develaps hairline cracking on surfaces within 1 month, but no disaggregation within 1 year of exposure.
DI2	Rock specimen or exposure develops hairline cracking on surfaces within 1 week, and/or disaggregation within 1 month of exposure.
DI3	Specimen or exposure may develop hairline cracks in 1 day and displays pronounced separation of bedding and/or disaggregation within 1 week of exposure.

Specimen or exposure displays pronounced cracking and disaggregation within 1 day (24 hours) of exposure. Generally ravels and degrades to small DI4 fragments.

COLOR

The Munsell color system (Geologic Society of America Rock Color Chart) should be used. This system defines wet color by its hue, value, and chroma. Color symbols used (i.e., 5 YR 5/6 may be included).

SEDIMENTARY AND PYROCLASTIC ROCK PARTICLE SIZES

Size	Rounded,	mentary subrounded, ngular	Ругос	lastic		
mm	Particle ar fragment	Lithified product	Fragment	Lithified product		
256 _	Boulder	Boulder conglomerate	Block ^(e) or	Volcanic ^(a) breccia or		
64	Cobble	Cobble conglomerate	Bornb ^(b)	Volcanic ^(b) agglomerate		
4 _	Pebble	Pebble conglomerate	Lapilli	Lapillîstone and Lapilli tuff		
2	Granule	Granule conglomerate				
1 0.5	Very coarse sand Coarse sand	Sandstone				
0.25	Medium sand	(Very coarse,	Coarse ash	Coarse tuff		
0.125	Fine sand	coarse, medium, fine, or very fine)				
0.0625	Very fine sand	rine)				
0.00391_	Silt	Siltstone/ Shale		Fine tuff		
	Clay	Claystone Shale	Fine ash			

(a) Broken from previous igneous rock, block shaped (angular to subangular). (b) Solidified from plastic material while in flight, rounded clasts,

IGNEOUS AND METAMORPHIC ROCK TEXTURE

TEXTURE DESCRIPTOR AVERAGE GRAIN DIAMETER

VERY COARSE GRAINED OR PEGMATITIC COARSE GRAINED MEDIUM GRAINED FINE GRAINED APHANITIC (Cannot be seen with the unaided eye)

>10 mm [>3/8 in] 5-10 mm [3/16 -3/8 in] 1-5 mm [1/32 -3/16 in] 0.1-1 mm [0.004 - 1/32 in] <0.1 mm [<0.004 in]

ADDITIONAL TEXTURAL **ADJECTIVES**

PIT (pitted) - pinhole to 0.03 ft [3/8 in] (<1 to 10 mm) openings.

VUG (vuggy) — Small openings (usually lined with crystals) ranging in diameter from 0.03 ft [3/8 in] to 0.33 ft [4 in] (10 to 100 mm).

CAVITY — An opening larger than 0.33 ft [4 in] (100 mm), size descriptions are required, and adjectives such as small, large, etc., may be used.

HONEYCOMBED — If numerous enough that only thin walls separate individual pits or vugs, this term further describes the preceding nomenclature to indicate cell—like

VESICLE (vesicular) - Small openings in volcanic rocks of variable shape and size formed by entrapped gas bubbles during solidification.

DESCRIPTORS THICKIY

VERY SOFT (H7): Can be readily indented, grooved or gouged with fingemail, or carved with a knife. Breaks with light manual pressure.

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BEDDING FOLIATION **OR FLOW TEXTURE**

THICKNESS/SPACING

MASSIVE VERY THICKLY (bedded, foliated or banded) MODERATELY THINLY VERY THINLY LAMINATED (Intensely foliated or banded)

Greater than 10 ft (>3 m) 3 to 10 ft (1 to 3 m)

1 to 3 ft (300 mm to 1 m) 0.3 to 1 ft (100 to 300 mm) 0.1 to 0.3 ft (30 to 100 mm) 0.03 [3/8 in] to 0.1 ft (10 to 30 mm) Less than 0.03 ft [3/8 in] (<10 mm)

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BEDROCK HARDNESS/STRENGTH

EXTREMELY HARD (H1): Core, fragment or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows.

VERY HARD (H2): Cannot be scratched with knife or sharp pick. Core or fragment breaks with repeated heavy hammer blows.

HARD (H3): Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.

MODERATELY HARD (H4): Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.

MODERATELY SOFT (H5): Can be grooved 1/16 inch (2 mm) deep by knife or sharp pick with moderate or heavy pressure. Core or fragment breaks with light hammer blow or heavy manual pressure.

SOFT (H6): Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scrotched with fingernail. Breaks with light to moderate manual

Any bedrock unit softer than H7, Very Soft, is to be described using USBR 5005-86 (visual classification of soils) consistency characteristics.

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DISCONTINUITY TERMINOLOGY

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DISCONTINUITY - A collective term used for all structural breaks in geologic materials which usually are unhacled and have zero or low tensile strength. Discontinuities also may be heated and exhibit high tensile strength. Discontinuities comprise fractures (including joints), planes of weakness, shears/faults, and shear/fault zones. Contacts between various units also may be considered discontinuities.

FRACTURE — A term used to describe any natural break in geologic material excluding shears and shear zones. Additional fracture terminalogy is provided below.

- SHFAR A structural break where differential movement has taken place along a surface or zone of failure by shear; characterized by striations, slickensides, gouge, breccia, mylonite, or any combination of these. Often direction, amount of displacement, and continuity may not be known because of limited exposures or observations.
- FAULT A shear with significant continuity which can be correlated between observations; occurs over a significant portion of a given site, foundation area, or region; or is a segment of a fault or fault zone defined in the literature. The designation of a shear as a fault or fault zone is a site-specific determination.
- SHEAR/FAULT ZONE A shear that is expressed in relative terms of width. The zone may consist of gouge, breccia, or many related faults or shears together with fractured and crushed rock between the shears and faults, or any combination of these. In the literature many fault zones simply are referred to as faults.
- SHEAR-/FAULT-DISTURBED ZONE An associated zone of fractures and/or folds adjacent to a shear or shear zone where the country rock has been subjected to only minor cataclastic action and may be mineralized. If adjacent to a fault or fault zone, the term is <u>fault-disturbed zone</u>. Occurrence, orientation, and areal extent of these phenomena depend upon depth of burial (pressure and temperature) during shearing, brittleness of materials, and the stress envelope.

FRACTURE TERMINOLOGY

EXAMPLES SHOWN FOR CORE, BUT APPLICABLE TO ANY OBSERVATION



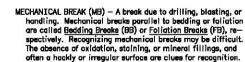
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JOINT (JT) — A relatively planar fracture along which there has been little or no shearing displacement.

FOLIATION JOINT (FJ) OR BEDDING JOINT (BJ) — a relatively planar fracture which is parallel to foliation or bedding along which there has been little or no shearing displaceme

- BEDDING PLANE SEPARATION A separation along bedding after extraction or exposure due to stress relief or slaking.
- INCIPIENT JOINT (IJ) OR INCIPIENT FRACTURE (IF) A joint or fracture which does not continue through the specimen or at least is not seen with the naked eye. However, when the spec-men is wetted, and then allowed to dry, the joint or fracture trace is evident. When core is broken, it breaks along an existina plane.

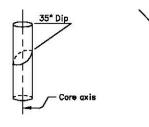
RANDOM FRACTURE (RF) - A natural break which does not belong to a joint set, and which exhibits a generally rough, very irregular, nonplanar surface.





FRACTURE ZONE (FZ) - Numerous, very closely spaced intersecting fractures. Often fragmented core cannot be fitted together.

METHOD OF MEASURING DIP OF PLANAR DISCONTINUITIES, FOLIATION. AND BEDDING IN CORE



1. Vertical hole - true dia is measured and reported 2. Angle hole - true dip usually not known; angle is measured from core axis and is called inclination.

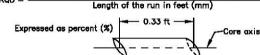
45°

Inclination

Core axis

ROCK QUALITY DESIGNATION (RQD)

EXAMPLE SHOWN FOR CORE, BUT APPLICABLE TO ANY LINEAR OBSERVATION $\frac{100 \text{ mm}}{100 \text{ mm}} = \frac{100 \text{ mm}}{100 \text{ mm}} \frac{100 \text{ mm}}{$



FRACTURE FREQUENCY

FRACTURE FREQUENCY - The number of natural fractures occurring within a base length or core run. The number of fractures is divided by the length and is reported as fractures per foot or fractures per meter. Expressed as 3/m or

FRACTURE DENSITY

FRACTURE DENSITY - Based on the spacing of <u>all natural</u> fractures in an expo-sure or core recovery lengths in boreholes; <u>excludes mechanical breaks</u>, <u>shears</u>, <u>and shear zones</u>; however, shear-disturbed zones (fracturing outside the shear) are included. Descriptors for fracture density apply to all rock exposures such as tunnel walls, dozer trenches, outcrops, or foundation cut slopes and inverts, as well as boreholes. Descriptive criteria presented below are based on borehole cores where lengths are measured along the core axis. For other exposures the criterium is distance measured between fractures (size of blocks)

UNFRACTURED (FD0): No fractures.

- VERY SLIGHTLY FRACTURED (FD1): Core recovered mostly in lengths greater than 3 feet (1 m).
- SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2) *
- SLIGHTLY FRACTURED (FD3): Core recovered mostly in lengths from 1 to 3 feet (300 to 1000 mm) with few scattered lengths less than 1 foot (300 mm) or greater than 3 feet (1000 mm).

MODERATELY TO SLIGHTLY FRACTURED (FD4) *

- MODERATELY FRACTURED (FD5): Core recovered mostly in 0.3- to 1.0-foot (100-to 300-mm) lengths with most lengths about 0.5 foot (200 mm).
- INTENSELY TO MODERATELY FRACTURED (FD6) .
- INTENSELY FRACTURED (FD7): Lengths average from 0.1 to 0.3 foot (30 to 100 mm) with scattered fragmented intervals. Core recovered mostly in lengths less than 0.3 foot (100 mm).
- VERY INTENSELY TO INTENSELY FRACTURED (FD8) *
- VERY INTENSELY FRACTURED (FD9): Core recovered mostly as chips and frag-ments with a few scattered short core lengths.

Combinations of fracture densities (e.g., Very Intensely to Intensely Fractured or Moderately to Slightly Fractured) are used where equal distribution of both fracture density characteristics are present over a significant interval or expo-sure, or where characteristics are "in between" the descriptor definitions.

FRACTURE SPACING

JOINT SET, OR FRACTURE SPACING DESCRIPTOR

TRUE SPACING

EXTREMELY WIDELY SPACED (SP1) VERY WIDELY SPACED (SP2) WIDELY SPACED (SP3) MODERATELY SPACED (SP4) CLOSELY SPACED (SP5) VERY CLOSELY SPACED (SP6)

Greater then 10 ft (>3 m) 3 to 10 ft (1 to 3 m) 1 to 3 ft (300 mm to 1 m) 0.3 to 1 m (100 to 300 mm) 0.1 to 0.3 ft (30 to 100 mm) less than 0.1 ft (<30 mm)

FRACTURE CONTINUITY

CONTINUITY DESCRIPTOR DISCONTINUITY LENGTH

DISCONTINUOUS (C1) SLIGHTLY CONTINUOUS (C2) MODERATELY CONTINUOUS (C3) HIGHLY CONTINUOUS (C4) VERY CONTINUOUS (C5)

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Less than 3 ft (<1 m) 3 to 10 ft (1 to 3 m) 10 to 30 ft (3 to 10 m) 30 to 100 ft (10 to 30 m) Greater than 100 ft (>30 m)

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FRACTURE ENDS (JOINT SURVEYS)

FRACTURE ENDS DESCRIPTOR DESCRIPTIVE CRITERIA ΕØ Zero ends leave the exposure (both ends can be seen). E1 One end of the fracture terminates in the exposure (one end can be seen).

F2 Neither fracture end terminates in the exposure (neither end can be seen).

FRACTURE OPENNESS OR FILLING THICKNESS

FILLING THICKNES: DESCRIPTOR	S THICKNESS/OPENNESS	OPENNESS DESCRIPTOR
CLEAN (TØ)	No film or coating.	
	No visible separation.	TIGHT (00)
VERY THIN (T1)	Less than 0.003 ft [1/32 in] (<1 mm).	SLIGHTLY OPEN (01)
MODERATELY THIN (T2)	0.003 to 0.01 ft [1/32 to 1/8 in] (1 to 3 mm).	MODERATELY OPEN (02)
THIN (T3)	0.01 to 0.03 ft [1/8 to 3/8 in] (3 to 10 mm).	OPEN (03)
MODERATELY THICK (T4)	0.03 ft [3/8 in] to 0.1 ft (10 to 30 mm).	MODERATELY WIDE (04)
ТНІСК (Т5)	Greater than 0.1 ft (>30 mm). Actual thickness or openings recorded.	WIDE (05)

FRACTURE MOISTURE CONDITIONS

MOISTURE DESCRIPTIVE CRITERIA DESCRIPTOR The fracture is dry. It is tight or filling (where present) is of sufficient density or composition to impede waterflow. Waterflow along the fracture does not appear possible. M1

- M2 The fracture is dry with no evidence of previous waterflow. Waterflow appears possible.
- The fracture is dry, but shows evidence of waterflow such M3 as staining, leaching and/or vegetation.
- M4 The fracture or filling (where present) is damp, but no free water is present.
- The fracture shows seepage. It is wet with occasional M5 drops of water.
- MB The fracture emits a continuous flow (estimate flow rate) under low pressure. Filling materials (where present) may show signs of leaching or piping.
- The fracture emits a continuous flow (estimate flow rate) M7 under moderate to high pressure. Water is squirting and/ or filling material (where present) may be substantially washed out.

FRACTURE ROUGHNESS

Refers to small-scale asperities of surfaces, not large-scale undulations or waviness.

STEPPED (R1): Near-normal steps and ridges occur on the fracture surface. ROUGH (R2): Large, angular asperities can be seen. MODERATELY ROUGH (R3): Asperities are clearly visible and fracture surface

feels abrasive. SLIGHTLY ROUGH (R4): Small asperities on the fracture surface are visible

and can be felt. SMOOTH (R5): No asperities, smooth to the touch.

POLISHED (R6): Extremely smooth and shiny.

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metrol, discontinuity surfaces or filling is healed or recemented; and/or strength of healing agent is less hord that surrounding rock. PARTLY HEALED (HLS) – Less than 50 percent of fractured or shoered material, discontinuity surfaces or filling is healed or recemented. NOT HEALED (HLS) – Discontinuity surface, fractured zone, sheared material or filling is not healed or recemented. NOT HEALED (HLS) – Discontinuity surface, fractured zone, sheared material or filling is not healed or recemented. DESCRIPTOR DESCRIPTIVE CRITERIA (Similar to consistency of soils) VERY HARD Gouge conto be broken with finger pressure; contobe indented with fingernoil. HARD Gouge conto be broken with finger pressure; contobe indented with fingernoil. HARD Gouge conto be one on the indented with thumb. FIRM Gouge conto be acaily arunbied; con be penetrated with thumb 5 to 25 mm. SOFT Gouge conto be penetrated with thumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS Net organize context of gouge is described on WIT (risible free woter); MOIST (Gouge con be penetrated with thumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS Mean opporent moliture, durity, dry to be to conto; moliture, durity, dry to be to conto; MI through M7 may be used to describe the shear or shear zone. Mean opporent moliture, durity, dry to be to context. Mean oppor	Descriptors fo (excluding alteration of Descriptors fo some as the TOTALLY HEALI healed or n	TURE SURFACE AND/OR FILLING ALTERATION AND HARDNESS r weathering or alteration of fracture surfaces and fracture fillings soil materials) are the same as those used for weathering and of rock. r hardness/strength of fillings and/or fracture surfaces are the ose presented for hardness of rock and consistency of soils. DISCONTINUITY HEALING ED (HL1) – All fragments bonded, discontinuity is completely ecomented to a degree at least as hard as surrounding rock. EALED (HL3) – Greater than 50 percent of fractured or sheared	D
discontinuity surface or filling is healed or recurrented. NOT HEALED (H.B.) – Discontinuity surface, fractured zone, sheared material or filling in take by their own engularity and/or cohesiveness. C SHEAR/FAULT DESCRIPTORS SHEAR/FAULT GOUGE CONSISTENCY C DESCRIPTOR DESCRIPTIVE CRITERIA (Similar to consistency of soils) C VERY HARD Gouge cannot be broken with finger pressure; cannot be indented with fingermail. C HARD Gouge can be booken with finger pressure; can be indented with fingermail. C SOFT Gouge can be acaily crumbled; can be indented with thumb 1 to 5 mm. SOFT SOFT Gouge can be easily crumbled; can be penetrated with thumb 5 to 25 mm. SOFT VERY SOFT Gouge can be penetrated with thumb more than 25 mm. SOFT SOFT Gouge can be penetrated with thumb more than 25 mm. SOFT SOFT Gouge can be penetrated with thumb more than 25 mm. SOFT SOFT Gouge can be penetrated with thumb more than 25 mm. SOFT SOFT Gouge can be penetrated with thumb more than 25 mm. SOFT SUBARDUP, Land Call SHAPPES Missinger Call SHAPPES Missinger Call SHAPPES Multiple Subargular. Subargular. Soft Subargular. Soft Subargular. <td>material, d strength of</td> <td>iscontinuity surfaces or filling is healed or recemented; and/or healing agent is less hard than surrounding rock.</td> <td></td>	material, d strength of	iscontinuity surfaces or filling is healed or recemented; and/or healing agent is less hard than surrounding rock.	
Illing is not helded or recommitted, rock frogments or filling (if present) held SHEAR/FAULT DESCRIPTORS SHEAR/FAULT GOUGE CONSISTENCY C DESCRIPTOR DESCRIPTIVE CRITERIA (Similar to consistency of solie) C VERY HARD Gouge conto to broken with finger pressure; cannot be indented with fingernali; cannot be indented with thumb 1 to 5 mm. C SOFT Gouge can be casily arounded; can be prestrated with thumb 5 to 25 mm. C SOFT Gouge can be assily molded; can be prestrated with thumb 5 to 25 mm. C VERY SOFT Gouge can be prestrated with thumb more than 25 mm. C VERY SOFT Gouge can be prestrated with thumb for each with thumb 5 to 25 mm. D VERY SOFT Gouge can be prestrated with thumb more than 25 mm. E MDEST (damp, but no visible woter); and DBY (obsence) of moleture, duty, dry to the touch). Molisture descriptors MI through M7 may be used to describe B Multiple Maguiar Maguiar Maguiar Subangular Maguiar Maguiar Maguiar Subangular Maguiar Maguiar Maguiar Maguiar Subangular Maguiar Maguiar Maguiar Maguiar Maguiar Maguiar Subangular Maguiar <td></td> <td></td> <td></td>			
SHEAR/FAULT GOUGE CONSISTENCY C DESCRIPTION DESCRIPTIVE CRITERIA (Similar to consistency of solis) C VERY HARD Gouge cannot be broken with finger pressure; cannot be indented with fingernoil; cannot be indented with thumb. E E HARD Gouge can be broken with fing finger pressure; can be indented with thumb 1 to 5 mm. E E SOFT Gouge can be easily crumbled; can be penetrated with thumb 1 to 25 mm. E E SOFT Gouge can be penetrated with thumb more than 25 mm. E E VERY SOFT Gouge can be penetrated with thumb more than 25 mm. E E SUEDRY/FAULT MOISTURE DESCRIPTORS The apporent moisture content of gouge is described as WEI (visible free water); moisture content of gouge is described as WEI (visible free water); but bit touch). Moisture descriptors MI through MP may be used to describe the shear or shear zone. B BRECCIA SHAPES B Angular	filling is n	ot healed or recemented, rock fragments or filling (if present) held	
DESCRIPTIOR DESCRIPTIVE CRITERIA (Similar to consistency of soils) C VERY HARD Gouge conto be broken with finger pressure; contob to indented with fingernoil; contob to indented with thumb. Findented with fingernoil; contob to indented with thumb. HARD Gouge contob easily crumbled; contob to indented with thumb 1 to 5 mm. SOFT Gouge contob easily molded; contob penetrated with thumb 5 to 25 mm. SOFT Gouge contob easily molded; contob penetrated with thumb 5 to 25 mm. VERY SOFT Gouge contob penetrated with thumb more than 25 mm. VERY SOFT Gouge contob penetrated with thumb more than 25 mm. VERY SOFT Gouge contob penetrated with thumb more than 25 mm. VERY SOFT Gouge context of gouge is described as WET (visible free water); Motion (down, down, dow	5	SHEAR/FAULT DESCRIPTORS	
DESCRIPTOR DESCRIPTOR INTEGRIPTIVE CRITERIA (Similar to consistency of solis) VERY HARD Gouge cannot be broken with finger pressure; cannot be indented with fugeronil. HARD Gouge can be broken with firm finger pressure; can be indented with fumb. FIRM Gouge can be easily crumbled; can be indented with fumb 1 to 5 mm. SOFT Gouge can be easily molded; can be penetrated with fumb 5 to 25 mm. VERY SOFT Gouge can be penetrated with fumb more than 25 mm. VERY SOFT Gouge can be penetrated with fumb more than 25 mm. VERY SOFT Gouge can be penetrated with fumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS The apportent molisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DFY (damence of molisture, duity, dry to the touch). Molisture descriptors MI through MP may be used to describe the shear or shear zone. BREECCIA SHAPES B Angular	S	HEAR/FAULT GOUGE CONSISTENCY	
with fingernall. HARD Gouge can be broken with firm finger pressure; can be indented with fingernall; cannot be indented with thumb. FIRM Gouge can be easily crumbled; can be indented with thumb 1 to 5 mm. SOFT Gouge can be easily molded; can be penetrated with thumb 5 to 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS The opporent moisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DRY (observe due to describe the shear or shear zone. BRECCIA SHAPES Angular	DESCRIPTOR	DESCRIPTIVE CRITERIA (Similar to consistency of soils)	С
with fingernall; connot be indented with thumb. FIRM Couge can be easily crumbled; can be indented with thumb 1 to 5 mm. SOFT Couge can be easily molded; can be penetrated with thumb 5 to 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS The opporent moisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DRY (obsence of moisture, dusty, dry to the touch). Moisture descriptors MI through M7 may be used to describe the shear or shear zone. BRECCIA SHAPES Subangular	VERY HARD		
Soft Gouge can be easily molded; can be penetrated with thumb 5 to 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. VERY SOFT Gouge can be penetrated with thumb more than 25 mm. SHEAR/FAULT MOISTURE DESCRIPTORS The apporent moisture content of gouge is described as WET (visible free water); MOIST (domp, but no visible water); MOIST	HARD		
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SHEAR/FAULT MOISTURE DESCRIPTORS The opporent moisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DRY (absence of moisture, dusty, dry to the touch). Moisture descriptors MI through M7 may be used to describe the shear or shear zone. BRECCIA SHAPES Angular Subangular. Subangular. Subangular. Breas Rounded Platy Lens=shaped Contorted Image: State of the Discontinue for the Unteget of the State of the Sta	SOFT	Gouge can be easily molded; can be penetrated with thumb 5 to	
The apparent moisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DRY (absence of moisture, duity, dry to the touch). Moisture descriptors M1 through M7 may be used to describe the shear or shear zone. BRECCIA SHAPES B BRECCIA SHAPES Angular	VERY SOFT	Gouge can be penetrated with thumb more than 25 mm.	-
The apparent moisture content of gouge is described as WET (visible free water); MOIST (damp, but no visible water); and DRY (absence of moisture, duity, dry to the touch). Moisture descriptors M1 through M7 may be used to describe the shear or shear zone. BRECCIA SHAPES B BRECCIA SHAPES Angular			
MOIST (domp, but no visible water); and DRY (absence of moisture, dusty, dry to the touch). Moisture descriptors M1 through M7 may be used to describe the shear or shear zone. BRECCIA SHAPES B Angular			
Angular			
Angular	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe	
Subrounded Rounded	The apparent r MOIST (dar to the touc	naisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone.	В
Rounded.	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES	В
Platy	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular	В
Lens-shaped	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular Subangular Subrounded.	В
Wedge-shaped	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular Subangular Subrounded Rounded	В
Image: Note of the second state of	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry n). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular	В
ALWAYS THINK SAFETY ALWAYS THINK SAFETY	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular Subangular Subrounded. Rounded. Platy	в
ALWAYS THINK SAFETY ALWAYS THINK SAFETY	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular Subangular Subrounded Rounded Platy	в
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION GEOLOGY FOR DESIGN & SPECIFICATIONS A STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES GEOLOGY MOMENCIATURE COMMITTEE _ CHECKED_CHARK SULLIVAN DRAWN DRAWN DRAWN CHOD SYSTEM CUDD SYSTEM	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular	в
BUREAU OF RECLAMATION GEOLOGY FOR DESIGN & SPECIFICATIONS STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES GEOLOGY MOMENCIATURE COMMITTEE _ CHECKED_ CHUCK SULLIVAN DRAMAY DRAMAY DRAMAY CODD SYSTEM CUDD SYSTEM	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe r shear zone. BRECCIA SHAPES Angular	в
STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES GEOLOGY _NOMENCLATURE COMMITTEE _ CHECKED_CHECK SULLIVAN DRAWN _MARSHULL MONSONTECH, APPROVAL _PETER M. ROHRER APPROVEDMARK MONEDUNINA CODD SYSTEMROMONTIME FLOTTED	The apparent r MOIST (dar to the touc	Insisture content of gauge is described as WET (visible free water); mp, but no visible water); and DRY (absence of moisture, dusty, dry moisture descriptors M1 through M7 may be used to describe subargular	в
CRITERIA FOR DISCONTINUITIES GEOLOGY_NOMENCLATURE_COMMITTEE_CHECKED_CHUCK SULLIVAN DRAWN_MMRSHALL_MONSONTECH. APPROVAL_PETER M. ROHRER APPROVED_MARK MCKEDINN RED ROIZEVEN CADD STSTEDN CAD STSTEDN CAD STSTEDN CAD STSTEDN CAD STSTEDN CAD STSTEDN CAD	The apparent r MOIST (dar to the touc	Invision content of gauge is described as WET (visible free water); Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Imp, but no visible water); and DRY (absence of moisture, dusty, dry Subounded. Subrounded. Platy Lens-shaped Wedge-shaped Contorted Imp, MC, MO, MIMOR REVISIONS. Imped States Imped States Imped States Imped States	B
DRAINNMARSHALL_MONSONTECH, APPROVALPETER M, ROHRER APPROVEDMARK MCKEDMIN CADD SYSTEMADD RYTENDA CADD SYSTEM CADD FYLENDA	The apparent r MOIST (dar to the touc	noisture content of gouge is described as WET (visible free water); np, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe shear zone. BRECCIA SHAPES Angular	
APPROVEDMARK_MCKEDUNY 	The apparent r MOIST (dar to the touc	Indisture content of gauge is described as WET (visible free water); mp, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe BRECCIA SHAPES Angular	
CADD SYSTEM CADD FILENAME DATE AND TIME PLOTTED	The apparent r MOIST (dar to the touc	Indisture content of gauge is described as WET (visible free water); mp, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe BRECCIA SHAPES Angular	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	The apparent r MOIST (dar to the touc	Indisture content of gouge is described as WET (visible free water); mp, but no visible water); and DRY (absence of moisture, dusty, dry). Moisture descriptors M1 through M7 may be used to describe shear zone. BRECCIA SHAPES Angular	

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		GEC	DLO	GIC	LO	g of	F DF	RILL	HOLE	NO. DI	HR9	-15-1	SHEET 1 OF 1
DEPTH AND ELEVATION OF WATER LE													
		/ERY		LABC	RAT	ORYI	DATA		≻Z	FT		z	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME												/	0.0 - 7.7 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_												0.0 - 7.7 FT SILTY SAND (SM) : ABOUT 80% FINE SAND, ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH, LOW TOUGHNESS; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; JOE PROCTOR, HELPERS; BRANDON LANE; RENATO MATHESON	-										Qal	SM	7.7 - 28.7 FT CRETACEOUS MENEFEE FORMATION (Kmf)
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—		28.2	71.8	0	NP	NP	3.9	SM	12/22/41			7.7 - 10.3 FT SANDSTONE WITH CLAYSTONE INTERBEDS: SLIGHTLY WEATHERED (W3), SOFT (H6), TAN IN COLOR; NO REACTION WITH
DRILL EQUIPMENT: TRACK MOUNTED CME 850.		36									-		HCI.
DRILL METHOD: 0.0 - 8.7 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs. 8.7 - 28.7 FT HQ3 WIRELINE CORING									5	0/REFUSAL			10.3 - 28.7 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY WEATHERED (W4), VERY SOFT (H7); NO REACTION WITH HCI.
SYSTEM WITH A 5' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	10_											SANDSTON	= STRATIGRAPHY: 0.0 - 7.7 FT: QUATERNARY ALLUVIUM (Qal)
CASING RECORD: NONE USED.		00										5835.2	7.7 - 28.7 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
DRILLING MEDIUM: 0.0 - 8.7 FT NONE USED. 8.7 - 28.7 FT WATER.	_	88											ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	_												
	15 — _	90											
	-										Kmf		
	_											CLAYSTONE	
	20—	100											
	_	100											
	_												
	25—	100											
	-												
	_					B		M OF F	IOLE			5816.8	

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/18/15 FINISHED: 11/18/15 DEPTH AND ELEVATION OF WATER LEVEL: 11.0 ft. (5820.9)

AND DATE MEASURED: 11.0 (5820.9) 11/18/2015

PROJECT: NGWSP COORDINATES: N 1,835,943.4 E 2,474,721.4 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: 10.8

SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 5831.9 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

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		VERY		LABO	ORAT	ORY	DATA		×NO	FT		vo /	
NOTES	DEPTH	CORE RECOVERY	ES	9	GRAVEL	IQUID LIMIT	PLASTICITY INDEX	FURE	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
		% COR	% FINES	% SAND	% GR	LIQUII	PLAS ⁻	MOISTURE	LABC	BLO	GEOLO	CLAS	
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.													
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-												0.0 - 10.8 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND, TRACE OF COARSE SAND; ABOUT 40% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, LOW
DRILLED BY: U.C. REGION DRILL CREW DRILLER; KYLE KILLEBREW HELPERS: JOE PROCTOR. BRANDON	-												TOUGHNESS AND SLOW DILATANCY; MAXIMUM SIZE, COARSE SAND; LIGHT BROWN IN COLOR; NO REACTION WITH HCI.
LANE	-		51.4	48.6	0	NA	NA	17.6	NA	1/2/3			10.8 - 25.0 FT CRETACEOUS MENEFEE FORMATION (Kmf)
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-	100									Qal	sc	10.8 - 22.4 FT CLAYSTONE: GREY IN COLOR, VERY SOFT (H7), MODERATELY TO INTENESELY WEATHERED (W6),
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-		26.5	73.5	0	NA	NA	19.6	NA	19/32/39			INTERVITENT IRON OXIDE STAINING, THINLY TO MODERATELY BEDDED, VISIBLE ORGANIC MATERIAL.
DRILL METHOD: 0.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-	60	20.3	10.0				13.0		19/32/39		2	22.4 - 25.0 FT SANDSTONE: MODERATELY TO SLIGHTLY WEATHERED (W4), SOFT (H6), TAN IN COLOR; NO REACTION WITH HCI.
CASING RECORD: NONE USED.													STRATIGRAPHY: 0.0 - 10.8 FT: QUATERNARY ALLUVIUM (Qal)
DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.	10-	100	26.7	73.3	0	NA	NA	19.9	NA	35/24/13			10.8 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-											5821.1	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-	100	79.4	20.6	0	NA	NA	3.0	NA	8/29/38			
	-	-											
	-		82.3	17.7	0	NA	NA	17.7	NA	12/23/26			
	15—	100											
	-												
	-	100	70.8	29.2	0	NA	NA	17.2	NA	13/29/31		CLSTNE	
	-										Kmf		
	-	-	59.0	41.0	0	NA	NA	18.7	NA	16/50			
	20-												
	-	-											
	-	100										5809.5	
	-	1										SS	
	-	1											
	-25-		<u> </u>		I	E	 ВОТТОІ	L M OF F	I IOLE			5806.9	I

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G5

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/18/15 FINISHED: 11/18/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/18/2015

PROJECT: NGWSP COORDINATES: N 1,831,286.9 E 2,476,219.7 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: 19.2

SHEET 1 OF 1

G6

STATE: NM GROUND ELEVATION: 5875.1 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

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		/ERY		LABC	ORAT	ORYI			≻S	FT		NC	/	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME														0.0 - 19.2 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	0												0.0 - 6.1 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; LOW DRY STRENGTH, DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; KYLE KILLEBREW; HELPERS, JOE PROCTOR, BRANDON LANE	-											SM		6.1 - 8.6 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40%
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5	52	51.0	49.0	0	29.3	15.9	6.3	s(CL)	7/12/12				FINES WITH LOW PLASTICITY, LOW DRY STRENGTH LOW TOUGHNESS AND SLOW DILATANCY; TRACE OF COARSE SAND MAXIMUM SIZE, COARSE SAND, LIGHT BROWN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	_												5869.0	8.6 - 10.9 FT FAT CLAY (CH): ABOUT 90% PLASTIC FINES WITH HIGH TOUGHNESS, HIGH
DRILL METHOD: 0.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	-	60	38.8	59.4	1.8	26.9	12.4	4.4	SC	15/21/15		SC		DRY STRENGTH; ABOUT 10% FINE SAND WITH NO DILATANCY; MAXIMUM SIZE, FINE SAND; NO REACTION WITH HCI.
CASING RECORD: NONE USED.	-												5866.5	10.9 - 16.0 FT CLAYEY SAND (SC): ABOUT 60% FINE SAND; ABOUT 40% MEDIUM PLASTIC
DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.	-	100	90	10	0	56.7	36.0	15.0	СН	14/23/27	Qal	сн		FINES, NO DILATANCY, MEDIUM DRY STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	10—	1											5864.2	16.0 - 19.2 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40%
	-	68	84.5	15.5	0	42.5	27.0	13.6	(CL)s	11/21/31				FINES WITH LOW PLASTICITY, LOW DRY STRENGTH LOW TOUGHNESS AND SLOW DILATANCY; TRACE OF COARSE SAND MAXIMUM SIZE,COARSE SAND, LIGHT BROWN IN COLOR; NO REACTION WITH HCI.
	-											sc		19.2 - 25.0 FT CRETACEOUS MENEFEE FORMATION (Kmf)
	- 15— -	88	59.1	40.9	0	31.9	16.6	16.5	s(CL) 1	6/36/REFUSA	κL.		5859.1	19.2 - 25.0 FT CLAYSTONE: DECOMPOSED (W9) AND DESCRIBED AS SOIL; FAT CLAY (CH): ABOUT 90% PLASTIC FINES WITH HIGH TOUGHNESS, HIGH DRY STRENGTH; ABOUT 10% FINE SAND WITH NO DILATANCY; NO REACTION WITH HCI.
	-	100										SC		STRATIGRAPHY: 0.0 - 19.2 FT: QUATERNARY ALLUVIUM (Qal) 19.2 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	-		86.8	13.2	0	44.6	26.5	15.9	CL	_			5855.9	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	20-									-				
	-	-												
	-	100									Kmf	CLST	ΓNE	
	-	-												
	_ ₂₅					E	 10170	M OF F	IOLE				5850.1	

COMMENTS:

			(GEO	LOC	GIC	LOC	g Ol	F DF	RILL	но	LEN	10. D	HR9	15-4	SHEET 1 OF 1
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/11/15 FINISHED: 10/1 DEPTH AND ELEVATION OF WATER AND DATE MEASURED:		L: WLM	NE			COO TOTA	RDINA L DEF	PTH:	N 1,8		3.2 E	2,477,5	541.8			STATE: NM GROUND ELEVATION: 5963.7 ft. ANGLE FROM HORIZONTAL: AZIMUTH: HOLE LOGGED BY: CBEYER REVIEWED BY: J. GILBERT
NOTES	DEPTH	GEOLOGIC SYMBOL	% CORE RECOVERY	RQD	HARDNESS	WEATHERING	% FINES	LAB gnrs %	% GRAVEL	TORY	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	VISUAL VISUAL	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	Qal	_		7	8									(SM)g	0.0 - 2.5 FT: QUATERNARY ALLUVIUM (Qai): 0.0-2.5 FT SILTY SAND WITH GRAVEL (SM)g: ABOUT 60% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, NO DRY STRENGTH AND RAPID DILATANCY; ABOUT 20% FINE TO COARSE GRAVEL; BROWN IN COLOR, MOIST; MAXIMUM SIZE. 75MM.
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; JOE PROCTOR, HELPERS; BRANDON LANE; RENATO MATHESON	_	-			/	0	_									2.5 - 25.0 FT CRETACEOUS MENEFEE FORMATION 2.5 - 11.9 FT SANDSTONE: TAN IN COLOR,
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS. DRILL EQUIPMENT: TRACK MOUNTED CME 850. DRILL METHOD: 0.0 - 5.0 FT 4.14" HSA. PILOT BIT 5.0 - 25.0 FT 4.14" HSA. PILOT BIT CASING RECORD: NONE USED. DRILLING MEDIUM: 0.0 - 5.0 FT NONE USED.	5— — — — 10—	-	66	12	6	6										2.5 - 11.9 F I SANDS IONE: IAN IN COLOR, VERY INTENSELY WEATH-REED (W8) VERY SOFT (H7) IN TOP 1.0 FT. SANDSTONE BECOMES MODERATELY TO INTENSELY WEATH-RED (W6) AND SOFT (H6) BELOW THE TOP 1.0 FT. IT IS FINE GRAINED, AND THINLY BEDDED. THE SANDSTONE HAS NO REACTION WITH HCI AND CONTAINS INTERMITTENT ANGULAR 1"MUDSTONE RIPUP CLASTS. 11.9 - 13.2 FT SANDSTONE: GREY IN COLOR, SLIGHTLY WEATH-RED TO FRESH (W2) AND HARD (H3). IT IS MODERATELY BEDDED AND CALCAREOUS, STRONG REACTION WITH HCI. ROCK HAMMER RINGS WHEN CORE IS STRUCK. 13.2 - 24.5 FT SANDSTONE: TAN IN COLOR, MODERATELY TO INTENSELY WEATH-RED (W6) AND SOFT (H6); FINE GRAINED, AND THINLY BEDDED, NO REACTION WITH HCI AND
5.0 - 25.0 FT WATER HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.		. Kmf	82	0	6	6									SS	CONTAINS INTERMITTENT ANGULAR 1"MUDSTONE RIPUP CLASTS. 24.5 - 25.0 CLAYSTONE: GREY IN COLOR, MODERATELY TO INTENSELY WEATHERED (W6), SOFT (H6), SAMPLE WASHED BY DRILL AND STUCK TO CORE BARREL. STRATIGRAPHY: 0.0 - 2.5 FT. QUATERNARY ALLUVIUM (Cal) 2.5 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf) ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	- - - -	-	32	0	6	6	Ē	зоттс	DM OF	HOLE					CLST	

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G7

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 8/14/15 FINISHED: 8/14/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 8/14/2015

PROJECT: NGWSP COORDINATES: N 1,824,358.0 E 2,478,371.0 TOTAL DEPTH: 21.1 DEPTH TO BEDROCK: BNE

G8

STATE: NM GROUND ELEVATION: 5960.8 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: C. BEYER

AND DATE MEASURED. 0/14/2013													REVIEWED BT. C. BETER
		ERY		LABO	ORAT	ORYI	DATA		, ∠Z	FT		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 21.1 FT: QUATERNARY ALLUVIUM (Qal):
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW; DRILLER; JEFF VAN AUSDAL, HELPERS;	-	-											0.0 - 16.3 FT SILTY SAND (SM): ABOUT 80% PREDOMINATELY FINE TO MEDIUM SAND; ABOUT 20% NONPLASTIC FINES, WITH RAPID DILATANCY, LOW DRY STRENGTH, DRY, BROWN TO GREY IN COLOR; MAXIMUM SIZE, MEDIUM SAND; ROOTS ON TOP 1.0 FT; NO REACTION WITH HCI.
JOE PROCTOR; BRIAN HART. PURPOSE:	-												16.3 - 21.1 FT POORLY GRADED SAND WITH GRAVELS (SP)g: ABOUT 75% FINE TO
PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS. DRILL EQUIPMENT:	-		17.4	82.6	0	NA	NP	3.0	SM	2/5/5			COARSE, HARD TO VERY HARD SUBROUNDED SAND; ABOUT 20% FINE TO COARSE, HARD TO VERY HARD, SUBANGULAR TO SUBROUNDED GRAVEL;
TRUCK MOUNTED CME 85. DRILL METHOD:	5-	92									-		ABOUT 5% NONPLASTIC FINES; MAXIMUM SIZE, 50 mm; NO REACTION WITH HCI.
0- 21.1 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-												STRATIGRAPHY: 0.0 - 21.1 FT. QUATERNARY ALLUVIUM (Qal)
CASING RECORD: NONE USED.	-	48	14.2	85.8	0	NA	NP	2.3	SM	3/2/1			ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
DRILLING MEDIUM: 0.0 - 21.1 FT NONE USED.	-											SM	
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	- 10-	100	33.1	66.9	0	20.1	3.5	4.7	SM	1/5/12			
	_										Qal		
	-	80	20.3	79.6	0.1	NA	NP	2.9	SM	5/9/11			
	- 15-	100	44.8	55.2	0	21.0	7.4	4.7	SC	6/9/12			
	_												
	-		13.4	65.6	21.0	NA	NP	1.1	(SM)g	20/50/50		5944.5	
	-	96									-		
	-										-	(SP)g	
	20-	0	9.9	79.1	11.0	NA	NP	0.6	SM	REFUSAL			
		0										5939.7	
						E	BOTTO	VI OF F	IULE				
1													

COMMENTS:

	GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-6 FEATURE: REACH 9, 10 AND 11 PROJECT: NGWSP													
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/11/15 FINISHED: 10/11/1 DEPTH AND ELEVATION OF WATER LE AND DATE MEASURED:		VLNE			C(T(DORDI	INATES DEPTH:	6: N 1 26.5	,819,682.3 (: BNE	E 2,479,5	68.4		STATE: NM GROUND ELEVATION: 5930.7 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY:	
		/ERY		LABO	ORAT	ORY	DATA		×°	FT		z		
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION	
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.												, , , , , , , , , , , , , , , , , , ,	0.0 - 26.5 FT: QUATERNARY ALLUVIUM (Qal):	
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_												0.0 - 7.5 FT POORLY GRADED SAND WITH CLAY (SP-SC): ABOUT 90% FINE SAND; ABOUT 10% FINES WITH LOW PLASTICITY, LOW	
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; JOE PROCTOR, HELPERS; BRANDON LANE; RENATO MATHESON	-	NR										(SP-SC)	TOUGHNES, LOW DRY STRENGTH AND SLOW DILATANCY; LOOSE CONSOLIDATOIN; MAXIMUM SIZE, FINE SAND; WEAK REACTION WITH HCL.	
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-										-		7.5 - 12.0 FT CLAYEY SAND (SC): ABOUT 85% PREDOMINATELY FINE SAND; ABOUT 15% FINES WITH LOW PLASTICITY, LOW	
DRILL EQUIPMENT: TRACK MOUNTED CME 850. DRILL METHOD:	-	32	27.7	72.3	0	23.6	5	4.9	SC-SM	4/8/7			TOUGHNES, LOW DRY STRENGTH AND SLOW DILATANCY; TRACE MEDIUM SAND AND COARSE SUBROUNDED GRAVEL; LOOSE CONSOLIDATOIN; MAXIMUM SIZE, 3 INCHES;	
0.0 - 5.0 4 1/4" HSA WITH PILOT BIT 5.0 - 26.5 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	-										-	5923.2	WEAK REACTION WITH HCL. 12.0 - 17.0 FT SILTY SAND WITH GRAVEL	
CASING RECORD: NONE USED.		48	33.1	66.9	0	26.6	7.1	6.2	sc	5/7/7			(SM)g: ABOUT 60% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, NO DRY STRENGTH AND RAPID DILATANCY; ABOUT	
DRILLING MEDIUM: NONE USED.	10—											sc	20% FINE TO COARSE GRAVEL; BROWN IN COLOR, DRY, LOOSE CONSOLIDATION; MAXIMUM SIZE, 3 INCHES; GRAVEL PULVERIZED BY AUGER AND SPT SAMPLER.	
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	48	32.2	67.8	0	24.4	6.5	5.9	SC-SM	5/6/7			17.0 - 17.5 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ANOUT	
	-											5918.7	10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; NO REACTION WITH HCL.	
	-	56	22.8	37.5	39.7	NA	NP	2.7	(GM)s	32/25/19	Qal		17.5 - 22.7 FT POORLY GRADED SAND WITH GRAVEL (SP-SM)g: ABOUT 75% PRODOMINATELY FINE SAND, TRACE MEDIUM	
	15—		19.2	56.5	24.3	NA	NP	3.2	(SM)g	16/18/17	-	(SM)g	TO COARSE SAND; ABOUT 15% FINE TO COARSE GRAVEL; ABOUT 10% FINES WITH NO PLASTICITY, RAPID DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE 3 INICHES; NO REACTION WITH HCL.	
		88							(0)g		-	5913.7	22.7 - 26.5 FT SILTY SAND (SM): ABOUT 85% PREDOMINATELY FINE SAND, TRACE MEDIUM	
	_		13.8	68.2	18	NA	NP	2.9	(SM)g	14/23/20		(SP-SM) _{13.2}	TO COARSE SAND; ABOUT 15% FINES WITH NO PLASTICITY, RAPID DILATANCY, AND LOW DRY STRENGTH; INTERMITTENT CALCITE	
	-	72							(0)g		_		NODULES, CALCITE CEMENTED FROM 22.7 TO 23.5 FT; DRY, BECOMES MOIST BELOW 23.0 FT; STRONG REACTION WITH HCL.	
	20—		16.1	49.3	34.6	NA	NP	3.2	(SM)g	2734/15		(SP-SM)g	STRATIGRAPHY: 0.0 - 26.5 FT: QUATERNARY ALLUVIUM (Qal)	
									(0)g		-		ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.	
	_	58										5908.0		
	-											SM		
	25-		20.4	77.8	1.8	NA	NP	8.3	SM	6/9/8				
	L					l E	 ВОТТОІ	I M OF H	IOLE			5904.2		

COMMENTS:

LOCATION: REACH 9 PIPELINE BEGUN: 10/27/15 FINISHED: 10/27/19 DEPTH AND ELEVATION OF WATER LE AND DATE MEASURED:		WLNE			CC TC DE	GROUND ELEVATION: 5938.4 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT							
		RY		LABC	RAT	ORYI	DATA		7	⊢		_ /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_											SP 5937.4	0.0 - 7.3 FT QUATERNARY ALLUVIUM (Qal)
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_												0.0 - 1.0 FT: POORLY GRADED SAND (SP): ABOUT 95% PREDOMINATELY FINE SAND, TRACE MEDIUM, AND COARSE SAND, TRACE
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; JOE PROCTOR, HELPERS; BRANDON LANE; RENATO MATHESON	_	NR											GRAVEL; ABOUT 5% FINES WITH NO PLASTICITY, NO DRY STRENGTH AND RAPID DILATANCY; WEAK CEMENTATION; MAXIMUM SIZE, 25MM; NO REACTION WITH HCL.
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5										Qal	СН	1.0 - 7.3 FT: FAT CLAY (CH): ABOUT 90% FINES WITH HIGH PLASTICITY, HIGH DRY STRENGTH, AND HIGH TOUGHNESS; ABOUT 10% FINE SAND. GREY IN COLOR; NO REACTION WITH
DRILL EQUIPMENT: TRACK MOUNTED CME 850. DRILL METHOD:	-	100	94.3	5.7	0	114.3	94.0	15.7	СН	7/11/13			HCI. 7.3 - 25.0 FT CRETACEOUS MENEFEE FORMATION
0.0 - 5.0 FT 4 1/4" HSA WITH PILOT BIT 5.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-		71.1	28.9	0	40.5	26.3	6.6	(CL)s	45/REFUSAL		5931.1	7.3 - 7.8 FT SANDSTONE: DECOMPOSED (W9) VERY SOFT (H7) CLASSIFIED AS A SOIL.
CASING RECORD: NONE USED.	-	92	71.1	20.3	0	40.3	20.3	0.0	(02)5				ABOUT 80% PREDOMINATELY FINE SAND, TRACE MEDIUM TO COARSE SAND; ABOUT 20% FINES WITH MEDIUM PLASTICITY,
DRILLING MEDIUM: NONE USED.	10—												MEDIUM TOUGHNESS AND MEDIUM DRY STRENGTH; BROWNISH ORANGE IN COLOR, WEAK REACTION WITH HCI.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.		94											7.8 - 25.0 FT SANDSTONE: MODERATELY TO INTENSELY WEATHERED (W6) SOFT (H6), AND MODERATELY BEDDED FROM 7.8 TO 15.0 FT; BECOMES MODERATELY WEATHERED (W5), MODERATELY SOFT (H5) AND THICKLY BEDDED BELOW 15 FT; GRAYISH BROWN IN COLOR, NO REACTION WITH HCI; SUBANGULAR CLAYSTONE RIPUP CLASTS, 12MM IN DIAMETER FROM 24.5 TO 25.0 FT. STRATIGRAPHY:
	15—												0.0 - 7.3 FT: QUATERNARY ALLUVIUM (Qal) 7.3 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	_										Kmf	SS	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	_	100											
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	20-												
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	-	100											
	-												
	L_25—]			B	 BOTTOI	I M OF H	IOLE	1	<u> </u>	5913.4	I

PROJECT: NGWSP

COMMENTS:

FEATURE: REACH 9, 10 AND 11

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

STATE: NM

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/12/15 FINISHED: 10/12/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED:

PROJECT: NGWSP COORDINATES: N 1,809,042.7 E 2,481,215.1 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: 10.0

G11 SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 5967.6 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT

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							DATA		≻Z	F		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.													0.0 - 10.0 FT QUATERNARY ALLUVIUM (Qal)
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW;	-	-										SP-SM 5964.9	0.0 - 2.7 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; GRAYISH BROWN IN COLOR; WEAK CEMENTATION; STRONG
DRILLER; JOE PROCTOR HELPERS; BRANDON LANE, RENATO MATHESON.													REACTION WITH HCI. 2.7 - 10.0 FT POORLY GRADED SAND WITH
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	-	27.7	67.8	4.5	19.2	0.7	2.6	SM		Qal		GRAVEL (SP-SM)9: ABOUT 65% PREDOMINATELY FINE SAND, TRACE MEDIUM TO COARSE SAND; ABOUT 15% FINE TO COARSE GRAVEL; ABOUT 10% FINES WITH NO PLASTICITY, RAPID DILATANCY, AND LOW DRY
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	-								4/REFUSAL	-	(SP-SM)g	STRENGTH; MAXIMUM SIZE, 3 INCHES; STRONG REACTION WITH HCI.
DRILL METHOD: 0.0 - 15.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	-	-									-		10.0 - 25.0 FT CRETACEOUS MENEFEE FORMATION
15.0 - 25.0 FT HQ3 WIRELINE CORING SYSTEM WITH A 3' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	-		33.9	34.3	31.8	29.4	15.1	4.0	(SC)g	33/19/16			10.0 - 25.0 FT CLAYSTONE: DARK GREY IN COLOR, VERY INTENSELY WEATHERED (W8) AND VERY SOFT (H7) FROM 10.0 TO 12.0 FT.
	-	1							(,5				MODERATELY TO INTENSELY WEATHERED (W6), SOFT (H6) BELOW 12.0 FT. LAMINATED
CASING RECORD: NONE USED.	10—											5957.6	TO THINLY BEDDED; INTERMITTENT IRON OXIDE STAINING CARBONACEOUS FRAGMENTS AND CALCITE NODULES.
DRILLING MEDIUM: 0.0 - 15.0 FT NONE USED. 15.0 - 25.0 FT WATER	-	92	94.8	5.2	0	62.4	40.4	14.4	СН	11/17/19	-		SAMPLES STUCK TO CORE BARREL, MAKING THEM DIFFICULT TO REMOVE INTACT.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-												STRATIGRAPHY: 0.0 - 10.0 FT: QUATERNARY ALLUVIUM (Qal) 10.0 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	_	80											ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER
	15—												BNE = BEDROCK NOT ENCOUNTERED.
	-												
	-												
	-	100									Kmf	CLST	
	-	-											
	20-												
	-												
	-	100											
	-												
	-											5042.0	
	<u>-25</u> -	4	1	1	1	B		M OF F	IOLE	1	1	5942.6	1

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/22/15 FINISHED: 11/23/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/23/2015

PROJECT: NGWSP COORDINATES: N 1,805,195.0 E 2,480,983.7 TOTAL DEPTH: 25.9 DEPTH TO BEDROCK: 11.1

SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 5938.6 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

AND DATE MEASURED: 11/23/2015	5												REVIEWED BY: P. GARDNER
		ERY		LABC	DRAT	ORY	DATA		z	FT		/	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 F	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 11.1 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_	0											0.0 - 6.9 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW; DRILLER; KYLE KILLEBREW HELPERS; JOE PROCTOR, BRANDON LANE	_		42.3	57.7	0	22.3	4.4	3.9	SC-SM	4/4/7		SM	6.9 - 11.1 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH LOW TOUGHNESS AND SLOW
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	72									Qal		DILATANCY; TRACE OF COARSE SAND AND FINE GRAVEL; MAXIMUM SIZE, FINE GRAVEL; BROWN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-		41.9	58.1	o	24.6	9.1	5.0	SC	6/16/21		5931.7	11.1 - 25.9 FT CRETACEOUS MENEFEE FORMATION (Kmf)
DRILL METHOD: 0.0 - 25.9 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	_	36											11.1 - 25.9 FT SANDSTONE: VERY INTENSELY WEATHERED TO DECOMPOSED (W8-W9), VERY SOFT TO SOFT (H6-H7), TAN IN COLOR, BREAKS WITH MODERATE HAMMER BLOW;
DRILLING MEDIUM: 0.0 - 25.9 FT NONE USED.	-	48	52.7	47.3	0	27.3	14.8	5.8	s(CL)	11/10/16		SC	NO REACTION WITH HCI. STRATIGRAPHY: 0.0 - 11.1 FT: QUATERNARY ALLUVIUM (Qal)
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	10—											5927.5	11.1 - 25.9 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	_	80	29.3	70.7	0	N∕A	N/P	1.3	SM 4	18/REFUSAL		002110	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-												
	- 15-	100	27.8	72.2	0	N/A	N/P	2.3	SM	_			
	_		-										
	-	100											
	-		-								Kmf	SS	
	20—												
	-	100											
	-												
			-										
	25—	100											
	I	L	1	I	I	B	BOTTO	I M OF F	IOLE	I		5912.7	I

COMMENTS:

GE	OLOGIC LOG OF DRILL HOLE NO. DHR9-15-10
FEATURE: REACH 9, 10 AND 11	PROJECT: NGWSP
LOCATION: REACH 9 PIPELINE	COORDINATES: N 1,799,310.8 E 2,480,923.2
BEGUN: 10/15/15 FINISHED: 10/15/15	TOTAL DEPTH: 25.0
DEPTH AND ELEVATION OF WATER LEVEL: WLM	NE DEPTH TO BEDROCK: 16

AND DATE MEASURED:

G13

STATE: NM GROUND ELEVATION: 6048.2 ANGLE FROM HORIZONTAL:

		/ERY		LABC	RAT	ORY	DATA		×Z	Ε		z /		
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION	
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_											SP	0.0 - 16.0 FT QUATERNARY ALLUVIUM (Qal)	
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW;	-											6046.7 (SP)g 6045.7	0.0 - 1.5 FT POORLY GRADED SAND (SP): ABOUT 95% PREDOMINATELY FINE SAND, TRACE MEDIUM TO COARSE SAND; ABOUT 5% FINES WITH NO PLASTICITY, RAPID DILATANCY, AND LOW DAY STRENGTH	
DRILLER; JOE PROCTOR HELPERS; BRANDON LANE, RENATO MATHESON.			15.4	35.4	49.2	NP	NP	4.8	(GM)s				MAXIMUM SIZE, COARSE SAND; NO REACTION WITH HCI.	
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	-											1.5 - 2.5 FT POORLY GRADED SAND WITH GRAVEL (SP)g: ABOUT 75% PREDOMINATELY FINE SAND, TRACE MEDIUM TO COARSE SAND; ABOUT 20% FINE TO COARSE GRAVEL; ABOUT 5% FINES WITH NO PLASTICITY, RAPID	
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-												DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, 3 INCHES; WEAK REACTION WITH HCI.	
DRILL METHOD: 0.0 - 2.5 FT 4 1/4" HSA WITH PILOT BIT 2.5 - 25.0 FT HO3 WIRELINE CORING SYSTEM WITH A 3" SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	-	-									Qal		2.5 -16.0 FT WELL GRADED GRAVEL WITH SILT, SAND, COBBLES AND BOULDERS (GW-GM)scb: ABOUT 40% HARD FINE GRAINED,	
REACHED AUGER REFUSAL IN HARD COBBLES AND BOULDERS AT 2.5 FT. SWICHED TO CORING SYSTEM, RESULTING IN POOR RECOVERY. NOTE: MULTIPLE TEST PITS EXCAVATED AND ABANDONED BY UNKNOWN PARTY NEAR												(GW-GM)scb	SUBROUNDED SANDSTONE COBBLES; ABOU 25% FINE TO COARSE SUBROUNDED HARD	
DHR9-15-10. CASING RECORD: NONE USED.	_	-											16.0 - 25.0 FT CRETACEOUS MENEFEE FORMATION	
DRILLING MEDIUM: 0.0 - 2.5 FT NONE 2.5 - 25.0 FT WATER	-	-											16.0 - 25.0 FT CLAYSTONE: DARK GREY IN COLOR, VERY INTENSELY WEATHERED (W8) AND VERY SOFT (H7) IN TOP 2.0 FT. MODERATELY TO INTENSELY WEATHERED (W6), AND SOFT (H6) BELOW TOP 2.0 FT.	
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	15—												LAMINATED TO THINLY BEDDED; INTERMITTENT IRON OXIDE STAINING, SAMPLES STUCK TO CORE BARREL, MAKING THEM DIFFICULT TO REMOVE INTACT.	
	-	-										6032.2	STRATIGRAPHY: 0.0 - 16.0 FT: QUATERNARY ALLUVIUM (Qal) 16.0 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)	
	-	NR											ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.	
	20—										Kmf	CLST		
	-													
	-	72												
	25-											6023.2		

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-11 FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 8/13/15 FINISHED: 8/13/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED:

PROJECT: NGWSP COORDINATES: N 1,795,726.5 E 2,480,507.3 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: BNE

SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 6030.3 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: C. BEYER

AND DATE MEASURED:													REVIEWED BY: C. BEYER
		ERY		LABC	ORAT	ORYI	DATA		Ţ	FT		/	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 F	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 25.0 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW	-												0.0 - 9.7 FT SILTY SAND (SM): ABOUT 80% PREDOMINATELY FINE TO MEDIUM SAND; ABOUT 20% NONPLASTIC FINES, WITH RAPID DILATANCY, LOW DRY STRENGTH, DRY, BROWN TO GREY IN COLOR; MAXIMUM SIZE, MEDIUM SAND; ROOTS ON TOP 1.0 FT; NO
DRILLER; JEFF VAN AUSDALE HELPERS; JOE PROCTOR, BRIAN HART.													REACTION WITH HCI. 9.7 - 12.2 FT POORLY GRADED SAND WITH
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5	92	33.8	66.2	0	NA	NP	3.3	SM	3/5/6		ѕм	SILT (SP-SM): ABOUT 90% PREDOMINATELY FINE SAND; ABOUT 10% NON PLASTIC FINES, NO DRY STRENGTH, RAPID DILATANCY; MAXIMUM SIZE, MEDIUM SAND; DRY, LIGHT
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-										-		BROWN IN COLOR; NO REACTION TO HCI.
DRILL METHOD: 0-25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	_	100	49.5	50.5	0	24.8	5.8	5.3	SC-SM	5/5/7			12.2-16.3 FT SILTY SAND (SM): ABOUT 80% FINE TO MEDIUM SAND; ABOUT 20% NONPLASTIC FINES WITH RAPID DILATANCY, NO DRY STRENGTH; MAXIMUM SIZE, MEDIUM SAND; NO REACTION WITH HCI.
CASING RECORD: NONE USED.	-										-		16.3 - 23.5 FT SANDY LEAN CLAY s(CL): ABOUT 60% FINES WITH MEDIUM TO HIGH
DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.		80	17.3	81.8	0.9	21.1	NP	1.5	SM	5/6/7		6020.6	DRASTICITY, NO DILATANCY, MEDIUM TO HIGH DRY STRENGTH; ABOUT 40% FINE SAND, BROWN IN COLOR; NO REACTION WITH HCI.
HOLE COMPLETION: HOLE BACKFILLED	_											SP-SM	23.5 - 24.2 FT LEAN CLAY (CL): ABOUT 90 % FINES WITH MEDIUM PLASTICITY, MEDIUM
WITH CUTTINGS AND BENTONITE.	_	100	42.7	57.3	0	22.5	7.2	4.1	sc	4/5/6		SP-SM 6018.1	DRY STRENGTH, MEDIUM TOUGHNESS; ABOUT 10%, PREDOMINATELY FINE TO MEDIUM SAND; MAXIMUM SIZE, MEDIUM SAND; NO REACTION WITH HCL.
	-										Qal		24.2 - 25.0 FT POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)g: ABOUT 45%
	- 15-	100	19.7	79.5	0.8	NA	NP	1.7	SM	5/6/5		SM	COARSE TO FINE, HARD, SUBANGULAR TO SUBROUNDED GRAVEL; ABOUT 30% FINE TO MEDIUM SAND WITH RAPID DILATANCY; ABOUT 25% NONPLASTIC FINES, NO DRY STRENGTH, NO TOUGHNESS; NO REACTION
	15												WITH HCI.
	-		61.3	38.7	0	42.3	23.8	9.7		6/11/15		6014.0	STRATIGRAPHY: 0.0 - 25.0 ft. QUATERNARY ALLUVIUM (Qal)
	-	100	01.3	30.7	0	42.3	23.6	9.7	s(CL)	6/11/15			ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-		74.1	25.9	0	46.7	32.0	5.7	(CL)s	15/22/21			
	20—										-	sc	
	-	100											
	-												
	-												
		_											6006.8 CL 6006.1
			17.5	69.7	12.8	NA	NP	2.4	SM	17/18/28		(SP-SM)g 6005.3	
	-25-					E	OTTO	M OF H	IOLE				•

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G14

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/27/15 FINISHED: 10/27/15 DEPTH AND ELEVATION OF WATER LE AND DATE MEASURED:		WLNE	200		CC TC	DTAL D	NATES EPTH:	6: N 1 26.5	,790,652.6 :: BNE	E 2,480,5		STATE: NM GROUND ELEVATION: 6018.4 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT	
		ERY		LABC	RAT	ORYI	DATA		_N	5 FT		z	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.51	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_	_											0.0 - 26.5 FT QUATERNARY ALLUVIUM (Qal)
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-											SC	0.0 - 3.0 FT CLAYEY SAND (SC): ABOUT 80% FINE SAND: ABOUT 20% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, SLOW DILATANCY AND LOW TOUGHNESS;
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	-											6015.4	BROWNISH RED IN COLOR; MAXIMUM SIZE, FINE SAND.
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-												3.0 - 17.5 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH;
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	40	35.0	65.0	0	21.7	3.7	4.4	SM	3/5/4			MAXIMUM SIZE, FINE SAND; BROWNISH GREY IN COLOR. 17.5 - 22.5 FT POORLY GRADED SAND (SP):
DRILL METHOD: 0.0 - 26.5 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	-												ABOUT 95% FINE SAND; ABOUT 5% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE,
CASING RECORD: NONE USED.		50	49.8	50.2	0	23.2	4.5	7.6	SC-SM	3/4/4			FINE SAND; BROWNISH GREY IN COLOR. 22.5 - 26.5 FT POORLY GRADED SAND WITH
DRILLING MEDIUM: 0.0 - 26.5 FT NONE USED.	10—											SP-SM	SILT (SP-SM): ABOUT 90% FINE SAND, TRACE COARSE GRAVEL; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE, COARSE GRAVEL;
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	72	40.6	59.4	0	NA	NP	7.2	SM	2/2/3			BROWNISH GREY IN COLOR.
	-												0.0 - 26.5 FT: QUATERNARY ALLUVIUM (Qal)
	-	100	59.7	40.3	0	25.1	5.3	8.3	s(CL-ML)	3/3/3	Qal		ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	15—												
	-	52	39.0	61.0	0	NA	NP	5	SM	2/2/3	_		
	-											6000.9	
	-	64	35.8	64.2	0	NA	NP	3.8	SM	4/5/5			
	20-											SP	
	_	-	33.7	66.3	0	NA	NP	3.7	SM	3/5/6			
	-	32										5995.9	
	25-										SP-SM		
	_							3.8	SM	5/7/20		5992.4	
	-					В	οττοι	M OF H	IOLE				

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

SHEET 1 OF 1

G16													
	(GEO	LOC	GIC I	LOG	i OF	DR	ILL I		IO. DH	IR9-	15-13	SHEET 1 OF 1
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/19/15 FINISHED: 11/19/15 DEPTH AND ELEVATION OF WATER LEV AND DATE MEASURED:		VLNE			CC TC	DORDI DTAL D	EPTH:	S: N 1 25.1	,786,197.8 :: BNE	E 2,480,7	89.8		STATE: NM GROUND ELEVATION: 6003.9 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER
		ERY		LABC	DRAT	ORY	DATA		<u> </u>	FT		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 F	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 25.1 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_	0											0.0 - 24.2 FT SILTY SAND (SM): ABOUT 80% FINE SAND, ABOUT 20%FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; KYLE KILLEBREW HELPERS; JOE PROCTOR, BRANDON LANE	-		16.5	69.1	14.4	NP	NP	2.5	SM	3/5/5			24.2 - 25.1 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND, TRACE OF COARSE SAND; ABOUT 40% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH LOW
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	0											TOUGHNESS AND SLOW DILTANCY; MAXIMUM SIZE, COARSE SAND; LIGHT BROWN IN COLOR, NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-		61.7	23.7	14.6	32.1	14.5	4.2	s(CL)	3/4/6			STRATIGRAPHY: 0.0 - 25.1 FT: QUATERNARY ALLUVIUM (Qal)
DRILL METHOD: 0.0 - 25.1 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-	36											ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
CASING RECORD: NONE USED.	_		31.6	66.5	1.9	20.6	7.0	3.9	SC-SM	4/4/4			- BEBROCKNOT ENCOUNTERED.
DRILLING MEDIUM: 0.0 - 25.1 FT NONE USED.	10—	100											
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.											-		
		60	35.5	64.5	0	NP	NP	4.3	SM	4/4/5		SM	
	_										Qal		
	_	40	44.6	55.4	0	23.2	8.0	4.1	SC	3/6/7			
	15—												
	-	76	33.4	63.7	1.9	NP	NP	3.7	SM	5/9/5			

BOTTOM OF HOLE

5/8/10

10/14/14

5979.7

5978.8

sc

COMMENTS:

44.6 55.4 0 NP NP 4.5 SM

62.5 37.5 0 34.0 22.0 9.7 s(CL)

20-

71

			G	EO	LOG	SIC I	-00	G OF	DR	ILL	HOL	.E N	0.	DHR9-	15-15	SHEET 1 OF 1
FEATURE: REACH 9, 10 AND 11						PRO	JECT	NGV	VSP							STATE: NM
LOCATION: REACH 9 PIPELINE									N 1,7	79,049	9.5 E	2,480,	659.5			GROUND ELEVATION: 6030.4 ft.
BEGUN: 10/23/15 FINISHED: 10/2								PTH:								ANGLE FROM HORIZONTAL: -90
DEPTH AND ELEVATION OF WATER DATE MEASURED: 10/23/2015	LEVE	L: VVL	NE			DEP	IHIC	BEDF	ROCK:	8.8						HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT
DATE MEASORED. 10/23/2013			1			1							-			
		BOL	ERY			0		LAE	BORA	FORY	DAT/	A	γZ	L E	z	
	E	GEOLOGIC SYMBOL	CORE RECOVERY		HARDNESS	WEATHERING				Ť	≻		LABORATORY CLASSIFICATION	0.5 F	VISUAL CLASSIFICATION	CLASSIFICATION AND
NOTES	DEPTH	GIC	RE	% RQD	RDN	ATHE	FINES	SAND	GRAVE		ASTICI	IURI INN	SIFIC	IS /	ISU/	PHYSICAL CONDITION
		OLO	ORE	r i	HA	WE/	% FI	% S	% GF	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	-ABC	BLOWS / 0.5	-ASS	
		ß	0 %						•`	Ĩ	Ē	≥o	72	-	Ū	
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE																0.0 - 8.8 FT QUATERNARY ALLUVIUM (Qal)
SAME AS THOSE USED BY THE	-	-													SP	0.0 - 2.5 FT FT POORLY GRADED SAND (SP): ABOUT 95% FINE SAND; ABOUT 5%
DRILLER.															0.	NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE,
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	1													6032.9	FINE SAND; BROWNISH GREY IN COLOR.
DRILLED BY: U.C. REGION DRILL CREW	_															2.5 - 8.8 FT WELL GRADED GRAVEL WITH
DRILLER; JOE PROCTOR																SAND (GW)S: ABOUT 60% FINE TO COARSE SUB ROUNDED TO SUBANGULAR GRAVEL;
HELPER; RENATO MATHESON.	-	-														ABOUT 35% FINE TO COARSE SAND; ABOUT 5% NONPLASTIC FINES WITH RAPID
PURPOSE:		Qal														DILATANCY AND NO DRY STRENGTH; MAXIMUM SIZE, 75MM.
PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION	5-	1														8.8 - 25.0 FT CRETACEOUS MENEFEE
INVESTIGATIONS.							21.3	68.4	10.3	NA	NP	2.6	SM	10/34/50	(GW)s	FORMATION
DRILL EQUIPMENT: TRACK MOUNTED CME 850.														ļ	-	8.8 - 10.8 FT CLAYSTONE: VERY INTENSELY
	-	4														WEATHERED (W8), VERY SOFT (H7), GREY IN COLOR, IRON OXIDE STAINING; SAMPLE FELL
DRILL METHOD: 0.0 - 8.9 FT 4 1/4" HSA AND DRY CORE																APART IN CORE BARREL, NO VISIBLE STRUCTURE.
SYSTEM WITH SPTs. 8.9- 25.0 FT HQ3 WIRELINE CORING	-	-														10.8 - 13.8 FT SANDSTONE: INTENSELY TO
SYSTEM WITH A 3' SPLIT TUBE			_												6039.2	MODERATELY WEATHERED (W6), SOFT (H6),
SAMPLER AND DIAMOND SURFACE- SET BIT.	-	1														FINE GRAINED, MODERATELY BEDDED, LIGHT BROWN IN COLOR. THIN CLAYSTONE
	10-	1			7	8									CLST	INTERBED 15.4 TO 15.5 FT.
CASING RECORD:															6041.2	13.8 - 14.2 FT CLAYSTONE: VERY INTENSELY WEATHERED (W8), VERY SOFT (H7), GREY IN
NONE USED.	-	-													0041.2	COLOR, IRON OXIDE STAINING, THINLY BEDDED.
DRILLING MEDIUM: 0.0 - 8.9 FT NONE USED.																
8.9 - 25.0 FT WATER.	-	1														14.2 - 15.1 FT SANDSTONE: INTENSELY TO MODERATELY WEATHERED (W6), SOFT (H6),
HOLE COMPLETION: HOLE			90	17	6	6									SS	FINE GRAINED, MODERATELY BEDDED, LIGHT BROWN IN COLOR.
BACKFILLED WITH CUTTINGS AND BENTONITE.	-	1			Ŭ	ľ									00	15.1 - 15.5 FT CLAYSTONE: VERY INTENSELY
BENTONTE.	-	4														WEATHERED (W8), VERY SOFT (H7), GREY IN COLOR, IRON OXIDE STAINING, THINLY
																BEDDED.
	15-	+			7	8	-								6045.5	15.5 - 25.0 SANDSTONE: MODERATELY
						0									0049:9	 WEATHERED (W5), MODERATELY SOFT (H5), FINE GRAINED, MODERATELY BEDDED, LIGHT
	-	1														BROWN IN COLOR, BECOMES BROWNISH ORANGE WITH IRON OXIDE STAINING BELOW
	_	Kmf														17.6 FT. CORE SEPARATES ALONG BEDDING PLANES.
			98	26												STRATIGRAPHY:
	-	-														0.0 - 8.8 FT: QUATERNARY ALLUVIUM (Qal)
																8.8 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	-	1														ABBREVIATIONS: WLNE = WATER LEVEL
	20-															NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	20				6	6									SS	
	-	-					1									
	-	1														
		1	92	32			1									
		1					1									
	-	4														
	25-								<u> </u>					L	6055.4	

BOTTOM OF HOLE

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND"CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G17

			G	EOI	LOG					RILL	HOI	E N	Ю. Г	OHR9-	15-16	SHEET 1 OF 1
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/23/15 FINISHED: 10/24 DEPTH AND ELEVATION OF WATER DATE MEASURED:		L: WLI	NE			COO TOTA	RDIN/	PTH:	N 1,		2.0 E	2,479	440.2			STATE: NM GROUND ELEVATION: 6062.9 ft. ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT
NOTES	DEPTH	GEOLOGIC SYMBOL	% CORE RECOVERY	% RQD	HARDNESS	WEATHERING	% FINES	LAE GNPS %	% GRAVEL	TORY	PLASTICITY DAT		LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	VISUAL CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED	-	Qal													(SP-SM)	0.0 - 2.5 FT QUATERNARY ALLUVIUM (Qai) 0.0 - 2.5 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND, TRACE COARSE GRAVEL; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE, COARSE
IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	-	-	68	0	3	3									6060.4	GRAVEL: BROWN IN COLOR; MOIST. 2.5 - 25.0 FT CRETACEOUS MENEFEE FORMATION 2.5 - 4.6 FT SANDSTONE: FINE GRAINED, GREY
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—				7	8	-									IN COLOR, SLIGHTLY WEATHERED (W3), HARD (H3), INTENSELY FRACTURED (FD7), CONJUGATE FRACTURES, IRON OXIDE STAINING ALONG FRACTURES SURFACES, THINLY TO MODERATELY BEDDED.
DRILL EQUIPMENT: TRACK MOUNTED CME 850. DRILL METHOD: 0.0 - 2.5 FT 4 1/4" HSA WITH PILOT BIT 2.5 - 25.0 FT HQ3 WIRELINE CORING	-		80	0	6	6										4.6 - 5.0 FT CLAYSTONE: VERY INTENSELY WEATHERED (W8), VERY SOFT (H7), GREY IN COLOR, IRON OXIDE STAINING, THINLY BEDDED. 5.0 - 8.3 FT SANDSTONE: FINE GRAINED,
SYSTEM WITH A 3' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT. CASING RECORD:	-	-			7	7	-									INTENSELY TO MODERATELY WEATHERED (W6), SOFT (H6), FINE GRAINED, MODERATELY BEDDED, LIGHT BROWN IN COLOR, NO REACTION WITH HCI. 8.3 - 9.3 FT CLAYSTONE: VERY INTENSELY
NONE USED. DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.	10—															WEATHERED (W8), VERY SOFT (H7), GREY IN COLOR, IRON OXIDE STAINING, SANDY, VISIBLE ORGANIC MATERIAL, MODERATELY BEDDED.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	Kmf	100	68												JOINT: DEPTH INCL R M T HL INFILLING 8.3 10 5 4 3 ORGANIC MATTER. 9.3 - 25.0 FT SANDSTONE: FINE GRAINED, INTENSELY TO MODERATELY WEATHERED (W6), SOFT (H6), MODERATELY BEDDED, LIGHT BROWN IN COLOR, NO REACTION WITH HCI.
	15 - -				6	6										STRATIGRAPHY: 0.0 - 2.5 FT: QUATERNARY ALLUVIUM (Qal) 2.5 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf) ABBREVIATIONS: WLNE = WATER LEVEL NOT
	-	-	98	48												ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	20—		42	0												
	- - -															
	25							BOTTO	OM OF	HOLE						

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND"CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G18

G19 SHEET 1 OF 1

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-17

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/26/15 FINISHED: 10/26/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED:

PROJECT: NGWSP COORDINATES: N 1,769,729.9 E 2,477,629.6 TOTAL DEPTH: 26.5 DEPTH TO BEDROCK: BNE

STATE: NM GROUND ELEVATION: 6044.6 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT

		'ERY		LABC	DRAT	ORYI	DATA		, <u>≻</u> Z	Ŀ		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_												0.0 - 26.5 FT QUATERNARY ALLUVIUM (Qal) 0.0 - 4.5 FT CLAYEY SAND (SC): ABOUT 80%
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	-										SC	FINE SAND: ABOUT 20% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, SLOW DILATANCY AND LOW TOUGHNESS; BROWNISH RED IN COLOR; MAXIMUM SIZE,
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	-												FINE SAND. 4.5 - 7.4 FT POORLY GRADED SAND WITH SILT
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-										-	6040.1	(SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; MOIST.
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	32	34.3	66.7	0	NA	NP	3.3	SM	3/4/3		(SP-SM)	7.4 - 8.7 CLAYEY SAND (SC): ABOUT 80% FINE SAND: ABOUT 20% FINES WITH LOW PLASTICITY. LOW DRY STRENGTH. SLOW
DRILL METHOD: 0.0 - 26.5 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-											6037.2	DILATANCY AND LOW TOUGHNESS; BROWNISH RED IN COLOR; MAXIMUM SIZE, FINE SAND.
CASING RECORD: NONE USED.		60	54.4	45.6	0	31.8	19.5	7.4	s(CL)	6/7/7		SC 6035.9	8.7 - 14.7 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT
DRILLING MEDIUM: 0.0 - 26.5 FT NONE USED.	10-												10% NONPLASTIC FINES WITH RAPID DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	44	35.1	64.9	0	NA	NP	3	SM	3/5/6			COLOR; DRY, CALCAREOUS ZONE FROM 11.8 TO 12.0 FT.
	-											(SP-SM)	14.7 - 17.0 FT CLAYEY SAND (SC): ABOUT 80% FINE SAND: ABOUT 20% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, SLOW DILATANCY AND LOW TOUGHNESS;
	-	-	49.5	50.5	o	22.0	1.2	4.3	SM	5/4/5	Qal		BROWNISH RED IN COLOR; MAXIMUM SIZE, FINE SAND.
	-	50										6029.9	17.0 - 17.5 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID
	15-	40	83	17	0	40.4	24.6	6.4	(CL)s	3/4/3	-	SC	DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; DRY.
	-											6027.6 (SP-SM) _{27.1}	17.5 - 19.0 FT POORLY GRADED SAND (SP): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY
	-	100	35.4	64.6	0	NA	NP	3.5	SM	5/6/6		SP	AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; DRY.
	-	100										6025.6	19.0 - 26.5 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID
	20-	-	60.3	39.7	0	24.1	2.4	4.9	s(ML)	5/6/6	1		DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; MOIST.
	-	64											STRATIGRAPHY: 0.0 - 25.6 FT: QUATERNARY ALLUVIUM (Qal)
	-											(SP-SM)	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
		1											
	25-												

COMMENTS:

G20 SHEET 1 OF 1

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-18

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/23/15 FINISHED: 10/23/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED:

PROJECT: NGWSP COORDINATES: N 1,765,078.6 E 2,475,667.7 TOTAL DEPTH: 26.5 DEPTH TO BEDROCK: BNE

STATE: NM GROUND ELEVATION: 6047.6 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER

AND DATE MEASURED:	VLL.				DI				. DINE				REVIEWED BY: J. GILBERT
		/ERY		LABC	RAT	ORYI	DATA		×Z	FT		z	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 26.5 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW	-	NR											0.0 - 12.5 FT CLAYEY SAND (SC): ABOUT 85 % FINE SAND; ABOUT 15% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY; GREY IN COLOR; WEAK CEMENTATION.
DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	-												12.5 - 14.2 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-												DILATANCY, AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; DRY.
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	44	79.1	20.9	0	41.5	26.2	7	(CL)s	2/3/4		sc	14.2 - 16.0 FT CLAYEY SAND (SC): ABOUT 85 % FINE SAND; ABOUT 15% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, LOW
DRILL METHOD: 0.0 - 26.5 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.		<u> </u>									-		TOUGHNESS AND SLOW DILATANCY; GREY IN COLOR; LOOSE CONSISTENCY. 16.0 - 18.0 FT POORLY GRADED SAND WITH
CASING RECORD: NONE USED.	-	48	53.7	46.3	0	46.1	30.6	9.6	s(CL)	4/6/7	-		SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND LOW DRY STRENGTH;
DRILLING MEDIUM: 0.0 - 26.5 FT NONE USED.	10-										-		MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; DRY.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	60	72	28	0	28.8	11.0	7	(CL)s	4/6/8			18.0 - 26.5 FT CLAYEY SAND (SC): ABOUT 85 % FINE SAND; ABOUT 15% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY; GREY IN
	-										-	6035.1	COLOR; WEAK CEMENTATION.
	-	96	33.2	66.8	0	23.2	5.4	5.3	SC-SM	7/10/11	Qal	(SP-SM) 6033.4	STRATIGRAPHY: 0.0 - 26.5 FT: QUATERNARY ALLUVIUM (Qal)
	15—										-	sc	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-	100	80.6	19.4	0	47.8	34	7.3	(CL)s	9/11/12	-	6031.6	
	-	<u> </u>									-	(SP-SM)	
	-	100	80.2	19.8	0	88	72.1	6.2	(CH)s	6/7/9		6029.6	
	20-												
	-		47.1	52.9	0	22.2	2.0	4.5	SM	6/7/9			
	-	26										sc	
	-												
	25-												
			52.7	47.3	0	21.5	2.3	6.3	s(ML)	5/8/9		6021.1	
						E		MOFH	IULE				

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 10/25/15 FINISHED: 10/25/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 10/25/2015

PROJECT: NGWSP COORDINATES: N 1,761,055.6 E 2,473,622.9 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: BNE

SHEET 1 OF 1

G21

STATE: NM GROUND ELEVATION: 6067.4 ANGLE FROM HORIZONTAL: -90 HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT

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		ΈRΥ		LABO	ORAT	ORYI	DATA		, ∠Z	E		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 25.0 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	NR										SP-SM	0.0 - 5.0 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT 10% NONPLASTIC FINES WITH RAPID DILATANCY, AND NO DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; DRY.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	-												5.0 - 7.0 FT CLAYEY SAND (SC): ABOUT 60 % FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH,
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5-											6072.4	MEDIUM TOUGHNESS AND NO DILATANCY; MAXIMUM SIZE, FINE SAND; GRAY IN COLOR.
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	26	69.8	30.2	0	49	25.2	10.7	s(CL)	4/3/4		sc	7.0 - 8.0 FT LEAN CLAY WITH SAND (CL)s: ABOUT 75% FINES WITH MEDIUM TO HIGH PLASTICITY, MEDIUM TO HIGH TOUGHNESS AND MEDIUM TO HIGH DRY STRENGTH;
DRILL METHOD: 0.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-											6074.4	ABOUT 25% FINE SAND; GREY IN COLOR. 8.0 - 15.0 FT CLAYEY SAND (SC): ABOUT 60 %
CASING RECORD: NONE USED.	-		93.2	6.8	0	66	35.8	10.6	сн	7/8/8		(CL)s 6075.4	FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS AND NO DILATANCY;
DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.	-	44											GREY IN COLOR. 15.0 - 16.4 FT POORLY GRADED SAND (SP):
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	10-	84	78	22	0	39.6	19.2	11.3	(CL)s	7/7/5			ABOUT 95% FINE SAND; ABOUT 5% NONPLASTIC FINES WITH RAPID DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; WEAK CMENTATION; DRY.
	-	04										SC	16.4 - 17.5 FT CLAYEY SAND (SC): ABOUT 60 % FINE SAND; ABOUT 40% FINES WITH MEDIUM
	-		82.5	17.5	0	30.8	12.4	5.2	(CL)s	5/7/9	Qal		PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS AND NO DILATANCY; GREY IN COLOR.
	-	28										6082.4	17.5 - 19.5 FT POORLY GRADED SAND (SP): ABOUT 95% FINE SAND; ABOUT 5% NONPLASTIC FINES WITH RAPID DILATANCY
	15—		17.7	82.3	0	NA	NP	2.2	SM	3/5/5		SP	AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; WEAK CMENTATION; DRY.
	-	48										6083.8 SC	19.5 - 21.4 FT CLAYEY SAND (SC): ABOUT 60 % FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH,
	-	-	25.7	74.3	0	NA	NP	3.6	SM	7/7/8		6084.9	MEDIUM TOUGHNESS AND NO DILATANCY; GREY IN COLOR.
	-	60		1 1.0				0.0				SP 6086.9	21.4 - 24.6 FT LEAN CLAY WITH SAND (CL)s: ABOUT 75% FINES WITH MEDIUM TO HIGH PLASTICITY, MEDIUM TO HIGH TOUGHNESS
	20-												AND MEDIUM TO HIGH DRY STRENGTH; ABOUT 25% FINE SAND; GREY IN COLOR.
	-	-	80.1 45	19.9 55	0	56.8 29.3	30.1 14.7	10.5 5.0	(CH)s SC	7/7/8		SC 6088.8	24.6 - 25.0 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT
	-	01										0000.0	10% NONPLASTIC FINES WITH RAPID DILATANCY AND LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; WEAK CEMENTATION; DRY.
	-	84										(CL)s	STRATIGRAPHY: 0.0 - 25.0 FT. QUATERNARY ALLUVIUM (Qal)
	-25-												ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
1	-0					E	OTTO	M OF F	HOLE				

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-20 PROJECT: NGWSP

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/20/15 FINISHED: 11/20/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/20/2015

COORDINATES: N 1,753,655.6 E 2,469,860.6 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: 13.3

SHEET 1 OF 1

G22

STATE: NM GROUND ELEVATION: 6075.8 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: C. BEYER

AND DATE MEASURED. 11/20/2013													REVIEWED BT. C. BETER
		ERY		LABC	RAT	ORYI	DATA		Z	FT		NG /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.51	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 13.3 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW DRILLER: KYLE KILLEBREW	-	0											0.0 - 10.5 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY, TRACE OF COARSE SAND; MAXIMUM SIZE, COARSE SAND; LIGHT BROWN IN COLOR; NO REACTION WITH HCI.
HELPERS, JOE PROCTOR, BRANDON	_												10.5 - 13.3 FT SILTY SAND (SM): ABOUT 80% FINE SAND, MAXIMUM SIZE, FINE SAND;
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	100	40.3	57.6	2.1	25.2	10.8	7.4	SC	5/9/12		SC	HINE SAND, WAANDUN SLEE, FINE SAND, ABOUT 20%FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-												13.3 - 25.0 FT CRETACEOUS MENEFEE FORMATION (Kmf)
DRILL METHOD: 0.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	_	64	50.4	49.6	0	31.0	18.0	6.3	s(CL)	11/15/15	Qal		13.3 - 18.1 FT CLAYSTONE: GREY IN COLOR, VERY SOFT (H7), MODERATELY TO INTENESELY WEATHERED (W6),
CASING RECORD: NONE USED.													INTERMITTENT IRON OXIDE STAINING, THINLY TO MODERATELY BEDDED, VISIBLE ORGANIC MATERIAL.
DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.	- 10-	100	39.9	60.1	0	31.8	15.9	6.3	SC	16/30/48			18.1 - 20.4 FT SANDSTONE: MODERATELY TO SLIGHTLY WEATHERED (W4), SOFT (H6), TAN IN COLOR; NO REACTION WITH HCI.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	_											6065.3	20.4 - 25.0 FT CLAYSTONE: GREY IN COLOR,
	_	48	27.9	72.1	0	N/A	N/P	6.7	SM	27/48/35		SM	VERY SOFT (H7), MODERATELY TO INTENESELY WEATHERED (W6), INTERMITTENT IRON OXIDE STAINING, THINLY TO MODERATELY BEDDED, VISIBLE ORGANIC MATERIAL.
	-	-										6062.5	STRATIGRAPHY:
	_		95.0	5.0	0	82.5	61.3	7.7	сн	8/18/24			0.0 - 13.3 FT: QUATERNARY ALLUVIUM (Qal) 13.3 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	15—	100										CLSTN	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	_	100	96.2	3.8	0	84.1	63.3	15.4	сн	13/32/41			
	-	-										6057.7	
	-		85.1	14.9	0	54.5	38.6	7.4	сн	30/22/41	Kmf	SS	
	20—											6055.4	
	-												
	-	88										CLSTN	
												6050.8	
						E	οττοι	M OF H	IOLE				

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-21 PROJECT: NGWSP

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/20/15 FINISHED: 11/20/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/20/2015

COORDINATES: N 1,745,756.3 E 2,465,051.6 TOTAL DEPTH: 25.7 DEPTH TO BEDROCK: 10.7

SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 6102.6 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

AND DATE MEASURED: 11/20/2015	5												REVIEWED BY: P. GARDNER
		ERY		LABC	ORAT	ORYI	DATA		、z	L.		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	ΓΙΔΟΙΡ ΓΙΜΙΤ	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 10.7 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW DRILLER: KYLE KILLEBREW	-												0.0 - 6.8 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICTY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY; TRACE COARSE SAND AND FINE GRAVEL; MAXIMUM SIZE, FINE GRAVEL; BROWN IN COLOR: NO REACTION WITH HCI.
HELPERS; JOE PROCTOR, BRANDON LANE	-		53.0	47.0	0	31.3	19.1	7.6	s(CL)	5/7/8		SC	6.8 - 10.7 FT POORLY GRADED SAND WITH SILT (SP-SM): ABOUT 90% FINE SAND; ABOUT
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	56									Qal		10% NONPLASTIC FINES WITH RAPID DILATANCY AND LOW DRY STRENGTH; GREYISH BROWN IN COLOR; LOOSE CONSISTANCY: STRONG REACTION WITH HCI
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-		20.8	79.2	0	NP	NP	4.1	ѕм	9/22/48		6095.8	ON CALICHE.
DRILL METHOD: 0.0 - 25.7 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-	64									-		FORMATION (Kmf) 10.7 - 25.7 FT SANDSTONE: VERY INTENSELY
CASING RECORD: NONE USED.	-		25.5	74.5	0	24.6	5.5	5.7	SC-SM	19/29/47		SP-SM	WEATHERED TO DECOMPOSED (W8-W9), VERY SOFT TO SOFT (H6-H7), TAN IN COLOR, BREAKS WITH MODERATE HAMMER BLOW; NO REACTION WITH HCI.
DRILLING MEDIUM: 0.0 - 25.7 FT NONE USED.	10—	96									-		STRATIGRAPHY: 0.0 - 10.7 FT: QUATERNARY ALLUVIUM (Qal)
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-		19.3	80.7	0	NA	NA	3.0	NA	REFUSAL		6091.9	10.7-25.7 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	-	100									-		ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-												
	15— _ _	100											
	-		-								Kmf	SS	
		100											
	-	100											
	25—							M OF F				6076.9	
						B			IULE				

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/21/15 FINISHED: 11/21/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/21/2015

PROJECT: NGWSP COORDINATES: N 1,742,939.9 E 2,463,046.9 TOTAL DEPTH: 26.0 DEPTH TO BEDROCK: 0.2

G24

STATE: NM GROUND ELEVATION: 6140.5 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

AND DATE MEASURED: 11/21/2015	5												REVIEWED BY: P. GARDNER
		ERY		LABC	ORAT	ORYI	ΟΑΤΑ		Ţ	FT		z	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 F	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME											Qal	SM 6140.3	0.0 - 0.2 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	-											0.0 - 0.2 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; LOW DRY STRENGTH, DRY, TAN IN COLOR, NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; KYLE KILLEBREW HELPERS; JOE PROCTOR, BRANDON LANE	-										-		0.2 - 26.0 FT CRETACEOUS MENEFEE FORMATION (Kmf)
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	36	30.4	69.6	0	21.3	7.9	3.9	SC	6/7/7	-		0.2 - 21.9 FT CLAYSTONE: GREY IN COLOR, VERY SOFT (H7), MODERATELY TO INTENESELY WEATHERED (W6), INTERMITTENT IRON OXIDE STAINING, THINLY TO MODERATELY DEDED IN CIPIE FOR ONLY
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-												TO MODERATELY BEDDED, VISIBLE ORGANIC MATERIAL.
DRILL METHOD: 0.0 - 16.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-	32	98.7	1.3	0	67.7	39.5	16.3	СН	10/12/18	-		JOINT MEASUREMENTS: DEPTH INCL R W O T HL INFILLING 19.8 45 4 2 5 FeOX
16.0 - 26.0 HQ WIRELINE CORING SYSTEM WITH SPLIT SPOON SAMPLER													21.9 - 26.0 FT SILTSTONE: LIGHT GREY IN
CASING RECORD: NONE USED.	10-	68	98.3	1.7	0	60.9	36.3	15.5	СН	10/23/24	-		COLOR, MODERATELY HARD (H4) MODERATELY TO SLIGHTLY WEATHERED (W4), NON FISSILE, NO REACTION WITH HCI.
DRILLING MEDIUM: 0.0 - 16.0 FT NONE USED. 16.0 - 26.0 FT WATER.	-										-	CLSTNE	STRATIGRAPHY: 0.0 - 0.2 FT: QUATERNARY ALLUVIUM (Qal) 0.2 - 26.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	96	93.7	6.3	0	53.4	30.7	11.9	СН	12/26/29			ABBREVIATIONS: WLNE = WATER LEVEL NOT
	-	-									Kmf		ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
		-	94.3	5.7	0	50.6	25.4	13.7	сн з	0/REFUSAL	+		
	-		-										
	-	-											
	-	100											
	20—	-											
	-											6118.6	
	_	94										SLSTNE	
	25—												
						В	 юттоі	M OF H	IOLE			6114.5	

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 9 PIPELINE BEGUN: 11/21/15 FINISHED: 11/21/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 11/21/2015

PROJECT: NGWSP COORDINATES: N 1,739,271.1 E 2,460,822.8 TOTAL DEPTH: 28.2 DEPTH TO BEDROCK: BNE

G25

STATE: NM GROUND ELEVATION: 6151.5 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDNER

	-												
		ΈRΥ		LABC	ORAT	ORY	DATA		、z	FT		z /	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 F	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_												0.0 - 28.2 FT QUATERNARY ALLUVIUM (Qal) 0.0 - 19.2 FT SILTY SAND (SM): ABOUT 80%
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	-											FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; KYLE KILLEBREW HELPERS; JOE PROCTOR, BRANDON LANE	-	44	56.3	43.7	0	27.4	12.9	7.0	s(CL)	3/4/6			19.2 - 23.2 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	-											DILATANCY; MAXIMUM SIZE, FINE SAND; BROWN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85. DRILL METHOD:	-	- 28	23.5	76.5	0	NA	N/P	3.2	SM	3/5/5			23.2 - 24.7 FT SILTY SAND SM: ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; LOW DRY STRENGTH, DRY, TAN IN COLOR; NO REACTION WITH HCI.
0.0 - 28.2 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-		34.1	65.9	0	N/A	N/P	3.7	SM	2/3/5			24.7 -28.2 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40%
DRILLING MEDIUM: 0.0 - 28.2 FT NONE USED.	10—	60									-	SM	FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY; TRACE COARSE SAND AND FINE GRAVEL; MAXIMUM SIZE, FINE GRAVEL;
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	_	36	33.2	66.8	0	21.2	6.0	3.3	SC-SM	6/7/6			BROWN IN COLOR; NO REACTION WITH HCI. STRATIGRAPHY: 0.0 - 28.2 FT: QUATERNARY ALLUVIUM (Qal)
	-												ABBREVIATIONS: WLNE = WATER LEVEL NOT
	-		63.5	36.5	0	30.7	12.5	6.5	s(CL)	4/7/7	Qal		ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	15—	36											
	-												
	-		83.8	16.2	0	44.0	25.6	6.9	(CL)0	4/7/6			
	20-		83.8	16.2	0	44.0	25.6	6.9	(CL)s	4/7/6		6132.3	
	-	78										sc	
	-	-											
												6128.3 SM	
	25-											6126.8	
	-	96										sc	
												6123.3	
						E	вотто	VI UF F	IULE				

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. DHR9-15-24 SHEET 1 OF 1 PROJECT: NGWSP FEATURE: REACH 9, 10 AND 11 STATE: NM LOCATION: REACH 9 PIPELINE COORDINATES: N 1,737,168.1 E 2,459,296.5 GROUND ELEVATION: 6164.1 BEGUN: 11/22/15 FINISHED: 11/22/15 TOTAL DEPTH: 25.0 ANGLE FROM HORIZONTAL: DEPTH AND ELEVATION OF WATER LEVEL: WLNE DEPTH TO BEDROCK: BNE HOLE LOGGED BY: J. GILBERT AND DATE MEASURED: 11/22/2015 REVIEWED BY: P. GARDNER LABORATORY DATA RECOVERY LABORATORY CLASSIFICATION -OWS / 0.5 FT VISUAL CLASSIFICATION GEOLOGIC UNIT SYMBOL Ξ PLASTICITY INDEX MOISTURE ELEVATION NOTES -IQUID LIM DEP. % **GRAVEI** PHYSICAL CONDITION FINES SAND % CORE Ы % % ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED DILATANCY; TRACE OF COARSE SAND AND

21.1

26.1

8.2

43.1

9.0

73.6 26.4 0 37.5

38.4 61.6 0 N/A N/P 3.4

48.3

81.9 18.1 0 33.8 16.6 5.8

78.8

51.7

21.2 0

21.0 79.0

0 37.1 20.6

0 23.9 2.8 4.9

72

24

32 10

40

28

32

31.7 68.3 0 20.4 2.0 4.2 SM

15

20

5

(CL)s

SM

SM

(CL)s

(CL)s

(CL)s

6.4

4/8/6

4/5/6

4/5/4

4/5/6

4/6/6

5/6/7

10/10/10

DRILLED BY: U.C. REGION DRILL CREW DRILLER: KYLE KILLEBREW HELPERS; JOE PROCTOR, BRANDON LANE

PURPOSE PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.

DRILL FOUIPMENT TRUCK MOUNTED CME 85.

DRILL METHOD: 0.0 - 25.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.

DRILLING MEDIUM: 0.0 - 25.0 FT NONE USED.

HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.

CLASSIFICATION AND

0.0 - 25.0 FT QUATERNARY ALLUVIUM (Qal) 0.0 - 6.0 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH. LOW TOUGHNESS AND SLOW

SC

SM

SC

6139.1

Qal

6158.1

6150.7

FINE GRAVEL; MAXIMUM SIZE, FINE GRAVEL; BROWN IN COLOR: NO REACTION WITH HCL 6.0 - 13.4 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; LOW DRY STRENGTH, DRY, TAN IN COLOR; NO REACTION WITH HCI.

13.4 - 25.0 FT CLAYEY SAND (SC): ABOUT 60% PREDOMINATELY FINE SAND; ABOUT 40% FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND SLOW DILATANCY; TRACE OF COARSE SAND AND FINE GRAVEL; MAXIMUM SIZE, FINE GRAVEL; BROWN IN COLOR; NO REACTION WITH HCI.

STRATIGRAPHY: 0.0 - 25.0 FT: QUATERNARY ALLUVIUM (Qal)

ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.

BOTTOM OF HOLE

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED

GEOLOGIC LOG OF DRILL HOLE NO. DHR10-15-1 PROJECT: NGWSP STATE: NM

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 10 PIPELINE BEGUN: 8/12/15 FINISHED: 8/12/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 8/12/2015

COORDINATES: N 1,731,412.4 E 2,455,713.3 TOTAL DEPTH: 25.0 DEPTH TO BEDROCK: 19.5

SHEET 1 OF 1 GROUND ELEVATION: 6190.3

ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: C. BEYER

		/ERY		LABC	DRAT	ORY	DATA		, <u>≻</u> 2	ET		z /	1
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	_												0.0 - 19.5 FT QUATERNARY ALLUVIUM (Qal) 0.0 - 4.3 FT SILTY SAND (SM): ABOUT 80%
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_											SM	PREDOMINATELY FINE TO MEDIUM SAND; ABOUT 20% NONPLASTIC FINES, LOW DRY STRENGTH AND RAPID DILATANCY; MAXIMUM SIZE, MEDIUM SAND; DRY, BROWN TO GREY
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JEFF VAN AUSDAL HELPERS; JOE PROCTOR; BRIAN HART.	-										-		IN COLOR; NO REACTION WITH HCI. 4.3 - 19.5 FT CLAYEY SAND (SC): ABOUT 60%
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.		100	37.7	62.3	0	22.3	5.7	4.4	SC-SM	11/13/11		6186.0	FINE SAND; ABOUT 40% MEDIUM PLASTIC FINES, NO DILATANCY, MEDIUM DRY STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-										-		19.5 - 25.0 FT CRETACEOUS MENEFEE FORMATION (Kmf)
DRILL METHOD: 0-17.1 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS. 17.1 - 25.0 FT HQ3 WIRELINE CORING SYSTEM WITH A 5" SPLLT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	-	80	49.7	50.3	0	26.9	13.7	5.8	SC	16/34/47			19.5 - 25.0 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY WEATHERED (W4), VERY SOFT (H7), FeOx STAINING ALONG FRACTURES; NO REACTION WITH HCI.
CASING RECORD: NONE USED.	-	100	43.9	56.1	0	26.8	13.6	6.5	sc	16/22/24	Qal		STRATIGRAPHY: 0.0 - 19.5 FT: QUATERNARY ALLUVIUM (Qal)
DRILLING MEDIUM: 0.0 - 17.1 FT NONE. 17.1 - 25.0 FT WATER.	10—												19.5 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	_	100	43.6	56.4	0	26.9	13.8	6.6	SC	19/25/21		SC	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-												
	- 15-	100	82.5	17.5	0	55.9	40.1	7.5	(CH)s	11/21/29			
	-	100	83.9	16.1	0	41.0	23.0	6.2	(CL)s 2	0/REFUSAL	-		
	-												
	20-											6170.8	-
		100											
	-										Kmf	CLAYSTON	E
	-	100											
	-25					 E	 30TT0	M OF F	IOLE			6165.3]

COMMENTS:

																G28
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 10 PIPELINE BEGUN: 10/22/15 FINISHED: 10/2 DEPTH AND ELEVATION OF WATER DATE MEASURED:		L: WL		EO	LOG	PRO. COOI TOTA	JECT: RDIN/ AL DE	G OF NGW ATES: PTH: DBEDR	VSP N 1,7 25.0	729,236				DHR10	-15-2	SHEET 1 OF 1 STATE: NM GROUND ELEVATION: 6214.8 ft. ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT
		gol	ΞRΥ					LAE	BORA	TORY	DAT/	A	、 Z	L	z	
NOTES	DEPTH	GEOLOGIC SYMBOL	% CORE RECOVERY	% RQD	HARDNESS	WEATHERING	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE	_															0.0 - 5.2 FT QUATERNARY ALLUVIUM (Qal) 0.0 - 5.2 FT CLAYEY SAND (SC): ABOUT 85%
DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-	Qal													SC	PREDOMINATELY FINE SAND, TRACE FINE TO COARSE SAND; ABOUT 15% FINES WITH LOW PLASTICITY, LOW DRY STRENGTH LOW TOUGHNESS AND SLOW DILATANCY; MAXIMUM SIZE, COARSE SAND; BROWNISH RED IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	_															5.2 - 25.0 FT CRETACEOUS MENEFEE FORMATION
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	 	-				-								6209.6	5.2 - 25.0 FT SANDSTONE: FINE GRAINED, BROWNISH TAN IN COLOR, MODERATELY BEDDED, SOFT (H6) AND INTENSELY WEATHERED (W7) FROM 5.2 TO 8.2 FT, NO
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-	-			6	7	19.6	80.4	0.0	NA	NP	2.1	SM	12/32/19		REACTION WITH HCI. BECOMES MODERATELY SOFT (H5) AND MODERATELY WEATHERED (W5) BELOW 8.2 FT. CORE SEPARATES ALONG BEDDING PLANES. GRAYISH BROWN
DRILL METHOD: 0.0 - 5.0 FT 4 1/4" HSA WITH PILOT BIT. 5.0 - 8.9 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS. 8.9 - 25.0 FT HQ3 WIRELINE CORING	-	-					-									IN COLOR, CARBONACEOUS, MICACEOUS AND STAINED WITH IRON OXIDE BELOW 15.0 FT. CLAYSTONE INTERBED FROM 16.9 TO 17.0 FT. CLAYSTONE IS SOFT (H6) AND MODERATELY WEATHERED (W5), SANDSTONE CONTAINS
SYSTEM WITH A 3' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	-	-	90	40												SUBROUNDED CLAYSTONE RIPUP CLASTS 3mm IN DIAMETER FROM 23.0 TO 23.5 FT.
CASING RECORD:	10—	-			1											STRATIGRAPHY: 0.0 - 5.2 FT: QUATERNARY ALLUVIUM (Qal) 5.2 - 25.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
NONE USED. DRILLING MEDIUM: 0.0 - 8.9 FT NONE USED. 8.9 - 25.0 FT WATER. HOLE COMPLETION: HOLE	-	-	100	14												ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED 1.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
BACKFILLED WITH CUTTINGS AND BENTONITE.	-	-														
	15—	Kmf			-										SS	
	 	-	88	52	5	7										
	-	-	100	56												
	25-							BOTTO							6189.8	
								50110		IJLE						

COMMENTS:

G29 SHEET 1 OF 1

FEATURE: REACH 9, 10 AND 11
LOCATION: REACH 10 PIPELINE
BEGUN: 10/21/15 FINISHED: 10/22/15
DEPTH AND ELEVATION OF WATER LEVEL: WLNE
DATE MEASURED:

PROJECT: NGWSP COORDINATES: N 1,728,537.9 E 2,453,677.7 TOTAL DEPTH: 40.0 DEPTH TO BEDROCK: 11.1

STATE: NM GROUND ELEVATION: 6232.6 ft. ANGLE FROM HORIZONTAL: HOLE LOGGED BY: C. BEYER REVIEWED BY: J. GILBERT

		BOL	ΞRΥ			(1)		LAB	ORA	TORY	DATA	4	Z	L ⊢	Z	
NOTES	DEPTH	GEOLOGIC SYMBOL	% CORE RECOVERY	% RQD	HARDNESS	WEATHERING	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	VISUAL CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM																0.0-11.1 FT QUATERNARY ALLUVIUM (Qal)
GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED	-														SC	0.0 - 6.4 FT CLAYEY SAND (SC): ABOUT 80% PREDOMINATELY FINE SAND, TRACE FINE TO COARSE SAND AND FINE GRAVEL; ABOUT 20% FINES WITH MEDIUM PLASTICITY, LOW DRY STRENGTH, LOW TOUGHNESS AND
	-															SLOW DILATANCY; MAXIMUM SIZE, 20mm; BROWNISH RED IN COLOR; NO REACTION
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPER; RENATO MATHESON.	5-	Qal					34.7	65.3	0	21.0	2.0	4.6	SM	6/7/8	6226.2	WITH HCI. 6.4 - 11.1 FT SILTY SAND (SM): ABOUT 85% FINE SAND; ABOUT 15% NONPLASTIC FINES,
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	-						34.8	65.2	0	NA	NP	3.8	SM	6/12/16	SM	WITH RAPID DILATANCY AND LOW DRY STRENGTH; DRY, BROWN TO GREY IN COLOR MAXIMUM SIZE, FINE SAND; CALCAREOUS ZONES WITH STRONG REACTION WITH HCI, NO REACTION WITH HCI OUTSIDE
DRILL EQUIPMENT:	10—															CALCAREOUS ZONES.
TRACK MOUNTED CME 850. DRILL METHOD:	-						42.5	57.5	0	NA	NP	3.4	SM 3	0/REFUSA	L 6221.5	11.1 - 40.0 FT CRETACEOUS MENEFEE FORMATION
0.0 - 5.0 FT 4 1/4" HSA WITH PILOT BIT. 5.0 - 15.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS. 15.0 - 40.0 FT HQ3 WIRELINE CORING SYSTEM WITH A 3' SPLIT TUBE SAMPLER AND DIAMOND SURFACE-			96	41	6	6									SS	11.1 - 18.0 FT SANDSTONE: FINE GRAINED, GRAYISH BROWN IN COLOR AND MODERATELY BEDDED. SOFT (H6), AND MODERATELY TO INTENSELY WEATHERED (W6) FROM 11.1 TO 15.0 FT. MODERATELY SOFT (H5) AND MODERATELY WEATHERED (W5) WITH CARBONACEOUS PARTICLES AND
SET BIT.	-				5	5										ÎROŃ OXIDE STAINING FROM 15.0 TO 18.0 FT.
CASING RECORD: NONE USED.	-	-	76	15			_								6214.6	18.0 - 20.0 FT CLAYSTONE: GREY IN COLOR, VERY SOFT (H7), MODERATELY TO INTENSELY WEATHERED (W6), INTERMITTENT IRON OXIDE STAINING, THINLY BEDDED; CORE
DRILLING MEDIUM: 0.0 - 15.0 FT NONE USED. 15.0 - 40.0 FT WATER.	20-				7	6									CLST 6212.6	STICKS TO SAMPLER, WASHED BY DRILL.
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-		100	48	6	6									SS 6210.1	GRAYISH BROWN IN COLOR, MODERATELY BEDDED, MODERATELY SOFT (H5), MODERATELY WEATHERED (W5), SOME CARBONACEOUS PARTICLES AND IRON OXIDE STAINING, CONJUGATE FRACTURES
																THROUGHOUT. 22.5 - 35.5 FT CLAYSTONE: GREY IN COLOR,
	25— — —	Kmf	96	75												VERY SOFT (H7), MODERATELY TO INTENSEL' WEATHERED (W6), INTERMITTENT IRON OXIDE STAINING, THINLY TO MODERATELY BEDDED, VISIBLE ORGANIC MATERIAL, AND IRON OXIDE STAINING. CARBONACEOUS INTERBEDS FROM 32.0 TO 33.0 FT; CORE STICKS TO SAMPLER, WASHED BY DRILL.
	-				7	6									CLST	35.5 - 40.0 FT SANDSTONE: FINE GRAINED, GRAYISH BROWN IN COLOR, MODERATELY BEDDED, MODERATELY SOFT (H5) AND
	30— — —		100	100												MODERATELY WEATHERED (W5), SOME CARBONACEOUS PARTICLES AND IRON OXIDE STAINING. CORE SEPARATES ALONG BEDDING PLANES.
					-										6107.1	STRATIGRAPHY: 0.0 - 11.1 FT: QUATERNARY ALLUVIUM (Qal) 11.1 - 40.0 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	-						1								6197.1	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-		96	91	5	5									SS	
	40-							воттс	M OF	HOLE					6192.6	
								20								

COMMENTS:

G30 SHEET 1 OF 1

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 11 ROAD BORE BEGUN: 8/4/15 FINISHED: 8/4/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE DATE MEASURED: 8/4/2015

PROJECT: NGWSP COORDINATES: N 1,728,271.8 E 2,452,819.3 TOTAL DEPTH: 40.5 DEPTH TO BEDROCK: 18.0

STATE: NM GROUND ELEVATION: 6236.8 ft. ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: C.BEYER

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		BOL	ΞRΥ			0		LAB	ORA	TORY	DATA	4	, z	⊢	z	
NOTES	DEPTH	GEOLOGIC SYMBOL	% CORE RECOVERY	% RQD	HARDNESS	WEATHERING	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	VISUAL CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM																0.0-18.0 FT QUATERNARY ALLUVIUM (Qal)
GROUND SURFACE AND ARE THE SAME AS THOSE USED BY THE DRILLER.	-															0.0 - 6.9 FT SILTY SAND (SM) : ABOUT 80% FINE SAND, ABOUT 20% FINES WITH NO PLASTICITY, RAPID DILATANCY, LOW DRY STRENGTH, LOW TOUGHNESS; MAXIMUM
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_						67.3	32.7	0	28.4	11.8	5.4	s(CL)	7/11/14	SM	SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JEFF VAN AUSDAL HELPERS; JOE PROCTOR; BRIAN HART.	5						45.7	54.3	0	NA	NP	3.4	SM	15/24/21	6229.9	6.9 - 18.0 FT LEAN CLAY (CL): ABOUT 90 % FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS; ABOUT 10%, PREDOMINATELY FINE TO MEDIUM SAND; MAXIMUM SZE, MEDIUM
PURPOSE:	_															SAND; NO REACTION WITH HCI.
PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	-	Qal					60.2	39.8	0	34.5	17.8	8.4	s(CL)	14/27/34	-	18.0 - 40.5 FT CRETACEOUS MENEFEE FORMATION (Kmf)
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	10—						65.1	34.9	0	36.2	17.2	5.1	s(CL)	14/17/18	-	18.0 - 29.2 FT SANDSTONE: MODERATELY TO SLIGHTLY WEATHERED (W4), SOFT (H6), TAN IN COLOR; NO REACTION WITH HCI.
DRILL METHOD: 0- 18.0 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS.	-														CL	JOINT MEASUREMENTS: DEPTH INCL R M T HL INFILLING 27.3 90 5 4 3 FeOx
18.0 - 40.5 FT HQ3 WIRELINE CORING SYSTEM WITH A 5' SPLIT TUBE SAMPLER AND DIAMOND SURFACE-	- 15-						96.9	3.1	0	81.9	62.7	9.6	СН	10/13/14	-	28.1 90 4 4 2 FeOx
SET BIT. CASING RECORD: NONE USED.	-														6218.8	29.2 - 34.9 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY WEATHERED (W4), VERY SOFT (H7), FeOx STAINING ALONG FRACTURES; NO REACTION WITH HCI.
DRILLING MEDIUM: 0.0 - 18.0 FT NONE. 18.0 - 40.5 FT WATER.	 20		44	0										REFUSAL		DEPTH INCL R M T HL INFILLING 31.4 75 5 4 3 FeOx 31.8 80 4 4 2 FeOx 32.6 65 4 4 2 FeOx
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-															33.2 75 4 4 2 FeOx 34.9 - 40.5 FT SANDSTONE: MODERATELY TO
	-		86	80										s	ANDSTON	SLIGHTLY WEATHERED (W4), SOFT (H6), TAN IN COLOR; NO REACTION WITH HCI. E STRATIGRAPHY:
	25-															0.0 - 18.0 FT: QUATERNARY ALLUVIUM (Qal) 18.0 - 40.5 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	-		100	36												ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	- 30-	Kmf				4									6207.6	
	-															
	-		96	56										(LAYSTON	E
															6201.9	
	-															
	-		100	54										s	ANDSTON	E
	40-							BOTTO							6196.3	
							I	BUILC	JIVI UF	HULE						

COMMENTS:

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 11 PIPELINE BEGUN: 8/3/15 FINISHED: 8/3/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE DATE MEASURED: 8/3/2015

PROJECT: NGWSP COORDINATES: N 1,717,020.5 E 2,446,962.8 TOTAL DEPTH: 25.7 DEPTH TO BEDROCK: BNE

STATE: NM GROUND ELEVATION: 6303.2 ft. ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT

REVIEWED BY: C. BEYER

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NOTES	DEPTH	GE OLOGIC SYMBOL	% CORE RECOVERY	% RQD	HARDNESS	WEATHERING	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	VISUAL CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE																0.0 - 25.7 FT: QUATERNARY ALLUVIUM (Qal):
SAME AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED	-	-														0.0 - 9.1 FT SILTY SAND (SM): ABOUT 80% PREDOMINATELY FINE TO MEDIUM SAND; ABOUT 20% NONPLASTIC FINES WITH RAPID DILATANCY, LOW DRY STRENGTH; MAXIMUM
IN FEET EXCEPT WHERE NOTED. DRILLED BY: U.C. REGION DRILL CREW	_															SIZE, MEDIUM SAND; DRY, BROWN TO GREY IN COLOR, ROOTS ON TOP 1.0 FT; NO REACTION WITH HCI.
DRILLER; JEFF VAN AUSDAL HELPERS; JOE PROCTOR; BRIAN HART	-		50				39.8	60.2	0	NA	NP	4.3	SM	4/7/6		9.1 - 10.5 FT CLAYEY SAND (SC): ABOUT 60% FINE SAND; ABOUT 40% MEDIUM PLASTIC FINES, NO DILATANCY, MEDIUM DRY
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	-	52	-											SM	STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	-	-	76				53.9	46.1	0	31.0	17.0	4.5	s(CL)	4/5/6		10.5 - 16.8 FT LEAN CLAY (CL): ABOUT 90 % FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS; MAXIMUM SIZE, MEDIUM SAND; ABOUT 10%, PREDOMINATELY FINE TO MEDIUM SAND; NO
DRILL METHOD: 0.0 - 25.7 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-															REACTION WITH HCL. 16.8 - 21.2 FT SILTY SAND (SM): ABOUT 80%
CASING RECORD: NONE USED.	-	-	48				97.3	2.7	0	45.6	25.8	8.5	CL	4/5/5	6294.1 SC	PREDOMINATELY FINE SAND; ABOUT 20% NONPLASTIC FINES, WITH RAPID DILATANCY, LOW DRY STRENGTH; DRY, BROWN TO GREY IN COLOR; MAXIMUM SIZE, FINE SAND; STRONG REACTION WITH HCI.
DRILLING MEDIUM: 00 - 25.7 FT NONE.	10—			-											6292.7	21.2 - 25.7 FT CLAYEY SAND (SC): ABOUT 60% FINE TO MEDIUM SAND; ABOUT 40% MEDIUM
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-		72				97.6	2.4	0	72.6	42.7	12.7	сн	8/14/15		PLASTIC FINES, NO DILATANCY, MEDIUM DRY STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, MEDIUM SAND; TAN IN COLOR; NO REACTION WITH HCI.
	-	Qal		_												STRATIGRAPHY: 0.0 - 25.7 FT: QUATERNARY ALLUVIUM (Qal)
	- 15-		88				41.9	58.1	0	25.7	6.5	4.3	SC-SM	5/5/6	CL	ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED 1.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	_			-												
	-	_	100				49.4	50.6	0	25.1	7.2	4.4	SC	6/6/7	6286.4	
	-			-												
	-		96				97.5	2.5	0	66.6	39.7	10.7	СН	9/13/9	SM	
	20-			_											6282.0	
	-	-	96				40.7	59.3	0	NA	NP	4.2	SM	6/6/8	0202.0	
	-	-		-											SC	
	25-		80													
							 	вотто	MOF	HOLE					6277.5	

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

SHEET 1 OF 1 DRILL HOLE DHR11-15-2

G31

SHEET 1 OF 1

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 11 PIPELINE BEGUN: 10/9/15 FINISHED: 10/9/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 10/9/2015

PROJECT: NGWSP COORDINATES: N 1,717,447.3 E 2,446,870.1 TOTAL DEPTH: 29.1 DEPTH TO BEDROCK: 14.1

SHEET 1 OF 1

STATE: NM GROUND ELEVATION: 6303.1 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT REVIEWED BY: P. GARDENR

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NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 14.1 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-												0.0 - 9.5 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO PLASTICITY, LOW DRY STRENGTH, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPERS; BRANDON LANE, RANATO MATHESON	-	-										SM	9.5 - 10.1 FT CLAYEY SAND (SC): ABOUT 60% FINE SAND; ABOUT 40% MEDIUM PLASTIC FINES, NO DILATANCY, MEDIUM DRY
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5	64	44.0	54.5	1.5	24.3	6.2	4.7	SC-SM	9/8/10		Sim	STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.
DRILL EQUIPMENT: TRACK MOUNTED CME 850.	-										Qal	6203.6	10.1 - 12.6 FT FAT CLAY (CH): ABOUT 90% PLASTIC FINES WITH HIGH TOUGHNESS, HIGH DRY STRENGTH; ABOUT 10% NONPLASTIC FINES WITH NO DILATANCY; NO REACTION
DRILL METHOD: 0.0 - 14.1 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTS. 14.1 - 29.1 FT HQ3 WIRELINE CORING	-	52	48.3	51.7	0	24.2	6.1	4.9	SC-SM	7/8/9			WITH HCI. 12.6 - 14.1 FT SANDY LEAN CLAY s(CL): ABOUT 60% FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS: ABOUT 40%, PREDOMINATELY
SYSTEM WITH A 5' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	10-										-	SC 6293.0	
CASING RECORD: NONE USED.	-	96	83.8	16.2	0	39.9	20.9	11.9	(CL)s	16/21/33		сн	FINE SAND; MAXIMUM SIZE, FINE SAND; NO REACTION WITH HCI. 14.1 - 29.1 FT CRETACEOUS MENEFEE
DRILLING MEDIUM: 0.0 - 18.7 FT NONE.	-											6290.5	FORMATION (Kmf)
14.1 - 29.1 FT WATER. HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-	93	78.9	21.1	0	42.0	20.6	8.0	(CL)s	6/REFUSAL		s(CL) 6289.0	14.1 - 28.4 FT SANDSTONE: MODERATELY TO SLIGHTLY WEATHERED (W4), SOFT (H6), TAN IN COLOR; NO REACTION WITH HCI.
WITTOUTINGS AND BENTONTE.	15—	92											28.4 - 29.1 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY WEATHERED (W4), VERY SOFT (H7), FeOx STAINING THROUGHT SAMPLE, MOTTLED; NO REACTION WITH HCI.
	-	52											STRATIGRAPHY: 0.0 - 14.1 FT: QUATERNARY ALLUVIUM (Qal) 14.1 - 29.1 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
	20-	-											ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.
	-	96									Kmf	SANDSTON	Ē
	-		-										
	25-												
	-	52											
		-										6274.7 CLAYSTONE	
						B		M OF H	IULE				

COMMENTS:

ALL ANGLES MEASURED FROM CORE AXIS AT ZERO DEGREES, UNLESS OTHERWISE NOTED. THE DATA FOR THE CENTER COLUMN AND "CLASSIFICATION AND PHYSICAL CONDITIONS" COLUMN ARE BASED ON BUREAU OF RECLAMATION GEOLOGY FIELD MANUAL AND DRAWINGS TITLED FOR DESIGNS AND SPECIFICATIONS AS FOLLOWS- DRAWING NO. 40-D-6493. STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK. DRAWING NO. 40-D-6499. STANDARD DESCRIPTORS AND DESCRIPTIVE CRITERIA FOR DISCONTINUITIES.

G32

FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 11 PIPELINE BEGUN: 8/12/15 FINISHED: 8/12/15 DEPTH AND ELEVATION OF WATER LE	SHEET 1 OF 1 STATE: NM GROUND ELEVATION: 6349.5 ANGLE FROM HORIZONTAL: HOLE LOGGED BY: J. GILBERT												
AND DATE MEASURED: 8/12/2015			1			REVIEWED BY: C. BEYER							
NOTES	DEPTH	% CORE RECOVERY	% FINES	LABC DNPS %	% GRAVEL	ORY LIWIT GINDIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5 FT	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME													0.0 - 5.1 FT QUATERNARY ALLUVIUM (Qal)
AS THOSE USED BY THE DRILLER. ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	_										Qal	SM	0.0 - 5.1 FT SILTY SAND (SM): ABOUT 80% FII SAND; ABOUT 20% FINES WITH NO PLASTICITY, LOW DRY STRENGTH, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; DR TAN IN COLOR; NO REACTION WITH HCI.
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JEFF VAN AUSDAL HELPERS; JOE PROCTOR; BRIAN HART	_										Qai		5.1 - 25.7 FT CRETACEOUS MENEFEE FORMATION (Kmf)
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—	100	32.9	67.1	0	NA	NP	7.4	SM	24/REFUSAL		6344.4	5.1 - 10.5 FT SANDSTONE: SLIGHTLY WEATHERED (W3), SOFT (H6), TAN IN COLO THINLY BEDDED, FINE TO MEDIUM GRAINEE NO REACTION WITH HCI.
DRILL EQUIPMENT: TRUCK MOUNTED CME 85.	_									_			10.5 - 20.3 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY
DRILL METHOD: 0-8.7 FT 4-1/4" HSA AND DRY CORE SYSTEM WITH SPTS. 8.7 - 25.7 FT HQ3 WIRELINE CORING SYSTEM WITH A 5' SPLIT TUBE SAMPLER AND DIAMOND CUPERAGE CET DIT	_	100	31.4	68.6	0	NA	NP	3.4	SM			SANDSTON	20.3 - 25.7 FT SANDSTONE: SLIGHTLY
AND DIAMOND SURFACE- SET BIT. CASING RECORD: NONE USED.		65											WEATHERED (W3), SOFT (H6), TAN IN COLO MODERATELY BEDDED, FINE TO MEDIUM GRAINED; NO REACTION WITH HCI. STRATIGRAPHY:
DRILLING MEDIUM: 0.0 - 8.7 FT NONE USED.	_											6339.0	0.0 - 5.1 FT: QUATERNARY ALLUVIUM (Qal) 5.1 - 25.7 FT: CRETACEOUS MENEFEE FORMATION (Kmf)
3.7 - 25.7 FT WATER. HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	_												ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERE I.D. = INSIDE DIAMETER BNE = BEDROCK N
	-	92											ENCOUNTERED.
	15—										Kmf	CLAYSTONE	: :
	_												
	_												
	_	100											
	20—											6329.2	
	-												
	_	100										SANDSTON	Ξ
	 25—												
						E	 Воттоі	 M OF H	l IOLE			6323.8	

G33

SHEET 1 OF 1

STATE: NM

GROUND ELEVATION: 6374.0

HOLE LOGGED BY: J. GILBERT

ANGLE FROM HORIZONTAL:

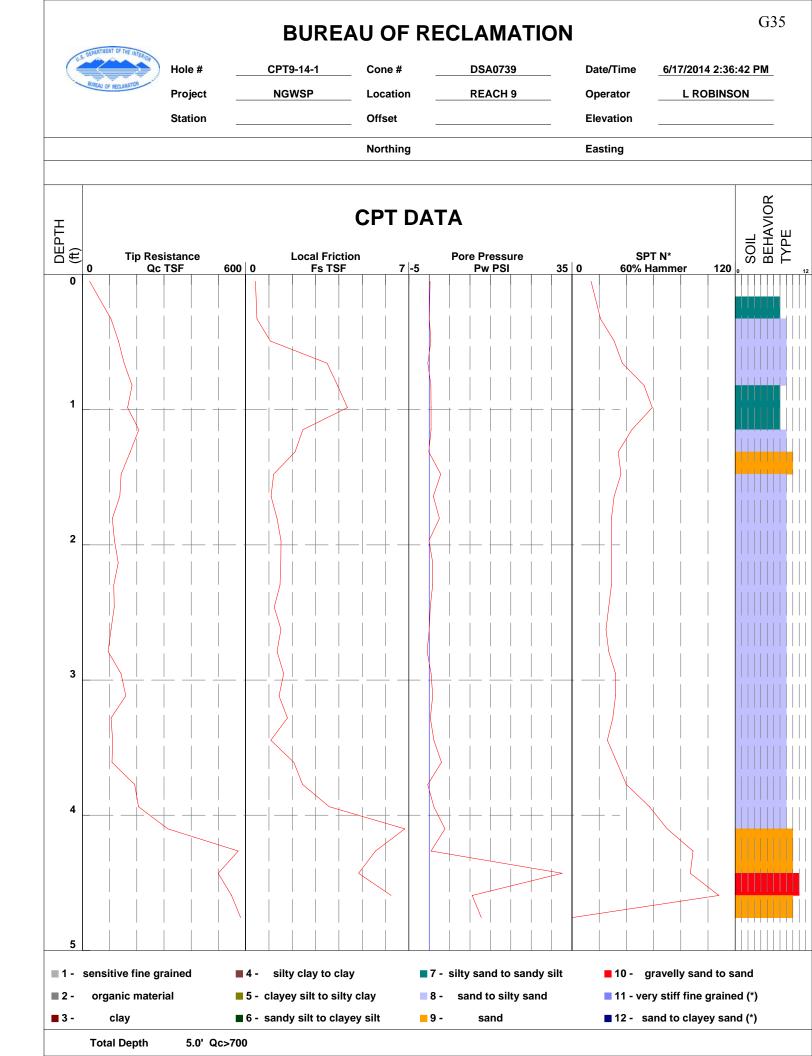
G34

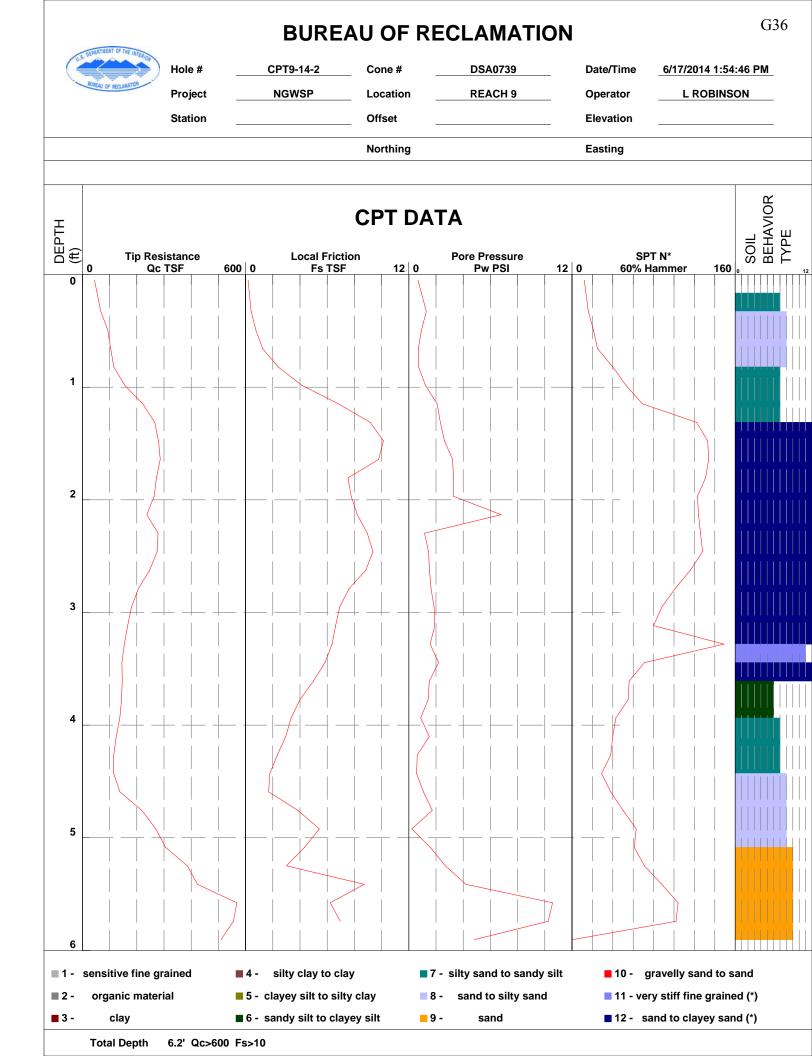
FEATURE: REACH 9, 10 AND 11 LOCATION: REACH 11 PIPELINE BEGUN: 10/7/15 FINISHED: 10/7/15 DEPTH AND ELEVATION OF WATER LEVEL: WLNE AND DATE MEASURED: 10/7/2015

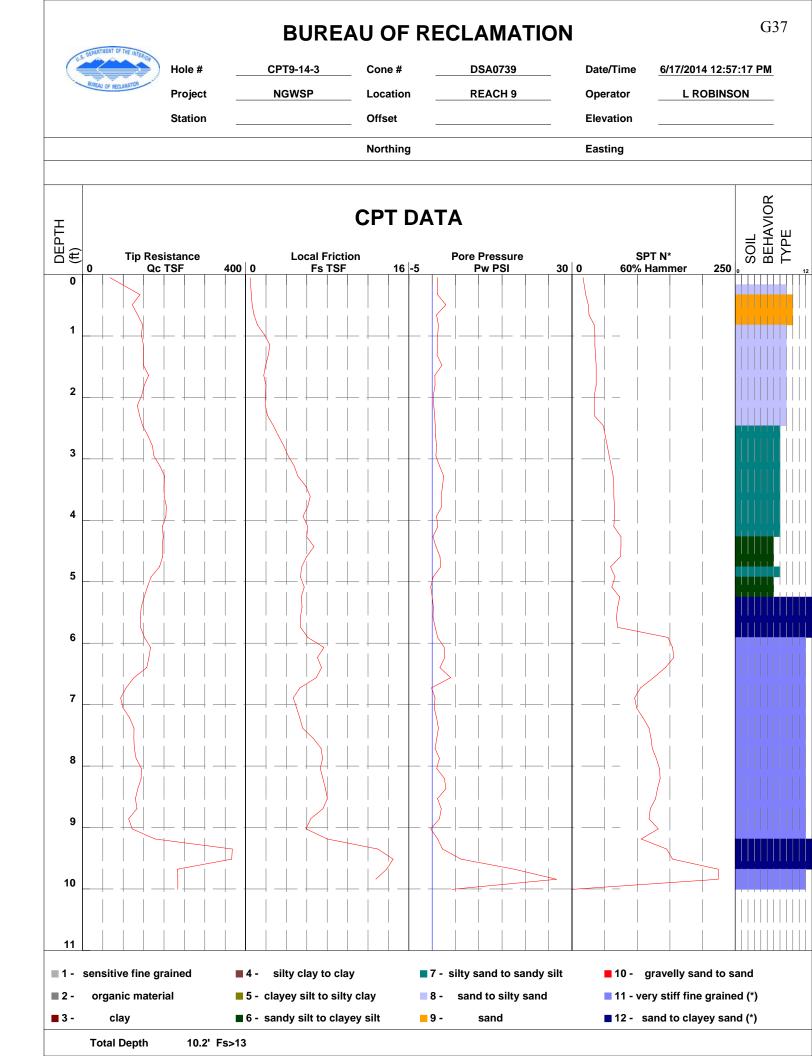
PROJECT: NGWSP COORDINATES: N 1,712,754.4 E 2,443,810.1 TOTAL DEPTH: 28.7 DEPTH TO BEDROCK: 18.7

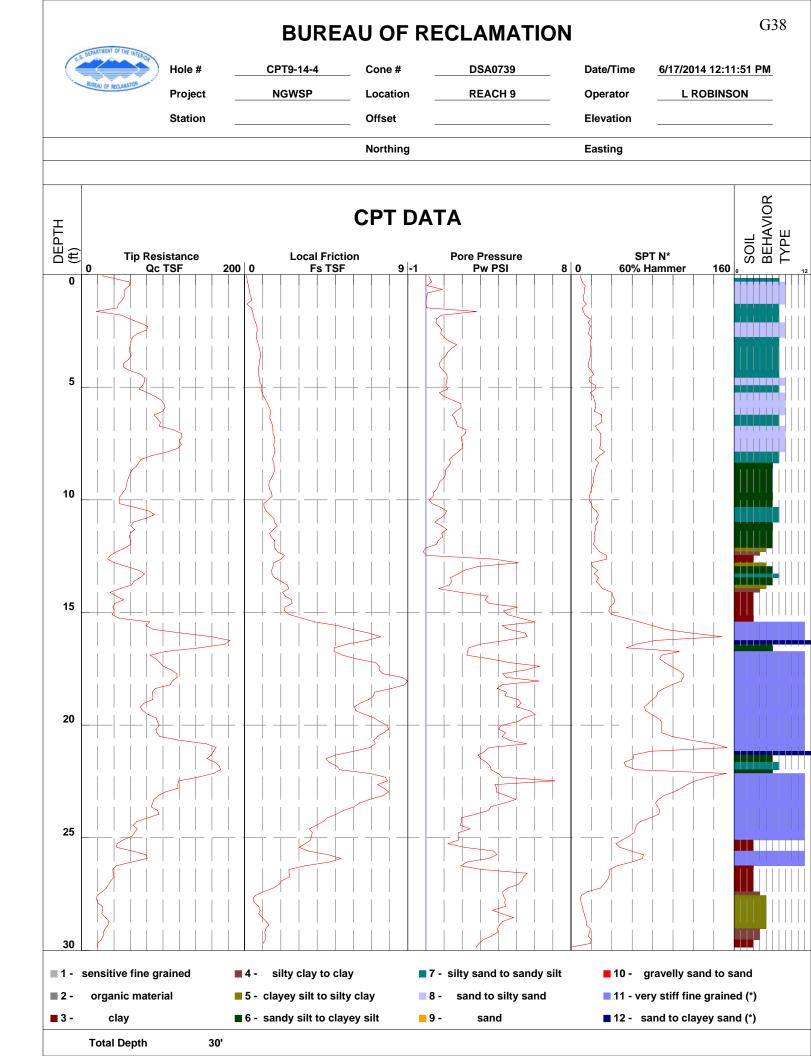
AND DATE MEASURED: 10/7/2015							O DEL		. 18.7					REVIEWED BY: P. GARDNER	
		/ERY		LABC	ORAT	ORYI	DATA		×Z	FT		N	/	1	
NOTES	DEPTH	% CORE RECOVERY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	BLOWS / 0.5	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION	
ALL MEASUREMENTS ARE FROM GROUND SURFACE AND ARE THE SAME														0.0 - 18.7 FT QUATERNARY ALLUVIUM (Qal)	
AS THOSE USED BY THE DRILLER.	-													0.0 - 4.9 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20% FINES WITH NO	
ALL MEASUREMENTS ARE REPORTED IN FEET EXCEPT WHERE NOTED.	-										-	SM		PLASTICITY, LOW DRY STRENGTH, RAPID DILATANCY; MAXIMUM SIZE, FINE SAND; DRY, TAN IN COLOR; NO REACTION WITH HCI.	
DRILLED BY: U.C. REGION DRILL CREW DRILLER; JOE PROCTOR HELPERS; BRANDON LANE	-		44.8	55.2	0	23.2	5.1	6.7	SC-SM	8/7/8	-			4.9 - 8.7 FT CLAYEY SAND (SC): ABOUT 60% FINE SAND; ABOUT 40% MEDIUM PLASTIC FINES, NO DILATANCY, MEDIUM DRY	
PURPOSE: PRECONSTRUCTION SOIL AND BEDROCK FOUNDATION INVESTIGATIONS.	5—		48.9	51.1	0	25.5	11.8	7.1	sc	7/7/9	-		6369.1	STRENGTH, MEDIUM TO HIGH TOUGHNESS; MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.	
DRILL EQUIPMENT: TRACK MOUNTED CME 850.						20.0					-	sc		8.7 - 14.9 FT SILTY SAND (SM): ABOUT 80% FINE SAND; ABOUT 20%FINES WITH NO PLASTICITY, RAPID DILATANCY: MAXIMUM	
DRILL METHOD: 0.0 - 18.7 FT 4 1/4" HSA AND DRY CORE SYSTEM WITH SPTs.	-		40.0	60.0	0	22.9	5.7	5.4	SC-SM	11/12/16			6365.3	SIZE, FINE SAND; LOW DRY STRENGTH, DRY, TAN IN COLOR; NO REACTION WITH HCI.	
18.7 - 28.7 FT HQ3 WIRELINE CORING SYSTEM WITH A 5' SPLIT TUBE SAMPLER AND DIAMOND SURFACE- SET BIT.	10—										Qal		0000.0	14.9 - 17.2 FT CLAYEY SAND (SC): ABOUT 60% FINE SAND; ABOUT 40% MEDIUM PLASTIC FINES, NO DILATANCY, MEDIUM DRY STRENGTH, MEDIUM TO HIGH TOUGHNESS;	
CASING RECORD: NONE USED.	- 10		41.9	58.1	0	NP	NP	4.3	SM	14/19/26				MAXIMUM SIZE, FINE SAND; TAN IN COLOR; NO REACTION WITH HCI.	
DRILLING MEDIUM: 0.0 - 18.7 FT NONE. 18.7 - 28.7 FT WATER.	-										-	SM		17. 2 - 18.7 FT LEAN CLAY (CL): ABOUT 90 % FINES WITH MEDIUM PLASTICITY, MEDIUM DRY STRENGTH, MEDIUM TOUGHNESS;	
HOLE COMPLETION: HOLE BACKFILLED WITH CUTTINGS AND BENTONITE.	-		62.2	37.8	0	25.0	NP	4.9	s(ML)	22/24/35				ABOUT 10%, PREDOMINATELY FINE SAND; MAXIMUM SIZE, FINE SAND; NO REACTION WITH HCI.	
	15—										-		6359.1	18.7 - 28.7 FT CRETACEOUS MENEFEE FORMATION (Kmf)	
	-		77.3	22.7	0	40.5	25.1	11.2	(CL)s	12/13/19	-	sc	6356.8	18.7 - 28.7 FT CLAYSTONE: DARK GREY IN COLOR, MODERATELY TO SLIGHTLY WEATHERED (W4), VERY SOFT (H7), FeOX STAINING THROUGHOUT SAMPLE, MOTTLED;	
	_		84.4	15.6	0	44.5	23.9	12.6	(CL)s	20/25/48		CL		NO REACTION WITH HCI.	
	-										-		6355.3	0.0 - 18.7 FT: QUATERNARY ALLUVIUM (Qal) 18.7 - 28.7 FT: CRETACEOUS MENEFEE FORMATION (Kmf)	
	20—	74												ABBREVIATIONS: WLNE = WATER LEVEL NOT ENCOUNTERED I.D. = INSIDE DIAMETER BNE = BEDROCK NOT ENCOUNTERED.	
	-														
	-										Kmf	CLAY	STONE		
	25—														
	-	94													
						 E		M OF F	IOLE				6345.3		

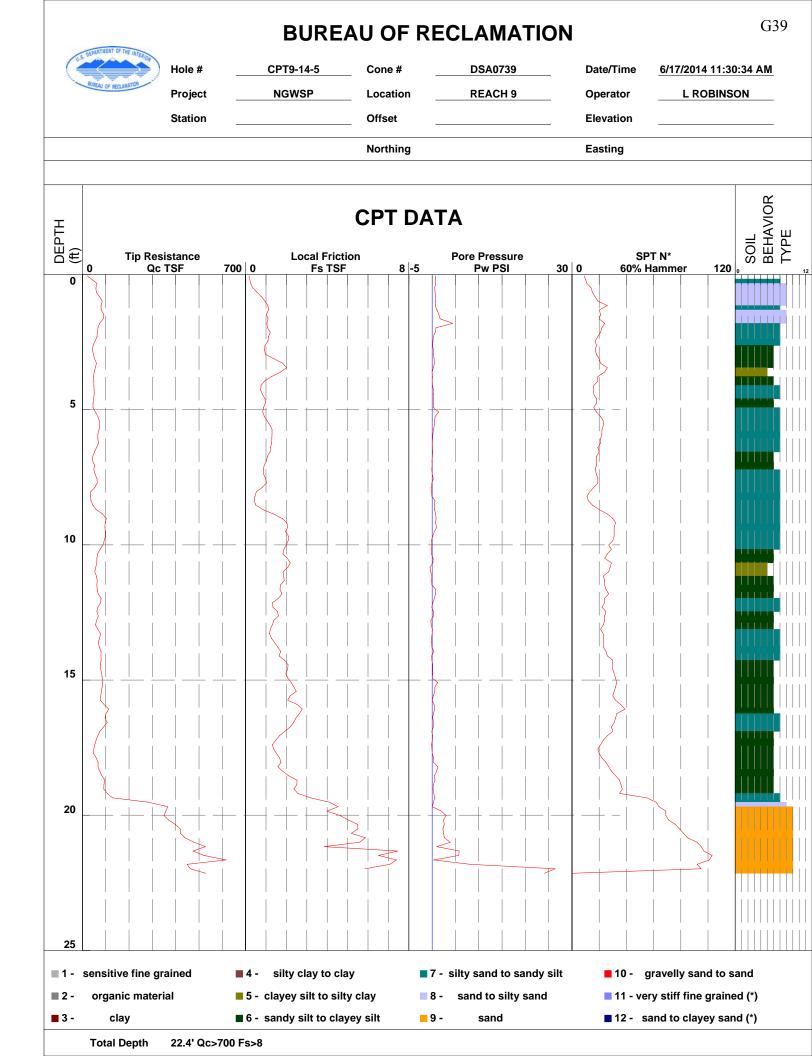
COMMENTS:

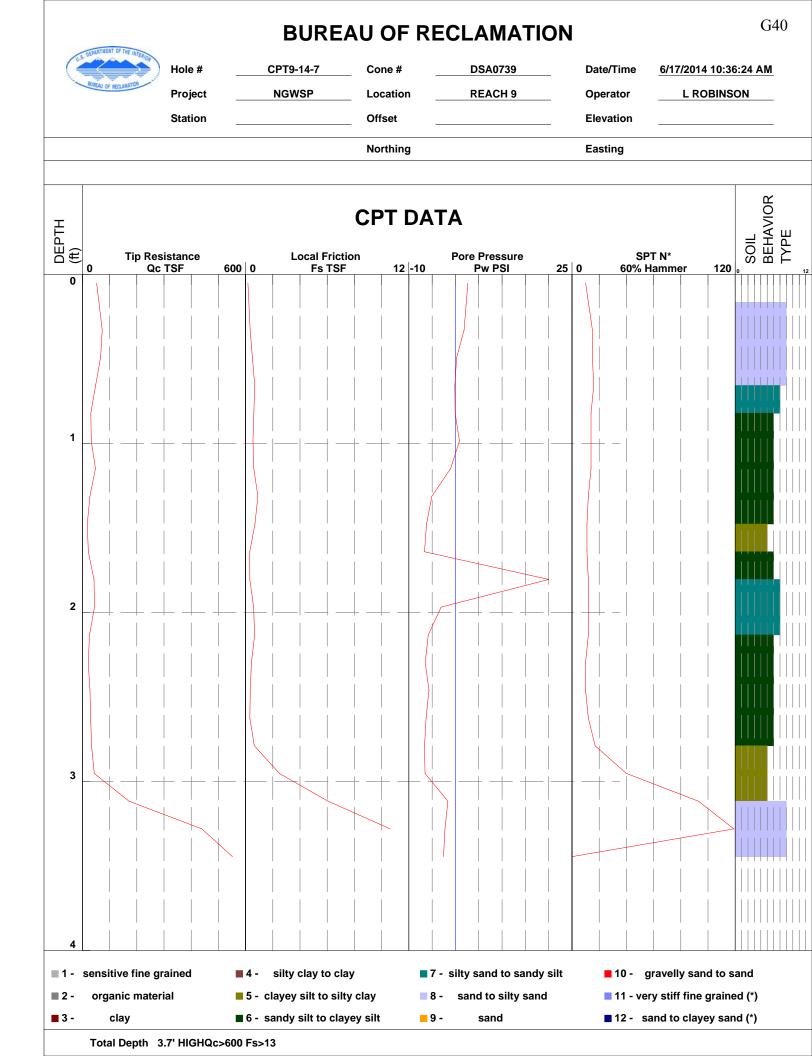


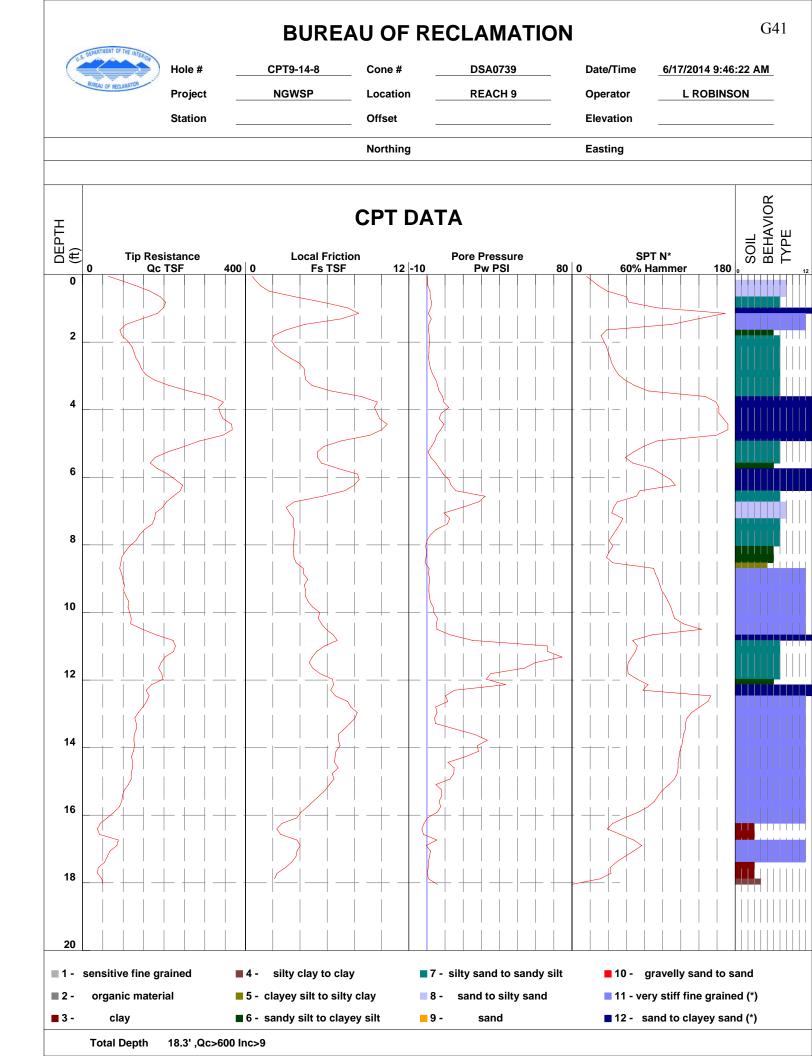


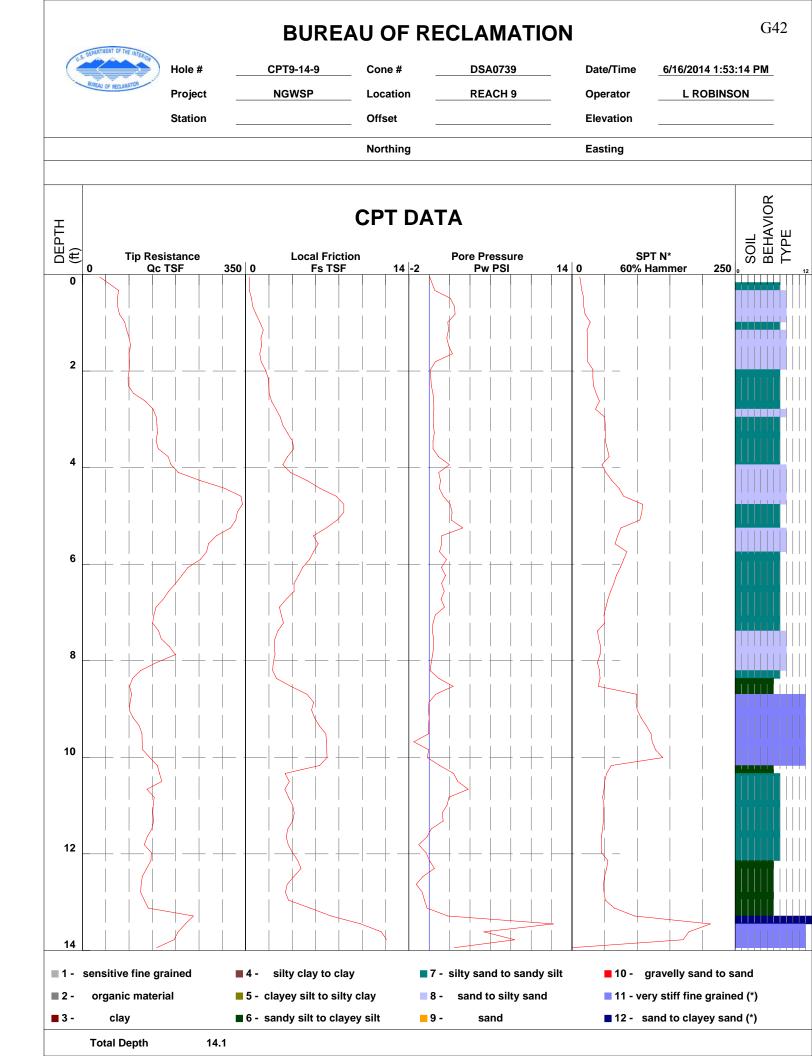


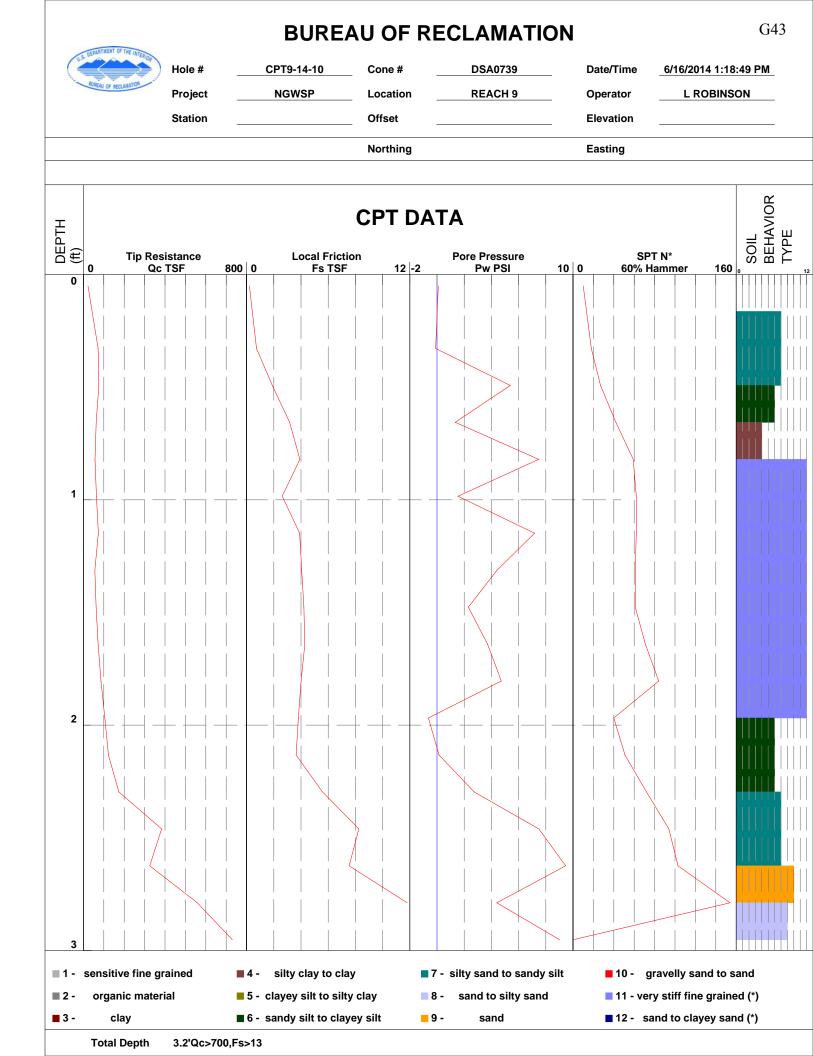


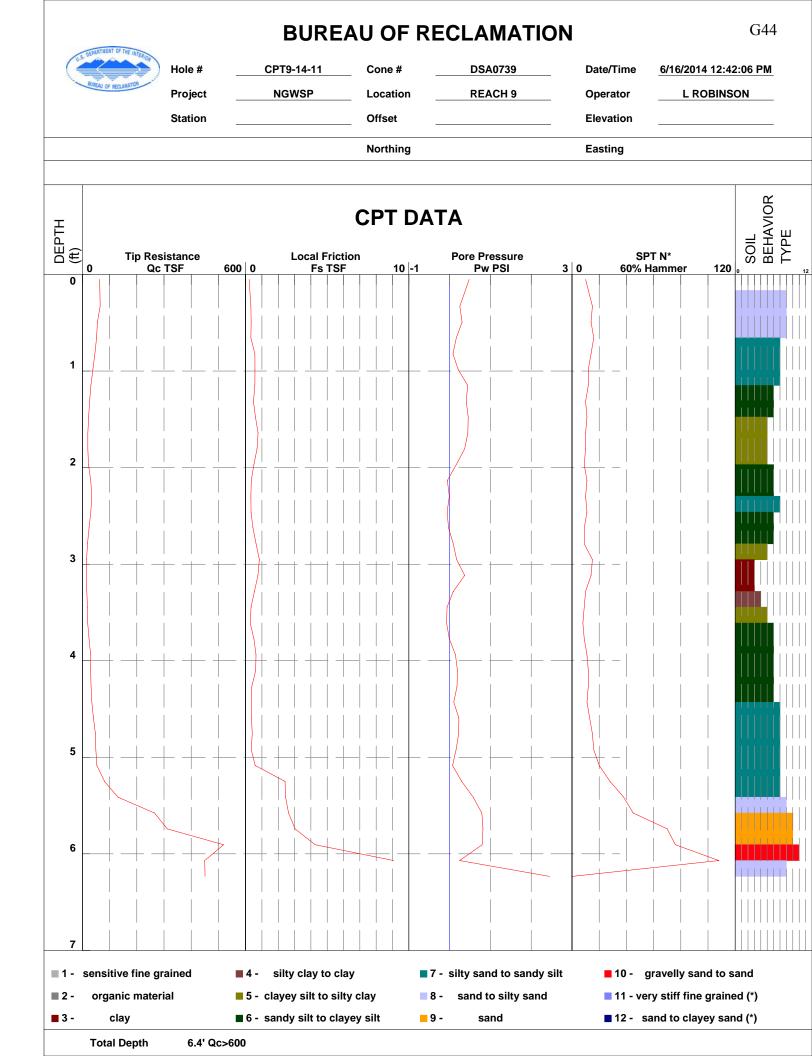


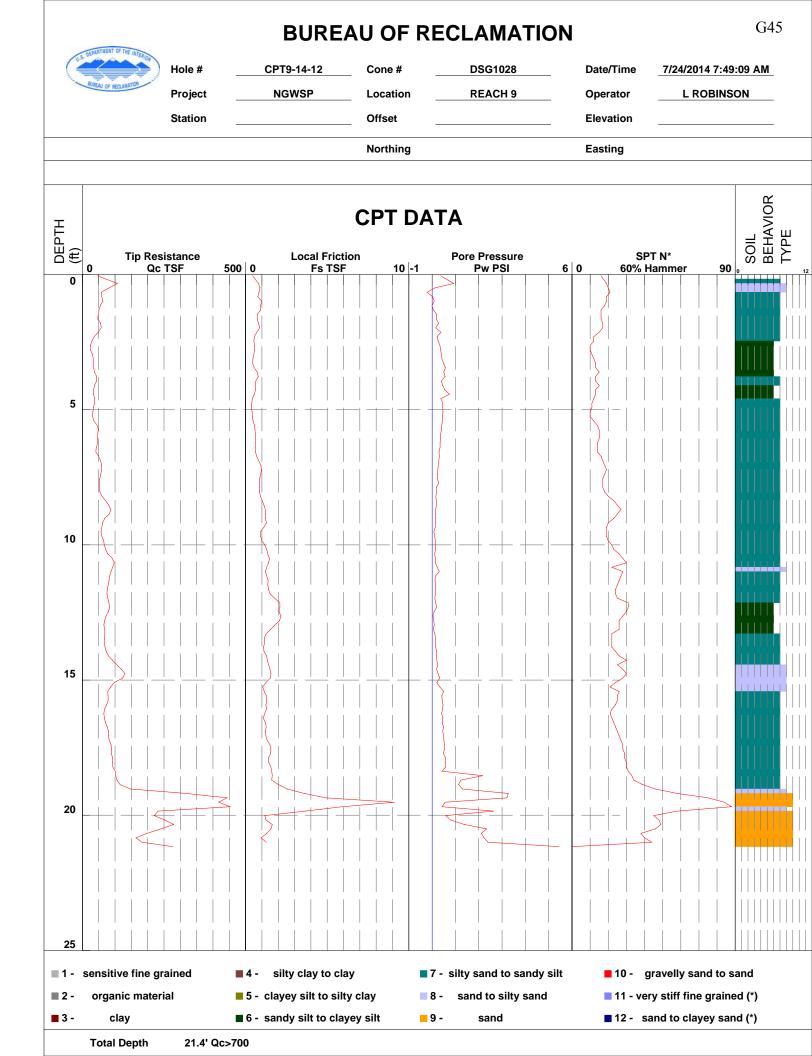


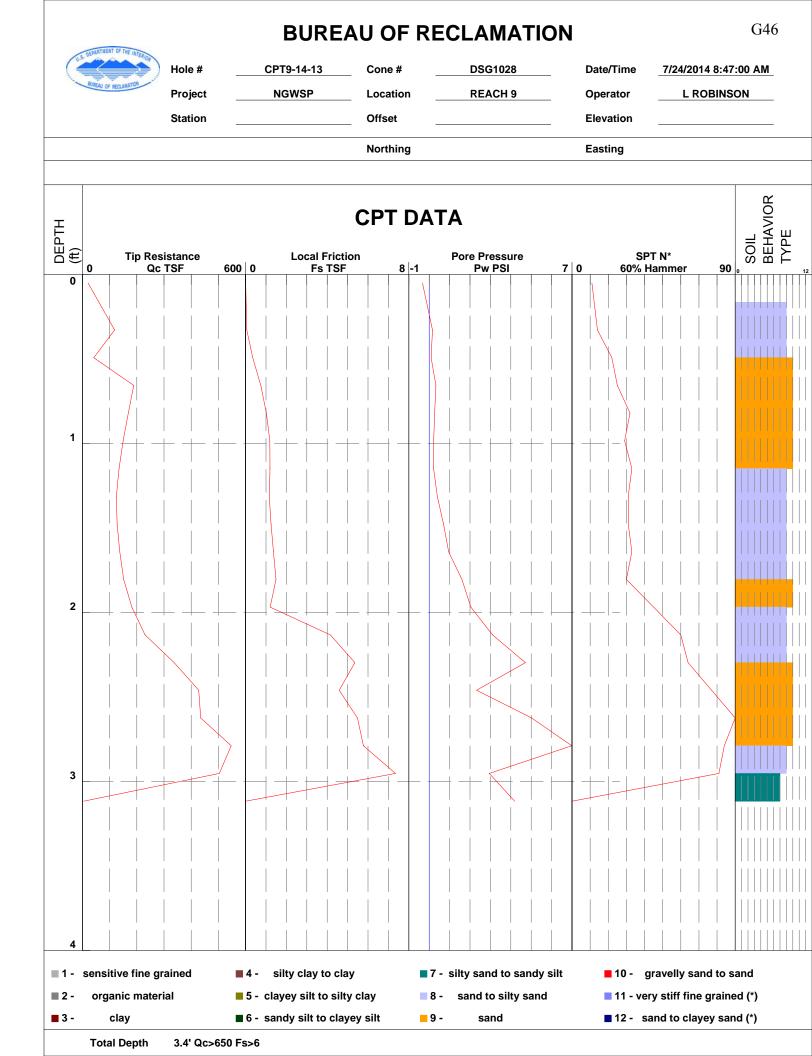


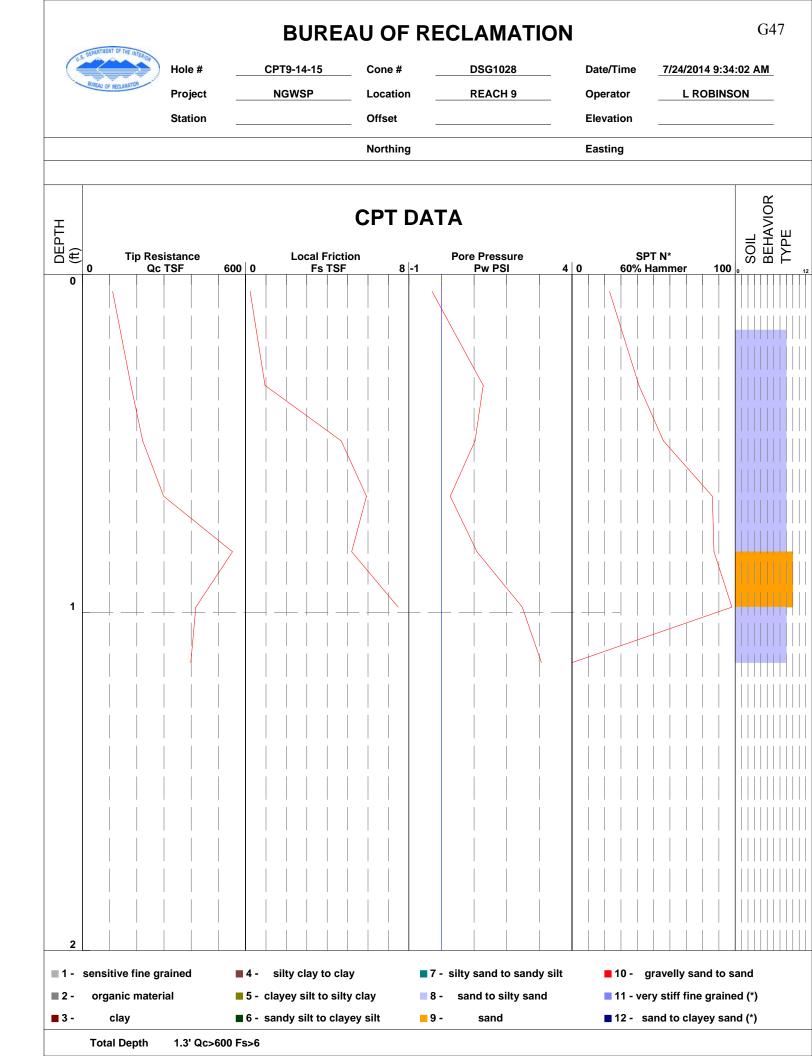


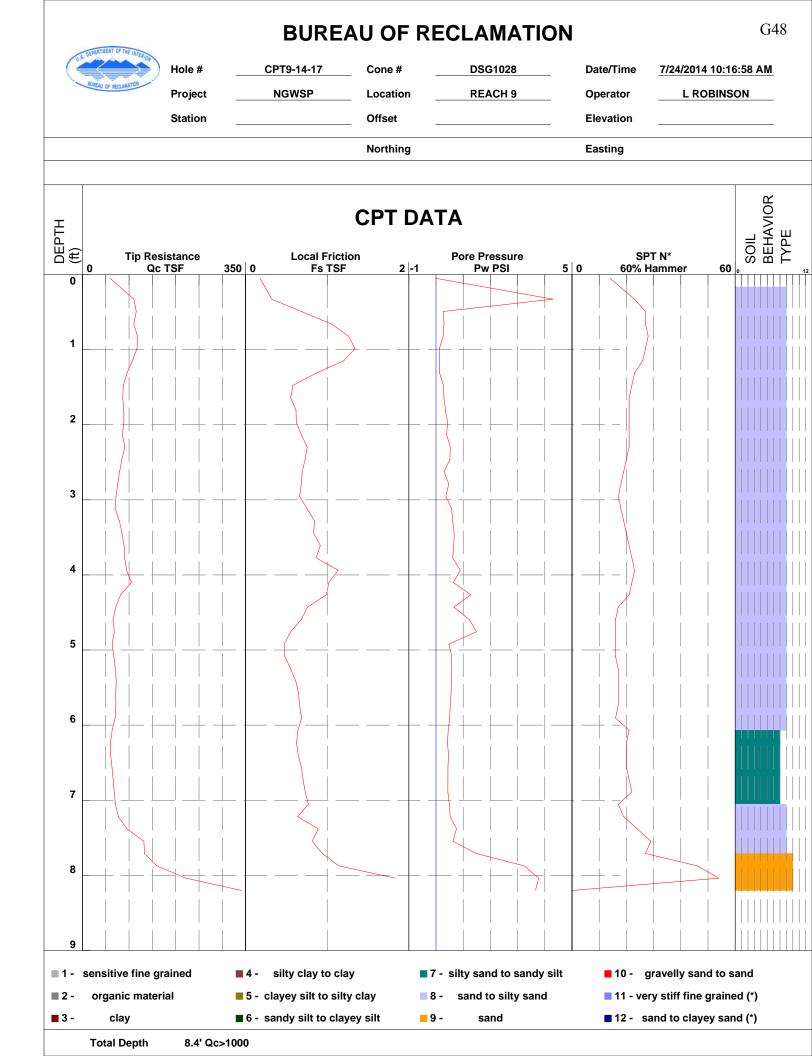


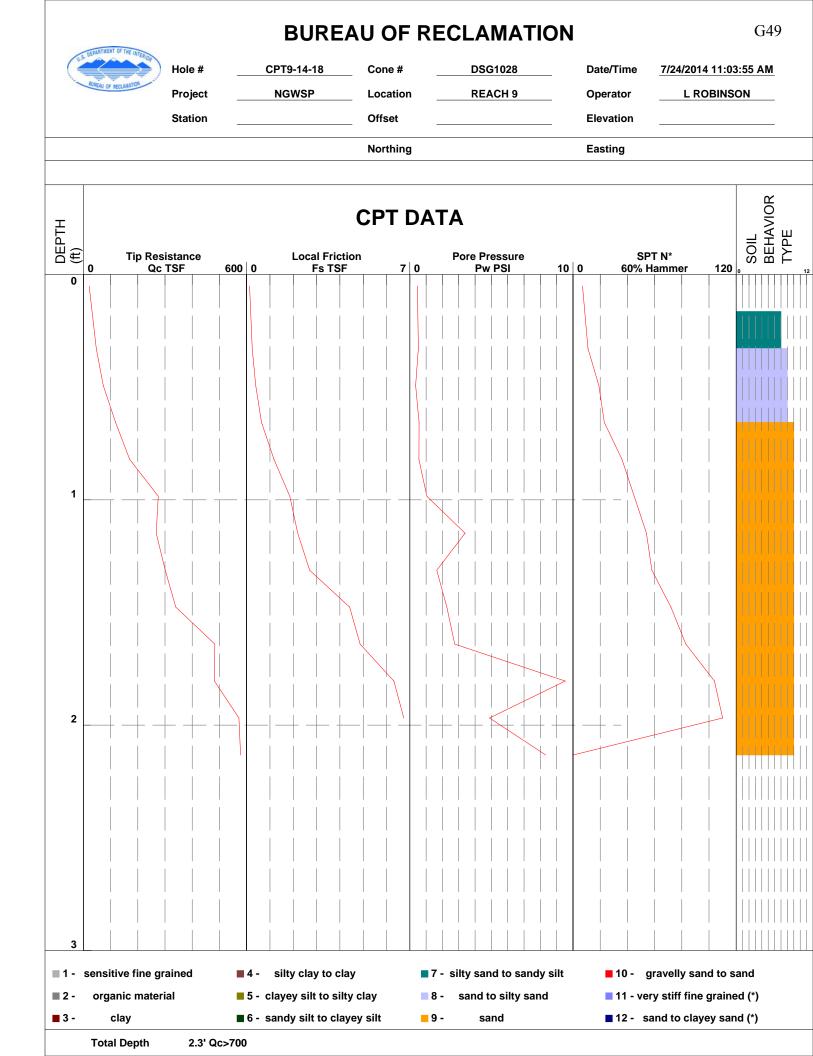


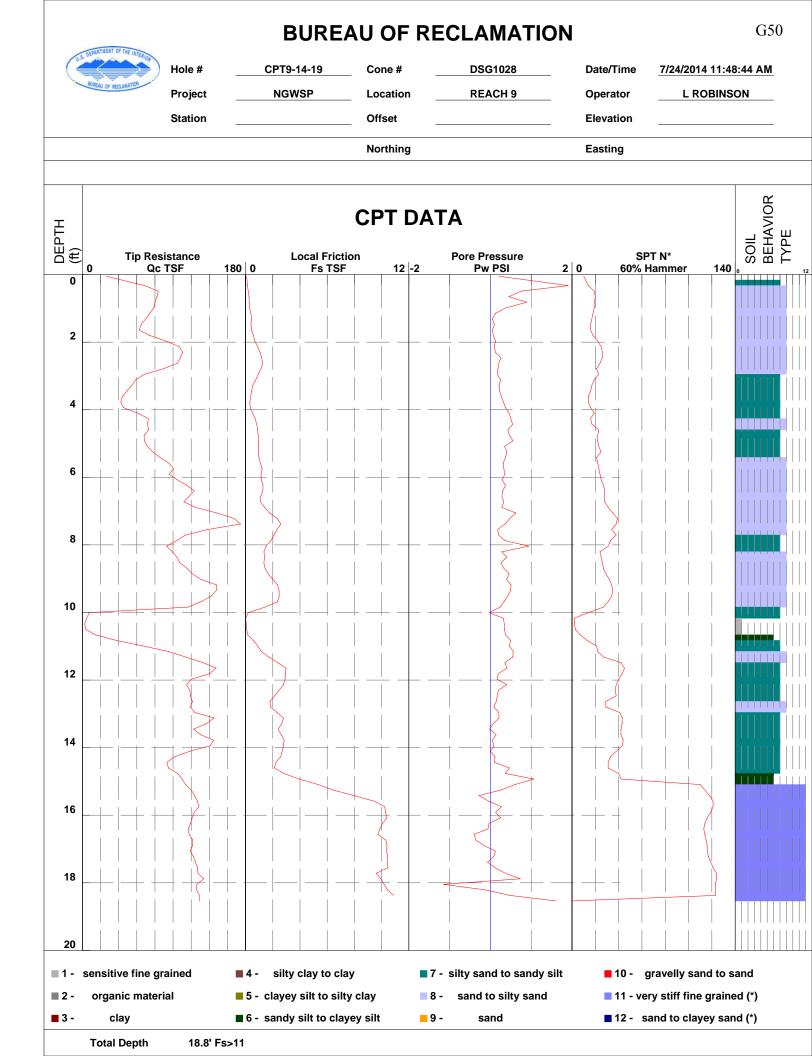


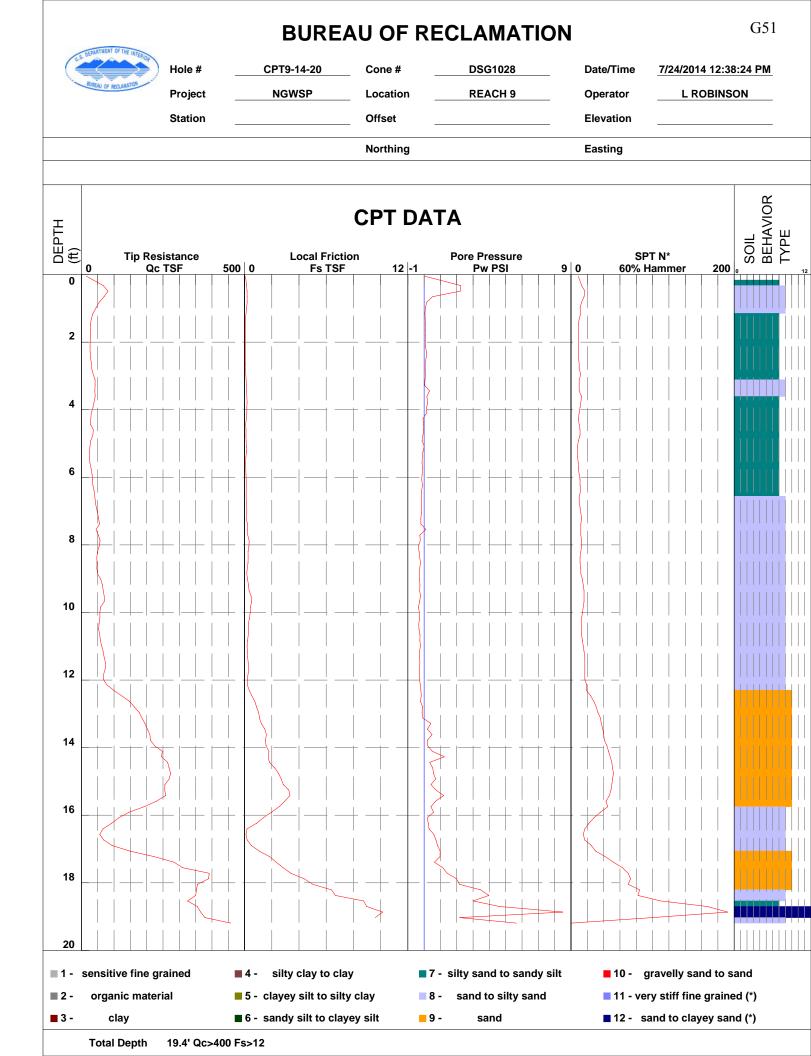


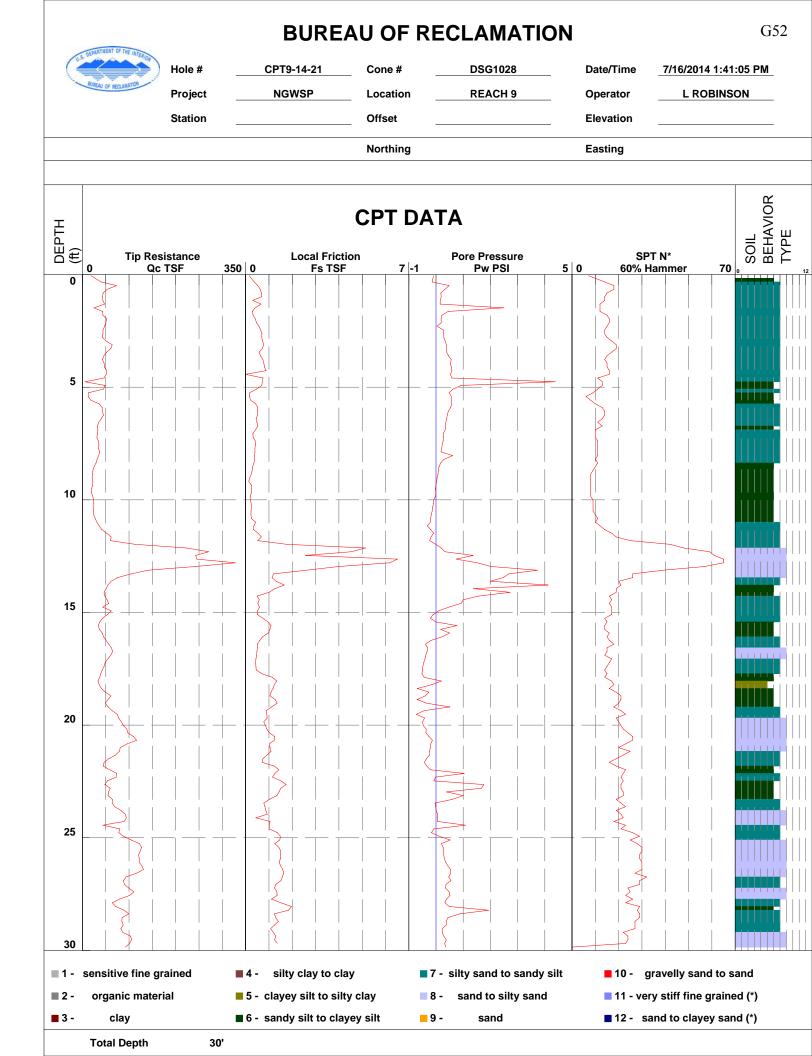


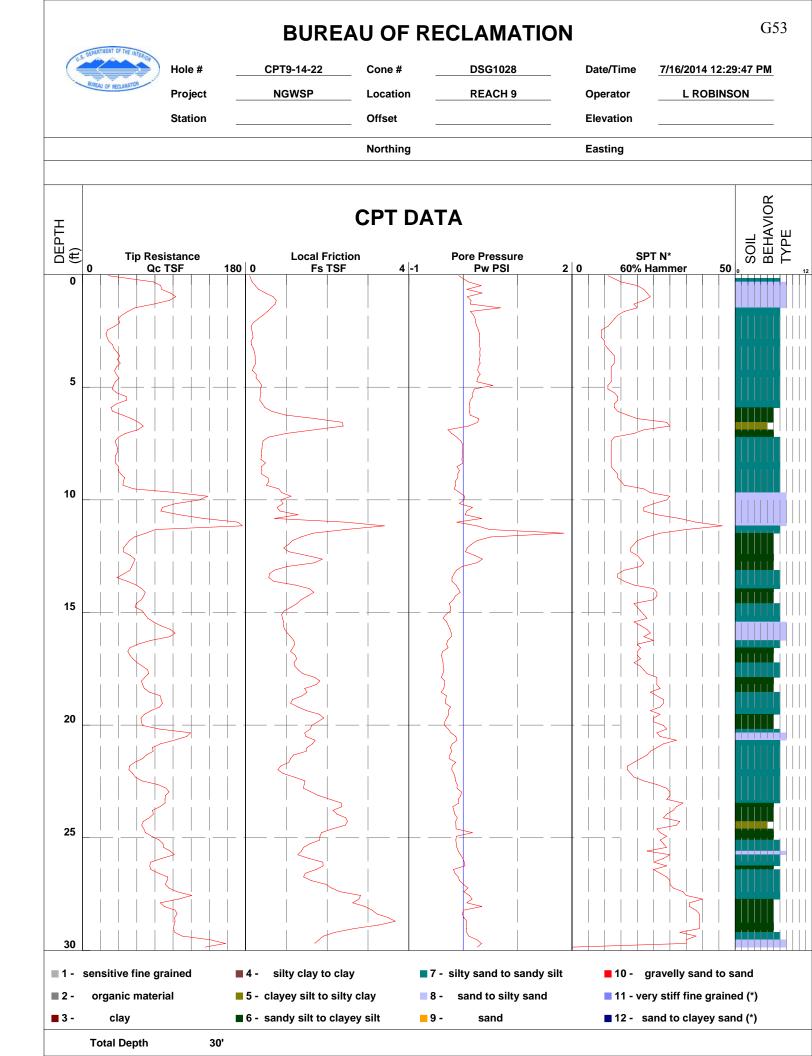


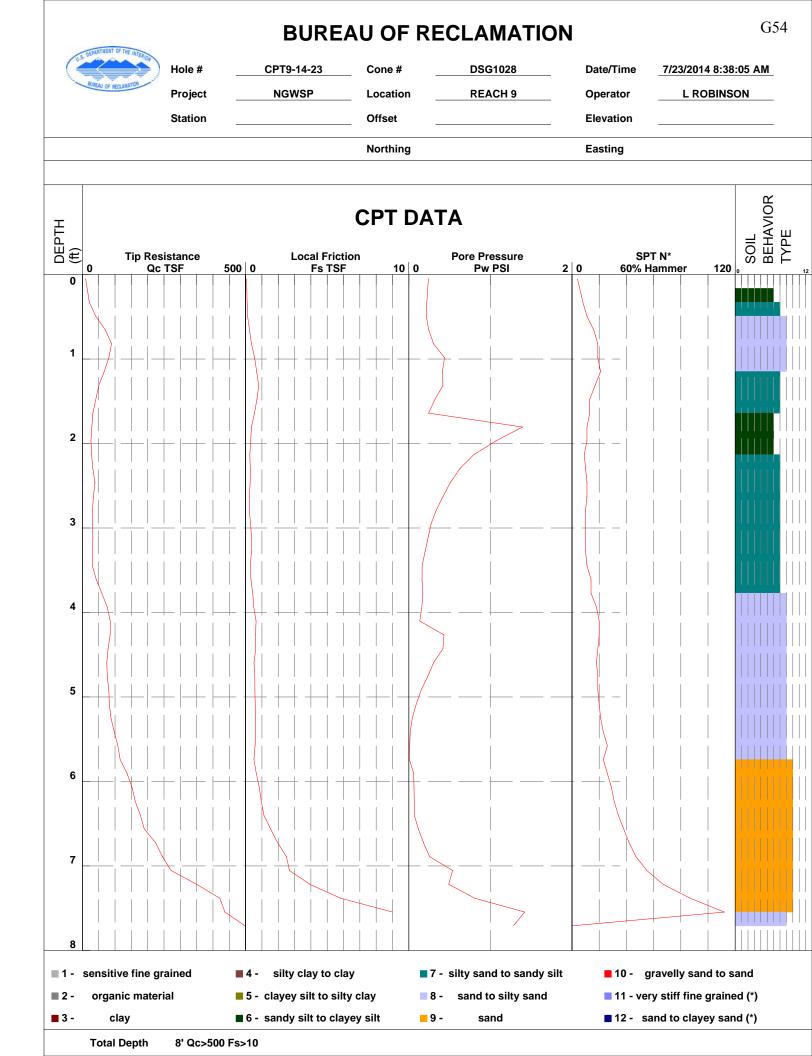


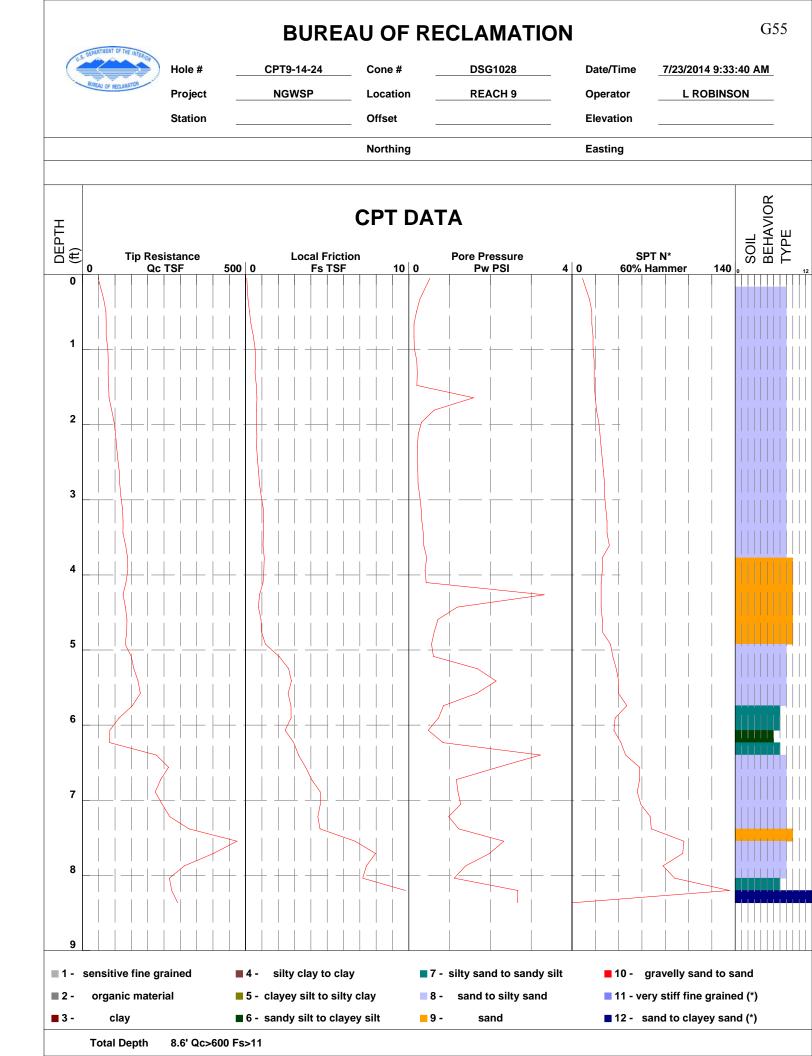


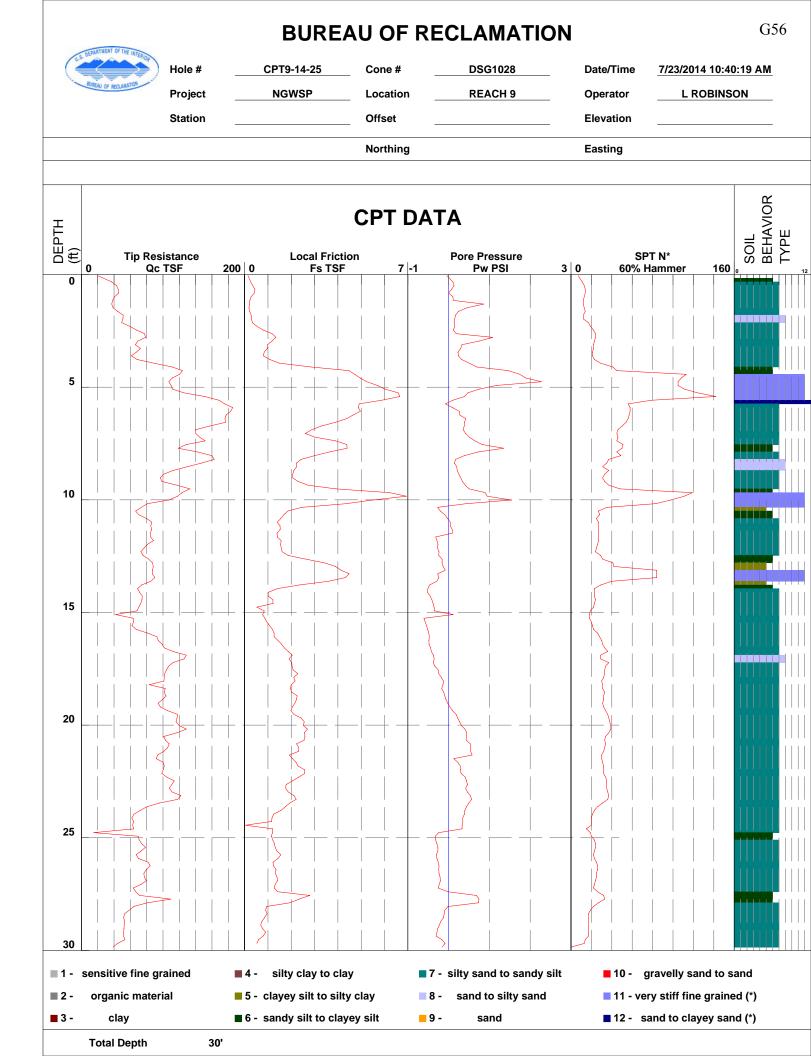


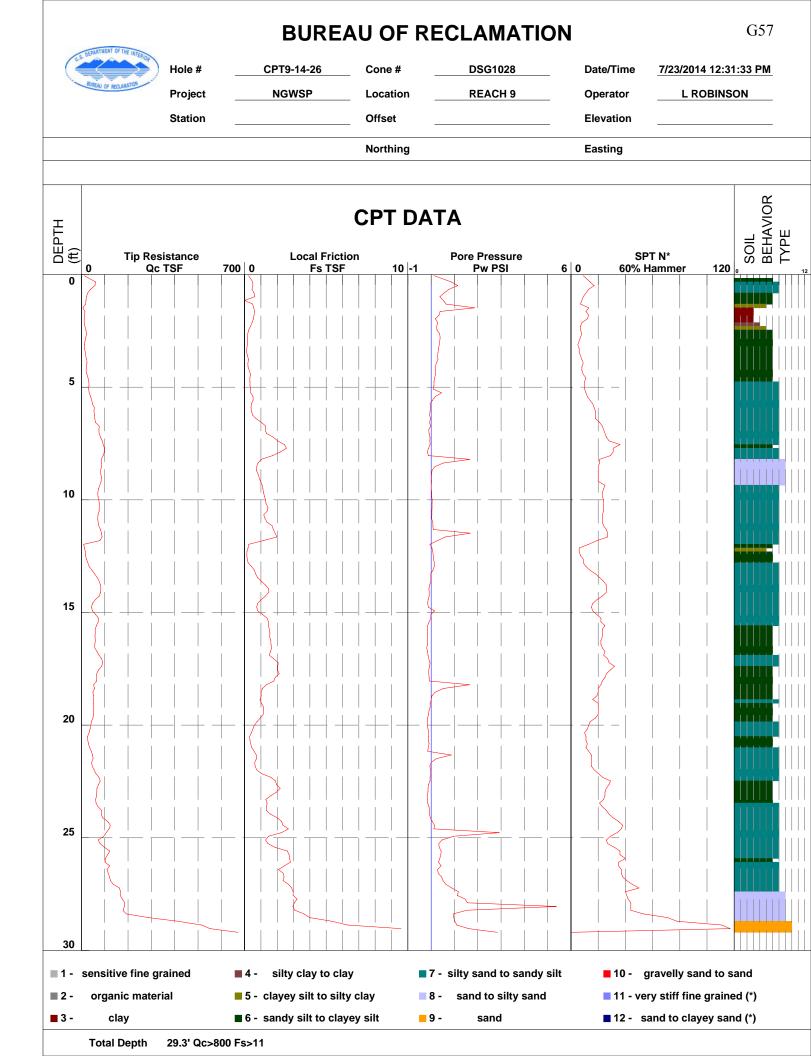


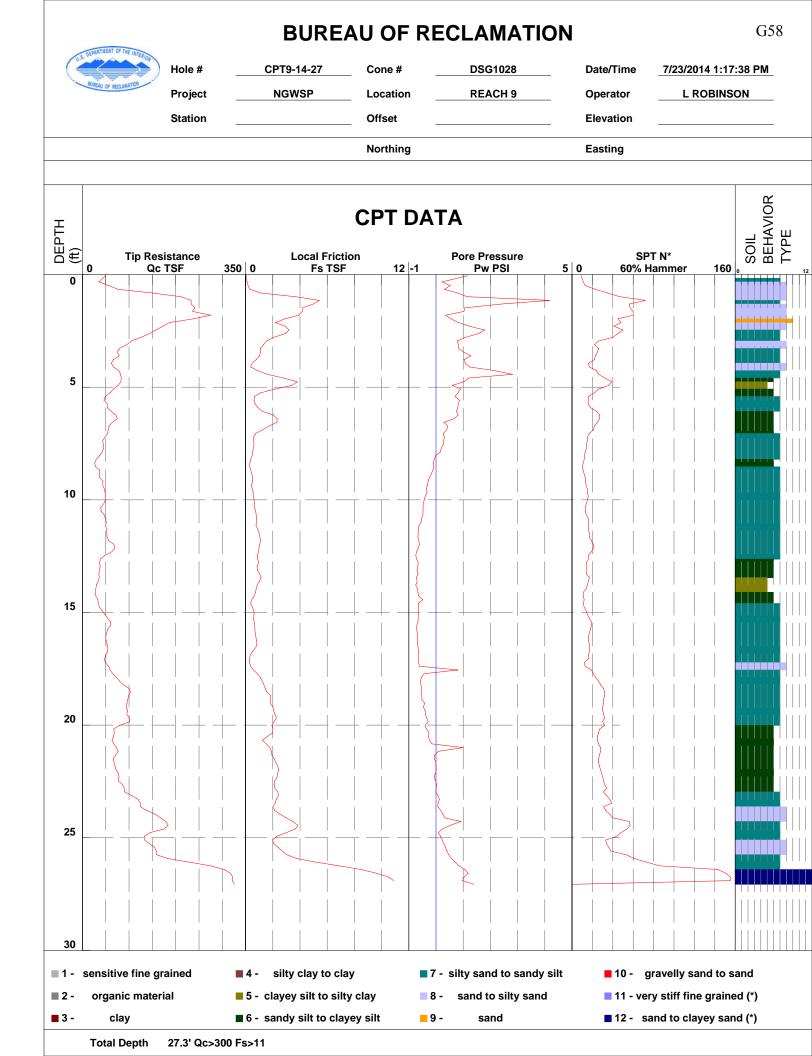


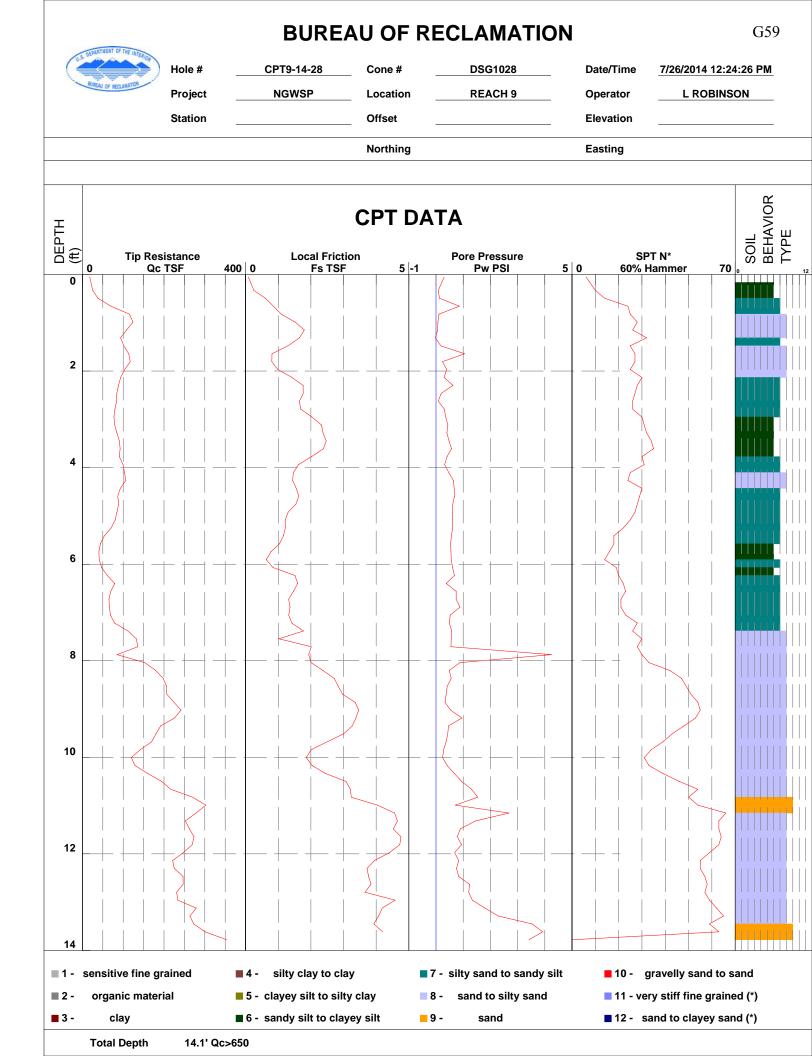


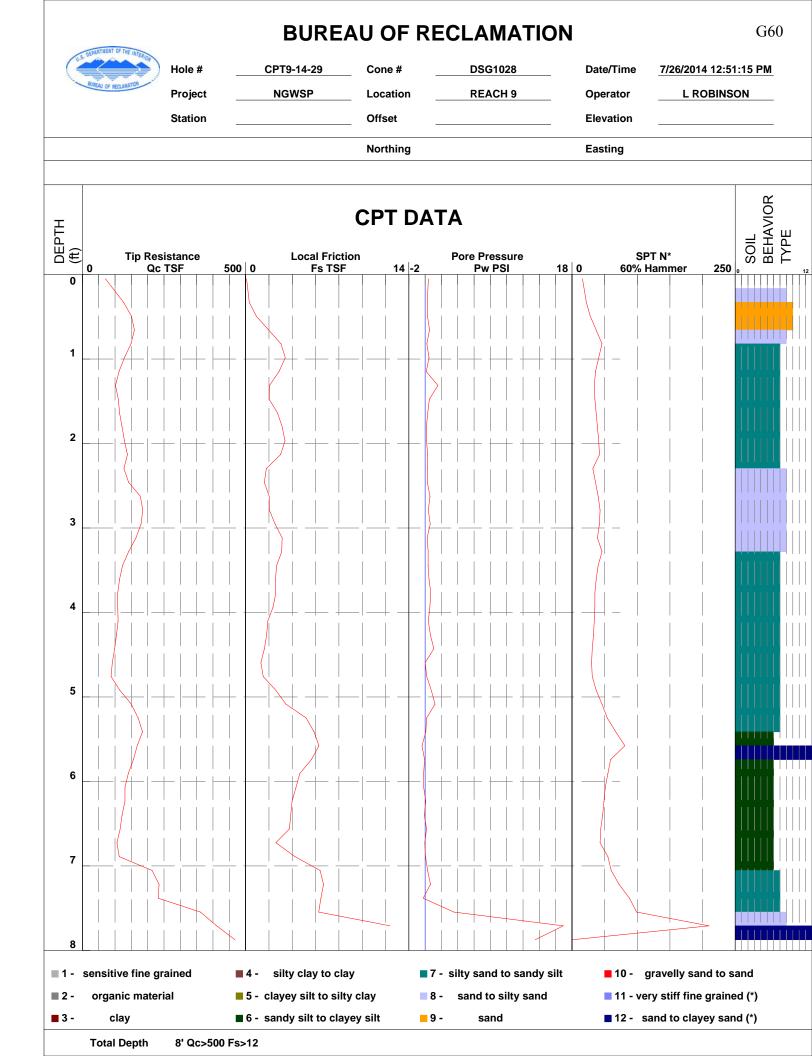


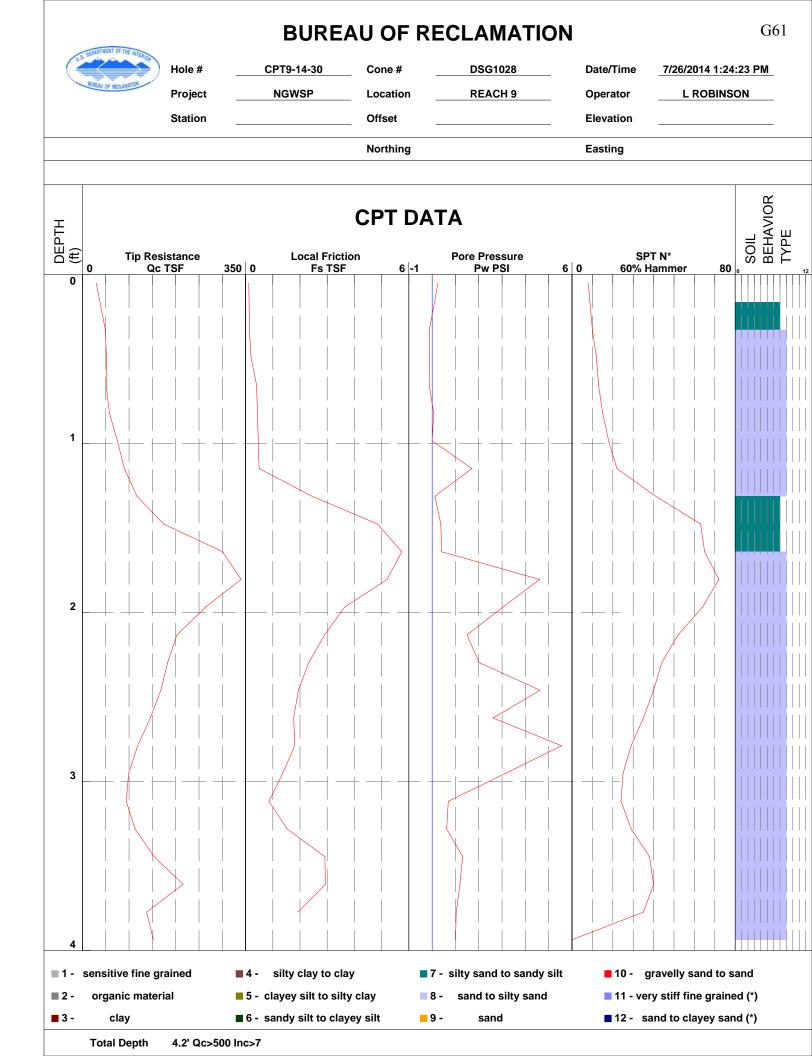


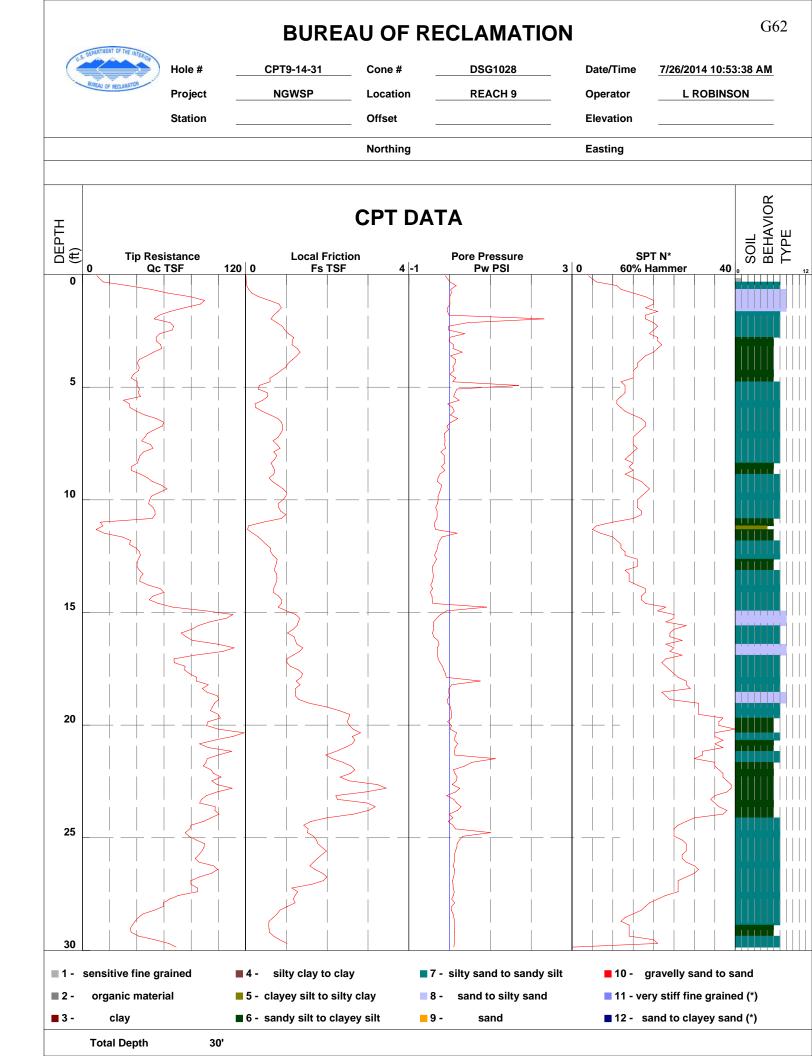


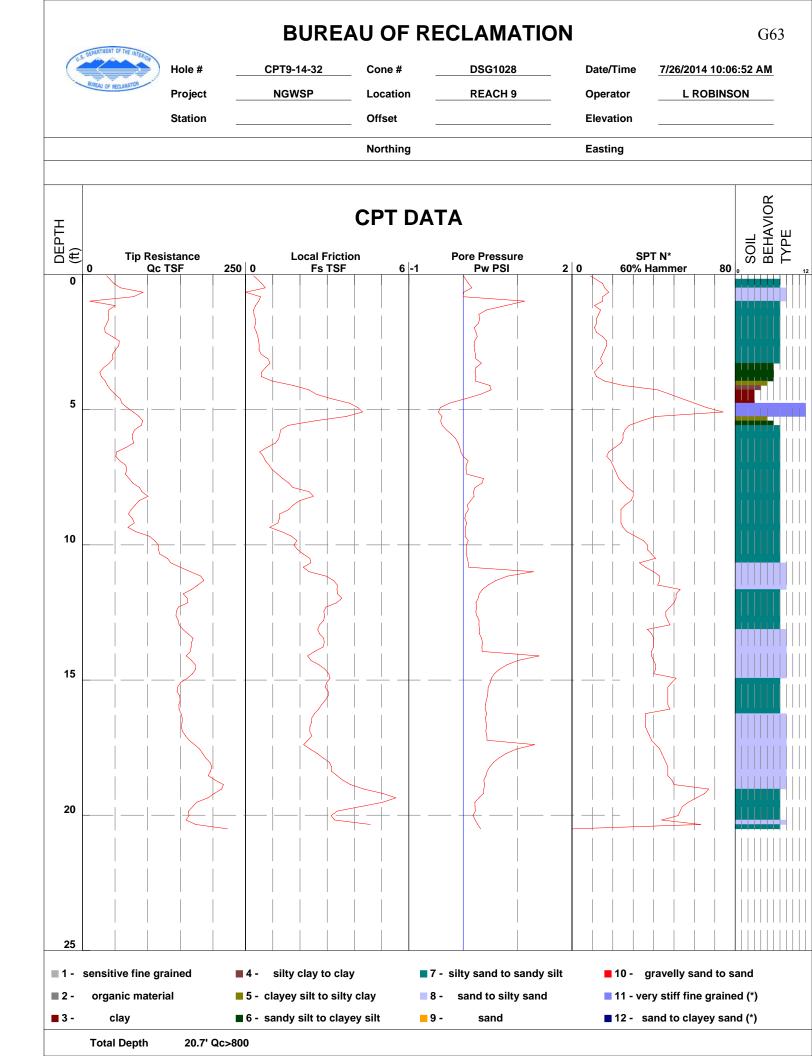


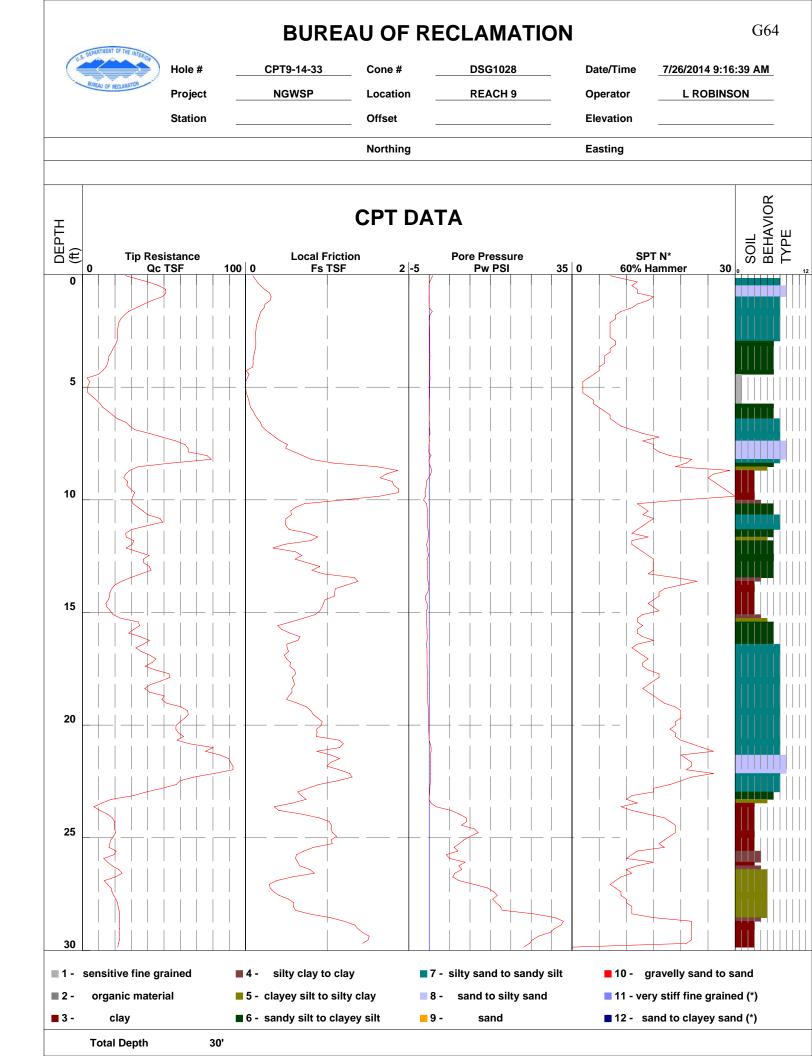


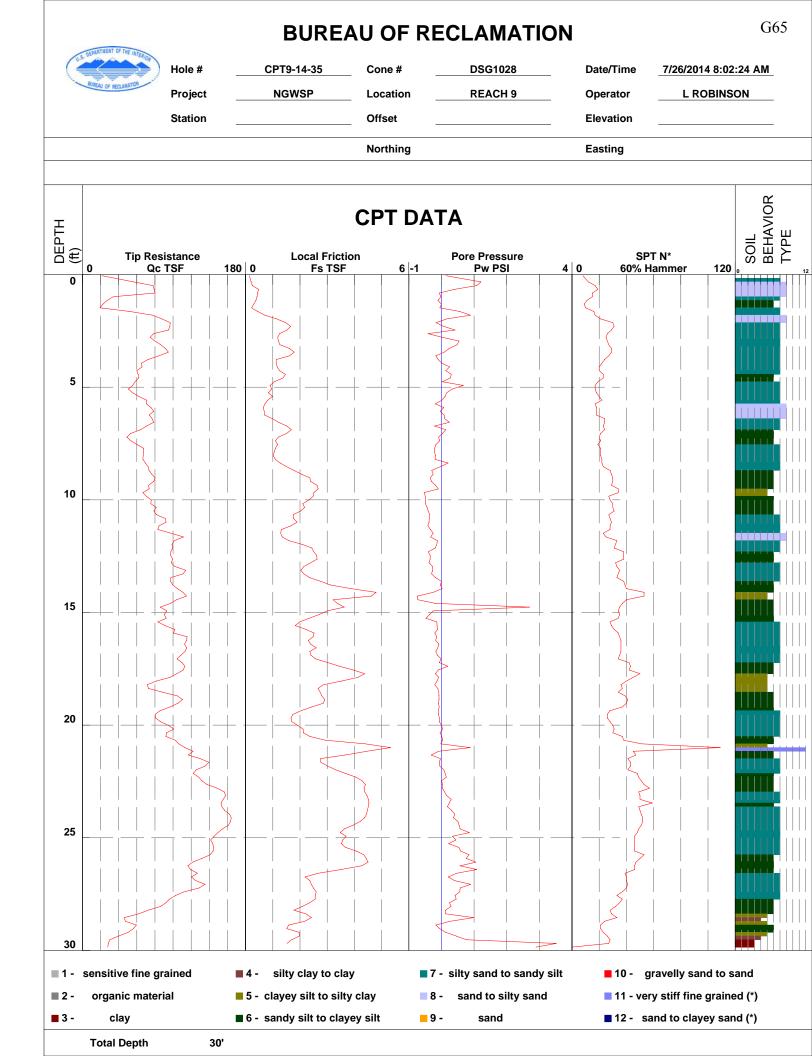


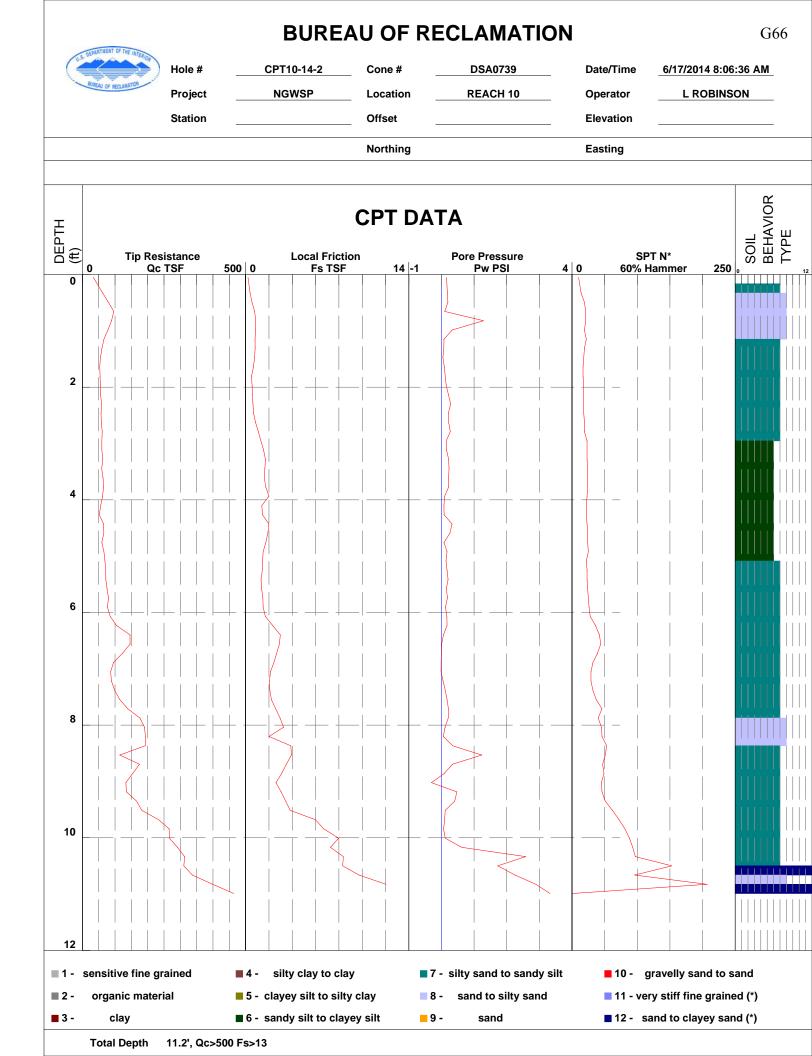


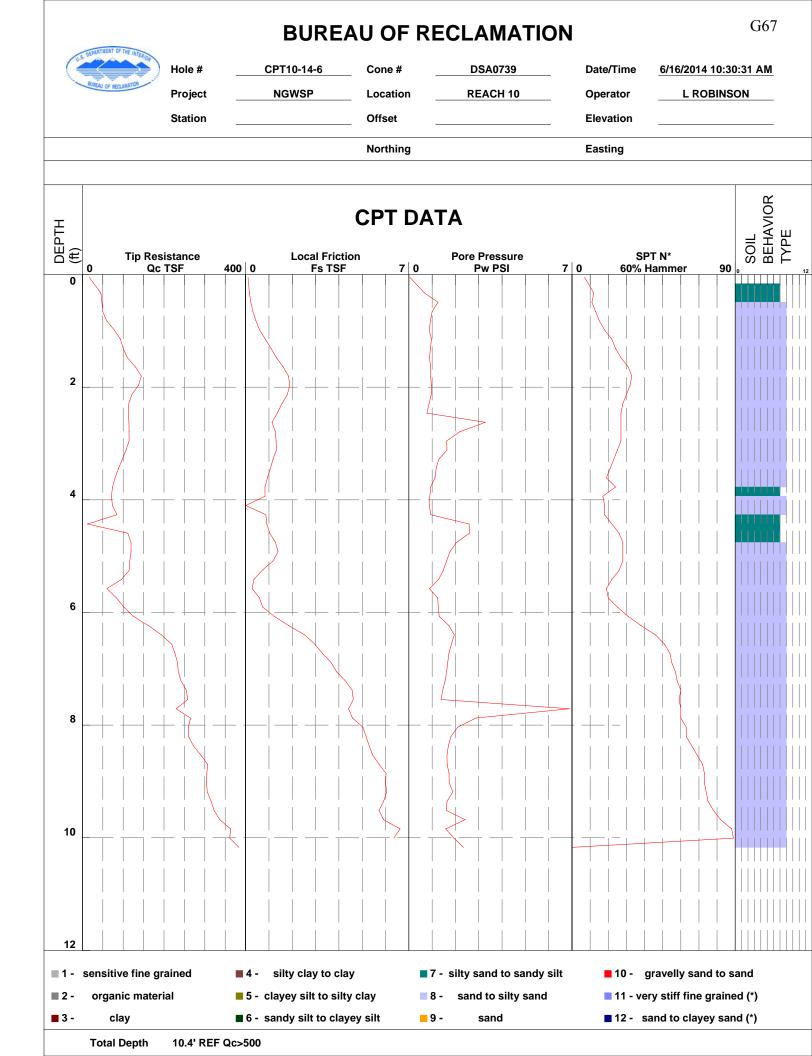


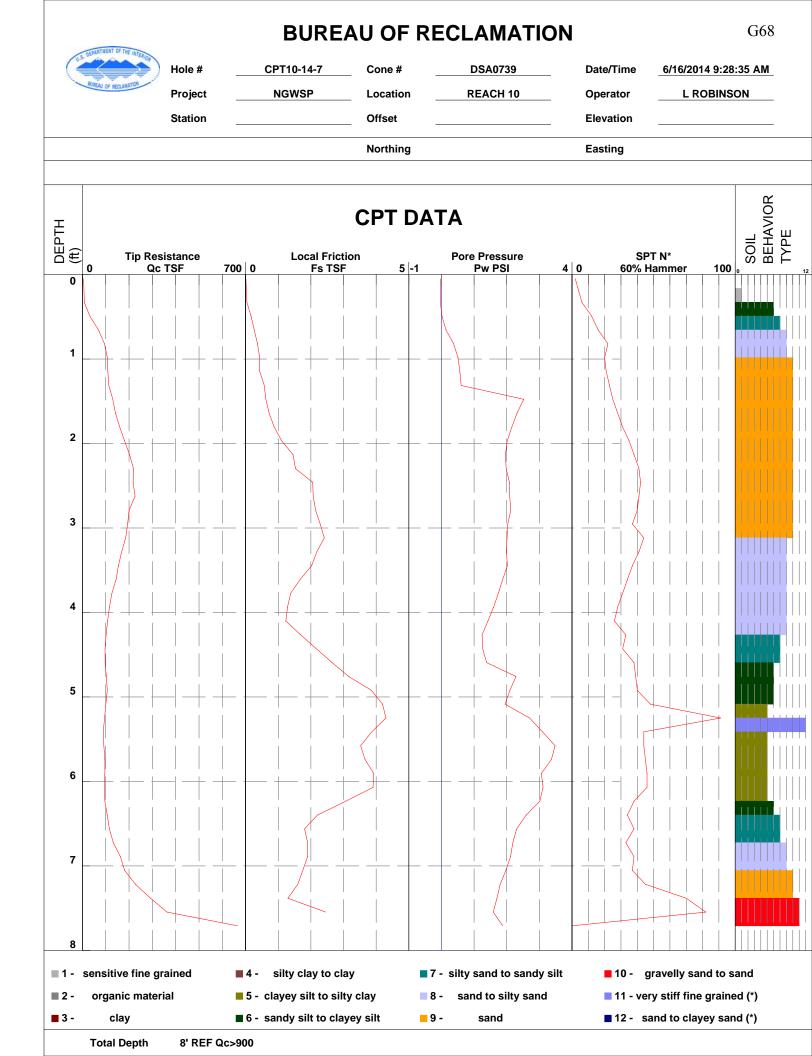












7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT	/HAND-AUGER NO. TPR9-15-1	SHEET	1 OF	2
FEATURE: Reaches 9,	10 and 11	PROJECT: Navajo Gallup Water Supply Project			
LOCATION: PIPELINE		GROUND ELEVATION: 5879.4			
COORDINATES: N 1,84	14,394 E 2,472,375	METHOD OF EXPLORATION: CASE 680 L BACH	KHOE		
APPROXIMATE DIMEN	SIONS: 15.0'X12.0'X11.7'	LOGGED BY: J. GILBERT			
DEPTH TO WATER: W	/LNE DATE:	DATE EXCAVATED: 10/21/2015			
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL	(BY	PLUS 3 VOLU	ME)
SYMBOL	(S	SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
(SP)gc	50% fine sand; about 45% s rapid dilatancy and no dry s	<i>. .</i>	ו	25	tr
- 2 - -	to 5-inch, hard subangular	UME): About 25% 5 to 12 inch cobbles; about 20% to subrounded cobbles; remainder minus 3-inch; trong reaction with HCI to caliche coated gravel ar			
3 -	IN-PLACE CONDITION: Dr	ry, loose			
-	GEOLOGIC INTERPRETA	TION: Quaternary Pediment Deposit (Qpd)			
4 —					
- - 5					
-					
6 -					
_					
7 —					
8					
-					
9 -					
<u>9.5 ft (5869.9)</u> (SP)cb		ADED SAND WITH COBBLES AND BOULDERS		25	
- - <u>10.6 ft (5868.8)</u>	with rapid dilatancy and no	It 45% subangular gravel; about 5% non plastic fir dry strength and no toughness.	les		
11 S(CL)	TOTAL SAMPLE (BY VOLU to 5-inch, hard subangular	UME): About 25% 5 to 12 inch cobbles; about 20% to subrounded cobbles; remainder minus 3-inch;			
11.7 ft (5867.7)	maximum size, 500 mm; st cobbles.	trong reaction with HCI to caliche coated gravel ar			
	IN-PLACE CONDITION: Dr	ry, loose			
	RFACE HEAVILY VEGETATED	O WITH RUSSIAN THISTLE AND TUMBLE WEEL OF EQUIPMENT.	DS.	<u> </u>	1

7 E	7-1336-A (1-86) Bureau of Reclamation	nation LOG OF TEST-PIT/HAND-AUGER NO. TPR9-15-1 SH		IEET 2 OF 2				
FE	FEATURE: REACHES 9, 10 AND 11 PROJECT: NGWSP							
LC	CATION: PIPELINE	GROUND ELEVATION: 5879.4						
COORDINATES: N 1,844,394 E 2,472,375		14,394 E 2,472,375 METHOD OF EXPLORATION: CASE 680 L BAC	METHOD OF EXPLORATION: CASE 680 L BACKHOE					
APPROXIMATE DIMENSIONS: 15.0'X12.0'X11.7' LOGGED BY: J. GILBERT								
DE	PTH TO WATER: W	/LNE DATE: DATE EXCAVATED: 10/21/2015						
ТН	CLASSIFICATION	CLASSIFICATION AND DESCRIPTION OF MATERIAL		% PLUS 3 in (BY VOLUME)				
DEPTH	GROUP SYMBOL	(SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in		
	MMENTS	GEOLOGIC INTERPRETATION: Quaternary Pediment Deposit (Qpd) 10.6 to 11.7 ft SANDY LEAN CLAY: About 50% medium plastic fines with medium dry strength, medium toughness; about 50% fine sand; maximum s fine sand; no reaction with HCl. IN-PLACE CONDITION: Brown in color GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal).	size,					
CC	MMENTS:							

7-133 Burea	6-A (1-86) au of Reclamation	LOG OF TEST-PIT/	HAND-AUGER NO. TPR9-15-2	SHEE	T 1 0	F 1	
FEATU	RE: REACHES 9	, 10 AND 11	PROJECT: NGWSP				
LOCAT	ION: PIPELINE GROUND ELEVATION: 5844.6						
COORE	DINATES: N 1,84	2,946 E 2,473,035	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
APPRC	XIMATE DIMENS	SIONS: 15.0'X10.0'X12.0'	LOGGED BY: J. GILBERT				
DEPTH	I TO WATER: W	LNE DATE:	DATE EXCAVATED: 10/21/2015				
.≖ CLA	ASSIFICATION	CLASSIFICATION AND DESCRIPTION OF MATERIAL			% PLUS 3 in (BY VOLUME)		
	GROUP SYMBOL	(0)		3			
		(5)	EE USBR 5000, 5005)	5 in		12 in	
- - 1 -	SM	0.0 to 12.0 ft SILTY SAND: with low toughness, low to n with HCI.	About 80% fine sand; about 20% nonplastic fine o dry strength; maximum size, fine sand; no rea	s ction			
-		IN-PLACE CONDITION: Tai	n in color, dry.				
2 —			ND MOISTURE FROM 7.0 ft.				
- - 3 - -			nd, 16.4 % fines, LL= NA, PI = NP SPG = 2.63 1 lbs. / cu ft., optimum water content = 14.3%				
4		GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)				
-							
- 5							
-							
	IN-PLACE						
	DENSITY KEN AT 7.5						
′	ft						
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7							
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3 -							
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9 —							
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' -							
-							
2 -12	.0 ft (5832.6)						
	,						
COMM		FACE VEGETATED WITH RU IIPMENT.	SSIAN THISTLE, DISCONTINUED DUE TO LIN	1IT OF	·		

FEATURE: REACHES 9, 10 LOCATION: PIPELINE	AND 11	PROJECT: NGWSP			
LOCATION: PIPELINE					
		GROUND ELEVATION: 5830.5			
COORDINATES: N 1,840,67	73 E 2,473,294	METHOD OF EXPLORATION: CASE 680 L BACK	KHOE		
APPROXIMATE DIMENSION	NS: 15.0'X10.0'X8.5'	LOGGED BY: J. GILBERT			
DEPTH TO WATER: WLNE	DATE:	DATE EXCAVATED: 10/22/2015			
				% PLUS 3 in (BY VOLUME	
	(SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
-		80% fine sand; about 20% fines with low ength and slow dilatancy; maximum size	, fine		
1	IN-PLACE CONDITION: Tan color.				
	GEOLOGIC INTERPRETATION: Q	uaternary Alluvium (Qal)			
2 -					
2.5 ft (5828.0)					
s(CL)		bout 50% medium plastic fines with medi bout 50% fine sand; maximum size, fine s			
	IN-PLACE CONDITION: Brown in c	olor			
4 -	GEOLOGIC INTERPRETATION: Q	uaternary Alluvium (Qal)			
5 5.0 ft (5825.5)					
I ``		color, mottled, soft (H6) moderately iron oxide staining and calcite nodules; d as 2 to 4 inch subangular fragments.			
6 -	GEOLOGIC INTERPRETATION: C	retaceous Menefee Formation (Kmf)			
_					
7 —					
8 - 8.0 ft (5822.5)					
8.5 ft (5822.0)	intensely weathered (W8) in top 0.5	ined, tan in color, very soft (H7) and very ft; becomes soft (H6) and moderately to			
	intermittent iron oxide staining and o	 0.5 ft; thinly to moderately bedded; calcareous zones; no reaction with HCl ed as 3 to 10 inch subangular fragments. 	. /		
COMMENTS: SURFA	CE SPARSLEY VEGETATED WITH	H RUSSIAN THISTLE, REFUSAL MET A	T 8.5 FT		
		,,,,,,,,,,,,,			

7 E	7-1336-A (1-86) Bureau of Reclamation LOG OF TEST-PIT/HAND-AUGER NO. TPR9-15-3 SHEE FEATURE: REACHES 9, 10 AND 11 PROJECT: NGWSP SHEE	EET	2 OF	2			
FE	ATURE: REACHES	, 10 AND 11 PROJECT:	NGWSP				
LO	CATION: PIPELINE	GROUND E	ELEVATION: 5830.5				
CC	ORDINATES: N 1,84	0,673 E 2,473,294 METHOD C	OF EXPLORATION: CASE 680 L BAC	CKHOE			
AP	PROXIMATE DIMEN	SIONS: 15.0'X10.0'X8.5' LOGGED B	Y: J. GILBERT				
DE	PTH TO WATER: W	LNE DATE: DATE EXC	AVATED: 10/22/2015				
Ē	CLASSIFICATION	CLASSIFICATION AND DESCRIPTIC	N OF MATERIAL		% PLUS 3 i (BY VOLUM		
DEPTH	GROUP SYMBOL	(SEE USBR 5000, 500	95)		3 - 5 in	5 - 12 in	PLUS 12 in
		GEOLOGIC INTERPRETATION: Cretaceous	Menefee Formation (Kmf)				
CO	MMENTS:						L
50							

G73

7-1336-A (1-86) Bureau of Reclamation LOG OF TEST-PIT/HAND-AUGER NO. TPR9-15-4 SHEE FEATURE: REACHES 9, 10 AND 11 PROJECT: NGWSP SHEE				EET	1 OF	1	
FE	ATURE: REACHES	9, 10 AND 11 PROJECT: NGWSP					
	CATION: PIPELINE	GROUND ELEVATION: 5836					
	ORDINATES: N 1,8		: CASE 680 L BAC	KHOE			
	PROXIMATE DIMEN PTH TO WATER: W	SIONS: 15.0'X13.0'X14.5' LOGGED BY: J. GILBERT /LNE DATE: DATE EXCAVATED: 10/22/20)15				
	FILLOWALLK. M	DATE EXCAVATED. 10/22/20	/15		% F	LUS	3 in
Ŧ	CLASSIFICATION	CLASSIFICATION AND DESCRIPTION OF MATERIA	۱L	ļ		VOLU	ME)
DEPTH	GROUP SYMBOL	(SEE USBR 5000, 5005)			3 - 5 in	5 - 12 in	PLUS 12 in
- - 1 - - -	SC	0.0 to 4.2 ft CLAYEY SAND: About 60% fine sand; about 40% plasticity, low toughness, low dry strength and slow dilatancy sand; weak reaction with HCI. IN-PLACE CONDITION: Tan color.					
2 -		IN-FLACE CONDITION. Tail color.					
		GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal).					
4 -	4.2 ft (5831.9)						
	SM (VISUAL) (SM)g (LAB CLASS)	4.2 to 14.5 ft SILTY SAND: About 80% fine sand; about 20% rapid dilatancy, and low dry strength; maximum size, fine san with HCI.					
6 —		IN-PLACE CONDITION: Brown in color.					
- 7 - -		IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 104.7 lbs. / cu ft., 2.8 %.(93.3 % compaction) LAB TEST DATA: 67.9% sand, 14.4 % fines, 17.7% gravel, L	.L= NA, PI = Nf	þ			
8 — - 9 —	IN-PLACE DENSITY	SPG = 2.64 Maximum dry density= 116.3 lbs. / cu ft., optimum water cont Laboratory classification is: SILTY SAND WITH GRAVEL	ent = 11.6%				
- - 10	TAKEN AT 7.0 ft	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal).					
- 11 — - -							
12 — - - 13 —							
-							
- 14							
-	14.5 ft (5821.6)			+			
CC		RFACE VEGETATED WITH RUSSIAN THISTLE, DISCONTINUE			-		
	EQL	JIPMENT.					

7 B	7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HA	ND-AUGER NO. TPR9-15-5	SHEE	T 1 OF	1
FE.	ATURE: REACHES 9	9, 10 AND 11	PROJECT: NGWSP			
LO	CATION: PIPELINE		GROUND ELEVATION: 5836.4			
со	ORDINATES: N 1,83	8,473 E 2,474,173	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
AP	PROXIMATE DIMENS	SIONS: 15.0'X13.0'X13.2'	LOGGED BY: J. GILBERT			
DE	PTH TO WATER: W	LNE DATE:	DATE EXCAVATED: 10/22/2015			
E	CLASSIFICATION	CLASSIFICATION AND	DESCRIPTION OF MATERIAL		3 in JME)	
DEPTH	GROUP SYMBOL	(SEE US	BR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
	SP-SM					
- - 7 - - 8 - 8 -	<u>6.9 ft (5829.5)</u> SM (VISUAL) (CL)s (LAB CLASS)		80% fine sand; about 20% nonplastic fine th; maximum size, fine sand; strong reaction			
9 -		IN-PLACE CONDITION: Brown in	color.			
	IN-PLACE DENSITY TAKEN AT 7.0 ft	IN-PLACE UNIT WEIGHT AND M Total: 103.4 lbs. / cu ft., 6.2 %.(97 LAB TEST DATA: 82.7 % fines, 1 Maximum dry density= 106.4 lbs. Laboratory classification is: LEAN	7.2 % compaction) 7.3% sand, LL= 29.4, PI = 8.1 SPG = NA / cu ft., optimum water content = 17.2%			
11 —		GEOLOGIC INTERPRETATION:	Quaternary Alluvium (Qal).			
12 —						
13 —	13.2 ft (5823.2)					
со		FACE VEGETATED WITH RUSSIA	N THISTLE, DISCONTINUED DUE TO LIN	MIT OF		L

G75

	-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HAN	D-AUGER NO.	TPR9-15-8	SH	EET	1 OF	1
FE	ATURE: REACHES 9	, 10 AND 11	PROJECT: NGWSP					
LO	CATION: PIPELINE		GROUND ELEVATION:	5865.6				
CC	ORDINATES: N 1,83	3,412 E 2,475,530	METHOD OF EXPLORA	TION: CASE 680 L BAC	KHOE			
AP	PROXIMATE DIMENS	SIONS: 15.0'X14.0'X11.0'	LOGGED BY: J. GILBER	RT				
DE	PTH TO WATER: W	LNE DATE:	DATE EXCAVATED: 10/	22/2015				
E	CLASSIFICATION	CLASSIFICATION AND D	ESCRIPTION OF MAT	ERIAL			PLUS : Volu	
DEPTH	GROUP SYMBOL	(SEE USB	R 5000, 5005)			3 - 5 in	5 - 12 in	PLUS 12 in
- - 1 —	SM	0.0 to 2.1 ft SILTY SAND: About 80 rapid dilatancy, and low dry strength with HCI.						
_		IN-PLACE CONDITION: Brown in c	olor.					
2 —	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal).							
- - 3 -	SC 2.1 to 6.9 ft CLAYEY SAND: About 60% fine sand; about 40% fines with low plasticity, low toughness, low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl.							
-		IN-PLACE CONDITION: Tan color.						
4 —		GEOLOGIC INTERPRETATION: Q	uaternary Alluvium (C	Qal).				
_								
5 —								
_								
6 —								
_								
7 —	6.9 ft (5858.7)							
	s(CL)	6.9 to 11.0 ft SANDY LEAN CLAY: dry strength, medium toughness; al no reaction with HCI.						
-	IN-PLACE	IN-PLACE CONDITION: Brown in c	olor					
- 9 — -	DENSITY TAKEN AT 7.0 FT	IN-PLACE UNIT WEIGHT AND MC Total: 78.1 lbs. / cu ft., 2.6 %.(71.4 LAB TEST DATA: 39.6% sand, 60.3 SPG =2.62	% compaction)		9			
- 10		Maximum dry density= 109.0 lbs. / c Laboratory classification is: SANDY		content = 17.0%				
- - 11 -	11.0 ft (5854.6)	GEOLOGIC INTERPRETATION: Q	uaternary Alluvium (C	Qal).				
	- (
со		FACE VEGETATED WITH RUSSIAN	THISTLE. DISCONTI		/IT OF			
	EQU	IPMENT.						

7	-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HAN	D-AUGER NO.	TPR9-15-9	SHEE	T 1 OF	- 1
	ATURE: REACHES		PROJECT: NGWSP				
	CATION: PIPELINE	,	GROUND ELEVATION:	5880.7			
со	ORDINATES: N 1,83	32,446 E 2,475,823	METHOD OF EXPLORA	TION: CASE 680 L BAC	KHOE		
AP	PROXIMATE DIMENS	SIONS: 15.0'X13.0'X11.6'	LOGGED BY: J. GILBER	रा			
DE	PTH TO WATER: W	'LNE DATE:	DATE EXCAVATED: 10/	/22/2015			
Η	CLASSIFICATION	CLASSIFICATION AND D	ESCRIPTION OF MAT	ERIAL		% PLUS BY VOLI	
DEPTH	GROUP SYMBOL	(SEE USB	R 5000, 5005)		3 5 ir	12	PLUS 12 in
	(SM)gc	0.0 to 6.7 SILTY SAND WITH GRA about 30% subrounded to subangu subangular cobbles; about 5% non IN-PLACE CONDITION: Loose, dry	lar gravel; about 25% plastic fines; no react	subrounded to	and;	25%	
2		GEOLOGIC INTERPRETATION: Q	uaternary Pediment I	Deposit (Qpd)			
4							
6	<u>6.7 ft (5874.0)</u>						
7 — - - 8 —	CLAYSTONE	6.7 to 11.6 FT CLAYSTONE: Grey i weathered (W5), moist, intermittent strong reaction with HCI on calcite.	iron oxide staining ar	nd calcite nodules;	nts.		
- - 9 -		GEOLOGIC INTERPRETATION: C	retaceous Menefee F	Formation (Kmf)			
10							
- 11 —							
	11.6 ft (5869.1)						
СО	MMENTS: SUF	RFACE VEGETATED WITH RUSSIAN	THISTLE		I		<u> </u>

7-1336-A (1-86) Bureau of Reclamation	LUG OF TEST-PI	Г/HAND-AUGER NO. TPR9-15-10	SHEET	TUF	- 2
EATURE: REACHES	9, 10 AND 11	PROJECT: NGWSP			
OCATION: PIPIELINE		GROUND ELEVATION: 5880.8			
COORDINATES: N 1,8	SIONS: 15.0'X13.0'X12.3'	METHOD OF EXPLORATION: CASE 680 L BACKI LOGGED BY: J. GILBERT	IUE		
DEPTH TO WATER: W		DATE EXCAVATED: 10/23/2015			
				PLUS	
CLASSIFICATION GROUP SYMBOI	CLASSIFICATI			(BY VOLUM	
SYMBOL		(SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
SP-SM		RADED SAND WITH SILT: About 90% fine sand; ab rapid dilatancy, low dry strength; strong reaction with			
-	IN-PLACE CONDITION: (Grayish brown in color, calcite cement.			
-	Total: 91.1 lbs. / cu ft., 3.9	AND MOISTURE FROM 7.0 ft. 9%.(82.4 % compaction)			
-	Maximum dry density= 11 Laboratory classification is	sand, 26.0 % fines, LL = NA, PI = NP SPG = 2.65 0.6 lbs. / cu ft., optimum water content = 14.5% s: SILTY SAND			
-	GEOLOGIC INTERPRET	ATION: Quaternary Alluvium (Qal).			
IN-PLACE					
- TAKEN AT 7.0					
-					
-					
-					
-					
-					
-					
-					
-					
-					
-					
_ 10.2 ft (5870.6)					-
SANDSTONE	for a station (NACO) and a state state to the	NE: Fine grained, tan in color, slightly weathered to ard (H4), thinly to moderately bedded; intermittent			
11.0 ft (5869.8)		ction with HCl outside calcareous zones. Recovered	a 🖂		-
	as 2 to 4 inch blocky frag	ments.			
-		ATION: Cretaceous Menefee Formation (Kmf)			
- 12.3 ft (5868.5)	11.0 to 12.3 ft CLAYSTO	NE: Grey in color, mottled, soft (H6) moderately	— <u> </u>		+
	weathered (W5), moist, in blocky fragments; no read	ntermittent iron oxide staining, recovered as 2 to 4 inc ction with HCI.	:h /		
OMMENTS SUF		RUSSIAN THISTLE, MET BACKHOE REFUSAL ON			 \т
	FT.	TOGGIAN THISTEL, WET DAGNING REFUSAL ON	DEDRU		11

7-1336-A (1-86) Bureau of Reclamation LOG OF TEST-PIT/HAND-AUGER NO. TPR9-15-10 SHE FEATURE: REACHES 9, 10 AND 11 PROJECT: NGWSP			EET	2 OF	2		
FE	ATURE: REACHES	9, 10 AND 11	PROJECT: NGWSP				
LO	CATION: PIPIELINE		GROUND ELEVATION: 5880.8				
CO	ORDINATES: N 1,83	30,005 E 2,476,729	METHOD OF EXPLORATION: CASE 680 L BAC	CKHOE			
		SIONS: 15.0'X13.0'X12.3'	LOGGED BY: J. GILBERT				
DE	PTH TO WATER: W	/LNE DATE:	DATE EXCAVATED: 10/23/2015				
Ŧ	CLASSIFICATION	CLASSIFICATION AND I	DESCRIPTION OF MATERIAL		% F (BY	PLUS : VOLU	3 in ME)
DEPTH	GROUP				3 -	5 -	PLUS
	SYMBOL	(SEE USE	3R 5000, 5005)		5 in	12 in	12 in
		GEOLOGIC INTERPRETATION: (Cretaceous Menefee Formation (Kmf)				
CO	MMENTS:			I			

Bureau of Reclamation	LOG OF TEST-PIT/HAP	ND-AUGER NO. TPR9-15-11	SHEE	T 1 OF	- 1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NGWSP			
LOCATION: PIPELINE		GROUND ELEVATION: 5910.4			
COORDINATES: N 1,82	28,831 E 2,476,970	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
APPROXIMATE DIMEN	SIONS: 12.0'X10.0'X8.0'	LOGGED BY: J. GILBERT			
DEPTH TO WATER: W	INE DATE:	DATE EXCAVATED: 10/23/2015			
	CLASSIFICATION AND	CLASSIFICATION AND DESCRIPTION OF MATERIAL		% PLUS 3Y VOLU	JME)
E CLASSIFICATION GROUP SYMBOL	(SEE U	SBR 5000, 5005)	3 5 in	12	PLUS 12 in
- SC		ut 60% fine sand; about 40% fines with me edium dry strength and slow dilatancy; maxi ICI.			
1 —	IN-PLACE CONDITION: Brown in	n color.			
-	GEOLOGIC INTERPRETATION	: Quaternary Alluvium (Qal).			
2 -					
-					
3 -					
- - 3.3 ft (5907.1) - SM 		80% fine sand; about 20% nonplastic fines gth; maximum size, fine sand; strong reacti			
-	IN-PLACE CONDITION: Brown in	n color.			
-	GEOLOGIC INTERPRETATION	: Quaternary Alluvium (Qal).			
5					
-					
- 					
-					
-					
7 – _ 7.2 ft (5903.2)					<u> </u>
SANDSTONE	intensely weathered to decompo	grained, tan in color, very soft (H7) and very sed (W8-W9) in top 1.5 ft; becomes moder			
3 - 8.0 ft (5902.4)		sely weathered (W6); thinly to moderately fragments; no reaction with HCI.			
		: Cretaceous Menefee Formation (Kmf)			
		N THISTLE. REFUSAL MET ON SANDST			
			0112.		

7 B	7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HA	ND-AUGER NO. TPR9-15-12	SHEET	⁻ 1 OF	1	
	ATURE: REACHES 9	, 10 AND 11	PROJECT: NGWSP				
LO	CATION: PIPELINE		GROUND ELEVATION: 5963.5				
СО	ORDINATES: N 1,82	6,548 E 2,477,808	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
		SIONS: 13.0'X10.0'X12.2'	LOGGED BY: J. GILBERT				
DE	PTH TO WATER: W	LNE DATE:	DATE EXCAVATED: 10/23/2015				
н	CLASSIFICATION				% PLUS 3 ir (BY VOLUME		
DEPTH	GROUP			3 -		PLUS	
	SYMBOL	(SEE U	JSBR 5000, 5005)	5 in	12 in	12 in	
- - 1 -	SC		bout 60% fine sand; about 40% fines with me nedium dry strength and slow dilatancy; no	dium			
-		IN-PLACE CONDITION: Reddis	sh brown in color.				
2 -	2.5 ft (5961.0)	GEOLOGIC INTERPRETATION	N: Quaternary Alluvium (Qal).				
3 3 4	(SM)gc	sand with rapid dilatency; about	H GRAVELS AND COBBLES: About 40% fir 30% subrounded to subangular gravel; abo cobbles; about 5% nonplastic fines; no reac	ut	25%		
		IN-PLACE CONDITION: Loose,	, dry.				
5 —		GEOLOGIC INTERPRETATION	N: Quaternary Pediment Deposit (Qpd)				
-							
6 —							
7 —							
8 —							
9							
-							
- 10 —							
_							
1							
11 -							
- 12 —							
	12.2 ft (5951.3)						
СО	MMENTS: SUR	FACE VEGETATED WITH RUSSI	IAN THISTLE				

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HAN	D-AUGER NO. TPR9-15-13	SHEET	1 OF	1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NGWSP			
LOCATION: PIPELINE		GROUND ELEVATION: 5960.1			
COORDINATES: N 1,8	25,418 E 2,478,093	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
APPROXIMATE DIMEN	ISIONS: 15.0'X10.0'X11.7'	LOGGED BY: J. GILBERT			
DEPTH TO WATER: V	VLNE DATE:	DATE EXCAVATED: 10/23/2015			
	CLASSIFICATION AND	CLASSIFICATION AND DESCRIPTION OF MATERIAL			3 in ME)
	(SEE US	BR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
SP-SM 1 - 2 - 3 - 4 - 5 - 5 -	10% nonplastic fines with rapid dila fine sand; no reaction with HCI. IN-PLACE CONDITION: Tan color GEOLOGIC INTERPRETATION: 0 3.8 to 6.4 ft LEAN CLAY: About 50	Quaternary Alluvium (Qal). 0% medium plastic fines with medium dry ut 50% fine sand; maximum size, fine sand	out ce,		
6	GEOLOGIC INTERPRETATION:				
6.4 ft (5953.7) (SM)gc (SM)gc 10- 11- 11.7 ft (5948.4)	sand; about 30% subrounded to s with rapid dilatency; no reaction wi TOTAL SAMPLE (BY VOLUME): <i>I</i> to 5-inch, hard subangular to subr maximum size, 500 mm; strong re IN-PLACE CONDITION: Loose, dr GEOLOGIC INTERPRETATION: 0	About 25% 5 to 12 inch cobbles; about 20% ounded cobbles; remainder minus 3-inch; action to caliche coated gravel and cobble	nes % 3-	25%	
	RFACE VEGETATED WITH RUSSIAN	N THISTLE, DISCONTINUED DUE TO LIN	1IT OF		

7-1336-A (1-86) Bureau of Reclamation		ST PIT NO. TPR9-15-14	SHEET		·
EATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
OCATION: REACH 9		GROUND ELEVATION: 5949.5			
COORDINATES: N 1,8	23,263 E 2,478,913	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
APPROXIMATE DIMEN	SIONS: 15.0'X10.0'X10.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: W	/LNE DATE: 11/17/2015	DATE EXCAVATED: 11/17/2015	I		
	CLASSIFICATION	AND DESCRIPTION OF MATERIAL	(B`	PLUS / VOLU	JME
GROUP SYMBOL	(SE	EE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLI 1: ir
SM		bout 85% fine sand; about 15% nonplastic fines dry strength; maximum size, fine sand; no			
-	IN-PLACE CONDITION: Lig	ht brown in color, loose consolidation.			
2.0 ft (5947.5)	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)			
SC	to medium plasticity, mediun	About 80% fine sand; about 20% fines with low n toughness, medium dry strength and slow e sand; strong reaction with HCl.			
_	IN-PLACE CONDITION: Bro	wn in color.			
-	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)			
-					
-					
_					
_ 5.6 ft (5943.9)				_	+
s(CL) (VISUAL) SC-SM (LAB		LAY: About 60% fines with medium plasticity, a dry strength and no dilatancy; maximum size, th HCI.			
CLASSIF)	IN-PLACE CONDITION: Gre	ey in color, calcareous, firm consistency.			
density and 50 Lb sample taken from 7.0	Total: 101.6 lbs. / cu ft., 6.3% LAB TEST DATA: 62.8% sa	ND MOISTURE FROM 7.0 TO 8.0 ft. %. (89.7% compaction) nd, 36.8% fines, 0.4% gravel, LL = 21.9, PI = 5.1	7		
to 8.0 ft.	SPG = 2.61 Maximum dry density = 113. Laboratory classification is C	3 Ibs. / cu ft., optimum water content = 14.5% CLAYEY SAND WITH SILT			
9.5 ft (5940.0)	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal).			
		Fine grained, moderately to intenesely prownish red in color, moderately bedded; inch subangular fragments.			-
1		ION: Cretaceous Menefee Formation (Kmf)			
				1	⊥ ⊣.

10 AND 11PROJECT: NAVAJO GALLUP WATER SUPPL'IPELINEGROUND ELEVATION: 5945.52,080 E 2,479,154METHOD OF EXPLORATION: CASE 680 L BAIONS: 15.0'X10.0'X14.0'LOGGED BY: C. BEYER.NEDATE: 11/17/2015DATE: 11/17/2015DATE EXCAVATED: 11/17/2015		CT		
2,080 E 2,479,154 METHOD OF EXPLORATION: CASE 680 L BA IONS: 15.0'X10.0'X14.0' LOGGED BY: C. BEYER LNE DATE: 11/17/2015		% F		
IONS: 15.0'X10.0'X14.0' LOGGED BY: C. BEYER LNE DATE: 11/17/2015 DATE EXCAVATED: 11/17/2015		% F		
NE DATE: 11/17/2015 DATE EXCAVATED: 11/17/2015		% F		
		% F		
CLASSIFICATION AND DESCRIPTION OF MATERIAL		% F		
CLASSIFICATION CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUP				
		3 -		PLU
(SEE USBR 5000, 5005)		5 in	12 in	12 in
sand; strong reaction with HCI. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 TO 8.0 ft. Total: 89.4 lbs. / cu ft., 3.3%. (84.8 % compaction)				
12.0 to 14.0 ft POORLY GRADED SAND WITH GRAVEL AND COBBLES		10	5	trac
About 75% predominately fine sand, trace medium to coarse sand; about 20% fine to coarse, subrounded gravel; about 5% nonplastic fines, with rap dilatancy, and no dry strength; maximum size, coarse gravel. TOTAL SAMPLE (BY VOLUME) About 15% subrounded, hard, sandstone cobbles; trace subrounded to	pid			
IN-PLACE CONDITION: Grey in color; dry; weak cementation.				
GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
	1			1
\ \	 0.0 to 12.0 ft POORLY GRADED SAND: About 95% fine sand; about 5% nonplastic fines with rapid dilatancy, and low dry strength; maximum size, f sand; strong reaction with HCI. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 TO 8.0 ft. Total: 89.4 lbs. / cu ft., 3.3%. (84.8 % compaction) LAB TEST DATA: 67.4% sand, 32.6% fines, LL = N/P, PI = N/P SPG = 2.6 Maximum dry density = 105.4 lbs. / cu ft., optimum water content = 14.0% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 12.0 to 14.0 ft POORLY GRADED SAND WITH GRAVEL AND COBBLES: About 75% predominately fine sand, trace medium to coarse sand; about 20% fine to coarse, subrounded gravel; about 5% nonplastic fines, with rapidilatancy, and no dry strength; maximum size, coarse gravel. TOTAL SAMPLE (BY VOLUME) About 15% subrounded, hard, sandstone cobbles; trace subrounded to subangular sandstone boulders; remainder minus 3-inch; maximum size, 'inches. 	 0.0 to 12.0 ft POORLY GRADED SAND: About 95% fine sand; about 5% nonplastic fines with rapid dilatancy, and low dry strength; maximum size, fine sand; strong reaction with HCI. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 TO 8.0 ft. Total: 89.4 lbs. / cu ft., 3.3%. (84.8 % compaction) LAB TEST DATA: 67.4% sand, 32.6% fines, LL = N/P, PI = N/P SPG = 2.63 Maximum dry density = 105.4 lbs. / cu ft., 0, optimum water content = 14.0% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 12.0 to 14.0 ft POORLY GRADED SAND WITH GRAVEL AND COBBLES: About 75% predominately fine sand, trace medium to coarse sand; about 20% fine to coarse, subrounded gravel; about 5% nonplastic fines, with rappid dilatancy, and no dry strength; maximum size, coarse gravel. TOTAL SAMPLE (BY VOLUME) About 15% subrounded, hard, sandstone cobbles; trace subrounded to subangular sandstone boulders; remainder minus 3-inch; maximum size, 12 inches. 	in 0.0 to 12.0 ft POORLY GRADED SAND: About 95% fine sand; about 5% nonplastic fines with rapid dilatancy, and low dry strength; maximum size, fine sand; strong reaction with HCl. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 TO 8.0 ft. Total: 89.4 lbs. / cu ft., 3.3%. (84.8 % compaction) LAB TEST DATA: 67.4% sand, 32.6% fines, LL = N/P, PI = N/P SPG = 2.63 Maximum dry density = 105.4 lbs. / cu ft., optimum water content = 14.0% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 12.0 to 14.0 ft POORLY GRADED SAND WITH GRAVEL AND COBBLES: About 75% predominately fine sand, trace medium to coarse sand; about 20% fine to coarse, subrounded gravel; about 5% nonplastic fines, with rappid dilatancy, and no dry strength; maximum size, coarse gravel. 10 TOTAL SAMPLE (BY VOLUME) About 15% subrounded, hard, sandstone cobbles; trace subrounded to subangular sandstone boulders; remainder minus 3-inch; maximum size, 12 inches. 10	in in in in 0.0 to 12.0 ft POORLY GRADED SAND: About 95% fine sand; about 5% nonplastic fines with rapid dilatancy, and low dry strength; maximum size, fine sand; strong reaction with HCl. IN-PLACE CONDITION: Brownish grey in color; moist in top 2.0 ft; weak cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 TO 8.0 ft. Total: 89.4 lbs. / cu ft., 3.3%. (84.8 % compaction) LAB TEST DATA: 67.4% sand, 32.6% fines, LL = N/P, PI = N/P SPG = 2.63 Maximum dry density = 105.4 lbs. / cu ft., optimum water content = 14.0% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 12.0 to 14.0 ft POORLY GRADED SAND WITH GRAVEL AND COBBLES: About 75% predominately fine sand, trace medium to coarse sand; about 20% fine to coarse, subrounded gravel; about 5% nonplastic fines, with rappid dilatancy, and no dry strength; maximum size, coarse gravel. 10 5 TOTAL SAMPLE (BY VOLUME) About 15% subrounded, hard, sandstone cobbles; trace subrounded to subangular sandstone boulders; remainder minus 3-inch; maximum size, 12 12 12

7-1336-A (1-86)		ST PIT NO. TPR9-15-16	SHE	ET 1 OF	: 2
Bureau of Reclamation					2
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUF	PLY PROJEC	I	
LOCATION: REACH		GROUND ELEVATION: 5941.7	DAOKUOE		
,	820,886 E 2,479,400	METHOD OF EXPLORATION: CASE 680 L	BACKHOE		
	NSIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER:	WLNE DATE: 11/17/2015	DATE EXCAVATED: 11/17/2015	I		
	N CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL		% PLUS (BY VOLU	JME)
SYMBOL	(S	EE USBR 5000, 5005)		3 - 5 - 5 12 in in	PLU 12 in
- SP		DED SAND: About 95% fine sand; about 5% lilatancy, and low dry strength; maximum size ICI.	e, fine		
1 - - -	IN-PLACE CONDITION: Br cementation, stratified.	ownish grey in color; moist in top 2.0 ft; weak			
-	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal).			
_					
-					
-					
-					
-					
_ ; _					
-					
-					
-					
7.0 ft (5934.7)					
7.3 ft (5934.4)	7.0 to 7.3 ft LEAN CLAY W	ITH SAND: About 75% fines with medium			
SP (VISUAL)		ss, medium dry strength and no dilatancy; ab size, fine sand; weak reaction with HCl.	out	tr	
CLASSIF)	IN-PLACE CONDITION: Da	ark gray in color.			
 density and 50 Lb sample 		TION: Quaternary Alluvium (Qal).			
taken from 7.5 to 8.5 ft.	7.3 to 12.5 ft POORLY GRA	ADED SAND: About 95% fine sand; about 5% fine sand; about 5% filatancy, and low dry strength; trace fine to c			
-		um size, 100mm; strong reaction with HCl.			
		ownish grey in color; weak cementation.			
		JSSIAN THISTLE, AND OCCASIONAL SAG ATION DUE TO LIMIT OF EQUIPMENT.	E BRUSH A	ND	

7 1336 A (1 86)					000
7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-15-16	SHEE	T 2 OF	2
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9		GROUND ELEVATION: 5941.7			
COORDINATES: N 1,8		METHOD OF EXPLORATION: CASE 680 L BAC	XHOE		
	SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: W	VLNE DATE: 11/17/2015	DATE EXCAVATED: 11/17/2015		DILLO	0 :
	CLASSIFICATION	N AND DESCRIPTION OF MATERIAL		PLUS Y VOLU	
SYMBOL	(S	EE USBR 5000, 5005)	5 in	5 - 12 in	12 12
	GEOLOGIC INTERPRETAT	FION: Quaternary Alluvium (Qal).			
In-place density and 50 Lb sample taken from 7.5 to 8.5 ft. 12- 12.5 ft (5929.2)	Total: 88.4 lbs. / cu ft., 4.1% LAB TEST DATA: 63.5% sa Maximum dry density: 110. Laboratory classification is S	and, 31.6% fines, LL= NP, PI= NP SPG= 2.63 4 Ibs. / cu ft., optimum water content= 13.6%			
- (SP)gc				15	tr
¹³ - 14.0 ft (5927.7)	About 75% predominately fi 20% fine to coarse, subrour dilatancy, and no dry streng Total sample (BY VOLUME cobbles; trace subrounded minus 3-inch; maximum size): About 15% subrounded, hard, sandstone to subangular sandstone boulders; remainder	d		
COMMENTS:					

7-1336-A (1-86	3)						400
Bureau of Recl	lamation		PIT NO. TPR9-15-17			1 OF	1
FEATURE: RE			PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LOCATION: RE			GROUND ELEVATION: 5933.6				
		8,541 E 2,479,688	METHOD OF EXPLORATION: CASE 680 L BAC	CKHOE			
		SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER				
DEPTH TO WA	ATER: W	LNE DATE: 11/18/2015	DATE EXCAVATED: 11/18/2015				
		CLASSIFICATION AND	DESCRIPTION OF MATERIAL		(BY	PLUS 3 VOLUI	ME)
SYMB		(SEE US	SBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
- SP-S		about 10% nonplastic fines with ramaximum size, fine sand; strong	SAND WITH SILT: About 90% fine sand; apid dilatancy, and low dry strength; reaction with HCI. h grey in color dry, weak cementation.				
2 - SP	,	\backslash					
		GEOLOGIC INTERPRETATION:	Quaternary alluvium (Qal).	_/			
3 -			SAND: About 95% fine sand; about 5% cy, and low dry strength; maximum size, fi	ne			
4 - 4.3 ft (59 SC (VIS		IN-PLACE CONDITION: Light bro	own in color; dry, weak cementation,	/			
		GEOLOGIC INTERPRETATION:	Quaternary alluvium (Qal)				
	s(CL) (LAB CLASSIF)	4.3 to 14.0 ft CLAYEY SAND: Abo	out 70% fine sand; about 30% fines with ness, and medium dry strength; maximum	/			
7 -		IN-PLACE CONDITION: Brown in	n color; dry; becomes moist below 9.0 ft.				
⁸ ⁻ ⁹ ¹⁰ ¹⁰ ⁻ ¹⁰ ⁻ ¹⁰ ⁻ ¹⁰ ⁻ ¹⁰	and ample om 7.0		.3% compaction) 9.2% sand, LL = 26.8 , PI = 14.0 SPG = 2.0 5. / cu ft., optimum water content = 15.5 % Y LEAN CLAY.	65			
11- -							
12							
13 —							
- 14.0 ft (5	919.6)						
COMMENTS	S: SUF GRA	FACE VEGETATED WITH RUSSIA SS. DISCONTINUED EXCAVATION	N THISTLE, AND OCCASIONAL SAGE B N DUE TO LIMIT OF EQUIPMENT.	RUSH	ANE)	

7-1336-A (1-86)					
Bureau of Reclamation		ST PIT NO. TPR9-15-18	SHEET	1 OF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH		GROUND ELEVATION: 5940.6			
COORDINATES: N 5		METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
	INSIONS: 15.0'X10.0'X8.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER:	WLNE DATE: 11/18/2015	DATE EXCAVATED: 11/18/2015	0/		2 in
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL	% PLUS (BY VOL		
E CLASSIFICATIC	(SEE USBR 5000, 5005)		3 - 5	5 - 12	PLU 12
	· · · · · · · · · · · · · · · · · · ·	. ,	in	in	in
- SP-SM - -		DED SAND WITH SILT: About 90% fine sand; with rapid dilatancy, and low dry strength; trong reaction with HCI.			
1 —	IN-PLACE CONDITION: Br	ownish grey in color dry, weak cementation.			
	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
2 -					
-					
-					
3 —					
-					
4.0 ft (5936.6					
) BOULDERS WITH GRAVEL SAND AND SILT:	30	15	1(
AND BOULDERS		ravel; about 40% fine to coarse sand; about 10%			
5 -	nonplastic fines with rapid d	illatancy, no dry strength and rapid dilatancy; /el; grey in color, no reaction with HCl.	,		
50 pound bag sample collected from 4 to 8 ft.	subrounded sandstone cob subrounded sandstone cob	JME): About 30% 3 to 5 inch, hard, fine grained, bles; about 15% 5 to 12 inch hard, fine grained, bles; about 10% hard fine grained, subrounded nder minus 3-inch; maximum size, 1.6 ft.			
-	IN-PLACE CONDITION: Brassloughing test pit walls.	ownish grey in color dry, weak cementation,			
7	(Minus 3 inch fraction, by m	and, 47.3% gravel, 9.6% fines, LL= NP , PI = NP lass) POORLY GRADED GRAVEL WITH SILT AND			
8.0 ft (5932.6)	SAND	TOTAL TOTALL OF AND			
3		TION: Quaternary alluvium (Qal).			
GF		JSSIAN THISTLE, AND OCCASIONAL SAGE BI ATION DUE TO LIMIT OF EQUIPMENT. NO IN- S AND BOULDERS.			 ГY

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	ST PIT NO. TPR9-15-19	SHEET	1 OF 2	2
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
OCATION: REACH 9	PIPELINE	GROUND ELEVATION: 5943.9			
COORDINATES: N 81	6,203 E 2,480,335	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE		
APPROXIMATE DIMEN	ISIONS: 15.0'X10.0'X15.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: W	VLNE DATE: 11/18/2015	DATE EXCAVATED: 11/18/2015			
		AND DESCRIPTION OF MATERIAL		PLUS 3 VOLUM	
GROUP			3 -		יבנ
SYMBOL	(SE	E USBR 5000, 5005)	5 in		12 in
SP-SM		ED SAND WITH SILT: About 90% fine sand; vith rapid dilatancy, and low dry strength; ong reaction with HCI.			
2.1 ft (5941.8) SC	throughout.	wnish red in color dry, weak cementation, roots			
-	GEOLOGIC INTERPRETAT 2.1 to 4.0 ft CLAYEY SAND:	ION: Quaternary Alluvium (Qal). About 70% fine sand; about 30% fines with			
4.0 ft (5939.9)	medium plasticity, medium to	bughness, medium dry strength and slow e sand; strong reaction with HCI.	,		
SP-SM			Trace		
-	IN-PLACE CONDITION: Bro	wnish red in color, moderate calcite ut.			
6.0 ft (5937.9)		ION: Quaternary Alluvium (Qal			
(SP-SM)gc	fine fine sand, about 10% no	ED SAND WITH SILT: About 90% predominate nplastic fines with rapid dilatancy, and low dry	y 15		
7.5 ft (5936.4)		parse sand and subrounded sandstone gravel , 100 mm; strong reaction with HCI.			
SP-SM (VISUAL) SM (LAB	IN-PLACE CONDITION: Bro throughout.	wnish red in color dry, weak cementation, roots	Trace		
CLASSIF)	7.5 to 15.0 ft POORLY GRAI COBBLES:	ION: Quaternary Alluvium (Qal). DED SAND WITH SILT GRAVEL AND			
In-place density and 50 Lb sample taken from 8.0	sand; about 20% fine to coar	BY MASS): About 70% predominately fine fine rse, subrounded sandstone gravel; 10% atancy, and low dry strength; maximum size, n with HCI.			
to 9.0 ft.	TOTAL SAMPLE (BY VOLUI remainder minus 3-inch; ma	ME): About 15% subrounded sandstone cobbles ximum size, 100 mm;	5;		
	IN-PLACE CONDITION: Bro throughout.	wnish red in color dry, weak cementation, roots			
15.0 ft (5928.9)	7.5 to 15.0 ft POORLY GRAI predominately fine fine sand	ION: Quaternary Pediment (Qpd). DED SAND WITH SILT: About 90% , trace medium to coarse sand and subrounded			
		es; about 10% nonplastic fines with rapid th; maximum size, 100 mm; strong reaction with			
		SSIAN THISTLE, AND OCCASIONAL SAGE BF TION DUE TO LIMIT OF EQUIPMENT.	RUSH ANI	D	-

7 E	7-1336-A (1-86) Bureau of Reclamation LOG OF TEST PIT NO. TPR9-15-19 SHEET 2					2 OF	2
FE	ATURE: REACHES), 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	ECT		
LO	CATION: REACH 9 I	PIPELINE	GROUND ELEVATION: 5943.9				
	ORDINATES: N 816		METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
		SIONS: 15.0'X10.0'X15.0'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	LNE DATE: 11/18/2015	DATE EXCAVATED: 11/18/2015				
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION AND D	ESCRIPTION OF MATERIAL		(BY	PLUS (VOLU	ME)
DEF	SYMBOL	(SEE USB	R 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
		throughout. IN-PLACE UNIT WEIGHT AND MC Total: 104.8 lbs. / cu ft., 2.7 %.(95 LAB TEST DATA: 79.1% sand, 13. SPG = 2.64	.9 % compaction) 7 % fines, 7.2 % gravel, LL= N/P, PI = N/ cu ft., optimum water content = 13.7 % SAND		in	in	in
CO	MMENTS:						

Bureau of Reclamation EATURE: REACHES 9		EST PIT NO. TPR9-15-20 PROJECT: NAVAJO GALLUP WATER SUPPLY PR	OJECT		
OCATION: REACH 9 F		GROUND ELEVATION: 5915.4			
COORDINATES: N 1,81		METHOD OF EXPLORATION: CASE 680 L BACKH	IOF		
	SIONS: 15.0'X10.0'X10.0'	LOGGED BY: C. BEYER	.02		
	'LNE DATE: 11/18/2015	DATE EXCAVATED: 11/18/2015			
				PLUS	
CLASSIFICATION GROUP SYMBOI			· ·		<u> </u>
SYMBOL	(SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLL 12 in
_ 0.3 ft (5915.1)	0.0 to 0.3 ft CLAYEY SAN	D: About 70% fine sand; about 30% fines with			
SP-SM	medium plasticity, medium	in toughness, medium dry strength and slow ine sand; strong reaction with HCl.			
1.3 ft (5914.1)					
SC	roots throughout.	rayish brown in color, moderate cementation,			
_	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)	/ /		
-	0.3 to 1.3 ft POORLY GRA	DED SAND WITH SILT: About 90% fine sand;			
-	about 10% nonplastic fines maximum size, fine sand;	s with rapid dilatancy, and low dry strength; strong reaction with HCI.			
-	IN-PLACE CONDITION: G	rayish brown in color, calcite cement.			
-	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
4.3 ft (5911.1)		D: About 75% fine sand; about 25% fines with			
, ,		i toughness, medium dry strength and slow ine sand; strong reaction with HCl.	/		-
s(CL)					
(VISUAL) (CL)s (LAB CLASSIF)	IN-PLACE CONDITION: G roots throughout.	rayish brown in color, moderate cementation,			
	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
_	4.3 to 10.0 ft SANDY LEAN	N CLAY: About 60% fines with medium plasticity,	' 		
 In-place density and 		th, and medium to high toughness; about 40% fine sand; strong reaction with HCI.			
50 Lb sample taken from 8.0 to 9.0 ft. 1 Gal	IN-PLACE CONDITION: G nodules and roots through	rey in color, moderate cementation, calcite out.			
 bag sample 	IN-PLACE UNIT WEIGHT	AND MOISTURE FROM 8.0 TO 9.0 ft.			
 collected at 10.0 ft. 	Total: 96.8 lbs. / cu ft., 9.9	%. (96.2% compaction)			
-		and, 63.8 % fines, LL= 36.9, PI = 24.6 SPG = 2.65 0.6 lbs. / cu ft., optimum water content = 21.1 %			
-	Laboratory classification is				
-	BAG SAMPLE LAB TEST 35.1 SPG = 2.61	DATA: 23.4% sand, 76.6% fines, LL= 49.0 , PI =			
1	Laboratory classification is	LEAN CLAY WITH SAND			
10.0 ft (5905.4)		TION: Quaternary Alluvium (Qal)	\square		-
	-				
	PEACE VEGETATED WITH P	USSIAN THISTLE, AND OCCASIONAL SAGE BRU			
		ATION DUE TO LIMIT OF EQUIPMENT.			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	6T PIT NO. TPR9-15-21	SH	EET	1 OF	1	
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SU	PPLY PROJE	СТ			
OCATION: REACH 9	PIPELINE	GROUND ELEVATION: 5981.9					
COORDINATES: N 1,8	12,647 E 2,481,160	METHOD OF EXPLORATION: CASE 680	L BACKHOE				
APPROXIMATE DIMEN	ISIONS: 15.0'X10.0'X13.5'	LOGGED BY: C. BEYER					
DEPTH TO WATER: N	VLNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015					
	CLASSIFICATION	AND DESCRIPTION OF MATERIAL		% PLUS (BY VOL			
E CLASSIFICATION GROUP SYMBOL	(SE	EE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLU 12 in	
SP	nonplastic fines with rapid dil sand; weak reaction with HC	ED SAND: About 95% fine sand; about 5% latancy, and low dry strength; maximum siz l. wn in color, weak cementation.					
2 - 2.0 ft (5979.9)			/				
(GP)scb		ION: Quaternary Alluvium (Qal) DED GRAVEL WITH SAND, COBBLES AN		20	15	10	
- 3 -	BOULDERS:	avel; about 40% fine to coarse sand; about					
4	nonplastic fines with rapid dil in color, no reaction with HCl	atancy, no dry strength and rapid dilatancy	y; grey				
	subrounded sandstone cobb subrounded sandstone cobb	: About 20% 3 to 5 inch, hard fine grained, les; about 15% 5-12 inch hard fine grained les; about 10% hard fine grained, subroun der minus 3-inch; maximum size, 600mm.	l, hard,				
6 - - - 7 -	IN-PLACE CONDITION: Bro cobbles and boulders coated	wnish grey in color dry, weak cementation, d with calcite cement, sloughing test pit wa	lls.				
-	GEOLOGIC INTERPRETAT	ION: Quaternary Pediment (Qpd).					
3							
)							
0							
1 - 11.0 ft (5970.9)							
(SP)g	predominately fine sand, abo nonplastic fines with rapid dil	ADED SAND WITH GRAVEL: About 80% out 15% fine to coarse gravel; about 5% latancy, and no dry strength; trace medium , coarse gravel; weak reaction with HCI.	to				
3-	IN-PLACE CONDITION: Bro	wnish grey in color, dry, weak cementation	I.				
13.5 ft (5968.4)							
	GEOLOGIC INTERPRETAT	ION: Quaternary alluvium (Qal)					
GR	L RFACE VEGETATED WITH RU ASS. DISCONTINUED EXCAVA ST CONDUCTED IN COBBLES /	SSIAN THISTLE, AND OCCASIONAL SAC TION DUE TO LIMIT OF EQUIPMENT. NO AND BOULDERS.	GE BRUSH D IN-PLACE	ANE E DE) NSIT	L	

7	7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-15-22	SHEE	T 1 OF	:1	
	ATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY				
	CATION: REACH 9 F		GROUND ELEVATION: 5957.4	INOJECI			
-	ORDINATES: N 1,81		METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
	,	SIONS: 15.0'X4.0'X5.0'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	'LNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015				
т	CLASSIFICATION				% PLUS (BY VOLL		
DEPTH	GROUP			3 -	-	PLUS	
	SYMBOL	(SEE	USBR 5000, 5005)	5 in	12 in	12 in	
	(CL)s (VISUAL) 1 gal bag sample collected from 0.0 to 1.2 ft. 1.2 ft (5956.2) CLAYSTONE	 plasticity, medium to high dry s 25% fine sand; maximum size IN-PLACE CONDITION: Brow veins, roots throughout. BAG SAMPLE LAB TEST DAT 38.0, SPG = 2.72. Laboratory classification is: FA GEOLOGIC INTERPRETATION 1.2 to 5.0 ft CLAYSTONE: Dar occasional gypsum nodules, s (H6) from 1.2 to 2.5 ft. Becommoderately hard (H4) below 2 as 2 to 6 inch blocky fragment 	DN: Quaternary Alluvium (Qal). k grey to brown in color, iron oxide staining, andy, very intensely weathered (W8) and soft es moderately weathered (W5), and .5 ft. No reaction with HCl, recovered in bucke	ut :			
4 —							
-							
_							
5 —	5.0 ft (5952.4)						
CO			SIAN THISTLE, AND OCCASIONAL SAGE BI ION DUE TO REFUSAL ON CLAYSTONE BI			1	

7-1336-A (1-86) Bureau of Reclama	tion LOG OF	TEST PIT NO. TPR9-15-23	SH	IEET	1 OF	2
FEATURE: REACH		PROJECT: NAVAJO GALLUP WATER SUF	PLY PROJE	СТ		
LOCATION: REAC		GROUND ELEVATION: 5942.1				
COORDINATES: N	I 1,810,266 E 2,481,277	METHOD OF EXPLORATION: CASE 680 L	BACKHOE			
APPROXIMATE DI	MENSIONS: 15.0'X10.0'X14.5'	LOGGED BY: C. BEYER				
DEPTH TO WATE	R: WLNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015				
	ION CLASSIFICA	TION AND DESCRIPTION OF MATERIAL			PLUS (VOLU	
		(SEE USBR 5000, 5005)		3		PLU
		(3EE 03BK 3000, 3003)		5 in	12 in	12 in
SC 1 - 1.5 ft (5940	plasticity, low toughness	AND: About 85% fine sand; about 15% fines with s, low dry strength and slow dilatancy; maximum on with HCI.				
² SP		: Brownish Grey in color, roots throughout.				
-		TATION: Quaternary Alluvium (Qal)	/			
3		RADED SAND: About 95% fine sand; about 5% bid dilatancy, and low dry strength; trace fine gray no reaction with HCI.	/el;			
4	IN-PLACE CONDITION	: Brown in color weak cementation.				
5	GEOLOGIC INTERPRE	TATION: Quaternary Alluvium (Qal)				
- - 6 -						
7.0 ft (5935	.1)					
* SM		ND: About 85 % fine sand: about 15% fines with h and rapid dilatancy; maximum size, fine sand; l.	no			
Jin-place		: Brown in color, moist, weak cementation.				
density an 50 Lb sam taken from to 8.0 ft. gallon corrosior sample collected a 10.0 ft.	ble IN-PLACE UNIT WEIGH 7.0 Total: 92.2 Ibs. / cu ft., 7 LAB TEST DATA: 57.9 Maximum dry density = Laboratory classification	HT AND MOISTURE FROM 7.0 TO 8.0 ft. 7.2 %. (83.7 % compaction) % sand, 42.1 % fines, LL= 22.8, PI = 2.5 SPG = 110.2 lbs. / cu ft., optimum water content = 14.6 n is SILTY SAND				
3 - 4 - 14.0 ft (592)	,					
	medium sand; about 20	SAND: About 80% predominately fine sand, trac % fines with medium plasticity, medium toughne d slow dilatancy; maximum size, medium sand;				
		I RUSSIAN THISTLE, AND OCCASIONAL SAG CAVATION DUE TO LIMIT OF EQUIPMENT.	E BRUSH	ANE)	L

7 E	2-1336-A (1-86) Bureau of Reclamation	LOG OF	TEST PIT NO. TPR9-15-23	SF	IEET	2 OF	2
FE	ATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LO	CATION: REACH 9 I	PIPELINE	GROUND ELEVATION: 5942.1				
	ORDINATES: N 1,8		METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
		SIONS: 15.0'X10.0'X14.5'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	/LNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015		0/ 1		2 :0
ТН	CLASSIFICATION	CLASSIFIC	ATION AND DESCRIPTION OF MATERIAL		% PLUS (BY VOLU		
DEPTH	GROUP SYMBOL		(SEE USBR 5000, 5005)		3- 5	12	PLUS 12
		IN-PLACE CONDITIO	N: Brown in color, moist, moderate cementation.		in	in	in
		GEOLOGIC INTERPR	ETATION: Quaternary Alluvium (Qal)				
000							
	MMENTS:						

7	′-1336-A (1-86)				/	~ =	
E	Bureau of Reclamation		ST PIT NO. TPR9-15-24	SHE	ET 1	OF 1	1
	ATURE: REACHES 9		PROJECT: NAVAJO GALLUP WATER SUPPLY	Y PROJECT	Г		
	CATION: REACH 9 F		GROUND ELEVATION: 5938.8				
	ORDINATES: N 1,80		METHOD OF EXPLORATION: CASE 680 L BA	CKHOE			
		SIONS: 15.0'X10.0'X7.0'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	LNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015				
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION	AND DESCRIPTION OF MATERIAL	(% PLUS 3 (BY VOLUI		ИE)
DE	SYMBOL	(SE	EE USBR 5000, 5005)		5 1	5-F 12 in	PLU 12 in
-	SP-SM		ED SAND WITH SILT: About 90% fine sand; with rapid dilatancy, and low dry strength; eak reaction with HCI.				
- 1 —		IN-PLACE CONDITION: Gra	ayish brown in color, moderate cementation.				
-		GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)				
_							
2 —							
_							
_							
3 —	3.0 ft (5935.8)					_	
-	(SP-SM)g	predominately fine sand, trac	ED SAND WITH SILT AND GRAVEL: About 7 ce medium sand; about 15% subrounded fines with rapid dilatancy, and low dry strength k reaction with HCI				
4 —	4.0 ft (5934.8)		ayish brown in color, calcite cement.				
-	SP-SM		ION: Quaternary Alluvium (Qal) ED SAND WITH SILT: About 90% fine sand;				
_			with rapid dilatancy, and low dry strength;				
5 —			ayish brown in color, calcite cement.				
_			ION: Quaternary Alluvium (Qal)				
- 6 —							
-	6.5 ft (5932.3)						
_	CLAYSTONE					+	
- 7 —	7.0 ft (5931.8)	carbonaceous, gypsum veins	rown to orange in color, iron oxide staining, s, thinly bedded, slightly to moderately weather no reaction with HCI. Recovered in bucket as				
		to 6 inch blocky fragments.		- /			
			ION: Cretaceous Menefee Formation (Kmf)				
co			SSIAN THISTLE, AND OCCASIONAL SAGE E TION DUE TO REFUSAL ON CLAYSTONE B				

7-1336-A (1-86) Bureau of Reclamation	LOG OF T	TEST PIT NO. TPR9-15-25	SHE	ET 1	1 OF	1	
EATURE: REACHES 9	, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SI	JPPLY PROJEC	т			
OCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 5937.9					
DORDINATES: N 1,80	6,653 E 2,481,133	METHOD OF EXPLORATION: CASE 580	N BACKHOE				
PROXIMATE DIMENS	SIONS: 17'x13'x17.0'	LOGGED BY: P. Gardner					
EPTH TO WATER: NE	E DATE: 12/8/2015	DATE EXCAVATED: 12/8/2015					
				% PLUS 3 in (BY VOLUME)			
CLASSIFICATION GROUP	CLASSIFICAT	ION AND DESCRIPTION OF MATERIAL		-			
SYMBOL		(SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLU 12 in	
SM (visual) SC (lab	about 20% fines with low	ID: About 80% predominantly fine to medium plasticity, low dry strength, low toughness an coarse, hard, subrounded gravel; maximum s eaction with HCI.	d no				
classification)	IN-PLACE CONDITION: POORLY GRADED SAN carbonate stringers and r	Dry, brown, moderate cementation and lense ID from 1 inch in width to 5 inches in length. C nodules present.	ed with Calcium				
	Total: 86.6 lbf/ft³, 6.0% (LAB TEST DATA: 53.5% Maximum dry density: 11	% sand, 46.5% fines, LL= 26.8 PI= 13.4 SPG= 12.6 lbf/ft³, optimum water content= 13.6%	2.66				
-	GEOLOGIC IN TERPRET	TATION: Quaternary Alluvium (Qal)					
-							
In-place density taken							
at 7.0 ft							
-							
-							
-							
-							
-							
-							
-							
-							
-							
- 17.0 ft (5920.9)							
OMMENTS: Surfa	ace vegetation consists of g	rasses and tumbleweed. Discontinued hole d	ue to limit of	equ	ipme	ent.	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-15-26	SHEE	T 1 OF	2
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	I ' PROJECT		
LOCATION: REACH 9		GROUND ELEVATION: 5936.3			
COORDINATES: N 1,8	03,923 E 2,481,131	METHOD OF EXPLORATION: CASE 680 L BAG	CKHOE		
APPROXIMATE DIMEN	SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: V	VLNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015			
	CLASSIFICATION A	AND DESCRIPTION OF MATERIAL		% PLUS 3Y VOLU	
	(SEE	E USBR 5000, 5005)	3 5 in	12	PLUS 12 in
SC	plasticity, low toughness, low of fine sand; weak reaction with l				
2 -	IN-PLACE CONDITION: Brow	-			
	GEOLOGIC INTERPRETATIO	ON: Quaternary alluvium (Qal)			
³ – – 3.7 ft (5932.6)					
4 - SP 		ED SAND: About 95% fine sand; about 5% atancy, and low dry strength; trace fine gravel; action with HCI.			
5.7 ft (5930.6)	IN-PLACE CONDITION: Brow	n in color weak cementation.			
⁶ SC (VISUAL) In-place density and 50 Lb sample taken from 7.0 to 8.0 ft. 8.5 ft (5927.8)	5.7 to 8.5 ft CLAYEY SAND: A	DN: Quaternary Alluvium (Qal) About 85% fine sand; about 15% fines with low dry strength and slow dilatancy; maximum size HCI.			
9 _ SP	IN-PLACE CONDITION: Brow	<i>w</i> n in color, firm consistency.			
	Total: 91.6 lbs. / cu ft., 6.5 % LAB TEST DATA: 54.8% sand	d, 45.2 % fines, LL= 22.7 , PI = 6.6 SPG = 2.6 Ibs. / cu ft., optimum water content = 14.5 %			
$\frac{12.0 \text{ ft } (5924.3)}{\text{SC}}$	8.5 to 12.0 ft POORLY GRAD nonplastic fines with rapid dila	ON: Quaternary Alluvium (Qal) ED SAND: About 95% fine sand; about 5% itancy, and low dry strength; trace fine gravel;			
- 13 — -	maximum size, 25 mm; no rea				
14.0 ft (5922.3)					
		SIAN THISTLE, AND OCCASIONAL SAGE B ION DUE TO LIMIT OF EQUIPMENT.	RUSH AI	ND	

7 E	7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST	LOG OF TEST PIT NO. TPR9-15-26 SH				
FE	ATURE: REACHES §	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LO	CATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 5936.3				
CC	ORDINATES: N 1,80	03,923 E 2,481,131	METHOD OF EXPLORATION: CASE 680 L BAC	KHOE			
AP	PROXIMATE DIMEN	SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	/LNE DATE: 11/19/2015	DATE EXCAVATED: 11/19/2015				
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION A	ND DESCRIPTION OF MATERIAL		(BY		ME)
DEI	SYMBOL		USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
			About 85% fine sand; about 15% fines with ow dry strength and slow dilatancy; maximum vith HCI. n in color, firm consistency.		in		in
CO	MMENTS:						L

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-15-27	SHI	EET	1 OF	1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 5948.7				
COORDINATES: N 1,80	02,970 E 2,481,086	METHOD OF EXPLORATION: CASE 580N BAC	KHOE			
APPROXIMATE DIMEN	SIONS: 17'x13'x15.2'	LOGGED BY: P. Gardner				
DEPTH TO WATER: N	E DATE: 12/8/2015	DATE EXCAVATED: 12/8/2015				
	CLASSIFICATION A	AND DESCRIPTION OF MATERIAL			VOLUI	ME)
	(SEE	E USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
SM	fines with no plasticity, slow di medium sand; weak reaction					
² (CL)s	IN-PLACE CONDITION: Brow cementation.	PLACE CONDITION: Brown, dry, homogeneous and moderate nentation.				
3	1.8 to 4.6 ft LEAN CLAY WIT	DN: Quaternary Alluvium (Qal) H SAND: About 65% fines with low plasticity, ss and no dilatancy; about 35% fine sand; ng reaction with HCI.				
<u>4.6 ft (5944.1)</u> ₅ SM	IN-PLACE CONDITION: Dark	k brown, dry, homogeneous and hard, thumb sent.		tr		
(visual) (visual) SC (lab classification)	4.6 to 15.2 SILTY SAND WIT fines with no plasticity, mediur coarse, hard, subangular to su	DN: Quaternary Alluvium (Qal) H COBBLES: About 85% fine sand; about 15 n dry strength and slow dilatancy; trace of ubrounded gravel; trace of cobbles, hard and 100mm; weak reaction with HCI.	%			
8 -	IN-PLACE CONDITION: Brow gravel approximately 5 x 24 in	vn, dry, moderate cementation and lenses of ches in width and length.				
9 - In-place	SPG= 2.62					
10 density taken at 7.0 ft	Laboratory classification is CL					
11						
12						
13 — -						
- 14						
15 2 ft (5022 5)						
	ace vegetation consists of grasse	s, weeds and Goldenrod. Discontinued hole of	due to I	imit	of	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	EST PIT NO. TPR9-15-28	SHE	ET [,]	1 OF	1
FEATURE: REACHES 9		PROJECT: NAVAJO GALLUP WATER SUPP	LY PROJEC	т		
LOCATION: REACH 9 P	PIPELINE	GROUND ELEVATION: 5956.3				
COORDINATES: N 1,80	1,969 E 2,481,041	METHOD OF EXPLORATION: CASE 580N B	ACKHOE			
APPROXIMATE DIMENS	SIONS: 17'x13'x15.6'	LOGGED BY: P. Gardner				
DEPTH TO WATER: NE	E DATE: 12/8/2015	DATE EXCAVATED: 12/8/2015				
	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL			LUS 3 /OLUI	ME)
E CLASSIFICATION GROUP SYMBOL	(\$	SEE USBR 5000, 5005)		3 - 5 in	5 - 1 12 in	PLUS 12 in
SM (visual) s(CL) (lab classification) 	plasticity, slow dilatancy an gravel; maximum size, 10n IN-PLACE CONDITION: L homogeneous and dry. Ca IN-PLACE UNIT WEIGHT Total: 83.1 lbf/ft ³ , 8.0% (75 LAB TEST DATA: 53.9% f SPG= 2.59 Maximum dry density: 110 Laboratory classification is	fines, 46.0% sand, 0.1% gravel, LL= 26.1 PI= 1).3 lbf/ft³, optimum water content= 14.3%	o lar	in	in	in
3-						
4						
5-						
15.6 ft (5940.7)						

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7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-15-29	SHEET 1 O	F 1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	Y PROJECT	
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 5969.4		
COORDINATES: N 1,80	0,781 E 2,480,954	METHOD OF EXPLORATION: CASE 580N BAG	CKHOE	
APPROXIMATE DIMEN	SIONS: 17'x13'x15.0'	LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 12/8/2015	DATE EXCAVATED: 12/8/2015		
			% PLUS	3 in
± CLASSIFICATION	CLASSIFICATION A	AND DESCRIPTION OF MATERIAL	(BY VOL	
	(055		3- 5-	PLUS
SYMBOL	(SEE	E USBR 5000, 5005)	5 12 in in	12 in
SM SM SM SM A A A A A A A A A A A A A	 with no plasticity, no dry streng subrounded gravel; maximum IN-PLACE CONDITION: Brow cementation. Calcium carbon GEOLOGIC INTERPRETATIO 4.8 to 15.0 ft SILTY SAND: A plasticity, no dry strength and subrounded gravel; maximum IN-PLACE CONDITION: Ligh cementation. IN-PLACE UNIT WEIGHT AN Total: 83.8 lbf/ft³, 4.0% (78.8° LAB TEST DATA: 63.8% san Maximum dry density: 106.3 I Laboratory classification is SIL Two quart corrosion sample tagging the state of the s	% compaction) d, 36.2% fines, LL= NA PI= NP SPG= 2.60 bf/ft³, optimum water content= 16.5% .TY SAND	es	
14				
$\begin{vmatrix} - \\ - \\ - \\ 15 0 \text{ ft} (5954 \text{ A}) \end{vmatrix}$				
15.0 ft (5954.4)	ace venetation consists of weeds	. Discontinued hole due to limit of equipment	<u> </u>	1
	ace vegetation consists or weeds			

7- B	-1336-A (1-86) ureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-15-30	SHEET	1 OF	3			
FEA	ATURE: REACHES 9	, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT					
_00	CATION: REACH 9 F	IPELINE	GROUND ELEVATION: 6015.5						
CO	ORDINATES: N 1,79	8,117 E 2,480,867	METHOD OF EXPLORATION: CASE 580N BAC	KHOE					
APF	PROXIMATE DIMENS	SIONS: 17'x13'x15.0'	LOGGED BY: P. Gardner						
DE	PTH TO WATER: NE	DATE: 12/9/2015	DATE EXCAVATED: 12/9/2015						
I (CLASSIFICATION	CLASSIFICATION	N AND DESCRIPTION OF MATERIAL		% PLUS (BY VOLU				
	GROUP SYMBOL	(S	EE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in			
1	SM	about 20% fines with no pla of coarse, hard subangular HCI. IN-PLACE CONDITION: Br cementation. Roots and roo	About 80% fine to coarse, hard, subangular sand sticity, low dry strength and slow dilatancy; trace gravel; maximum size, 30mm; no reaction with rown, moist, homogeneous and moderate ot casts present. TION: Quaternary Alluvium (Qal)						
-	3.0 ft (6012.5)		CLAVe About 70% fines with modium plasticity						
_	s(CL)	medium toughness, high dr medium sand; maximum siz	CLAY: About 70% fines with medium plasticity, y strength and no dilatancy; about 30% fine to ze, medium sand; strong reaction with HCI. ark brown, dry, heterogeneous and hard, thumb alcium carbonate stringers and nodules and						
4 - -		manganese oxide staining p GEOLOGIC INTERPRETA	oresent. TION: Quaternary Alluvium (Qal)						
- 5 —	5.0 ft (6010.5)								
-	(CL)s	plasticity, medium toughnes	/ITH SAND: About 80% fines with medium ss, high dry strength and no dilatancy; about 20% ne sand; strong reaction with HCI.						
201			ses and weeds. Trace of boulders on the surface	ce. Discon	itinue	d			

Bureau of Reclamation FEATURE: REACHES 9 LOCATION: REACH 9 F COORDINATES: N 1,79 APPROXIMATE DIMENS DEPTH TO WATER: NE CLASSIFICATION GROUP SYMBOL	IPELINE 8,117 E 2,480,867 510NS: 17'x13'x15.0' E DATE: 12/9/2015 CLASSIFICATION AND E	PROJECT: NAVAJO GALLUP WATER SUPPLY GROUND ELEVATION: 6015.5 METHOD OF EXPLORATION: CASE 580N BAC LOGGED BY: P. Gardner DATE EXCAVATED: 12/9/2015	KHOE	% F	PLUS 3	
COORDINATES: N 1,79 APPROXIMATE DIMENSI DEPTH TO WATER: NE CLASSIFICATION GROUP SYMBOL	8,117 E 2,480,867 HONS: 17'x13'x15.0' E DATE: 12/9/2015 CLASSIFICATION AND E	METHOD OF EXPLORATION: CASE 580N BAC LOGGED BY: P. Gardner DATE EXCAVATED: 12/9/2015				
APPROXIMATE DIMENS	IONS: 17'x13'x15.0' DATE: 12/9/2015 CLASSIFICATION AND E	LOGGED BY: P. Gardner DATE EXCAVATED: 12/9/2015			LUS	
CLASSIFICATION GROUP SYMBOL	DATE: 12/9/2015 CLASSIFICATION AND E	DATE EXCAVATED: 12/9/2015			LUS 3	
CLASSIFICATION GROUP SYMBOL	CLASSIFICATION AND D				LUS	
GROUP SYMBOL		DESCRIPTION OF MATERIAL			LUS	0 :
	(SEE USE			(BX)	VOLU	
-		3R 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
3 —		wn, dry, homogeneous and hard, thumb nate stringers and nodules and manganes	se			
-	GEOLOGIC INTERPRETATION: 0	Quaternary Alluvium (Qal)				
7.0 ft (6008.5)						
SM - (lab classification) - In-place density taken - at 7.0 ft 8.0 ft (6007.5)	about 20% fines with no plasticity, I		1;			
(CL)s	Maximum dry density: 114.4 lbf/ft ³ Laboratory classification is SILTY S <u>GEOLOGIC INTERPRETATION:</u> 8.0 to 13.0 ft LEAN CLAY WITH S plasticity, medium toughness, high fine sand; maximum size, fine sand IN-PLACE CONDITION: Light brow	mpaction) 2.1% fines, LL= NA PI= NP SPG= 2.61 , optimum water content= 14.6% SAND Quaternary Alluvium (Qal) AND: About 80% fines with medium dry strength and no dilatancy; about 20% d; strong reaction with HCI. wn, dry, homogeneous, very hard and Calcium carbonate stringers and nodules sent.				

	7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT NO. TPR9	-15-30	SH	EET	3 OF	3
FE	ATURE: REACHES	, 10 AND 11 PROJECT: NAVAJ	O GALLUP WATER SUPPLY	PROJE	СТ		
LO	CATION: REACH 9 F	PIPELINE GROUND ELEVATI	ON: 6015.5				
CO	ORDINATES: N 1,79	8,117 E 2,480,867 METHOD OF EXPL	ORATION: CASE 580N BAC	KHOE			
AP	PROXIMATE DIMEN	SIONS: 17'x13'x15.0' LOGGED BY: P. G	ardner				
DE	PTH TO WATER: N	E DATE: 12/9/2015 DATE EXCAVATED	: 12/9/2015				
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION AND DESCRIPTION OF N	MATERIAL	-	(BY	VOLU	ME)
DE	SYMBOL	(SEE USBR 5000, 5005)			3 - 5 in	5 - 12 in	PLUS 12 in
11 — - - 12 — -							
- 13	13.0 ft (6002.5)						
-	s(CL)	 13.0 to 14.5 ft SANDY LEAN CLAY WITH COBBLES medium plasticity, medium toughness, medium dry s about 45% fine to coarse, hard, subangular to subrou hard, flat and elongated, subrounded cobbles; maxin to strong reaction with HCI. IN-PLACE CONDITION: Light brown, dry, homogene 	strength and no dilatanc unded sand; trace of num size, 125mm; wea	sy; Ik	tr		
14 —		carbonate stringers and nodules. Iron and mangane present. Roots and root casts present.					
_	14.5 ft (6001.0)	GEOLOGIC INTERPRETATION: Quaternary Alluviu	ım (Qal)				
- 15 -	SANDSTONE 15.0 ft (6000.5)	 14.5 to 15.0 ft SANDSTONE: Light gray, orange and grained with trace of coarse sand. Very soft (H7) and (W5). Joints are filled with clay and gypsum. Excava 12 inches in length and typically 1 or 2 inches thick. 	d moderately weathere ated in flat pieces up to Iron and manganese				
		oxide staining present. Calcium carbonate coating o	-				
		\GEOLOGIC INTERPRETATION: Cretaceous Mene		/			
CO	MMENTS:						

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST P	IT NO. TPR9-15-31	SHEE	Г 1 OF	1
FEATURE: REACHES S		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9		GROUND ELEVATION: 6025.2			
COORDINATES: N 1,79	96,915 E 2,480,664	METHOD OF EXPLORATION: CASE 580N BAC	KHOE		
APPROXIMATE DIMEN	SIONS: 17'x13'x14.0'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 12/9/2015	DATE EXCAVATED: 12/9/2015			
T CLASSIFICATION	CLASSIFICATION AND E	DESCRIPTION OF MATERIAL		PLUS Y VOLU	
CLASSIFICATION GROUP SYMBOL	(SEE USE	3R 5000, 5005)	3 - 5	12	PLUS 12
SM 1	plasticity, low dry strength and slow reaction with HCI.	0% fine sand; about 20% fines with no / dilatancy; maximum size, fine sand; no ry, moderate cementation. Roots presen Quaternary Alluvium (Qal)	t.	in	in
7 7 7 7 7 7 7 7 7 7 7 7 7 7	fines with medium plasticity, high to dilatancy; maximum size, medium IN-PLACE CONDITION: Dark brow carbonate stringers present. IN-PLACE UNIT WEIGHT AND MO Total: 95.0 lbf/ft ³ , 3.2% (87.6% cor LAB TEST DATA: 76.0% sand, 24 Maximum dry density: 108.5 lbf/ft ³ , Laboratory classification is SILTY S <u>GEOLOGIC INTERPRETATION: 0</u> 13.0 to 14.0 ft CLAYEY SAND WIT	sand; weak reaction with HCI. wn, dry, homogeneous and hard. Calciun DISTURE FROM 7.0 ft. mpaction) .0% fines, LL= NA PI= NP SPG= 2.64 optimum water content= 14.3% SAND Quaternary Alluvium (Qal) H GRAVEL, COBBLES AND BOULDER	S: 30	10	5
	toughness, high dry strength and n to subangular gravel; maximum siz TOTAL SAMPLE (BY VOLUME): <i>A</i> to angular cobbles; about 10% han cobbles; about 5% hard, subangula IN-PLACE CONDITION: Brown, dr GEOLOGIC INTERPRETATION: C	Quaternary Pediment Deposit (Qpd)			
		d weeds. Discontinued hole due to refus	al on cobb	les ar	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-15-32	SHEET	1 OF	: 1	
FEATURE: REACHES 9	,	PROJECT: NAVAJO GALLUP WATER SUPPLY GROUND ELEVATION: 6025.5	PROJECT			
COORDINATES: N 1,79	4,515 E 2,480,445	METHOD OF EXPLORATION: CASE 580N BACK	KHOE			
		LOGGED BY: P. Gardner				
DEPTH TO WATER: N	E DATE: 12/9/2015	DATE EXCAVATED: 12/9/2015	%	PLUS	3 in	
CLASSIFICATION GROUP	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL	(BY		VOLUME)	
GROUP SYMBOL	(S	SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in	
s(CL)	medium toughness no dilat	CLAY: About 60% fines with medium plasticity, tancy and medium dry strength; about 40% fine to and; maximum size, coarse sand; strong reaction				
-	IN-PLACE CONDITION: Data Calcium carbonate stringer	ark brown, very hard, homogeneous and dry. rs and nodules present.				
3.6 ft (6021.9)	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)				
SM (lab classification)	about 40% nonplastic fines	About 60% fine to coarse, hard, angular sand; with low dry strength and no dilatancy; trace of ravel; maximum size, 80mm; weak reaction with				
	IN-PLACE CONDITION: Bi lenses of POORLY GRADE 12 inches in length. Weak	rown, dry and strong cementation. Pockets and ED SAND WITH GRAVEL approximately 1 inch by reaction with HCI.	/			
	Total: 101.7 lbf/ft³, 3.3% (9 LAB TEST DATA: 70.7% s SPG= 2.62	and, 20.9% fines, 8.4% gravel, LL= NA PI= NP .9 lbf/ft³, optimum water content= 11.6%				
density taken at 7.0 ft	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)				
-						
- - - - 16.0 ft (6009.5)						
	ace vegetation consists of wee	eds. Discontinued hole due to limit of equipment.	I	1	<u> </u>	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST	PIT NO. TPR9-15-33	SHEET		1
FEATURE: REACHES 9,		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9 P COORDINATES: N 1,793 APPROXIMATE DIMENS	IPELINE 3,324 E 2,480,388	GROUND ELEVATION: 6026.7 METHOD OF EXPLORATION: CASE 580N BAC LOGGED BY: P. Gardner	KHOE		
DEPTH TO WATER: NE	DATE: 12/9/2015	DATE EXCAVATED: 12/9/2015			
	CLASSIFICATION AND	DESCRIPTION OF MATERIAL	(B)	PLUS (VOLU	ME)
SYMBOL	(SEE US	SBR 5000, 5005)	5 in		
SM (visual) SC (lab ² classification)	nonplastic fines with low dry strer	It 60% fine to medium sand; about 40% ngth and slow dilatancy; trace of hard, arse gravels; maximum size, 50mm; weak			
	IN-PLACE CONDITION: Brown a and coarse gravels, 2 by 12 inche	and dry. Lenses of hard, subrounded, fine es in length.			
4	IN-PLACE UNIT WEIGHT AND N Total: 86.3 lbf/ft ³ , 5.7% (74.5% c LAB TEST DATA: 56.7% sand, 4 SPG= 2.62				
₅ In-place		t³, optimum water content= 14.0% EY SAND			
6 density taken at 7.0 ft	Two quart corrosion sample take	n at 10 ft.			
7 - Corrosion sample taken 8 - at 10.0 ft	GEOLOGIC INTERPRETATION:	Quaternary Alluvium (Qal)			
9 -					
10					
- 11 -					
2					
³ 13.5 ft (6013.2)					
4 - (CL)s - 15.0 ft (6011.7)	plasticity, medium toughness, hig	I SAND: About 75% fines with medium h dry strength and no dilatancy; about 25% sand; Maximum size, coarse sand; no			
	IN-PLACE CONDITION: Dry, da Calcium carbonate stringers pres	rk brown, homogeneous and very hard. sent. Hard to excavate.			
	GEOLOGIC INTERPRETATION:	Quaternary Alluvium (Qal)			
	ice vegetation consists of grasses a ontinued hole due to limit of equipm	nd weeds. Trace of cobbles and gravels o ent.	n surface.		L

Bureau of Reclamation FEATURE: REACHES 9 LOCATION: REACH 9 P		ST PIT NO. TPR9-15-34	SH	EET	1 OF	1
		PROJECT: NAVAJO GALLUP WATER SUPP				
LOUIN ILAUIT		GROUND ELEVATION: 6025.8				
COORDINATES: N 1,79	2,125 E 2,480,358	METHOD OF EXPLORATION: CASE 580N E	BACKHOE			
APPROXIMATE DIMENS	SIONS: 17'x13'x15.2'	LOGGED BY: P. Gardner				
DEPTH TO WATER: NE	E DATE: 12/10/2015	DATE EXCAVATED: 12/10/2015				
⊥ CLASSIFICATION	CLASSIFICATION	AND DESCRIPTION OF MATERIAL			PLUS (VOLU	
GROUP			Γ	3 -	5 -	PLUS
SYMBOL	(SE	EE USBR 5000, 5005)		5 in	12 in	12 in
SM (visual) s(CL) (lab classification) - - - - - - - - - - - - - - - - - - -	with slow dilatancy and high 30mm; no reaction with HCI. IN-PLACE CONDITION: Lig cementation. Calcium carbo IN-PLACE UNIT WEIGHT A Total: 76.9 lbf/ft ³ , 11.9% (72 LAB TEST DATA: 68.8% fin Maximum dry density: 105.8 Laboratory classification is S	ht brown, dry and homogeneous. Moderate onate nodules and roots present. ND MOISTURE FROM 7.0 ft. 2.7% compaction) nes, 31.2% sand, LL= 40.1 PI= 22.9 SPG= 2.6 blbf/ft³, optimum water content= 18.2%				
⁷	toughness, medium dry strei maximum size, fine sand; we	About 90% fines with medium plasticity, medio ngth and no dilatancy; about 10% fine sand; eak reaction with HCI. urk brown, dry, homogeneous and hard, thum				
11- - 12.0 ft (6013.8) - CLAYSTONE - 13.0 ft (6012.8) - SANDSTONE	will not easily indent soil. Ca GEOLOGIC INTERPRETAT 12.0 to 13.0 ft CLAYSTONE scratched with fingernail, bre	ICN: Quaternary Alluvium (Qal) Dark gray and fissile. Soft (H6), can be eaks with moderate manual pressure and slig with HCI. Recovered as flat gravel sized				
14- 15- 15.2 ft (6010.6)	13.0 to 15.2 ft SANDSTONE and slightly weathered (W3) No reaction with HCI. Excav chunks.	ION: Cretaceous Menefee Formation (Kmf) Tan and fine grained. Moderately soft (H5 Calcium carbonate in joints and on surface rated in blocks, as gravels and flat 12 by 12 ir ION: Cretaceous Menefee Formation (Kmf)	s			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-15-35	SH	EET	1 OF	1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6023.1				
COORDINATES: N 1,78	39,709 E 2,480,354	METHOD OF EXPLORATION: CASE 580N BAC	KHOE			
APPROXIMATE DIMEN	SIONS: 17'x13'x15.7'	LOGGED BY: P. Gardner				
DEPTH TO WATER: N	E DATE: 12/10/2015	DATE EXCAVATED: 12/10/2015				
	CLASSIFICATION A	AND DESCRIPTION OF MATERIAL		(BY	PLUS 3 VOLUI	ME)
GROUP SYMBOL	(SEE	E USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
SM 1 - 1.4 ft (6021.7) 2 - s(CL)	about 25% nonplastic fines wi hard, subrounded, fine gravel IN-PLACE CONDITION: Tan cementation. Roots present.	out 75% fine to coarse, hard, subrounded sam ith slow dilatancy and low dry strength; trace of ; maximum size, 30mm; no reaction with HCI. , dry, homogeneous and moderate				
3 - - - 4 - 5 -	1.4 to 5.6 ft SANDY LEAN CL toughness, medium dry streng hard, subrounded sand; maxi HCI. IN-PLACE CONDITION: Dry,	ON: Quaternary Alluvium (Qal) AY: About 65% fines with low plasticity, low gth and no dilatancy; about 35% fine to coarse mum size, coarse sand; strong reaction with brown, hard and homogeneous. Roots				
5.6 ft (6017.5)	present.		4			
6 – SM (lab classification)	5.6 to 15.7 ft SILTY SAND: A	ON: Quaternary Alluvium (Qal) bout 75% fine to medium, subrounded sand; ith slow dilatancy and no dry strength; maximu action with HCI.	m			
8 - - - 9 - -	IN-PLACE UNIT WEIGHT AN Total: 88.1 lbf/ft³, 4.2% (78.9 LAB TEST DATA: 69.6% sar	% compaction) nd, 30.4% fines, LL= 20.8 PI= 2.2 SPG= 2.62				
- - 10	Laboratory classification is SI	lbf/ft³, optimum water content= 14.5% _TY SAND				
In-place density taken at 7.0 ft	GEOLOGIC INTERPRETATIO	ON: Quaternary Alluvium (Qal)				
- 12 - - - 13 -						
14-						
15 -						
– 15.7 ft (6007.4)						
	ace vegetation consists of grasse	es and weeds. Discontinued hole due to limit c	of equip	omer	<u> </u>	

7 4000 A (4 00)					
7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-15-36	SHEET	1 OF	1
FEATURE: REACHES 9	, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6015.1			
COORDINATES: N 1,78	8,530 E 2,480,178	METHOD OF EXPLORATION: CASE 580N BAC	KHOE		
APPROXIMATE DIMENS	SIONS: 17'x13'x17.0'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 12/10/2015	DATE EXCAVATED: 12/10/2015			
	CLASSIFICATION	AND DESCRIPTION OF MATERIAL		PLUS : VOLU	IME)
E CLASSIFICATION GROUP SYMBOL	(SI	EE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
s(CL)	medium plasticity, medium t dilatancy; about 30% fine to trace of hard, subangular to 125mm; strong reaction with IN-PLACE CONDITION: Da hard, thumb will not indent s GRADED SAND AND SILT	CLAY WITH COBBLES: About 70% fines with o high dry strength, medium toughness and no coarse, hard, subrounded to subangular sand; subrounded gravels and cobbles; maximum siz o HCI. ark brown, dry, predominantly homogeneous and soil. Roots present. Small channel of POORLY WITH GRAVEL measuring 2 ft in depth and 3 ft	t		
	length at the surface.	ION: Quaternary Alluvium (Qal)			
6.3 ft (6008.8)					
⁷ − SM ⁷ − (lab − classification) ³ −	to hard, subangular to subro rapid dilatancy and low dry s	VITH COBBLES: About 85% fine to coarse, soft bunded sand; about 15% nonplastic fines with strength; trace of hard, subrounded to subangula ngular to subrounded cobbles; maximum size, HCI.		tr	
9 - - -	IN-PLACE CONDITION: Ta moderate cementation.	n to light brown in color, dry, homogeneous and			
 In-place density taken at 7.0 ft 	Total: 94.3 lbf/ft ³ , 3.4% (84. LAB TEST DATA: 73.0% sa SPG= 2.61	and, 24.9% fines, 2.1% gravel, LL= NA PI= NP 2 lbf/ft³, optimum water content= 12.3%			
- - 3- - -	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)			
4 — - - 5 —					

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-15-37	Sł	HEET	1 OF	1
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SU	 PPLY PROJI	ECT		
OCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6019.6				
COORDINATES: N 1,78	37,327 E 2,480,127	METHOD OF EXPLORATION: CASE 580N	BACKHOE			
PPROXIMATE DIMEN	SIONS: 17'x13'x16.7'	LOGGED BY: P. Gardner				
EPTH TO WATER: N	E DATE: 12/10/2015	DATE EXCAVATED: 12/10/2015				
					PLUS	
CLASSIFICATION GROUP SYMBOI	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL				1
SYMBOL	(S	SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
SM	nonplastic fines with low dr	About 80% fine to medium sand; About 20% y strength and slow dilatancy; trace of fine to o subrounded gravel; maximum size, 50mm;				
- 3.2 ft (6016.4)	IN-PLACE CONDITION: Ta coarse sand and gravel.	an to light brown, dry, stratified 10 inch layer	of			
s(CL) (visual) SC-SM (lab	3.2 to 7.2 ft SANDY LEAN	TION: Quaternary Alluvium (Qal) CLAY: About 65% fines with low plasticity, lo d no dilatancy; about 35% fine sand; maximu tion with HCl.	w dry um			
classification) In-place density taken at 7.0 ft	carbonate nodules present	AND MOISTURE FROM 7.0 ft.	I			
- 7.2 ft (6012.4) SM	LAB TEST DATA: 57.3% s SPG= 2.64 Maximum dry density: 105. Laboratory classification is	and, 42.0% fines, 0.7% gravel, LL= 22.4 PI= .0 lbf/ft³, optimum water content= 18.2%	6.1			
	7.2 to 16.7 ft SILTY SAND: nonplastic fines with low dr	TION: Quaternary Alluvium (Qal) About 85% fine to medium sand; About 15% y strength and slow dilatancy; trace of fine to o subrounded gravel; maximum size, 50mm;				
Corrosion sample taken		an to light brown, dry, homogeneous.				
_ at 10.0 ft	Two quart corrosion sample	e taken at 10.0 ft.				
-	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)				
-						
-						
-						
16.7 ft (6002.9)						
, ,	ace vegetation consists of gras	sses and weeds. Discontinued hole due to li	mit of equ	ipme	nt.	<u> </u>
	J		1	•		

7-1336-A (1-86)		Г PIT NO. TPR9-15-38	СПЕ	ст	1 OF	1
Bureau of Reclamation					TOF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY GROUND ELEVATION: 6000.4	PROJEC	1		
COORDINATES: N 1,7		METHOD OF EXPLORATION: CASE 580N BAC	KHOF			
APPROXIMATE DIMEN		LOGGED BY: P. Gardner				
	E DATE: 12/11/2015	DATE EXCAVATED: 12/11/2015				
					PLUS	
	CLASSIFICATION A	ND DESCRIPTION OF MATERIAL	_	(Бт 3 -	VOLU 5 -	
BYMBOL	(SEE	USBR 5000, 5005)		5 in	12 in	12 12 in
1 SM	nonplastic fines with medium of	out 70% predominantly fine sand; about 30% Iry strength and slow dilatancy; trace of fine gravel; maximum size, 50mm; weak reaction				
² - 2.5 ft (5997.9)	IN-PLACE CONDITION: Brow gravel. Moderate cementation	n to tan, stratified and lensed with sand and				
3 - CL 	2.5 to 6.6 ft LEAN CLAY: Abo dry strength, medium toughne	DN: Quaternary Alluvium (Qal) ut 90% fines with medium plasticity, medium ss and no dilatancy; about 10% fine sand; trac bunded gravels; Maximum size, 70mm; strong				
	IN-PLACE CONDITION: Dark will not indent soil. Roots pres	brown, dry, homogeneous and hard, thumb ent.				
6.6 ft (5993.8)	GEOLOGIC INTERPRETATIC	N: Quaternary Alluvium (Qal)				
⁷ SM (lab classification)	to hard, subrounded sand; abo	TH COBBLES: About 80% fine to coarse, soft out 20% nonplastic fines with medium dry ace of cobbles; maximum size, 300mm; weak		tr	tr	
9 -	IN-PLACE CONDITION: Brow cementation.	n, dry, homogeneous and moderate				
	SPG= 2.62	6 compaction) d, 32.5% fines, 0.3% gravel, LL= NA PI= NP				
density taken at 7.0 ft	Maximum dry density: 111.8 It Laboratory classification is SIL	of/ft³, optimum water content= 15.2% TY SAND				
	GEOLOGIC INTERPRETATIC	N: Quaternary Alluvium (Qal)				
13						
14 — 						
¹⁵ – 15.8 ft (5984.6)						
- , ,	ace vegetation consists of grasses	s and weeds. Discontinued hole due to limit o	feauin	mer	nt	
			-			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	EST PIT NO. TPR9-15-39	SHEET	1 OF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY I	PROJECT		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 5991.5			
COORDINATES: N 1,7	785,378 E 2,481,411	METHOD OF EXPLORATION: CASE 580N BACH	(HOE		
APPROXIMATE DIMEN	ISIONS: 17'x13'x17.1'	LOGGED BY: P. Gardner			
DEPTH TO WATER: I	NE DATE: 12/11/2015	DATE EXCAVATED: 12/11/2015			
E CLASSIFICATIO	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL		PLUS VOLL	
	((SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
SM (visual) SC (lab classification) 	subrounded sand; About 2 slow dilatancy; trace of fine hard, subrounded cobbles with HCI. IN-PLACE CONDITION: L cementation. Cobble enco IN-PLACE UNIT WEIGHT Total: 87.5 lbf/ft³, 5.7% (70 LAB TEST DATA: 55.4% SPG= 2.56 Maximum dry density: 114 Laboratory classification is	AND MOISTURE FROM 7.0 ft. 6.6% compaction) sand, 42.5% fines, 2.1% gravel, LL= 22.3 PI= 7.3 4.3 lbf/ft ³ , optimum water content= 13.7%	J,	tr	
 15.5 ft (5976.0)					
		Y: About 90% fines with medium plasticity, medium			
¹⁰ − CL 7 − 17.1 ft (5974.4)	dry strength, medium toug	hness and no dilatancy; about 10% fine sand;	'		
	IN-PLACE CONDITION: E	Brown, dry, homogeneous and hard. Calcium odules present.			
		ATION: Quaternary Alluvium (Qal)			
	face vegetation consists of gra continued hole due to limit of e	asses and weeds. Coarse and fine gravels on surface equipment.	ace.	1	<u>I</u>

 (visual) SM (lab classification) 3 4 5 In place 	VELINEGROUND ELEVATION: 5988.8655E 2,481,193DNS: 17'x13'x16.5'LOGGED BY: P. Gardner	HOE %	PLUS VOLU	3 in
LOCATION: REACH 9 PIPE COORDINATES: N 1,784,62 APPROXIMATE DIMENSION DEPTH TO WATER: NE CLASSIFICATION GROUP SYMBOL 	YELINE GROUND ELEVATION: 5988.8 655 E 2,481,193 METHOD OF EXPLORATION: CASE 580N BACKH DNS: 17'x13'x16.5' LOGGED BY: P. Gardner DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 11.5 ft CLAYEY SAND: About 65% fine to coarse, angular to subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not	HOE (BY 3 - 5	VOLU 5 - 12	JME) PLUS
DEPTH TO WATER: NE LASSIFICATION GROUP SYMBOL - - - - - - - - - - - - -	DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 11.5 ft CLAYEY SAND: About 65% fine to coarse, angular to subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not	(BY 3 - 5	VOLU 5 - 12	JME) PLUS
LASSIFICATION GROUP SYMBOL - SC (visual) SM (lab classification) - In-place density taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 11.5 ft CLAYEY SAND: About 65% fine to coarse, angular to subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not	(BY 3 - 5	VOLU 5 - 12	JME) PLUS
GROUP SYMBOL SYMBOL SC (visual) SM (lab classification) 	(SEE USBR 5000, 5005) 0.0 to 11.5 ft CLAYEY SAND: About 65% fine to coarse, angular to subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not	(BY 3 - 5	VOLU 5 - 12	JME) PLUS
SIMBOL SC (visual) SM (lab classification) - - - - - - - - - - - - -	0.0 to 11.5 ft CLAYEY SAND: About 65% fine to coarse, angular to subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCl. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not	5	12	
 (visual) SM (lab classification) 	subrounded, soft to hard sand; About 35% fines with low plasticity, medium dry strength, low toughness and no dilatancy; trace of hard to soft, angular to subrounded gravel; maximum size, 40mm; strong reaction with HCl. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not			in
7 - - 8 - - 9 - - 10 - -	IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 102.7 lbf/ft ³ , 4.5% (92.3% compaction) LAB TEST DATA: 64.3% sand, 35.7% fines, LL= NA PI= NP SPG= 2.66 Maximum dry density: 111.3 lbf/ft ³ , optimum water content= 14.2% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
^{11 _} - 11.5 ft (5977.3)				
	11.5 to 16.5 ft CLAYEY SAND: About 55% fine sand, about 45% fines with low plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; no reaction with HCI.			
	IN-PLACE CONDITION: Yellowish to tan, dry and hard. Calcium carbonate stringers present.			
	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
¹⁶ 16.5 ft (5972.3)				
, ,	e vegetation consists of grasses. Fine gravels on surface. Discontinued hole on nent.	due to lin	nit of	<u> </u>

	EST PIT NO. TPR9-15-42	сц	сст	1 OF	1
					1
10 AND 11		r PROJE	CI		
		CKHOE			
DATE: 12/11/2015	DATE EXCAVATED: 12/11/2015				
CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL	-	(BY)	VOLU	ME)
(5	SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
medium plasticity, medium	dry strength, medium toughness and no dilatan	cy;			
IN-PLACE CONDITION: B cementation. Roots prese	brown, dry, homogeneous and moderate nt.	_			
2.4 to 5.2 ft SANDY LEAN	CLAY: About 55% fines with medium plasticity,	_/			
		ot			
5.2 to 16.7 ft SILTY SAND:	About 75% fine sand; about 25% nonplastic fin	es			
IN-PLACE CONDITION: T cementation.	an, dry, homogeneous and moderate				
Total: 90.8 lbf/ft ³ , 2.4% (85 LAB TEST DATA: 82.4% s Maximum dry density: 106	5.1% compaction) sand, 17.6% fines, LL= NA PI= NP SPG= 2.61 .7 lbf/ft³, optimum water content= 14.5%				
GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)				
	IPELINE 0,730 E 2,480,945 IONS: 17'x13'x16.7' DATE: 12/11/2015 CLASSIFICATIO (3 0.0 to 2.4 ft CLAYEY SANE medium plasticity, medium maximum size, fine sand; v IN-PLACE CONDITION: E cementation. Roots preser <u>GEOLOGIC INTERPRETA</u> 2.4 to 5.2 ft SANDY LEAN medium toughness, mediu fine sand; weak reaction w IN-PLACE CONDITION: E indent soil. Calcium carbo <u>GEOLOGIC INTERPRETA</u> 5.2 to 16.7 ft SILTY SAND: with low toughness and slo reaction with HCI. IN-PLACE CONDITION: T cementation. IN-PLACE UNIT WEIGHT Total: 90.8 lbf/ft³, 2.4% (88 LAB TEST DATA: 82.4% s Maximum dry density: 106 Laboratory classification is Two quart corrosion sample	IPELINE GROUND ELEVATION: 6008.9 0,730 E 2,480,945 METHOD OF EXPLORATION: CASE 580N BAG IONS: 17'x13'x16.7' LOGGED BY: P. Gardner DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 2.4 ft CLAYEY SAND: About 70% fine sand; about 30% fines with medium plasticity, medium dry strength, medium toughness and no dilatan- maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.4 to 5.2 ft SANDY LEAN CLAY: About 55% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will n indent soil. Calcium carbonate nodules present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 5.2 to 16.7 ft SILTY SAND: About 75% fine sand; about 25% nonplastic fin with low toughness and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate	PELINE GROUND ELEVATION: 6008.9 0,730 E 2,480,945 METHOD OF EXPLORATION: CASE 580N BACKHOE IONS: 17x13x16.7' LOGGED BY: P. Gardner DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 2.4 ft CLAYEY SAND: About 70% fine sand; about 30% fines with medium plasticity, medium dry strength, medium toughness and no dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.4 to 5.2 ft SANDY LEAN CLAY: About 55% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not indent soil. Calcium carbonate nodules present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 5.2 to 16.7 ft SILTY SAND: About 75% fine sand; about 25% nonplastic fines with low toughness and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation.	PELINE GROUND ELEVATION: 6008.9 0,730 E 2,480,945 METHOD OF EXPLORATION: CASE 580N BACKHOE IONS: 17x13x16.7' LOGGED BY: P. Gardner DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 2.4 ft CLAYEY SAND: About 70% fine sand; about 30% fines with medium plasticity, medium dry strength, medium toughness and no dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.4 to 5.2 ft SANDY LEAN CLAY: About 55% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not indent soil. Calcium carbonate nodules present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 5.2 to 16.7 ft SILTY SAND: About 75% fine sand; about 25% nonplastic fines with low toughness and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 90.8 lbf/ft³, 2.4% (85.1% compaction) LAB TEST DATA: 82.4% sand, 17.6% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 106.7 lbfft³, optimum water content= 14.5% Laboratory classification is SILTY SAND Two quart corrosion samp	PELINE GROUND ELEVATION: 6008.9 0,730 E 2,480,945 METHOD OF EXPLORATION: CASE 580N BACKHOE LONS: 17x13x16.7 LOGGED BY: P. Gardner DATE: 12/11/2015 DATE EXCAVATED: 12/11/2015 CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY VOLU 3- 5- 5 (BY VOLU 3- 5- 5 0.0 to 2.4 ft CLAYEY SAND: About 70% fine sand; about 30% fines with medium plasticity, medium dry strength, medium toughness and no dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.4 to 5.2 ft SANDY LEAN CLAY: About 55% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Brown, dry, homogeneous and hard, thumb will not indent soil. Calcium carbonate nodules present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 5.2 to 16.7 ft SILTY SAND. About 75% fine sand; about 25% nonplastic fines with low toughness and slow dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Tan, dry, homogeneous and moderate cementation. IN-PLACE CO

Priseau LOG OF TEST PIT NO. TPR9-16-43 SHEET 1 of FFATURE: REACHES 9, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT LOCATION: REACHES 9, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT LOCATION: REACHES 9, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT COORDINATES: N1,777,691 E 2,480,256 METHO OF EXPLORATION: 0500.7 COORDINATES: N1,777,691 E 2,480,226 METHO OF EXPLORATION: DEERE 310J BACKHOE APPROXIMATE DIMENSIONS: 12/18/12.7 LOGGED BY: P. Gardner DEPTH TO WATER: NE DATE: 1/25/2016 WELSSIFICATION CLASSIFICATION AND DESCRIPTION OF MATERIAL (9/17/201) GROUP (SEE USBR 5000, 5005) 3- 5- SYMBOL (SEE USBR 5000, 5005) 3- 5- SYMBOL (SEE USBR 5000, 5005) 3- 5- SYMBOL (SEE USBR 5000, 5005) 3- 5- 10 SYMBOL 0.0 to 2.3 ft CLAYEY SAND: About 55% fine to medium sand; strong reaction with HCI. 10 3- 5- SYMBOL 0.10 to 2.3 ft CLAYEY SAND: About 55% fine to coarse, subangular to subangular to subrounded, ravel: about 25% fine to coarse, subangular to subangular to subrounded; ravel:	7-1336-Δ (1	(1-86)					, , ,
LOCATION: REACH 9 PIPELINE GROUND ELEVATION: 6050.7 COORDINATES: N1,777,691 E 2,480,256 METHOD OF EXPLORATION: DEERE 310 BACKHOE APPROXIMATE DIMENSIONS: 12x18x12.7 LOGGED BY: P. Gardner DEPTH TO WATER: NE DATE: 1/25/2016 DATE EXCAVATED: 1/25/2016 CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUPhess, medium sand, about 45% (SEE USBR 5000, 5005)	Bureau of R	Reclamation	LOG OF TEST PIT	NO. IPR9-16-43	SHEET	1 OF	1
COORDINATES: N1,777,891 E.2480,256 METHOD OF EXPLORATION: DEERE 310J BACKHOE APPROXIMATE DIMENSIONS: 12X18x12.7 LOGGED BY: P. Gardner DEPTH TO WATER: NE DATE: 1252016 DATE EXCAVATED: 1/25/2016 CLASSIFICATION CLASSIFICATION AND DESCRIPTION OF MATERIAL (#Y VOL) SYMBOL (SEE USBR 5000, 5005) 3-5 5-7 SYMBOL 0.0 to 2.3 ft CLAYEY SAND: About 55% fine to medium sand, about 45% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, medium sand; strong reaction with HCI. IN-PLACE CONDITION: Dark brown, moist, homogeneous and firm. Roots and calcium carbonate nodules present. 2 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 20 10 3 GEOLOGIC INTERPRETATION: About 20% 3-5 inch hard, subangular to subrounded, hard to soft sand; about 25% fine to coarse, subangular to subrounded, hard to soft subangular to subrounded gravel; about 10% nonplastic fines with low dry strength and rapid dilatancy; strong reaction with HCI. TOTAL SAMPLE (BY VOLUME): About 20% 3-5 inch hard, subangular to subrounded cobbles; about 10% 5-12 inch hard, subangular to subrounded, hard to soft subangular to subrounded cobbles; about 5% hard subangular boulders; remainder minus 3 inch, maximum size, 500mm. IN-PLACE CONDITION: Dark to light brown, tan to white, dry and hard. Stratified and lensed with rock pockets and alternating layers of fines. Calcium carbonate present. Image aboud 10% fines to light brown, tan to white, dry and h	FEATURE: F	REACHES 9,	10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
APPROXIMATE DIMENSIONS: 12/X18/12.7 LOGGED BY: P. Gardner DEPTH TO WATER: NE DATE: 1/25/2016 DATE: 1/25/2016 DATE: 1/25/2016 CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUP (SEE USBR 5000, 5005) SYMBOL CLASSIFICATION NOT DESCRIPTION OF MATERIAL GROUP (SEE USBR 5000, 5005) SC 0.0 to 2.3 ft CLAYEY SAND: About 55% fine to medium sand, about 45% fines with medium plasticity, medium toughness, medium and, about 45% fines with medium coules present. CLASSIFICATION GEOLOGIC INTERPRETATION: Outetemary Alluvium (Oal) 2 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Outetemary Alluvium (Oal) 2.3 to 12.7 ft POORLY GRADED SAND WITH SILT, GRAVEL, COBBLES AND BOULDERS: About 65% fine to coarse, subangular to subrounded, hard to soft sand; about 25% fine to coarse, subangular to subrounded, hard to soft sand; about 25% fine to coarse, subangular to subrounded, subrounded gravel; about 10% nonplastic fines with low dry strength and rapid dilatancy, strong reaction with HCI. TOTAL SAMPLE (BY VOLUME): About 20% 3.5 inch hard, subangular to subrounded orable; about 10% 5.12 inch hard, subrounded cobbles; about 3% fine to coarse, subangular to subrounded, Stratified and lensed with rock pockets and alternating layers of fines. Calcium carbonate present. 6 GEOLOGIC INTERPRETATION: Quaternary Pediment Deposit (Qpd) 7 GEOLOGIC INTERPRETATION: Quaternary Pediment Deposit (Qpd) <td>LOCATION:</td> <td>: REACH 9 P</td> <td>PELINE</td> <td>GROUND ELEVATION: 6050.7</td> <td></td> <td></td> <td></td>	LOCATION:	: REACH 9 P	PELINE	GROUND ELEVATION: 6050.7			
DEPTH TO WATER: NE DATE: 1/25/2016 2 CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUP (SEE USBR 5000, 5005) % PLUS (BV VOL 3: 5: 5 11] 2 SC 0.0 to 2.3 ft CLAYEY SAND: About 55% fine to medium sand, about 45% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, medium set, strong reaction with HCI. IN-PLACE CONDITION: Dark brown, moist, homogeneous and firm. Roots and calcium carbonate nodules present. 2 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 20 10 3 GEOLOGIC INTERPRETATION: David 55% fine to coarse, subangular to subrounded gravel; about 55% fine to coarse, subangular to subrounded gravel; about 10% nonplastic fines with low dry strength and rapid dilatancy; strong reaction with HCI. TOTAL SAMPLE (BY VOLUME): About 20% 3-5 inch hard, subangular to subrounded cobbles; about 5% hard subangular boulders; remainder minus 3 inch; maximum size, 500mm. IN-PLACE CONDITION: Dark to light brown, tan to white, dry and hard. Stratified and lensed with ncck pockets and alternating layers of fines. Calcium carbonate present. GEOLOGIC INTERPRETATION: Quaternary Pediment Deposit (Qpd) I	COORDINAT	ATES: N 1,777	7,691 E 2,480,256	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE		
2 CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY VOLD)	APPROXIMA	IATE DIMENS	ONS: 12'x18'x12.7'	_OGGED BY: P. Gardner			
E CLASSIFICATION SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL (EY VOLI SEE USBR 5000, 5005) Image: Comparison of the comparison o	DEPTH TO V	WATER: NE	DATE: 1/25/2016	DATE EXCAVATED: 1/25/2016			
SC 0.0 to 2.3 ft CLAYEY SAND: About 55% fine to medium sand, about 45% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, medium sand; strong reaction with HCl. IN-PLACE CONDITION: Dark brown, moist, homogeneous and firm. Roots and calcium carbonate nodules present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) (SP-SM)gcb 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Outernary Alluvium (Qal) 2.3 ft (6048.4) GEOLOGIC INTERPRETATION: Subary and to soft, subangular to subrounded, hard to soft sand; about 55% fine to coarse, subangular to subrounded cobbles; about 10% nonplastic fines with low dry strength and rapid dilatancy; strong reaction with HCl. TOTAL SAMPLE (BY VOLUME): About 20% 3-5 inch hard, subangular to subrounded cobbles; about 55% hard subangular boulders; remainder minus 3 inch; maximum size, S00mm. N-PLACE CONDITION			CLASSIFICATION AND DES	SCRIPTION OF MATERIAL			
 fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, medium sand; strong reaction with HCl. IN-PLACE CONDITION: Dark brown, moist, homogeneous and firm. Roots and calcium carbonate nodules present. (SP-SM)gcb 2.3 th (6048.4) GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 2.3 to 12.7 ft POORLY GRADED SAND WITH SILT, GRAVEL, COBBLES AND BOULDERS: About 65% fine to coarse, subangular to subrounded, hard to soft sand; about 25% fine to coarse, subangular to subrounded gravel; about 10% nonplastic fines with low dry strength and rapid dilatancy; strong reaction with HCl. TOTAL SAMPLE (BY VOLUME): About 20% 3-5 inch hard, subangular to subrounded cobbles; about 10% 5-12 inch hard, subrounded cobbles; about 5% hard subangular boulders; remainder minus 3 inch; maximum size, 500mm. IN-PLACE CONDITION: Dark to light brown, tan to white, dry and hard. Stratified and lensed with rock pockets and alternating layers of fines. Calcium carbonate present. GEOLOGIC INTERPRETATION: Quaternary Pediment Deposit (Qpd) 			(SEE USBR	5000, 5005)	5	12	PLUS 12 in
12- - 12- - 12.7 ft (6038.0) - COMMENTS: Surface vegetation consists of grasses. Discontinued hole due to limit of equipment.	2 - 2.3 ft (((SP-S) 3 - 4 - 5 - 6 - 7 - 8 - 10 - 11 - 12 - 12.7 ft ((6048.4) SM)gcb	fines with medium plasticity, medium said dilatancy; maximum size, medium said IN-PLACE CONDITION: Dark brown, and calcium carbonate nodules prese GEOLOGIC INTERPRETATION: Qui 2.3 to 12.7 ft POORLY GRADED SAN AND BOULDERS: About 65% fine to hard to soft sand; about 25% fine to c subrounded gravel; about 10% nonpla- rapid dilatancy; strong reaction with H TOTAL SAMPLE (BY VOLUME): Abo subrounded cobbles; about 10% 5-12 5% hard subangular boulders; remain 500mm. IN-PLACE CONDITION: Dark to light Stratified and lensed with rock pocket Calcium carbonate present. GEOLOGIC INTERPRETATION: Qui	toughness, medium dry strength and r nd; strong reaction with HCI. , moist, homogeneous and firm. Roots ent. aternary Alluvium (Qal) ND WITH SILT, GRAVEL, COBBLES o coarse, subangular to subrounded, oarse, hard to soft, subangular to astic fines with low dry strength and CI. but 20% 3-5 inch hard, subangular to 2 inch hard, subrounded cobbles; about nder minus 3 inch; maximum size, t brown, tan to white, dry and hard. is and alternating layers of fines. aternary Pediment Deposit (Qpd)	10 5 20 t		5

EATURE: REACHES 9 OCATION: REACH 9 P COORDINATES: N 1,77 PPROXIMATE DIMENS	IPELINE	PROJECT: NAVAJO GALLUP WATER SUPPLY P GROUND ELEVATION: 6043.1	ROJECT		
OORDINATES: N 1,77 PPROXIMATE DIMENS		GROUND ELEVATION: 6043.1			
PPROXIMATE DIMENS					
		METHOD OF EXPLORATION: DEERE 310J BACK	HOE		
	ions: 12'x18'x13.2'	LOGGED BY: P. Gardner			
EPTH TO WATER: NE	DATE: 1/25/2016	DATE EXCAVATED: 1/25/2016			
CLASSIFICATION GROUP	CLASSIFICATION A	AND DESCRIPTION OF MATERIAL	(BY	PLUS (VOLU	JME
SYMBOL	(SEE	USBR 5000, 5005)	3 - 5 in	5 - 12 in	PL 1
SC		About 65% fine sand; about 35% fines with low dry strength and no dilatancy; maximum size, l.			
-	IN-PLACE CONDITION: Dark homogeneous. Roots present	k brown, dry, moderate cementation and t.			
-	GEOLOGIC INTERPRETATIO	DN: Quaternary Alluvium (Qal)			
- 3.4 ft (6039.7)					
CH (visual) s(CL)		out 95% fines with high plasticity, high dry no dilatancy; about 5% fine sand, maximum h HCl.			
- (lab classification)	IN-PLACE CONDITION: Dark carbonate nodules present. N	brown, dry, homogeneous and hard. Calcium lot easy to excavate.			
- - - - - - - - - - - - - - - - - - -	Maximum dry density: 108.3 I Laboratory classification is SA	% compaction) s, 35.6% sand, LL= 30.9 PI= 14.6 SPG= 2.61 bf/ft³, optimum water content= 16.0%			
11.5 ft (6031.6)					
CLAYSTONE	and fissile. Fine grained with f (W5) and moderately soft (H5	Tan to dark brown, laminated to thickly bedded fine sand lamination. Moderately weathered). Excavated in angular, gravel size to flat fion with HCI. MnOx spotting and stains present			
– 13.2 ft (6029.9)	N	DN: Cretaceous Menefee Formation (Kmf)			╞
		s and weeds. Discontinued hole due to refusal	<u> </u>		

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-45	SH	EET	1 OF	1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPF	LY PROJE	СТ		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6045.7				
COORDINATES: N 1,7	75,373 E 2,479,698	METHOD OF EXPLORATION: DEERE 310J	BACKHOE			
APPROXIMATE DIMEN	SIONS: 12'x18'x11.2'	LOGGED BY: P. Gardner				
DEPTH TO WATER: N	IE DATE: 1/25/2016	DATE EXCAVATED: 1/25/2016				
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL			PLUS : Volu	
≝ CLASSIFICATION GROUP SYMBOL	(9	EE USBR 5000, 5005)		3-		PLU
		SEE 03BR 3000, 3003)		5 in	12 in	12 in
SM (lab classification)	nonplastic fines with low dry coarse gravel; maximum siz IN-PLACE CONDITION: Ta cementation. IN-PLACE UNIT WEIGHT A Total: 95.0 lbf/ft ³ , 5.0% (86 LAB TEST DATA: 68.1% s SPG= 2.57 Maximum dry density: 110. Laboratory classification is s	and, 31.2% fines, 0.7% gravel, LL= NA PI= NI 0 lbf/ft³, optimum water content= 13.5%	et,			
-						
9 – – – 9.8 ft (6035.9)						
¹⁰ SANDSTONE 11 11.2 ft (6034.5)	Intensely weathered (W7) a Calcium carbonate present	E: Tan to orange to brown. Fine grained. and soft (H6), easily broken with hand pressur in joints. Sandstone has no reaction with HC avated in gravel size and flat 1x5x5 inch piece				
		TION: Cretaceous Menefee Formation (Kmf)				

CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005)	US 3 in OLUME) 5 - PLUS in in
GROUND ELEVATION: 6050.1 9,055 METHOD OF EXPLORATION: DEERE 310J BACKHOE x14.5' LOGGED BY: P. Gardner 5/2016 DATE EXCAVATED: 1/25/2016 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 3-5 in .5 ft SILTY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI. E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 in dry density: 108.9 lbf/ft³, optimum water content= 14.5% ry classification is SILTY SAND rt corrosion sample taken at 10 ft	OLUME) 5 - PLUS 12 12
x14.5' LOGGED BY: P. Gardner 55/2016 DATE EXCAVATED: 1/25/2016 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) (BY VI (BY VI (BY VI (BY VI)) (BE USBR 5000, 5005) Still TY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI. E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 n dry density: 108.9 lbf/ft³, optimum water content= 14.5% ory classification is SILTY SAND rt corrosion sample taken at 10 ft	OLUME) 5 - PLUS 12 12
5/2016 DATE EXCAVATED: 1/25/2016 CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) % PL (BY W 3- 5 in .5 ft SILTY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI. 8 .5 ft SILTY SAND: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. 8 .6 E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 n dry density: 108.9 lbf/ft³, optimum water content= 14.5% ory classification is SILTY SAND rt corrosion sample taken at 10 ft 1	OLUME) 5 - PLUS 12 12
CLASSIFICATION AND DESCRIPTION OF MATERIAL % PL (BY W (SEE USBR 5000, 5005) 3- 5 .5 ft SILTY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI. - E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. - E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. - 7.7 lbf/ft³, 5.7% (80.5% compaction) - ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 in dry density: 108.9 lbf/ft³, optimum water content= 14.5% ory classification is SILTY SAND - rt corrosion sample taken at 10 ft - -	OLUME) 5 - PLUS 12 12
CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY W (SEE USBR 5000, 5005) 3- 5 .5 ft SILTY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI. E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 n dry density: 108.9 lbf/ft³, optimum water content= 14.5% wry classification is SILTY SAND rt corrosion sample taken at 10 ft	OLUME) 5 - PLUS 12 12
(SEE USBR 5000, 5005)5in.5 ft SILTY SAND: About 55% fine sand; about 45% nonplastic fines dry strength and slow dilatancy; maximum size, medium sand; no with HCI.E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft.E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 n dry density: 108.9 lbf/ft³, optimum water content= 14.5% ory classification is SILTY SAND rt corrosion sample taken at 10 ft	12 12
dry strength and slow dilatancy; maximum size, medium sand; no with HCI. E CONDITION: Brown, dry, homogeneous and predominantly neous. Stratified and lenses at 3.2 to 4.2 ft. E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft³, 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 n dry density: 108.9 lbf/ft³, optimum water content= 14.5% rry classification is SILTY SAND rt corrosion sample taken at 10 ft	
heous. Stratified and lenses at 3.2 to 4.2 ft. E UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 7.7 lbf/ft ³ , 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 in dry density: 108.9 lbf/ft ³ , optimum water content= 14.5% ory classification is SILTY SAND rt corrosion sample taken at 10 ft	
7.7 Ibf/ft ³ , 5.7% (80.5% compaction) ST DATA: 64.7% sand, 35.3% fines, LL= NA PI= NP SPG= 2.65 in dry density: 108.9 Ibf/ft ³ , optimum water content= 14.5% bry classification is SILTY SAND rt corrosion sample taken at 10 ft	
n dry density: 108.9 lbf/ft³, optimum water content= 14.5% ry classification is SILTY SAND rt corrosion sample taken at 10 ft	
GIC INTERPRETATION: Quaternary Alluvium (Qal)	
	1
	on consists of grasses and weeds. Discontinued hole due to limit of equipment

	-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-47	SF	IEET	1 OF	2
FE	Bureau of Reclamation LOG OF TEST PTI NO. TPR9-10-47 S FEATURE: REACHES 9, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY PROV						
LO	CATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6048.6				
	ORDINATES: N 1,77		METHOD OF EXPLORATION: DEERE 310J BA	CKHOE			
		SIONS: 12'x18'x14.0'	LOGGED BY: P. Gardner				
DE	PIH TO WATER: N	E DATE: 1/26/2016	DATE EXCAVATED: 1/26/2016		%	PLUS	3 in
рертн	CLASSIFICATION GROUP	CLASSIFICATION	AND DESCRIPTION OF MATERIAL			VOLU	
ā	SYMBOL	(SI	EE USBR 5000, 5005)		5 in	12 in	12 in
-	CL		bout 95% fines with medium plasticity, medium ngth and no dilatancy; about 5% fine sand; p reaction HCI.				
-		IN-PLACE CONDITION: Da	ark brown, moist, homogeneous and hard.				
1 -		GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)				
-							
2							
	2.2 ft (6046.4)						
_	SP-SM 2.6 ft (6046.0)	_ coarse, hard, subrounded s	DED SAND WITH SILT: About 80% fine to and; about 10% fine to coarse, subrounded, har				
-	(CL)s (visual)	gravel; about 10% fines with maximum size, 70mm; no re	no plasticity, low dry strength and slow dilatance eaction with HCI.	;y;			
3 -	s(CL) (lab classification)	IN-PLACE CONDITION: Br cementation.	own, dry, lensed with gravel pockets, moderate				
- - 4 -		2.6 to 11.2 ft LEAN CLAY V plasticity, medium toughnes	TON: Quaternary Alluvium (Qal) VITH SAND: About 75% fines with medium s, medium dry strength and no dilatancy; about ze, fine sand; no reaction HCl.				
-			own, dry, homogeneous and hard.				
-	In-place density taken	IN-PLACE UNIT WEIGHT A	ND MOISTURE FROM 7.0 ft.				
5	at 7.0 ft		6% compaction) nes, 33.7% sand, LL= 33.3 PI= 19.3 SL= 14.4				
-		SPG= 2.67 Maximum dry density: 108.9 Laboratory classification is S	9 lbf/ft³, optimum water content= 16.2% SANDY LEAN CLAY				
6 —		GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)				
-							
-							
7		and variation consists of sur-	Discontinued hale due to limit of anything				
		ace vegetation consists of grass	ses. Discontinued hole due to limit of equipmer	п.			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PI	T NO. TPR9-16-47	SHI	EET	2 OF	2
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6048.6				
COORDINATES: N 1,7		METHOD OF EXPLORATION: DEERE 310J BA	CKHOE			
APPROXIMATE DIMEN		LOGGED BY: P. Gardner				
DEPTH TO WATER: N	IE DATE: 1/26/2016	DATE EXCAVATED: 1/26/2016	—	0/ Г	PLUS	2 in
	CLASSIFICATION AND D	ESCRIPTION OF MATERIAL	Ļ	(BY	VOLU	ME)
SYMBOL	(SEE USB	R 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
$ \begin{array}{c} $	11.2 to 14.0 ft CLAYEY SAND: Ab	y, homogeneous and moderate				
13 —						
14.0 ft (6034.6)						
COMMENTS:						

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	ST PIT NO. TPR9-16-48	SHEE	T 1 OF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6046.1			
COORDINATES: N 1,7	70,789 E 2,478,049	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE		
APPROXIMATE DIMEN	ISIONS: 12'x18'x14.4'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	JE DATE: 1/26/2016	DATE EXCAVATED: 1/26/2016			
	CLASSIFICATION	AND DESCRIPTION OF MATERIAL		PLUS (Y VOLU	ME)
± CLASSIFICATION GROUP SYMBOL	(SE	E USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
SC 1 - 2 - 1.8 ft (6044.3) s(CL)	sand; about 40% fines with m strength and no dilatancy; ma HCI.	About 60% fine to coarse, hard, subrounded nedium plasticity, low toughness, medium dry aximum size, coarse sand; weak reaction with own, dry, homogeneous, moderate cementation	ı. /		
(lab) 3 classification)	1.8 to 7.6 ft SANDY LEAN C medium dry strength, low tou maximum size, fine sand; we				
□ In-place □ density taken □ □ at 7.0 ft	IN-PLACE UNIT WEIGHT AN Total: 85.7 lbf/ft ³ , 7.8% (78.0	0% compaction)			
	Maximum dry density: 109.9 Laboratory classification is SA	es, 32.6% sand, LL= 28.6 PI= 14.5 SPG= 2.64 Ibf/ft³, optimum water content= 16.0% ANDY LEAN CLAY FO UNDERLYING INTERVAL.			
7 – 7.6 ft (6038.5)		ION: Quaternary Alluvium (Qal)			
8 - SC	7.6 to 14.4 ft CLAYEY SANE	D: About 55% fine sand, about 45% fines with h, low toughness and no dilatancy; maximum			
9	IN-PLACE CONDITION: Ligi cementation.	ht brown, dry, homogeneous, moderate			
10	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)			
- 12 -					
13					
14- 14.4 ft (6031.7)					
COMMENTS: Sur	face vegetation consists of grass	es and weeds. Discontinued hole due to limit o	f equipmo	ent.	

7-1336-A (1-86) Bureau of Reclamation FEATURE: REACHES 9		EST PIT NO. TPR9-16-49 PROJECT: NAVAJO GALLUP WATER SUPP	SHEET	
-CATION: REACHES		GROUND ELEVATION: 6041.7		
		METHOD OF EXPLORATION: DEERE 310J B		
COORDINATES: N 1,70			BACKHUE	
		LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 1/26/2016	DATE EXCAVATED: 1/26/2016		
CLASSIFICATION GROUP SYMBOI	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL	(BY	
SYMBOL	((SEE USBR 5000, 5005)	3 - 5 in	5 - PL 12 1 in i
SC		ID: About 55% fine sand; about 45% fines with ngth, low toughness and no dilatancy; maximun n with HCI.		
- - 2.2 ft (6039.5)	IN-PLACE CONDITION: E	Brown, dry, homogeneous, moderate cementati	on.	
CL (visual) (CL)s	2.2 to 11.3 ft LEAN CLAY	ATION: Quaternary Alluvium (Qal) 2 About 90% fines with medium plasticity, high o and no dilatancy; about 10% fine sand; maximur a reaction with HCI.	dry n	
(lab classification)		Dark brown, dry, homogeneous, very hard and r nbnail. Difficult to excavate.	not	
	Total: 96.8 lbf/ft³, 13.2% (LAB TEST DATA: 83.0% SPG= 2.61	AND MOISTURE FROM 7.0 ft. 98.3% compaction) fines, 17.0% sand, LL= 49.1 PI= 33.8 SL= 11.2 5 lbf/ft ³ , optimum water content= 23.0%		
_ In-place		EEAN CLAY WITH SAND		
density taken at 7.0 ft	GEOLOGIC INTERPRET	ATION: Quaternary Alluvium (Qal)		
-				
11.3 ft (6030.4)				
SM		ID: About 65% fine sand; about 35% fines with ngth, low toughness and no dilatancy; maximun n with HCI.		
-	IN-PLACE CONDITION: E	Brown, dry, homogeneous, moderate cementati	on.	
- 14.0 ft (6027.7)	GEOLOGIC INTERPRETA	ATION: Quaternary Alluvium (Qal)		
, ,	ace vegetation consists of gra	asses and weeds. Discontinued hole due to limi	t of oquipmo	nt

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	EST PIT NO. TPR9-16-50	SHEE	T 1 OF	[:] 1
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
OCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6044.1			
COORDINATES: N 1,76	7,531 E 2,476,755	METHOD OF EXPLORATION: DEERE 310J BA	CKHOE		
APPROXIMATE DIMEN	SIONS: 12'x18'x12.9'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 1/26/2016	DATE EXCAVATED: 1/26/2016			
CLASSIFICATION	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL		5 PLUS Y VOLL	
CLASSIFICATION GROUP SYMBOL	(5	SEE USBR 5000, 5005)	3 - 5	12	PLI 1
0.6 ft (6043.5) SC 1.6 ft (6042.5) (visual) (CL)s (lab classification) In-place density taken at 7.0 ft	toughness, medium dry stra maximum size, fine sand; r IN-PLACE CONDITION: G GEOLOGIC INTERPRETA 0.6 to 1.6 ft CLAYEY SANI plasticity, low dry strength, fine sand; weak reaction wi IN-PLACE CONDITION: B GEOLOGIC INTERPRETA 1.6 to 8.8 ft SANDY LEAN strength, low toughness an trace of fine, hard, subroun with HCI. IN-PLACE CONDITION: T stratified with SILT and POU IN-PLACE UNIT WEIGHT J Total: 80.6 lbf/ft ³ , 8.0% (77 LAB TEST DATA: 72.9% ff Maximum dry density: 103 Laboratory classification is	Gray, moist, homogeneous and hard. <u>ATION: Quaternary Alluvium (Qal)</u> D: About 65% fine sand; about 35% fines with lo low toughness and no dilatancy; maximum size, ith HCI. Brown, dry, homogeneous and hard. <u>ATION: Quaternary Alluvium (Qal)</u> <u>CLAY: About 65% fines with low plasticity, low of</u> ad slow dilatancy; about 35% fine to medium sam- inded gravel; maximum size, 20mm; weak reaction Fan to dark brown, dry and hard. Lensed and ORLY GRADED SAND WITH SILT. AND MOISTURE FROM 7.0 ft. 7.8% compaction) Fines, 27.1% sand, LL= 29.7 PI= 14.1 SPG= 2.65 .6 lbf/ft ³ , optimum water content= 19.4%	w dry d; n	in	
8.8 ft (6035.3)	GEOLOGIC INTERFRETA				_
	toughness, medium dry str	About 85% fines with medium plasticity, mediur ength and no dilatancy; about 15% fine to mediu dium sand; weak reaction with HCI.			
-	IN-PLACE CONDITION: D to excavate.	oark brown, dry. Calcium carbonate present. Ha	Ird		
-	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
-					
12.9 ft (6031.2)					
	ace vegetation consists of gras	sses and weeds. Discontinued hole due to refus	al on stiff	clav.	<u> </u>
	J				

7-1336-A (1-86)	LOG OF TEST PIT NO. TPR9-16-51	SHEE	T 1 0	= 1
Bureau of Reclamation				
FEATURE: REACHES		PROJECT		
COORDINATES: N 1,7		CKHUE		
APPROXIMATE DIMEN				
DEPTH TO WATER: N	IE DATE: 1/26/2016 DATE EXCAVATED: 1/26/2016			<u>.</u>
	CLASSIFICATION AND DESCRIPTION OF MATERIAL	(1	% PLUS 3Y VOL	JME)
SYMBOL	(SEE USBR 5000, 5005)	3 5 ir	12	PLUS 12 in
SM	0.0 to 2.6 ft SILTY SAND: About 80% fine to medium sand; about 20% nonplastic fines with low dry strength and slow dilatancy; maximum size, medium sand; weak reaction with HCI.			
	IN-PLACE CONDITION: Brown, dry, stratified and moderate cementation. Roots present.			
_ 2.6 ft (6044.2)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
3 – (CL)s (lab classification)	2.6 to 8.2 ft LEAN CLAY WITH SAND: About 85% fines with medium toughness, medium plasticity, medium dry strength and no dilatancy; about 15% fine sand; maximum size, fine sand; no to weak reaction with HCI.			
⁴ – – – 5 – In-place	IN-PLACE CONDITION: Dark brown, dry, homogeneous, very hard and difficult to scratch with thumbnail. Calcium carbonate stringers present. Hat to excavate.	ard		
density taken - at 7.0 ft	IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 92.1 lbf/ft³, 13.2% (90.7% compaction) LAB TEST DATA: 70.6% fines, 29.4% sand, LL= 40.7 PI= 25.9 SL= 10.9			
7	SPG= 2.64 Maximum dry density: 101.5 lbf/ft³, optimum water content= 20.9% Laboratory classification is LEAN CLAY WITH SAND			
- 8 − 8.2 ft (6038.6)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
				-
- CL 9	8.2 to 13.9 ft LEAN CLAY: About 95% fines with low plasticity, low toughness, low dry strength and no dilatancy; about 5% fine sand; maximum size, fine sand; weak reaction with HCl.	m		
_ 0 —	IN-PLACE CONDITION: Gray, dry, homogeneous and hard.			
-	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
-				
2				
-				
3-				
~ _				
13.9 ft (6032.9)				
, ,	face vegetation consists of grasses and weeds. Discontinued hole due to limit	of equipm	nent.	1

7-1336 Bureau	-A (1-86) of Reclamation	LOG OF TEST PIT N	O. TPR9-16-52	SHEET	1 OF	2
FEATUR	RE: REACHES 9	, 10 AND 11 PRC	DJECT: NAVAJO GALLUP WATER SUPPLY P	ROJECT		
	ON: REACH 9 F		DUND ELEVATION: 6050.4			
		, , ,	THOD OF EXPLORATION: DEERE 310J BACK	KHOE		
			GED BY: P. Gardner E EXCAVATED: 1/27/2016			
	IO WAILN. N			%	PLUS	3 in
	SSIFICATION GROUP	CLASSIFICATION AND DESCI	RIPTION OF MATERIAL		VOLL	T Ó
	SYMBOL	(SEE USBR 500	10, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
-	SP-SM	0.0 to 2.1 ft POORLY GRADED SAND medium sand; about 10% nonplastic fine dilatancy; maximum size, medium sand;	es with low dry strength and slow			
- 1		IN-PLACE CONDITION: Brown, dry, str Roots present.	atified and moderate cementation.			
-		GEOLOGIC INTERPRETATION: Quate	rnary Alluvium (Qal)			
2 - 2.1	ft (6048.3)					
	CL	2.1 to 4.0 ft LEAN CLAY: About 90% fir strength, low toughness and no dilatanc size, fine sand; weak reaction with HCI.				
3 —		IN-PLACE CONDITION: Dark brown, dr	y, homogeneous and very hard.			
-		GEOLOGIC INTERPRETATION: Quate	rnary Alluvium (Qal)			
4 4.0	ft (6046.4)					
-	SM ft (6045.8)	4.0 to 4.6 ft SILTY SAND: About 70% fi with low dry strength and slow dilatancy; reaction with HCI.		k		
5	(CL)s (visual)	N-PLACE CONDITION: Brown, dry, str	atified and moderate cementation.			
_	CL (lab	GEOLOGIC INTERPRETATION: Quate 4.6 to 9.2 ft LEAN CLAY WITH SAND:				
- clas	ssification)	plasticity, high dry strength, low toughne sand; maximum size, fine sand; weak re	ss and no dilatancy; about 25% fine			
s —		IN-PLACE CONDITION: Dark brown, dr	y, homogeneous and very hard.			
_		IN-PLACE UNIT WEIGHT AND MOISTU Total: 83.9 lbf/ft ³ , 12.1% (81.5% compa	ction)			
7		LAB TEST DATA: 87.0% fines, 13.0% s Maximum dry density: 103.0 lbf/ft ³ , optin Laboratory classification is LEAN CLAY				
_		GEOLOGIC INTERPRETATION: Quate	mary Alluvium (Oal)			
	ENTS: Surfa	ace vegetation consists of grasses and wee		equipme	nt.	1

7 E	7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PI	Г NO. TPR9-16-52	SH	IEET	2 OF	2
FE	ATURE: REACHES	, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	CT		
	CATION: REACH 9 F		GROUND ELEVATION: 6050.4				
	ORDINATES: N 1,76 PROXIMATE DIMEN		METHOD OF EXPLORATION: DEERE 310J BA LOGGED BY: P. Gardner	CKHOE			
		E DATE: 1/27/2016	DATE EXCAVATED: 1/27/2016				
						PLUS : VOLU	
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION AND DE	ESCRIPTION OF MATERIAL	ŀ	3 -		PLUS
ä	SYMBOL	(SEE USBF	8 5000, 5005)		5 in	12 in	12 in
_							
8 —							
-							
-							
9 —	9.2 ft (6041.2)						
-	SM	9.2 to 14.7 ft SILTY SAND: About 7	'0% fine sand; about 30% nonplastic fin	es			
_		with low dry strength and slow dilata	ncy; maximum size. fine sand; no to we	ak			
-		reaction with HCI.					
10 —		IN-PLACE CONDITION: Brown, dry	, stratified and moderate cementation.				
-		GEOLOGIC INTERPRETATION: Q	uaternary Alluvium (Qal)				
-							
-							
11 —							
-							
-							
-							
12 —							
_							
_							
-							
13 —							
-							
-							
-							
14 —							
_							
_							
	14.7 ft (6035.7)						
	MMENTS:						

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST	PIT NO. TPR9-16-53	SHEET 1	OF 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT	
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6056.7		
COORDINATES: N 1,7	63,180 E 2,474,750	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE	
APPROXIMATE DIMEN	SIONS: 12'x18'x14.9'	LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 1/27/2016	DATE EXCAVATED: 1/27/2016		
	CLASSIFICATION AN	D DESCRIPTION OF MATERIAL	(BY V	LUS 3 in /OLUME)
SYMBOL	(SEE U	JSBR 5000, 5005)	3 - 5 in	5 - PLUS 12 12 in in
s(CL) s(CL)	 high dry strength, medium tough maximum size, fine sand; weak IN-PLACE CONDITION: Brown from 2.3 ft to 3.0 ft contains a str SAND AND SILT to LEAN CLAY GEOLOGIC INTERPRETATION 3.0 to 8.9 ft CLAYEY SAND: At plasticity, low dry strength, low to fine sand; weak reaction with HC IN-PLACE CONDITION: Brown cemented. IN-PLACE UNIT WEIGHT AND Total: 92.0 lbf/ft³, 4.2% (80.8% LAB TEST DATA: 71.1% sand, Maximum dry density: 113.8 lbf/Laboratory classification is SILT 	, dry and hard. Stratified and lensed. Interva ratified sequence of SILT, POORLY GRADE (. <u>I: Quaternary Alluvium (Qal)</u> bout 55% fine sand; about 45% fines with low bughness and no dilatancy; maximum size, Cl. , dry, homogeneous and moderately MOISTURE FROM 7.0 ft. compaction) 28.9% fines, LL= NA PI= NP SPG= 2.67 (ft ³ , optimum water content= 14.3% Y SAND	al ED	
8 – 8 – 8.9 ft (6047.8)	GEOLOGIC INTERPRETATION	I: Quaternary Alluvium (Qal)		
9 - SM 10	with low dry strength and no dila reaction with HCI.	but 55% fine sand; about 45% nonplastic fine tancy; maximum size, fine sand; weak	es	
- 11 - -	GEOLOGIC INTERPRETATION	, dry, homogeneous and moderate		
- 12 - - - 13 - - - 14 - -				
14.9 ft (6041.8)				
COMMENTS: Sur	ace vegetation consists of sage, gra pment.	asses and weeds. Discontinued hole due to	limit of	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT N	IO. TPR9-16-54	SHE	ET	1 OF	1
FEATURE: REACHES 9	10 AND 11 PR0	DJECT: NAVAJO GALLUP WATER SUPPLY	PROJEC	т		
LOCATION: REACH 9 P	PELINE GR	OUND ELEVATION: 6060.0				
COORDINATES: N 1,76	2,111 E 2,474,206 ME	THOD OF EXPLORATION: DEERE 310J BAG	CKHOE			
APPROXIMATE DIMENS	IONS: 12'x18'x14.4'	GGED BY: P. Gardner				
DEPTH TO WATER: NE	DATE: 1/27/2016 DA	TE EXCAVATED: 1/27/2016				
	CLASSIFICATION AND DESC	RIPTION OF MATERIAL		(BY \	LUS 3 VOLUI	ME)
GROUP SYMBOL	(SEE USBR 50	00, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
s(CL) 1.0 ft (6059.0) (CL)s	0.0 to 1.0 ft SANDY LEAN CLAY: About medium dry strength, medium toughness sand; maximum size, fine sand; weak re	s and no dilatancy; about 45% fine				
² 2.4 ft (6057.6)	IN-PLACE CONDITION: Brown, dry, mo Lenses of SILT 1 inch wide to 3 feet in le					
³ (visual) SC (lab	GEOLOGIC INTERPRETATION: Quate 1.0 to 2.4 ft LEAN CLAY WITH SAND: plasticity, medium toughness, high dry s fine sand; maximum size, fine sand; wea	About 80% fines with medium trength and no dilatancy; about 20%	,			
	IN-PLACE CONDITION: Dark brown, d Roots present.	ry, very hard and homogeneous.				
5 - In-place 6 - density taken - at 7.0 ft	GEOLOGIC INTERPRETATION: Quate 2.4 to 10.4 ft SANDY LEAN CLAY: Abo medium toughness, medium dry strengt sand; maximum size, fine sand; no read	but 60% fines with medium plasticity, th and no dilatancy; about 40% fine				
Corrosion , sample taken , at 10.0 ft	IN-PLACE CONDITION: Brown, dry, ho	mogeneous and hard.				
- 8 - - -	IN-PLACE UNIT WEIGHT AND MOISTU Total: 88.1 lbf/ft ³ , 7.3% (79.4% compace LAB TEST DATA: 57.7% sand, 42.3% f Maximum dry density: 111.0 lbf/ft ³ , optir Laboratory classification is CLAYEY SA	tion) fines, LL= 24.3 PI= 10.0 SPG= 2.65 num water content= 16.0%				
9	Two quart corrosion sample taken at 10	ft.				
¹⁰ - 10.4 ft (6049.6)	GEOLOGIC INTERPRETATION: Quate	ernary Alluvium (Qal)				
- (CL)s	10.4 to 14.4 ft LEAN CLAY WITH SANI plasticity, medium toughness, high dry s fine sand; maximum size, fine sand; wea	trength and no dilatancy; about 20%				
12	IN-PLACE CONDITION: Dark brown, d	ry, very hard and homogeneous.				
- - 13- -	GEOLOGIC INTERPRETATION: Quate	ernary Alluvium (Qal)				
- 14- 14.4 ft (6045.6)						
COMMENTS: Surfa	ice vegetation consists of sage, grasses ar ment.	nd weeds. Discontinued hole due to	limit of	I	I	

7-1336-A (1-86)	UNINGENERATION UNINE DECOMPTION PROJECT: NAVAJO GALLUP WATER SUPPLY PRO GROUND ELEVATION: 6070.0 ION: REACH 9 PIPELINE GROUND ELEVATION: 6070.0 ION: REACH 9 PIPELINE GROUND ELEVATION: 6070.0 INATES IN: 1759.987 E 2.473.056 METHOD OF EXPLORATION: DEERE 310J BACKHO WATER: NE DATE: 1/27/2016 INATES: N. P. DATE: 1/27/2016 CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUP CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) S(CL) 0.0 to 1.2 ft: SANDY LEAN CLAY: About 70% fines with low plasticity, low toughness, low dry strength and no dilatancy; about 30% fine sand; maximum size, fine sand; no reaction with HCI. SC IN-PLACE CONDITION: Brown, moist, homogeneous and firm. Can be indented with thumb. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 12 to 4.3 ft: CLAYEY SAND: About 60% fine sand; about 40% fines with medium plasticity, low toughness, low dry strength and no dilatancy; maximum size, fine sand; weak reaction with HCI. SM (lab assification) IN-PLACE CONDITION: Brown, dry and moderately cemented. Lensed with SILT 2 linches wide and up to 3 feet in length. In-PLACE CONDITION: Light brown, dry, homogeneous and moderately cemented. IN-PLACE CONDITION: Light brown, dry, homogeneous and moderately cemented. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 96.5 Ib/ft ⁶ , 4.0% (86.6% compaction) LAB TEST DATA: 70.7% sand, 29.3% fines, LL= NA PI= NP SPG= 2.66 Maximum dry density: 111.4	SH	FET	1 OF	1
		PROJE			
,		JKHUE			
				PLUS	
	CLASSIFICATION AND DESCRIPTION OF MATERIAL	F	(BY 3-	VOLU 5 -	
SYMBOL	(SEE USBR 5000, 5005)		5 in	12 in	12 in
s(CL)	toughness, low dry strength and no dilatancy; about 30% fine sand; maximu	m			
- SC					
	1.2 to 4.3 ft CLAYEY SAND: About 60% fine sand; about 40% fines with medium plasticity, low toughness, low dry strength and no dilatancy;				
4.3 ft (6065.7)		th			
	4.3 to 11.0 ft SILTY SAND: About 70% fine sand; about 30% nonplastic fine with low dry strength and slow dilatancy; maximum size, fine sand; weak	es			
density taken	Total: 96.5 lbf/ft³, 4.0% (86.6% compaction) LAB TEST DATA: 70.7% sand, 29.3% fines, LL= NA PI= NP SPG= 2.66 Maximum dry density: 111.4 lbf/ft³, optimum water content= 14.6%				
0 —	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
1 - 11.0 ft (6059.0)					
	low plasticity, low toughness, low dry strength and no dilatancy; maximum				
3 -					
14.0 ft (6056.0)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
COMMENTS: Surf		limit o	f		1

DORDINATES: N 1,758,901 E 2,472,576 METHOD OF EXPLORATION: DEERE 310J BACKHOE UPPROXIMATE DIMENSIONS: 12:M8X14.0° LOGGED BY: P. Gardner DATE EXCAVATED: 1/27/2016 DETT TO WATER: NE DATE: 1/27/2016 DATE EXCAVATED: 1/27/2016 \$	36-A (1-86) au of Reclamation	LOG OF TEST PIT NO. TPR9-16-56	HEET	1 OF	1
DOORDINATES: N 1,758,901 E 2,472,576 METHOD OF EXPLORATION: DEERE 310J BACKHOE VPROXIMATE DIMENSIONS: 12/NBX14.0' LOGGED BY: P. Gardner DATE EXCAVATED: 1/27/2016 DEPTH TO WATER: NE DATE: 1/27/2016 DATE EXCAVATED: 1/27/2016 \$	JRE: REACHES 9, 10 A	ND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY PROJ	ECT		
APPROXIMATE DIMENSIONS: 12:X18:X14.0' LOGGED BY: P. Gardner DEPTH TO WATER: NE DATE: 1/27/2016 CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL GROUP (SEE USBR 5000, 5005)	TION: REACH 9 PIPELI	NE GROUND ELEVATION: 6072.8			
DEPTH TO WATER: NE DATE: 1/27/2016 DATE: 1/27/2016 CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) % PLUS 3. SC 0.0 to 4.8 ft CLAYEY SAND: About 60% fine sand; about 40% fines with low plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, hard and homogeneous. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4.8 ft (6068.0) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. In-place density taken at 7.0 ft IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 4.8 lb/ft ⁰ , 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LI= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lb/ft ⁰ , optimum water content= 16.3% Laboratory classification is SILTY SAND			Ξ		
CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY VOD) (SEE USBR 5000, 5005) (BY VOD) (BY VOD) (SE USBR 5000, 5005) (BY VOD) (SE USBR 5000, 5005) (BY VOD) (SE USBR 5000, 5005) (SE USBR 5005, 5005) (SE USBR 50					
CLASSIFICATION GROUP SYMBOL CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY VOL) Image: Classification and a statistication and a statistication and a stratified. Image: Classification and a stratified. SC 0.0 to 4.8 ft CLAYEY SAND: About 60% fine sand; about 40% fines with low plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; weak reaction with HCI. Image: Classification and a stratified. Image: Classification and a stra	TIO WATER: NE D/	ATE: 1/27/2016 DATE EXCAVATED: 1/27/2016	0/ 1		2 in
SC 0.0 to 4.8 ft CLAYEY SAND: About 60% fine sand; about 40% fines with low plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, hard and homogeneous. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4.8 ft (6068.0) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl. In-place 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl. In-place In-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. In-place IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.16/ft ⁴ , 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lb/ft ⁴ , optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)		CLASSIFICATION AND DESCRIPTION OF MATERIAL	(BY	VOLU	JME)
 plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, hard and homogeneous. Roots present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4.8 ft (6068.0) SM (lab (lab classification) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lb/ft⁴, 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lb/ft⁴, optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 		(SEE USBR 5000, 5005)	5	12	PLU 12 in
2 present. 3 GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4 4.8 ft (6068.0) 5 SM (lab classification) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCI. 7 IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. 8 IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lbf/ft ^a , 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lbf/ft ^a , optimum water content= 16.3% Laboratory classification is SILTY SAND 9 GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)	pl	asticity, low dry strength, low toughness and no dilatancy; maximum size,			
4 4.8 ft (6068.0) SM (lab classification) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lb/fft ³ , 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lb/ft ³ , optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)					
4.8 ft (6068.0) SM (lab classification) 4.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lbf/ft³, 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lbf/ft³, optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)	G	EOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
 SM (lab classification) A.8 to 12.1 ft SILTY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lbf/ft³, 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lbf/ft³, optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 					
A to 12.1 ft SIL IY SAND: About 85% fine sand; about 15% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Light brown, dry, moderate cementation and stratified. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 94.8 lbf/ft³, 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lbf/ft³, optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)	.8 ft (6068.0)				
In-place density taken at 7.0 ft In-place density taken density	(lab wi	th low dry strength and slow dilatancy; maximum size, fine sand; weak			
 In-place density taken at 7.0 ft Total: 94.8 lbf/ft³, 5.9% (85.0% compaction) LAB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 Maximum dry density: 111.5 lbf/ft³, optimum water content= 16.3% Laboratory classification is SILTY SAND GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 					
	In-place LA density taken M	otal: 94.8 lbf/ft³, 5.9% (85.0% compaction) AB TEST DATA: 65.5% sand, 34.5% fines, LL= NA PI= NP SPG= 2.61 aximum dry density: 111.5 lbf/ft³, optimum water content= 16.3%			
12.1 ft (6060.7)	G	EOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
	2.1 ft (6060.7)				
(CL)s 12.1 to 14.0 ft LEAN CLAY WITH SAND: About 70% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; about 30% fine sand; maximum size, fine sand; weak reaction with HCl.	pl	asticity, medium toughness, medium dry strength and no dilatancy; about			
4 14.0 ft (6058.8) IN-PLACE CONDITION: Dark brown, dry, very hard and homogeneous.	1.0 ft (6058.8)	-PLACE CONDITION: Dark brown, dry, very hard and homogeneous.	<u> </u>		
GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)		EOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)			
COMMENTS: Surface vegetation consists of sage, grasses and weeds. Discontinued hole due to limit of equipment.			of		

S 9, 10 AND 11	ST PIT NO. TPR9-16-57	SHEET		2
	PROJECT: NAVAJO GALLUP WATER SUPPL			-
9 PIPELINE	GROUND ELEVATION: 6079.8			
,757,815 E 2,472,073	METHOD OF EXPLORATION: DEERE 310J B	ACKHOE		
ENSIONS: 12'x18'x14.5'	LOGGED BY: P. Gardner			
NE DATE: 1/28/2016	DATE EXCAVATED: 1/28/2016			
ON CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL		VOLU	JME)
(5	SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
plasticity, low toughness, lo	w dry strength and no dilatancy; about 25% fine	9		
IN-PLACE CONDITION: B	rown, dry, blocky and hard.			
GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
)				
		es		
IN-PLACE CONDITION: Li moderate cementation.	ight brown, dry, stratified layers roughly 5mm th	iick,		
GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
plasticity, low toughness, lo	w dry strength and no dilatancy; about 25% fine	e		
N-PLACE CONDITION: B	rown, dry, homogeneous and hard.			
Total: 86.8 lbf/ft³, 10.8% (8 LAB TEST DATA: 55.4% f	30.7% compaction)			
Maximum dry density: 107.				
NOTE: TEST EXTENDED	INTO UNDERLYING INTERVAL.			
GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal)			
	ENSIONS: 12'x18'x14.5' NE DATE: 1/28/2016 ON CLASSIFICATIO (S 0.0 to 2.7 ft LEAN CLAY W plasticity, low toughness, lo sand; maximum size, fine s IN-PLACE CONDITION: B GEOLOGIC INTERPRETA (I) 2.7 to 4.1 ft SILTY SAND: with low dry strength and sl reaction with HCl. IN-PLACE CONDITION: L moderate cementation. 7) GEOLOGIC INTERPRETA 4.1 to 7.3 ft LEAN CLAY W plasticity, low toughness, lo sand; maximum size, fine s n) IN-PLACE CONDITION: L moderate cementation. 7) GEOLOGIC INTERPRETA 4.1 to 7.3 ft LEAN CLAY W plasticity, low toughness, lo sand; maximum size, fine s n) IN-PLACE CONDITION: B IN-PLACE UNIT WEIGHT / Total: 86.8 lbf/ft³, 10.8% (8 LAB TEST DATA: 55.4% ft SPG= 2.67 Maximum dry density: 107 Laboratory classification is NOTE: TEST EXTENDED	ENSIONS: 12x18x14.5' LOGGED BY: P. Gardner NE DATE: 1/28/2016 DATE: 1/28/2016 DATE EXCAVATED: 1/28/2016 DN CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 0.0 to 2.7 ft LEAN CLAY WITH SAND: About 75% fines with medium plasticity, low toughness, low dry strength and no dilatancy; about 25% fine sand; maximum size, fine sand; no reaction with HCI. IN-PLACE CONDITION: Brown, dry, blocky and hard. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) I) I) C.7 to 4.1 ft SILTY SAND: About 80% fine sand; about 20% nonplastic fine with low dry strength and slow dilatancy; maximum size, fine sand; no reaction with HCI. IN-PLACE CONDITION: Light brown, dry, stratified layers roughly 5mm th moderate cementation. 7) GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4.1 to 7.3 ft LEAN CLAY WITH SAND: About 75% fines with medium plasticity, low toughness, low dry strength and no dilatancy; about 25% fine sand; maximum size, fine sand; no reaction with HCI. n) IN-PLACE CONDITION: Brown, dry, homogeneous and hard. IN-PLACE CONDITION: Brown, dry, homogeneous and hard. IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 86.8 lb/fft*, 10.8% (80.7% compaction) LAB TEST DATA: 55.4% fines, 44.6% sand, LL= 32.5 PI= 18.4 SL= 15.0	ENSIONS: 12X18/x14.5' LOGGED BY: P. Gardner NE DATE: 1/28/2016 DATE EXCAVATED: 1/28/2016 ON CLASSIFICATION AND DESCRIPTION OF MATERIAL (BY (SEE USBR 5000, 5005) \$	ENSIONS: 12%18%14.5' LOGGED BY: P. Gardner NE DATE: 1/28/2016 DATE EXCAVATED: 1/28/2016 ON CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) \$\$ - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 10 - 10 -

7 E	-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT NO. TPR9-16-57	SH	IEET	2 OF	2
FE	ATURE: REACHES	9, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LO	CATION: REACH 9 F	PIPELINE GROUND ELEVATION: 6079.8				
	ORDINATES: N 1,75		CKHOE			
AP	PROXIMATE DIMENS	SIONS: 12'x18'x14.5' LOGGED BY: P. Gardner				
DE	PTH TO WATER: N	E DATE: 1/28/2016 DATE EXCAVATED: 1/28/2016				
DEPTH	CLASSIFICATION GROUP	CLASSIFICATION AND DESCRIPTION OF MATERIAL		(BY	PLUS : VOLU	ME)
DEI	SYMBOL	(SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
-	SM	7.3 to 8.6 ft SILTY SAND: About 65% fine sand; about 35% nonplastic fines with low dry strength and slow dilatancy; maximum size, fine sand; no reaction with HCI.				
8 —		IN-PLACE CONDITION: Light brown, dry, homogeneous with moderate cementation.				
-	8.6 ft (6071.2)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
- 9 —	SC	8.6 to 14.5 ft CLAYEY SAND: About 55% fine sand; about 45% fines with medium plasticity, low dry strength, low toughness and no dilatancy; maximum size, fine sand; no reaction with HCl.				
_		IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation.				
- 10		GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
-						
- 11 —						
-						
-						
12 —						
-						
13 —						
-						
- 14 —						
-						
	14.5 ft (6065.3)					
CO	MMENTS:					

7-1336-A (1-86) Bureau of Reclamation EATURE: REACHES OCATION: REACH 9 OORDINATES: N 1,7 PPROXIMATE DIMEN EPTH TO WATER: N CLASSIFICATION GROUP SYMBOL	9, 10 AND 11 PIPELINE 57,110 E 2,471,760 SIONS: 12'x18'x14.0' E DATE: 1/28/2016 CLASSIFICATION A	T PIT NO. TPR9-16-58 PROJECT: NAVAJO GALLUP WATER SUPPLY I GROUND ELEVATION: 6080.0 METHOD OF EXPLORATION: DEERE 310J BAC LOGGED BY: P. Gardner DATE EXCAVATED: 1/28/2016	PROJEC		1 OF	1
OCATION: REACH 9 OORDINATES: N 1,7 PPROXIMATE DIMEN EPTH TO WATER: N CLASSIFICATION GROUP	PIPELINE 57,110 E 2,471,760 SIONS: 12'x18'x14.0' IE DATE: 1/28/2016 CLASSIFICATION A	GROUND ELEVATION: 6080.0 METHOD OF EXPLORATION: DEERE 310J BAC LOGGED BY: P. Gardner		T		
COORDINATES: N 1,7 PPROXIMATE DIMEN EPTH TO WATER: N CLASSIFICATION GROUP	57,110 E 2,471,760 SIONS: 12'x18'x14.0' E DATE: 1/28/2016 CLASSIFICATION A	METHOD OF EXPLORATION: DEERE 310J BAC LOGGED BY: P. Gardner	KHOE			
PPROXIMATE DIMEN	SIONS: 12'x18'x14.0' E DATE: 1/28/2016 CLASSIFICATION A	LOGGED BY: P. Gardner	KHOE			
CLASSIFICATION	E DATE: 1/28/2016 CLASSIFICATION A					
CLASSIFICATION GROUP	CLASSIFICATION A	DATE EXCAVATED: 1/28/2016				
GROUP				0/ 5		
SYMBOL	(SFF	AND DESCRIPTION OF MATERIAL		(BY)	VOLU VOLU	ME)
		E USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLU 12 in
(CL)s 1.4 ft (6078.6)		H SAND: About 80% fines with low plasticity, ghness and no dilatancy;about 20% fine sand; reaction with HCI.				
s(CL) (lab	N-PLACE CONDITION: Brov	vn, dry , homogeneous and hard. Roots				
classification)	1.4 to 14.0 ft SANDY LEAN C	DN: Quaternary Alluvium (Qal) CLAY: About 55% fines with low plasticity, ghness and no dilatancy; about 45% fine sand; reaction with HCI.				
-	IN-PLACE CONDITION: Brow calcium carbonate.	vn, dry, homogeneous and very hard. Trace o	f			
-		% compaction) s, 36.1% sand, LL= 30.8 PI= 13.6 SPG= 2.66 bf/ft³, optimum water content= 16.8%				
	GEOLOGIC INTERPRETATIO	DN: Quaternary Alluvium (Qal)				
_ In-place - density taken - at 7.0 ft						
-						
-						
-						
-						
-						
-						
	ace vegetation consists of sage, ipment.	grasses and weeds. Discontinued hole due to	limit of			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-59	SHE	ET 1	OF 1	
FEATURE: REACHES), 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJEC	т		
LOCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6088.5				
COORDINATES: N 1,7	5,422 E 2,470,761	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE			
APPROXIMATE DIMEN	SIONS: 12'x18'x13.2'	LOGGED BY: P. Gardner				
DEPTH TO WATER: N	E DATE: 1/28/2016	DATE EXCAVATED: 1/28/2016				
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL			LUS 3 i /OLUM	
	(5	SEE USBR 5000, 5005)		3 - 5 in	12	LUS 12 in
s(CL) 1 - 1.6 ft (6086.9) 2 - CL (lab classification)	medium dry strength, medi sand; maximum size, fine s IN-PLACE CONDITION: B present. GEOLOGIC INTERPRETA	CLAY: About 60% fines with medium plasticity, um toughness and no dilatancy; about 40% fine sand; weak reaction with HCI. rown, dry, homogeneous and hard. Roots TION: Quaternary Alluvium (Qal)				
classification)	 1.6 to 13.2 ft LEAN CLAY: strength, medium toughnes maximum size, fine sand; r IN-PLACE CONDITION: D Calcium carbonate stringer IN-PLACE UNIT WEIGHT A Total: 92.3 lbf/ft³, 15.7% (9) 	About 90% fines with medium plasticity, high dry as and no dilatancy; about 10% fine sand; no to weak reaction with HCl. Park brown, dry, homogeneous and very hard. rs and nodules present. AND MOISTURE FROM 7.0 ft.	,			
6 In-place	SPG= 2.64 Maximum dry density: 96.8 Laboratory classification is	8 lbf/ft³, optimum water content= 22.8% LEAN CLAY				
 density taken at 7.0 ft Corrosion sample taken at 10.0 ft 	Two quart corrosion sampl	e taken at 10 π. TION: Quaternary Alluvium (Qal)				
9 - - - - 10 -						
12 - - - - - - - - - - - - - - - - - - -						
	ace vegetation consists of sag pment.	e, grasses and weeds. Discontinued hole due to	limit of	 		

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT NO. TPR9-16-60	SH	EET	1 OF	1
FEATURE: REACHES 9	, 10 AND 11 PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJE	СТ		
LOCATION: REACH 9 P	IPELINE GROUND ELEVATION: 6080.1				
COORDINATES: N 1,75	2,588 E 2,469,315 METHOD OF EXPLORATION: DEERE 310J BA	CKHOE			
APPROXIMATE DIMENS	SIONS: 12'x18'x13.4' LOGGED BY: P. Gardner				
DEPTH TO WATER: NE	E DATE: 1/28/2016 DATE EXCAVATED: 1/28/2016				
	CLASSIFICATION AND DESCRIPTION OF MATERIAL			PLUS 3 Volui	
GROUP			3 -		PLUS
SYMBOL	(SEE USBR 5000, 5005)		5 in	12 in	12 in
s(CL)	0.0 to 1.6 ft SANDY LEAN CLAY: About 60% fines with medium plasticity, medium dry strength, medium toughness and no dilatancy; about 40% fine sand; maximum size, fine sand; weak reaction with HCI.				
1.6 ft (6078.5) 2 - CH	IN-PLACE CONDITION: Brown, dry, homogeneous and hard. Roots present.	/			
- - - 3 - -	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 1.6 to 4.4 ft FAT CLAY: About 90% fines with high plasticity, high dry strength, high toughness and no dilatancy; about 10% fine sand; maximum size, fine sand; no reaction with HCI.	/			
4 – 4.4 ft (6075.7)	IN-PLACE CONDITION: Dark brown, dry, homogeneous and very hard.				
5 SC	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 4.4 to 6.3 ft CLAYEY SAND: About 65% fine sand; about 35% fines with lo plasticity, medium toughness, medium dry strength and no dilatancy; maximum size, fine sand; no reaction with HCI.	w			
⁶ 6.3 ft (6073.8)	IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation.	/			
(CL)s (visual) (Iab classification)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 6.3 to 13.4 ft LEAN CLAY WITH SAND: About 80% fines with medium plasticity, medium toughness, medium dry strength and no dilatancy; about 20% fine sand, maximum size, fine sand; weak reaction with HCI.				
-	IN-PLACE CONDITION: Dark brown, dry, homogeneous and very hard. Calcium carbonate stringers and nodules present.				
⁹ - In-place density taken at 7.0 ft	IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 93.8 lbf/ft ³ , 9.1% (86.8% compaction) LAB TEST DATA: 61.6% fines, 38.4% sand, LL= 30.5 PI= 16.5 SL= 14.6 SPG= 2.62				
- - 11-	Maximum dry density: 108.1 lbf/ft³, optimum water content= 17.0% Laboratory classification is SANDY LEAN CLAY				
-	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
2					
13- - - 13.4 ft (6066.7)					
COMMENTS: Surfa	ace vegetation consists of sage and grasses. Discontinued hole due to limit of	equipr	nent		

7-1336-A (1-86)			OUEET	4.05.4
Bureau of Reclamation		EST PIT NO. TPR9-16-61	SHEET	1 OF 1
FEATURE: REACHES S		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT	
LOCATION: REACH 9 F		GROUND ELEVATION: 6082.3		
COORDINATES: N 1,75		METHOD OF EXPLORATION: DEERE 310J BA	CKHOE	
APPROXIMATE DIMEN		LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 2/8/2016	DATE EXCAVATED: 2/8/2016		
	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL		PLUS 3 in VOLUME)
LASSIFICATION GROUP SYMBOL	(5	SEE USBR 5000, 5005)	3 - 5 in	5 - PLUS 12 12 in in
CL (visual) SM (lab classification) 	toughness, medium dry str maximum size, fine sand; v IN-PLACE CONDITION: E IN-PLACE UNIT WEIGHT Total: 90.9 lbf/ft ³ , 3.5% (80 LAB TEST DATA: 76.8% s Maximum dry density: 105 Laboratory classification is NOTE: TEST EXTENDED	Brown, dry, blocky and hard. Roots present. AND MOISTURE FROM 7.0 ft. 6.6% compaction) sand, 23.2% fines, LL= NA PI= NP SPG= 2.64 5.0 lbf/ft³, optimum water content= 14.6%		
7 – <u>7.2 ft (6075.1)</u> SM	with low dry strength and ra reaction with HCI.	D: About 65% fine sand; about 35% nonplastic fin apid dilatancy; maximum size, fine sand; no		
9		Brown, dry, homogeneous and weak cementation	1.	
10 - - - - - - - - - - - - -				
14.8 ft (6067.5)	oog vogstation oon date af			
COMMENTS: SUF	ace vegetation consists of sag	ge and grasses. Discontinued hole due to limit of	equipment	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	ST PIT NO. TPR9-16-62	SHEET 1	OF 1
FEATURE: REACHES 9	10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT	
LOCATION: REACH 9 P	IPELINE	GROUND ELEVATION: 6084.3		
COORDINATES: N 1,74	9,724 E 2,467,494	METHOD OF EXPLORATION: DEERE 310J BA	CKHOE	
APPROXIMATE DIMENS	IONS: 12'x18'x14.4'	LOGGED BY: P. Gardner		
DEPTH TO WATER: NE	DATE: 2/8/2016	DATE EXCAVATED: 2/8/2016		
⊥ CLASSIFICATION	CLASSIFICATION	AND DESCRIPTION OF MATERIAL		LUS 3 in /OLUME)
CLASSIFICATION GROUP	(0)		-	5 - PLU
SYMBOL	(56	EE USBR 5000, 5005)	5 in	12 12 in in
	toughness, high dry strength maximum size, fine sand; nc	bout 90% fines with medium plasticity, medium and no dilatancy; about 10% fine sand; preaction with HCI. Ink brown, dry, blocky and very hard. Roots		
- - - 3 - -	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)		
4 – 4.2 ft (6080.1)				
5 SM 5 (lab classification)		About 70% fine sand; about 30% nonplastic fin bid dilatancy; maximum size, fine sand; no	es	
- 6 -	IN-PLACE CONDITION: Broch cementation.	own, dry, homogeneous and medium		
In-place density taken 7.0 ft.	Total: 91.5 lbf/ft³, 5.3% (83. LAB TEST DATA: 55.8% sa	and, 44.2% fines, LL= NA PI= NP SPG= 2.60 B lbf/ft ³ , optimum water content= 15.6%		
	GEOLOGIC INTERPRETAT	ION: Quaternary Alluviuim (Qal)		
- - 10.7 ft (6073.6)				
1- SC 2-	low plasticity, low toughness size, fine sand; no to weak re			
	IN-PLACE CONDITION: Broch cementation.	own, dry, homogeneous and medium		
3	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)		
⁴ – 14.4 ft (6069.9)				
	ace vegetation consists of weed oment.	ls, sage and grasses. Discontinued hole due to	limit of	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-63	SHEET 1 OF 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPF	LY PROJECT
LOCATION: REACH 9		GROUND ELEVATION: 6088.9	
COORDINATES: N 1,7	48,645 E 2,466,949	METHOD OF EXPLORATION: DEERE 310J	BACKHOE
APPROXIMATE DIMEN		LOGGED BY: P. Gardner	
DEPTH TO WATER: 1	IE DATE: 2/8/2016	DATE EXCAVATED: 2/8/2016	
		N AND DESCRIPTION OF MATERIAL	% PLUS 3 ir (BY VOLUME
GROUP			3- 5- PL
SYMBOL	(S	EE USBR 5000, 5005)	5 12 1 in in i
		About 90% fines with medium plasticity, mediu n and no dilatancy; about 10% fine sand; o to weak reaction with HCl.	m
	IN-PLACE CONDITION: Da present.	ark brown, dry, blocky and very hard. Roots	
3 - 3.2 ft (6085.7)	GEOLOGIC INTERPRETAT	TION: Quaternary Alluvium (Qal)	
(CL)s (visual) CH	plasticity, medium toughnes	WITH SAND: About 80% fines with medium ss, high dry strength and no dilatancy; about 2 ne sand; no to weak reaction with HCI.	0%
☐ (lab 5 - classification)	IN-PLACE CONDITION: Br carbonate stringers and roo	own, dry, blocky and very hard. Calcium ts present.	
In-place density taken	Total: 90.5 lbf/ft ³ , 16.3% (97	ND MOISTURE FROM 7.0 ft. 7.0% compaction) nes, 6.3% sand, LL= 56.8 PI= 37.6 SL= 8.8 SI	PG=
7 – at 7.0 ft.	Maximum dry density: 93.3 Laboratory classification is F	Ibf/ft³, optimum water content= 25.8% FAT CLAY	
3 — - - - 9 —	GEOLOGIC INTERPRETAT	ΓΙΟΝ: Quaternary Alluvium (Qal)	
 □ <u>10.2 ft (6078.7)</u>			
		ND: About 60% fine sand; about 40% fines w s, low dry strength and slow dilatancy; maximu on with HCI.	
2	IN-PLACE CONDITION: Br cementation.	own, dry, homogeneous and moderate	
3-	GEOLOGIC INTERPRETAT	ΓΙΟΝ: Quaternary Alluvium (Qal)	
4 - 14.5 ft (6074.4)			
COMMENTS: Sur	face vegetation consists of sage	e and weeds. Discontinued hole due to limit o	f equipment.

7-1336-A (1-86)					<u>GI41</u>
Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-64	SHE	ET 1 C	DF 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUI	PPLY PROJECT	-	
LOCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6090.7			
COORDINATES: N 1,74	17,646 E 2,466,289	METHOD OF EXPLORATION: DEERE 310	J BACKHOE		
APPROXIMATE DIMEN	SIONS: 12'x18'x14.5'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 2/8/2016	DATE EXCAVATED: 2/8/2016			
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL		% PLU BY VO	
LASSIFICATION GROUP SYMBOL	(S	EE USBR 5000, 5005)		- 5 5 12 n in	2 12
(CL)s	plasticity, medium toughnes fine sand; maximum size, fi IN-PLACE CONDITION: Da carbonate stringers and roc	VITH SAND: About 85% fines with medium as, high dry strength and no dilatancy; about ne sand; strong reaction with HCI. ark brown, dry, blocky and very hard. Calciu ots present. TION: Quaternary Alluvium (Qal)			
³ – - 3.7 ft (6087.0)					
4 – SM 5 –		About 70% fine sand; about 30% nonplastic ow dilatancy; maximum size, fine sand; no	fines		
6 -	from 2 x 12 inches in length		ses		
6.9 ft (6083.8)	GEOLOGIC IN TERPRETA	TION: Qauternary Alluvium (Qal)			
CL (visual) 8 – CH (lab		About 90% fines with medium plasticity, me h and no dilatancy; about 10% fine sand; /eak reaction with HCl.	edium		
	IN-PLACE CONDITION: B	rown, dry, homogeneous and hard.			
- - - 10 -	Total: 85.1 lbf/ft³, 15.7% (9 LAB TEST DATA: 98.3% fi	AND MOISTURE FROM 7.0 ft. 1.3% compaction) nes, 1.7% sand, LL= 57.9 PI= 37.0 SL= 12.6	6		
In-place density taken at 7.0 ft	SPG= 2.69 Maximum dry density: 93.2 Laboratory classification is I	Ibf/ft³, optimum water content= 26.7% FAT CLAY			
	GEOLOGI C INTERPRETA	TION: Quaternary Alluvium (Qal)			
13 — _ _					
14 —					
14.5 ft (6076.2)					

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	T PIT NO. TPR9-16-65	SHEET		1
FEATURE: REACHES 9		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9 P	IPELINE	GROUND ELEVATION: 6095.7			
COORDINATES: N 1,74	6,640 E 2,465,635	METHOD OF EXPLORATION: DEERE 310J BA	CKHOE		
APPROXIMATE DIMENS	IONS: 12'x18'x14.4'	LOGGED BY: P. Gardner			
DEPTH TO WATER: NE	DATE: 2/9/2016	DATE EXCAVATED: 2/9/2016			
	CLASSIFICATION /	AND DESCRIPTION OF MATERIAL		PLUS : VOLU	
ELASSIFICATION	(SEI	E USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
(CL)s (visual) CL (lab classification)	plasticity, medium toughness, 15% fine sand; maximum size IN-PLACE CONDITION: Dar	H SAND: About 85% fines with medium medium dry strength and no dilatancy; about e, fine sand; no reaction with HCI. k brown, dry, blocky and stratified with 2 inch om 1.2 ft to 2.7 ft. Very hard. Calcium oxide staining. Roots present.			
 In-place density taken at 7.0 ft 	SPG= 2.63 Maximum dry density: 101.7 Laboratory classification is LE	3% compaction) s, 9.9% sand, LL= 38.7 PI= 19.0 SL= 16.5 lbf/ft³, optimum water content= 20.5%			
8 - 8.2 ft (6087.5) 9 - 10 - 11 - Corrosion sample taken at 10.0 ft 12 - 13 - 14 -	low plasticity, low toughness, very hard, angular cobbles; m IN-PLACE CONDITION: Brow cementation. Two quart corrosion sample t	: About 60% fine sand; about 40% fines with low dry strength and slow dilatancy; trace of naximum size, 120mm; weak reaction with HCl wn, dry, homogeneous and moderate aken at 10.0 ft. ON: Quaternary Alluvium (Qal)	. tr		
	ace vegetation consists of sage, oment.	grasses and weeds. Discontinued hole due to	limit of		

7-1336-A (1-86)		EST PIT NO. TPR9-16-66	SF	IEET		143
Bureau of Reclamation		PROJECT: NAVAJO GALLUP WATER SUF				-
LOCATION: REACH 9		GROUND ELEVATION: 6124.4		.01		
COORDINATES: N 1,7		METHOD OF EXPLORATION: DEERE 310				
APPROXIMATE DIMEN		LOGGED BY: P. Gardner				
DEPTH TO WATER: N		DATE EXCAVATED: 2/9/2016				
				%	PLUS	3 in
	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL			VOLU	
CLASSIFICATION		SEE USBR 5000, 5005)		3-	5 - 12	PLUS
OTMIDOL				5 in	in	12 in
SM (lab classification)	nonplastic fines with low d	About 75% fine to medium sand; about 25% ry strength and rapid dilatancy; trace of soft, size, 30mm; strong reaction with HCI.				
2 -	IN-PLACE CONDITION: F moderate to strong cemer present.	Reddish brown, moist in top 1.5 feet and dry b ntation with depth. Calcium carbonate stringer	elow, ⁻ s			
- - - 3 - -	Total: 96.0 lbf/ft³, 4.0% (8 LAB TEST DATA: 66.2%	sand, 33.8% fines, LL= NA PI= NP SPG= 2.63 2.2 lbf/ft³, optimum water content= 13.6%	3			
un-place density taken at 7.0 ft	GEOLOGIC INTERPRETA	ATION: Quaternary Alluvium (Qal)				
5 - - - 7						
- - - - - - - - - - - - - - - - - - -						
SANDSTONE	8.2 to 9.5 ft SANDSTONE	E: Brown to gray to orange. Fine to medium g	rain			
9 – 9.5 ft (6114.9)	Moderately soft (H5), brea pressure. Sligthly weather	iks with light hammer blow or moderate hand rd (W3), discoloration and oxidation present w e scratched with fingernail. Excavated in grave	ith			
	12x12x3 inch cobbles. Ca	alcium carbonate in some joints.	Г			
		ATION: Cretaceous Menefee Formation (Kmf Dark brown, fine grained and friable. Soft (H				
- 1 - 11.2 ft (6113.2)	breaks with light to modera fingernail. Slightly weathe	ate manual pressure and can be scratched wi red (W3) with calcium carbonate and mangar ed as coarse gravel. Difficult to excavate.	th			
		ATION: Cretaceous Menefee Formation (Kmf	, /			
		asses and weeds. Discontinued hole due to re			ono	

(-1330-A (1-80)					
7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	EST PIT NO. TPR9-16-67	SHEET	⁻ 1 OF	1
FEATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPP	LY PROJECT		
LOCATION: REACH 9 I	PIPELINE	GROUND ELEVATION: 6129.9			
COORDINATES: N 1,74	I4,177 E 2,463,879	METHOD OF EXPLORATION: DEERE 310J E	BACKHOE		
APPROXIMATE DIMEN	SIONS: 12'x18'x11.8'	LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 2/9/2016	DATE EXCAVATED: 2/9/2016			
	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL		PLUS : / VOLU	JME)
	(\$	SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
- SM	about 20% nonplastic fines fine to coarse, soft, angula strong reaction with HCI. IN-PLACE CONDITON: R cementation. Calcium car	About 80% fine to coarse, hard, subangular sa s with low dry strength and rapid dilatancy; trace in to subrounded gravel; maximum size, 70mm; Reddish brown, dry, lensed and moderate bonate nodules and stringers present. ATION: Quaternary Alluvium (Qal)	of		
3 - - 4 - 5					
6 CLAYSTONE	breaks with light to modera fingernail. Slightly weather staining in joints. Excavate sandstone intervals up to 5	E: Dark brown, fine grained and friable. Soft (H ate manual pressure and can be scratched with red (W3) with calcium carbonate and mangane ed as coarse gravel, cobbles and boulders. Sor 5 inches thick encountered. Difficult to excavate ATION: Cretaceous Menefee Formation (Kmf)	se ne		
8 - - - - 9 - - -					
- 10 - - - 11					
				1	1

PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT GROUND ELEVATION: 6147.1 METHOD OF EXPLORATION: DEERE 310J BACKHOE LOGGED BY: P. Gardner DATE EXCAVATED: 2/9/2016	6 PLUS 3 in Y VOLUME) 5 - PLU 12 12 in in tr
GROUND ELEVATION: 6147.1 METHOD OF EXPLORATION: DEERE 310J BACKHOE LOGGED BY: P. Gardner DATE EXCAVATED: 2/9/2016 ON AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) Y: About 80% fine to medium sand; about 20% tr dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCl. Brown, dry, homogeneous and moderate	Y VOLUME) 5 - PLU 12 12 in in
METHOD OF EXPLORATION: DEERE 310J BACKHOE LOGGED BY: P. Gardner DATE EXCAVATED: 2/9/2016 ON AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) Y: About 80% fine to medium sand; about 20% tr dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCl. Brown, dry, homogeneous and moderate	Y VOLUME) 5 - PLU 12 12 in in
LOGGED BY: P. Gardner DATE EXCAVATED: 2/9/2016 ON AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) 2: About 80% fine to medium sand; about 20% dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCl. Brown, dry, homogeneous and moderate	Y VOLUME) 5 - PLU 12 12 in in
DATE EXCAVATED: 2/9/2016 ON AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) The About 80% fine to medium sand; about 20% dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCl. Brown, dry, homogeneous and moderate	Y VOLUME) 5 - PLU 12 12 in in
ON AND DESCRIPTION OF MATERIAL (SEE USBR 5000, 5005) The About 80% fine to medium sand; about 20% dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCI. Brown, dry, homogeneous and moderate	Y VOLUME) 5 - PLU 12 12 in in
ON AND DESCRIPTION OF MATERIAL (E) (SEE USBR 5000, 5005) 3-5 :: About 80% fine to medium sand; about 20% dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, with HCI. tr Brown, dry, homogeneous and moderate 1	Y VOLUME) 5 - PLU 12 12 in in
(SEE USBR 5000, 5005) 5 in in c: About 80% fine to medium sand; about 20% tr dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, vith HCI. tr Brown, dry, homogeneous and moderate 5	12 12 in in
in 2: About 80% fine to medium sand; about 20% dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, vith HCI. Brown, dry, homogeneous and moderate	in in
dry strength and rapid dilatancy; trace of fine, hard, of very hard, angular cobbles; maximum size, vith HCI. Brown, dry, homogeneous and moderate	tr
ATION: Quaternary Alluvium (Qal)	
E: Brown to gray to orange. Fine to medium grain. aks with light hammer blow or moderate hand ered to fresh (W2), no oxidization or discolor present can be scratched with fingernail. Excavated as obbles. Calcium carbonate in some joints.	
ATION: Cretaceous Menefee Formation (Kmf)	
	aks with light hammer blow or moderate hand ered to fresh (W2), no oxidization or discolor present an be scratched with fingernail. Excavated as obbles. Calcium carbonate in some joints.

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-69	SHEET	1 OF 1
FEATURE: REACHES), 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT	
LOCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6147.3		
COORDINATES: N 1,74	0,621 E 2,461,693	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE	
APPROXIMATE DIMENS	SIONS: 12'x18'x14.5'	LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 2/10/2016	DATE EXCAVATED: 2/10/2016		
	CLASSIFICATION	I AND DESCRIPTION OF MATERIAL	(BY	PLUS 3 in VOLUME)
SYMBOL	(SI	EE USBR 5000, 5005)	3 - 5 in	5 - PLUS 12 12 in in
SM (lab classification)		About 85% fine sand; about 15% nonplastic fine bid dilatancy; maximum size, fine sand; strong	es	
2 -	IN-PLACE CONDITION: Brocementation. Calcium carbo coarse gravel present below	own, dry, homogeneous and moderate onate blebs present. Clayclasts the size of / 9 feet.		
3 - - 4 - -	Total: 85.9 lbf/ft³, 6.5% (81. LAB TEST DATA: 55.4% sa	and, 44.6% fines, LL= NA PI= NP SPG= 2.61 9 Ibf/ft ³ , optimum water content= 17.4%		
5	Two quart corrosion sample	taken at 10.0 ft.		
- - 6 -	GEOLOGIC INTERPRETAT	ION: Quaternary Alluvium (Qal)		
In-place density taken at 7.0 ft Corrosion sample taken at 10.0 ft				
14.5 ft (6132.8)				
COMMENTS: Surf	ace vegetation consists of sage	and weeds. Discontinued hole due to limit of e	quipment.	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT NO. TPR9-16-70		SHEET	1 OF	1
FEATURE: REACHES 9	P, 10 AND 11 PROJECT: NAVAJO GALLUP WATER	SUPPLY PR	OJECT		
LOCATION: REACH 9 F	PIPELINE GROUND ELEVATION: 6159.4				
COORDINATES: N 1,73		310J BACKH	IOE		
APPROXIMATE DIMENS					
DEPTH TO WATER: N	E DATE: 2/10/2016 DATE EXCAVATED: 2/10/2016				
	CLASSIFICATION AND DESCRIPTION OF MATERIAL		(BY	PLUS : VOLU I	ME)
SYMBOL	(SEE USBR 5000, 5005)		3 - 5 in	5 - 12 in	PLUS 12 in
	0.0 to 3.8 ft LEAN CLAY: About 90% fines with medium plasticity, hi toughness, high dry strength and no dilatancy; about 10% fine sand; maximum size, fine sand; weak reaction with HCI.	gh			
2 -	IN-PLACE CONDITION: Dark brown, dry, homogeneous and very ha Roots present.	ard.			
³ – 3.8 ft (6155.6)	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
⁴ – s(CL) ⁵ –	3.8 to 6.2 ft SANDY LEAN CLAY: About 65% fines with low plasticity toughness, low dry strength and no dilatancy; about 35% fine sand; n size, fine sand; weak reaction with HCI.				
6 – 6.2 ft (6153.2)	IN-PLACE CONDITION: Light brown to brown, dry, stratified and har	d.			
 SM (lab classification) 	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal) 6.2 to 13.8 ft SILTY SAND: About 70% fine sand; about 30% nonpla with low dry strength and slow dilatancy; maximum size, fine sand; we reaction with HCI.				
9 — -	IN-PLACE CONDITION: Brown, dry, homogeneous and moderate cementation.				
In-place density taken at 7.0 ft	IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 87.3 lbf/ft ³ , 4.3% (81.8% compaction) LAB TEST DATA: 63.1% sand, 36.9% fines, LL= NA PI= NP SPG= 2 Maximum dry density: 106.7 lbf/ft ³ , optimum water content= 15.7% Laboratory classification is SILTY SAND	2.59			
12	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)				
³ – 13.8 ft (6145.6)					
⁴⁴ SM 14.8 ft (6144.6)	13.8 to 14.8 ft SILTY SAND: About 75% fine sand; about 25% nonp fines with medium dry strength and slow dilatancy; maximum size, fin weak reaction with HCI.				
	IN-PLACE CONDITION: Reddish brown, dry and homogeneous.				
	GEOLOGIC INTERPRETATION: Quaternary Alluvium (Qal)]			
	ace vegetation consists of sage, grasses and weeds. Discontinued hole pment.	due to lim	nit of		

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR9-16-71	SHEET	1 OF	1
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
OCATION: REACH 9	PIPELINE	GROUND ELEVATION: 6168.4			
OORDINATES: N 1,7	35,951 E 2,458,604	METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE		
PPROXIMATE DIMEN	SIONS: 12'x18'x14.8'	LOGGED BY: P. Gardner			
EPTH TO WATER: N	E DATE: 2/10/2016	DATE EXCAVATED: 2/10/2016			
CLASSIFICATION GROUP SYMBOI	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL		PLUS VOLU	
GROUP SYMBOL					
SM (visual) CL (lab classification) In-place density taken at 7.0 ft	with low dry strength and ra reaction with HCI. IN-PLACE CONDITION: B 2 inch LEAN CLAY intervals IN-PLACE UNIT WEIGHT A Total: 78.5 lbf/ft ³ , 13.2% (8 LAB TEST DATA: 90.8% fi SPG= 2.66 Maximum dry density: 97.7 Laboratory classification is NOTE: TEST EXTENDED	ines, 9.2% sand, LL= 44.2 PI= 26.3 SL= 12.5 ′ lbf/ft³, optimum water content= 22.5%		in	in
7.2 ft (6161.2)					
CL 8.6 ft (6159.8)	plasticity, medium dry stren	/ITH SAND: About 90% fines with medium ogth, medium toughness and no dilatancy; about ize, fine sand; weak to strong reaction with HCI.			
- s(CL) 	GEOLOGIC INTERPRETA 8.6 to 14.8 ft SANDY LEAN medium toughness, mediur sand: maximum size, fine s IN-PLACE CONDITION: B	rown, dry, blocky and very hard. <u>TION:</u> Quaternary Alluvium (Qal) <u>N</u> CLAY: About 55% fines with medium plasticty, m dry strength and no dilatancy; about 45% fine sand; weak to strong reaction with HCI. rown, dry, homogeneous and hard. TION: Quaternary Alluvium (Qal)			
 14.8 ft (6153.6) OMMENTS: Sur	ace vegetation consists of wee	eds. Discontinued hole due to limit of equipment.			

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST PIT NO. TPR9-16-	72 SF	IEET	1 OF	1
EATURE: REACHES	9, 10 AND 11 PROJECT: NAVAJO GALI	LUP WATER SUPPLY PROJE	СТ		
OCATION: REACH 9	PIPELINE GROUND ELEVATION: 6'	171.7			
COORDINATES: N 1,7	34,915 E 2,458,008 METHOD OF EXPLORATI	ON: DEERE 310J BACKHOE	E		
PPROXIMATE DIMEN	SIONS: 12'x18'x14.6' LOGGED BY: P. Gardner				
EPTH TO WATER: N	E DATE: 2/10/2016 DATE EXCAVATED: 2/10/	2016			
CLASSIFICATION	CLASSIFICATION AND DESCRIPTION OF MATEI	RIAL		PLUS : VOLU	
CLASSIFICATION GROUP SYMBOL	(SEE USBR 5000, 5005)		3 - 5	5 - 12	PLL 12
s(CL) 1.8 ft (6169.9) SM (visual) CL (lab classification) In-place density taken at 7.0 ft	 0.0 to 1.8 SANDY LEAN CLAY: About 65% fines with low toughness, medium dry strength and no dilatancy; about 3 maximum size, fine sand; weak reaction with HCl. IN-PLACE CONDITION: Brown, dry, hard and stratified. I present. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Q 1.8 to 7.6 ft SILTY SAND: About 85% fine sand; about 15 low dry strength and rapid dilatancy; maximum size, fine sawith HCl. IN-PLACE CONDITION: Tan, dry, stratified and weak cent IN-PLACE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. Total: 76.5 lbf/ft³, 13.1% (77.3% compaction) LAB TEST DATA: 94.0% fines, 6.0% sand, LL= 38.1 PI= 7 SPG= 2.60 	v5% fine sand; ron oxide staining al) i% nonplastic fines, and; no reaction nentation.	in	in	
7.6 ft (6164.1) CL 9.2 ft (6162.5)	Maximum dry density: 99.0 lbf/ft ³ , optimum water content= Laboratory classification is LEAN CLAY NOTE: TEST EXTENDED INTO UNDERLYING INTERVA GEOLOGIC INTERPRETATION: Quaternary Alluvium (Q 7.6 to 9.2 ft LEAN CLAY: About 90% fines with medium p toughness, medium dry strength and no dilatancy; about 1 maximum size, fine sand; weak reaction with HCI.	L. al)			
s(CL) Corrosion	IN-PLACE CONDITION: Dark brown, dry, blocky to stratific GEOLOGIC INTERPRETATION: Quaternary Alluvium (Q 9.2 to 14.6 ft SANDY LEAN CLAY: About 55% fines with toughness, medium dry strength and no dilatancy; about 4 maximum size, fine sand; weak reaction with HCI. IN-PLACE CONDITION: Brown, dry, homogeneous and h	al) low plasticity, low 5% fine sand,			
_ sample taken - at 10.0 ft - - - -	Two quart corrosion sample taken at 10.0 ft. GEOLOGIC INTERPRETATION: Quaternary Alluvium (Q				
-					
14.6 ft (6157.1)					
,	ace vegetation consists of weeds. Discontinued hole due to li		•	•	

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	ST PIT NO. TPR9-16-73	SHEET		1
FEATURE: REACHES 9		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 9 F	PIPELINE	GROUND ELEVATION: 6175.3			
COORDINATES: N 1,73		METHOD OF EXPLORATION: DEERE 310J BAG	CKHOE		
APPROXIMATE DIMENS		LOGGED BY: P. Gardner			
DEPTH TO WATER: N	E DATE: 2/11/2016	DATE EXCAVATED: 2/11/2016	0/ 1	PLUS 3	2 in
± CLASSIFICATION	CLASSIFICATION	AND DESCRIPTION OF MATERIAL		VOLU	
ELASSIFICATION	(SE	E USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLUS 12 in
- SM	with low dry strength and rap weak reaction with HCl. IN-PLACE CONDITION: Lig	bout 60% fine sand; about 40% nonplastic fine id dilatancy; maximum size, fine sand; no to ht brown to brown to tan. Dry, stratified and clay about 1 to 2 inches in width. Low to			
3 – 3.8 ft (6171.5)	GEOLOGIC INTERPRETATI	ION: Quaternary Alluvium (Qal)			
4 (CL)s (lab classification) 6 classification) 9 ln-place density taken at 7.0 ft 10 11 11 12 12 13	plasticity, medium toughness 20% fine sand; maximum siz IN-PLACE CONDITION: Brow IN-PLACE UNIT WEIGHT AN Total: 82.2 lbf/ft ³ , 8.3% (78.2 LAB TEST DATA: 73.9% fine Maximum dry density: 105.1 Laboratory classification is LE	2% compaction) es, 26.1% sand, LL= 28.4 PI= 13.3 SPG= 2.60 Ibf/ft³, optimum water content= 17.5%			
 ₁₄ - 14.5 ft (6160.8)					
COMMENTS: Surf	ace vegetation consists of tumbl pment.	eweeds. Surface is humocky. Discontinued ho	ble due to l	limit o	of

7-1336-A (1-86) Bureau of Reclamation	I OG OF TEST	PIT NO. TPR10-16-1	SHEET	1 OF 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY		
LOCATION: REACH 10		GROUND ELEVATION: 6174.8	TROUEDT	
COORDINATES: N 1,73	2,948 E 2,456,647	METHOD OF EXPLORATION: DEERE 310J BA	CKHOE	
APPROXIMATE DIMEN	SIONS: 12'x18'x14.8'	LOGGED BY: P. Gardner		
DEPTH TO WATER: N	E DATE: 2/11/2016	DATE EXCAVATED: 2/11/2016		
	CLASSIFICATION AN	ND DESCRIPTION OF MATERIAL		PLUS 3 in VOLUME)
T CLASSIFICATION GROUP SYMBOL	(SEE	USBR 5000, 5005)	3 - 5 in	5 - PLU 12 12 in in
s(CL) s(CL) 4 4 4 4.7 ft (6170.1) 5 SM (lab classification) 7 In-place density taken at 7.0 ft 8	 medium toughness, medium dr sand; maximum size, fine sand IN-PLACE CONDITION: Dark GEOLOGIC INTERPRETATION 4.7 to 9.5 ft SILTY SAND: Above with low dry strength and rapid reaction with HCI. IN-PLACE CONDITION: Brown cementation. IN-PLACE UNIT WEIGHT AND Total: 83.0 lbf/ft³, 4.9% (78.3%) LAB TEST DATA: 56.7% sand Maximum dry density: 106.0 lb 	brown, moist, stratified and firm. N: Quaternary Alluvium (Qal) out 80% fine sand; about 20% nonplastic fine dilatancy; maximum size, fine sand; weak n, dry, homogeneous and moderate MOISTURE FROM 7.0 ft. compaction) J 43.3% fines, LL= NA PI= NP SPG= 2.61 f/ft ³ , optimum water content= 16.3%	e	
9 – 9.5 ft (6165.3)	Laboratory classification is SILT GEOLOGIC INTERPRETATIO			
10 (CL)s	9.5 to 14.8 ft LEAN CLAY WIT plasticity, medium toughness, n 25% fine sand; maximum size,	H SAND: About 75% fines with medium nedium dry strength and no dilatancy; about fine sand; weak reaction with HCI.		
-	IN-PLACE CONDITION: Brown			
12	GEOLOGIC INTERPRETATIO	n. Quatemary Alluvium (Qal)		
14.8 ft (6160.0)				
,	ace vegetation consists of grasses	and weeds. Discontinued hole due to limit c	of equipme	nt.

7-1336-A (1-86) Bureau of Reclama	ion	LOG OF TEST PIT NO. TPR10-15-2	HEET	1 OF	1
FEATURE: REACH		PROJECT: NAVAJO GALLUP WATER SUPPLY PROJ	ECT		
LOCATION: REAC	H 10 PIPELINE	GROUND ELEVATION: 6180.7			
COORDINATES: N	1,731,735 E 2,4	155,950 METHOD OF EXPLORATION: CASE 580 SUPER M B/	ACKHC	ЭE	
APPROXIMATE DI					
DEPTH TO WATER	: WLNE DATE	E: 9/16/2015 DATE EXCAVATED: 9/16/2015	0/_ 1	PLUS	3 in
	ION	CLASSIFICATION AND DESCRIPTION OF MATERIAL		VOLU	
LLASSIFICAT GROUP SYMBOL		(SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU: 12 in
SC	plasticit	4.2 ft CLAYEY SAND: About 80% fine sand; about 20% fines with low ty, low toughness, low dry strength and slow dilatancy; maximum size, nd; weak to strong reaction with HCl.			
_ _ 2 _		CE CONDITION: Reddish brown in color; becomes grayish brown 2 to 4.2 ft, moderate cementation; roots throughout.			
- - - 3 -	GEOLO	OGIC INTERPRETATION: Quaternary Alluvium (Qal)			
4 – 4.2 ft (6176	5)				
SP-SC	about 1	6.0 ft POORLY GRADED SAND WITH CLAY: About 90% fine sand; 10% fines with low plasticity, low toughness, low dry strength slow cy; maximum size, fine sand; strong reaction with HCI.			
₆ <u>-</u> 6.0 ft (6174	7) IN-PLA	CE CONDITION: Reddish brown in color.			
SP-SM (VISUAL In-place density an	6.0 to 9 about 1 size, fir	DGIC INTERPRETATION: Quaternary Alluvium (Qal). D.5 ft POORLY GRADED SAND WITH SILT: About 90% fine sand; 10% nonplastic fines with rapid dilatancy, low dry strength; maximum the sand; strong reaction with HCI.			
50 Lb samp taken from t		CE CONDITION: Grayish brown in color, moderate cementation.			
to 8.0 ft. 9	2) Total: 9	CE UNIT WEIGHT AND MOISTURE FROM 7.0 ft. 93.9 lbs. / cu ft., 3.7 %. (86.1% compaction) EST DATA: 50.7% sand, 49.3% fines, LL= NA, PI = NP SPG =2.64 um dry density= 109.1 lbs. / cu ft., optimum water content = 14.8%			
	NE \ Labora	tory classification is SILTY SAND			
<u>10.5 ft (6170</u>	9.5 to 1 intense intense intermit	DGIC INTERPRETATION: Quaternary Alluvium (Qal). 10.5 ft SANDSTONE: Fine grained, tan in color, very soft (H7) and very ely weathered (W8) in top 0.5 ft; becomes soft (H6) and moderately to ely weathered (W6) below top 0.5 ft; thinly to moderately bedded; ttent iron oxide staining and calcareous zones; no reaction with HCl e calcareous zones. Recovered as 3 to 10 inch subangular fragments.			
	GEOLO	OGIC INTERPRETATION: Cretaceous Menefee Formation (Kmf)			
		AVILY VEGETATED WITH RUSSIAN THISTLE, AND OCCASIONAL SAGED EXCAVATION DUE TO REFUSAL ON SANDSTONE BEDROCK.	I GE BF	RUSH	۱ <u>ـــــ</u> ۱.

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR10-15-3	SHEET	⁻ 1 OF	: 1
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPP	PROJECT		
OCATION: REACH 10	PIPELINE	GROUND ELEVATION: 6205.8			
COORDINATES: N 1,7	30,877 E 2,455,338	METHOD OF EXPLORATION: CASE 580 SU	JPER M BACKH	OE	
	SIONS: 15.0'X10.0'X11.5'	LOGGED BY: C. BEYER			
EPTH TO WATER: V	/LNE DATE: 9/16/2015	DATE EXCAVATED: 9/16/2015			
CLASSIFICATION	CLASSIFICATION	N AND DESCRIPTION OF MATERIAL		PLUS VOLU	JME)
CLASSIFICATION GROUP SYMBOL	(S	EE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
SP		DED SAND: About 95% fine sand; about 5% ilatancy, and low dry strength; maximum size Cl.	, fine		
-	IN-PLACE CONDITION: Re	eddish brown in color.			
2.6 ft (6203.2)	GEOLOGIC INTERPRETAT	TION: Quaternary Alluvium (Qal).			
SC		: About 75% fine sand; about 25% fines with I w dry strength and slow dilatancy; maximum s ith HCl.			
	IN-PLACE CONDITION: Re roots throughout.	eddish brown in color; moderate cementation	,		
5.3 ft (6200.5)	GEOLOGIC INTERPRETAT	TION: Quaternary Alluvium (Qal).			
SP-SM (VISUAL)		ADED SAND WITH SILT: About 90% fine san with rapid dilatancy, and low dry strength; trong reaction with HCI.	d;		
In-place density, 50 Lb	IN-PLACE CONDITION: Lig	ht brown in color, loosely consolidated.			
sample, and 1 gal corrosion sample taken from 7.0 to 8.0 ft.	Total: 93.5 lbs. / cu ft., 3.3% LAB TEST DATA: 65.4% sa	and, 34.6 % fines, LL= NA, PI = NP_SPG =2.6 0 lbs. / cu ft., optimum water content = 14.4 9			
- 10.0 ft (6195.8)	GEOLOGIC INTERPRETAT	TION: Quaternary Alluvium (Qal)			
SANDSTONE	and moderately to intensely intermittent calcareous zone Thin lenses of hard (H3), sli	E: Fine grained, tan in color, moderately soft (weathered (W6); thinly to moderately bedderes; no reaction with HCl outside calcareous zrightly weathered (W3), grey sandstone presert 3 to 10 inch subangular fragments.	d; ones.		
		TION: Cretaceous Menefee Formation (Kmf)			
		WITH RUSSIAN THISTLE, AND OCCASION UE TO REFUSAL ON SANDSTONE BEDRO		 RUSH	 1.

7-1336-A (1-86)					J154
Bureau of Reclamation	LOG OF T	EST PIT NO. TPR10-15-4	SHEE	T 1 OF	- 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 1		GROUND ELEVATION: 6212.8			
COORDINATES: N 1,7	, , ,	METHOD OF EXPLORATION: CASE 580 SUPE	ER M BACK	HOE	
	ISIONS: 15.0'X10.0'X11.5'	LOGGED BY: C. BEYER			
DEPTH TO WATER: N	VLNE DATE: 9/16/2015	DATE EXCAVATED: 9/16/2015			
	CLASSIFICATIO	ON AND DESCRIPTION OF MATERIAL		% PLUS 3Y VOLU	
GROUP	(SEE USBR 5000, 5005)	3 5 in	12	PLUS 12 in
SP	nonplastic fines with rapid sand; weak reaction with F		ne		
- 1.9 ft (6210.9)		Brown in color, roots throughout.			
² SC		ATION: Quaternary Alluvium (Qal) D: About 75% fine sand; about 25% fines with	[_
3 -	medium plasticity, medium	n toughness, medium dry strength and slow fine sand; strong reaction with HCI.			
4	IN-PLACE CONDITION: R roots throughout.	Reddish brown in color; moderate cementation,			
* _ _	GEOLOGIC INTERPRETA	ATION: Quaternary Alluvium (Qal)			
5 -					
-					
6 —					
6.5 ft (6206.3)					<u> </u>
⁷ – SM (LAB – CLASSIF)		: About 85% fine sand; about 15% nonplastic fine w dry strength; maximum size, fine sand; strong	S		
8 – In-place	IN-PLACE CONDITION: T	an in color, moderate cementation.			
 density and 50 Lb sample taken from7.0 to 8.0 ft. 	Total: 97.9 lbs. / cu ft., 6.0 LAB TEST DATA: 77.6% s	sand, 22.4 % fines, LL= 27.2, PI = 1.0 SPG = 2.6 1.0 lbs. / cu ft., optimum water content = 15.6 %	7		
¹⁰ – 10.5 ft (6202.3)	GEOLOGIC INTERPRETA	ATION: Quaternary Alluvium (Qal)			
¹¹ - SANDSTONE - 11.5 ft (6201.3)	and moderately to intensel intermittent calcareous zor	NE: Fine grained, tan in color, moderately soft (H5 ly weathered (W6); thinly to moderately bedded; nes; no reaction with HCl outside calcareous zon			
	Recovered as 3 to 10 inch	subangular fragments. ATION: Cretaceous Menefee Formation (Kmf)			
		D WITH RUSSIAN THISTLE, AND OCCASIONA DUE TO REFUSAL ON SANDSTONE BEDROCK		_ 3RUSH	 .

			T PIT NO. TPR11-15-1		<u> </u>	OF	1
1	ATURE: REACHES 9	, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJEC	Т		
	CATION: REACH 11	PIPELINE	GROUND ELEVATION: 6260.5				
СО	ORDINATES: N 1,72	7,486 E 2,453,041	METHOD OF EXPLORATION: CASE 680 L BAC	CKHOE			
AP	PROXIMATE DIMENS	SIONS: 15.0'X4.0'X11.0'	LOGGED BY: C. BEYER				
DE	PTH TO WATER: W	LNE DATE: 9/14/2015	DATE EXCAVATED: 9/14/2015				
тн	CLASSIFICATION	CLASSIFICATION A	ND DESCRIPTION OF MATERIAL		(BY V		ME)
DEPTH	GROUP SYMBOL	(SEE	USBR 5000, 5005)			5 - 12 in	PLUS 12 in
- - 1 -	SP-SM	about 10% nonplastic fines wit cobbles, maximum size, 100m			tr		
-	2.0 ft (6258.5)	IN-PLACE CONDITION: Brown					
2 —	. ,	GEOLOGIC INTERPRETATIO					
- - 3 -	SANDSTONE	to slightly weathered (W4) san moderately bedded, recovered	termittent lenses of grey, hard (H3), moderate dstone caprock in top 1.0 ft. The caprock is a s flat subangular fragments up to 1.4 ft X 0 main body of sandstone is predominately find).5			
-		grained, tan in color, soft (H6)	to moderately soft (H5) and moderately to				
_			e sandstone is thinly to moderately bedded, w	rith			
4 -			and calcareous zones. No reaction with HCl covered as 3 to 10 inch subangular fragments	s.			
			0N: Cretaceous Menefee Formation (Kmf)				
5 —							
-							
6 —							
_							
7 —							
-							
8 —							
-							
9							
- 10 —							
- 01							
-							
11 -	11.0 ft (6249.5)						
CO			ITH RUSSIAN THISTLE, AND OCCASIONAL TO REFUSAL ON SANDSTONE BEDROCK		BRI	JSH	Ι.

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST	Γ PIT NO. TPR11-15-2	SHE	ET 1 OF	= 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPL			
LOCATION: REACH 1		GROUND ELEVATION: 6247.4			
COORDINATES: N 1,7		METHOD OF EXPLORATION: CASE 680 L BA	CKHOF		
,	SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER			
	VLNE DATE: 9/14/2015	DATE EXCAVATED: 9/14/2015			
				% PLUS BY VOLI	
	CLASSIFICATION A	ND DESCRIPTION OF MATERIAL		- 5-	
SYMBOL	(SEE	USBR 5000, 5005)		5 12 n in	12 12 in
SC 1.0 ft (6246.4) 1.3 ft (6246.1) CL (VISUAL) CH (LAB					
² CLASSIF) - SP - 3.4 ft (6244.0) - CL	GEOLOGIC INTERPRETATIO	N: Quaternary Alluvium (Qal) It 95% fines with medium to high plasticity, Ind medium to high toughness; about 5% fin	e		
4	IN-PLACE CONDITION: Dark	grey in color, dry, roots throughout.			
In-place density, 50 Lb sample, and 1 gal corrosion sample taken from 6.0 to 7.0 ft.	LAB TEST DATA: 8.7% sand, = 2.55 Laboratory classification GEOLOGIC INTERPRETATIO 1.3 to 3.4 ft POORLY GRADEI nonplastic fines with rapid dilat sand; no reaction with HCI. IN-PLACE CONDITION: Grey GEOLOGIC INTERPRETATIO 3.4 to 11.5 ft LEAN CLAY: Abo medium dry strength, and med size, fine sand; strong reaction	91.3 % fines, LL= 54.7, PI =36.9 SL= 9.4, S n is FAT CLAY DN: Quaternary Alluvium (Qal) D SAND: About 95% fine sand; about 5% ancy, and low dry strength; maximum size, in color, dry, roots throughout. DN: Quaternary Alluvium (Qal) but 95% fines with medium to high plasticity, fium toughness; about 5% fine sand; maxim	fine		
⁰	roots throughout. IN-PLACE UNIT WEIGHT ANE Total: 86.7 lbs. / cu ft., 16.3%. LAB TEST DATA: 11.4% sand	D MOISTURE FROM 6.0 TO 7.0 ft. (92.3% compaction) I, 88.6 % fines, LL=46.7 , PI = 29.4, SPG= 2. s. / cu ft., optimum water content = 24.4 % AN CLAY			
^{3–} - 4 – 14.0 ft (6233.4)	11.5 to 14.0 ft CLAYEY SAND: low plasticity, low toughness, lo size, fine sand; no reaction with	: About 80% fine sand; about 20% fines with ow dry strength and slow dilatancy; maximul h HCl. ish brown in color, moist; calcite nodules be	n 📙		

7-1336-A (1-86) Bureau of Reclamation	LOG OF TES	ST PIT NO. TPR11-15-3	SH	IEET	1 OF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SU	PPLY PROJE	CT		
LOCATION: REACH 12		GROUND ELEVATION: 6251.6				
COORDINATES: N 1,7	24,381 E 2,451,026	METHOD OF EXPLORATION: CASE 680 I	BACKHOE			
APPROXIMATE DIMEN	SIONS: 15.0'X10.0'X14.0'	LOGGED BY: C. BEYER				
DEPTH TO WATER: V	/LNE DATE: 9/14/2015	DATE EXCAVATED: 9/14/2015				
	CLASSIFICATION	AND DESCRIPTION OF MATERIAL			PLUS 3 Volu	
E CLASSIFICATION GROUP SYMBOL				3 -	-	PLU
	(55	E USBR 5000, 5005)		5 in	12 in	12 in
SC (VISUAL) s(CL-ML) (LAB CLASSIF)	plasticity, low toughness, low fine sand; weak reaction with IN-PLACE CONDITION: Tan IN-PLACE UNIT WEIGHT AN Total: 84.0 lbs. / cu ft., 6.2% LAB TEST DATA: 60.4% fine Maximum dry density= 107.2 Laboratory classification is S	n color, roots in top 5 feet. ND MOISTURE FROM 6.0 TO 7.0 ft.	i size, ≠2.6			
In-place density and 50 Lb sample taken from 6.0 to 7.0 ft.						
 _ 14.0 ft (6237.6)						
COMMENTS: SUI	RFACE HEAVILY VEGETATED V CONTINUED EXCAVATION DU	WITH RUSSIAN THISTLE, AND OCCASIC IE TO LIMIT OF EQUIPMENT.	DNAL SAG	E BF	RUSH	 _

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	ST PIT NO. TPR11-15-4	SHEE	ET 1 OF	- 1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 1	1 PIPELINE	GROUND ELEVATION: 6271.3			
COORDINATES: N 1,7	22,031 E 2,449,505	METHOD OF EXPLORATION: CASE 580 SUPE	R M BACK	HOE	
APPROXIMATE DIMEN	ISIONS: 15.0'X10.0'X15.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: N	VLNE DATE: 9/15/2015	DATE EXCAVATED: 9/15/2015			
					3 in JME)
	(SI	EE USBR 5000, 5005)	3		PLUS 12
			ir	n in	in
SC (VISUAL) SM (LAB CLASSIF)		D: About 85% fine sand; about 15% fines with lo w dry strength and slow dilatancy; maximum size h HCl.			
2	IN-PLACE CONDITION: Gra becomes moist below 11.0 f	ayish tan in color; loosely consolidated, dry, ft, roots in top 1.0 foot.			
3 -	Total: 84.0 lbs. / cu ft., 4.9%	ND MOISTURE FROM 6.0 TO 7.0 ft. 6 (77.2% compaction)			
4		nd, 37.7% fines, LL= 22.1, PI =0.7 SPG =2.58 8 lbs. / cu ft., optimum water content = 15.3% SILTY SAND.			
5	GEOLOGIC INTERPRETAT	FION: Quaternary Alluvium (Qal)			
⁶ - - - - - - - - - - - - - - - - - - -					
 density and 50 Lb sample taken from 6.0 					
to 7.0 ft.					
10					
- - 11 - -					
2-					
4					
15.0 ft (6256.3)					
		WITH RUSSIAN THISTLE, AND OCCASIONAI CAVATION DUE TO LIMIT OF EQUIPMENT.	_ SAGE	BRUSI	-

7-1336-A (1-86) Bureau of Reclamation	LOG OF TE	EST PIT NO. TPR11-15-5	Sł	HEET	1 OF	1
EATURE: REACHES	9, 10 AND 11	PROJECT: NAVAJO GALLUP WATER SU	JPPLY PROJI	ECT		
OCATION: REACH 11	PIPELINE	GROUND ELEVATION: 6279.6				
OORDINATES: N 1,72	21,123 E 2,448,904	METHOD OF EXPLORATION: CASE 580	SUPER M B/	ACKHO	DE	
PPROXIMATE DIMEN	SIONS: 15.0'X10.0'X16.0'	LOGGED BY: C. BEYER				
EPTH TO WATER: W	/LNE DATE: 9/15/2015	DATE EXCAVATED: 9/15/2015				
					PLUS VOLL	
CLASSIFICATION GROUP SYMBOI	CLASSIFICATIO	IN AND DESCRIPTION OF MATERIAL		3 -		
SYMBOL	(5	SEE USBR 5000, 5005)		5 in	12 in	12
- SC - 1.3 ft (6278.3) - 1.6 ft (6278.0)		D: About 80% fine sand; about 20% fines wit bw dry strength and slow dilatancy; maximur ith HCl.				
_ (CL)s _ SP	N-PLACE CONDITION: Ta	an color; roots in top 5 feet.	//			
	1.3 to 1.6 ft LEAN CLAY W	TION: Quaternary Alluvium (Qal) VITH SAND: About 80% fines with medium ngth, and medium toughness; about 20% fin strong reaction with HCI.	e sand;			
	IN-PLACE CONDITION: Date the bottom of roots.	ark gray in color, dry, horizon concentrated	near			
6.0 ft (6273.6) SC (VISUAL) In-place	1.6 to 6.0 ft POORLY GRA	TION: Quaternary Alluvium (Qal) DED SAND: About 95% fine sand; about 5% dilatancy, and low dry strength; maximum si				
density and 50 Lb sample	IN-PLACE CONDITION: G	rayish tan in color, dry.				
taken from 6.0 to 7.0 ft. 10.0 ft (6269.6)	6.0 to 10.0 ft CLAYEY SAN	TION: Quaternary Alluvium (Qal) ID: About 80% fine sand; about 20% fines w ow dry strength and slow dilatancy; maximur ith HCl.				
SP	IN-PLACE CONDITION: G	rayish tan color, dry.				
	Total: 81.0 lbs. / cu ft., 5.7 LAB TEST DATA: 63.1% s Maximum dry density= 10	AND MOISTURE FROM 6.0 TO 7.0 ft. 7%. (75.2% compaction) and, 36.9% fines, LL=25.6, PI = 6.6 SPG = 2 7.7 lbs. / cu ft., optimum water content = 16 CLAYEY SAND WITH SILT.	2.59 .3%			
	10.0 to 16.0 ft POORLY GF	TION: Quaternary Alluvium (Qal) RADED SAND: About 95% fine sand; about dilatancy, and low dry strength; maximum si				
16.0 ft (6263.6)	IN-PLACE CONDITION: G	rayish tan in color, dry.	ſ			
		TION: Quaternary Alluvium (Qal)	/			
	RFACE HEAVILY VEGETATED	D WITH RUSSIAN THISTLE, AND OCCASI	ONAL SAG	 SE BF	 RUSH	⊥_ ⊣.
		DUE TO LIMIT OF EQUIPMENT.				

	, 10 AND 11 PIPELINE	T NO. TPR11-15-6 PROJECT: NAVAJO GALLUP WATER SUPPLY GROUND ELEVATION: 6286.9	PROJEC	ст		
LOCATION: REACH 11 COORDINATES: N 1,72 APPROXIMATE DIMENS DEPTH TO WATER: W	PIPELINE					
APPROXIMATE DIMENS	0,451 E 2,448,460					
APPROXIMATE DIMENS		METHOD OF EXPLORATION: CASE 580 SUPE	R M BAC	скно	E	
	SIONS: 15.0'X10.0'X15.5'	LOGGED BY: C. BEYER				
	LNE DATE: 9/15/2015	DATE EXCAVATED: 9/15/2015				
	CLASSIFICATION AND D	ESCRIPTION OF MATERIAL			LUS 3 Volui	
SYMBOL	(SEE USB	R 5000, 5005)		3 - 5	12	PLU 12
SP-SM 3 3 3 3 3 3 3 3 3 3 3 3 3	 about 10% nonplastic fines with rap maximum size, fine sand; strong re IN-PLACE CONDITION: Grayish br cementation. GEOLOGIC INTERPRETATION: C 3.0 to 3.4 ft CLAYEY SAND: About plasticity, low toughness, low dry str fine sand; weak reaction with HCl. IN-PLACE CONDITION: Tan color, throughout. GEOLOGIC INTERPRETATION: C 3.4 to 4.0 ft POORLY GRADED SA about 10% nonplastic fines with rap maximum size, fine sand; strong re IN-PLACE CONDITION: Grayish br cementation. GEOLOGIC INTERPRETATION: C 4.0 to 15.5 ft CLAYEY SAND: About to medium plasticity, low toughness maximum size, fine sand; strong re IN-PLACE CONDITION: Grayish ta IN-PLACE CONDITION: Grayish ta 	action with HCI. own in color, stratified dunes, moderate tuaternary Eolian (Qeo) 80% fine sand; about 20% fines with low rength and slow dilatancy; maximum size intermittent iron oxide staining, dry, roots tuaternary Alluvium (Qal) ND WITH SILT: About 90% fine sand; bid dilatancy, and low dry strength; action with HCI. rown in color, stratified, moderate tuaternary Eolian (Qeo) t 70% fine sand; about 30% fines with low s, low dry strength and slow dilatancy; action with HCI. n in color, moderate cementation. DISTURE FROM 6.0 TO 7.0 ft. % compaction) 5% sand, LL = 33.0, PI =18.6 SPG = 2.5 cu ft., optimum water content = 16.2 % LEAN CLAY	2,			
ARE		RUSSIAN THISTLE, AND OCCASIONAL O 3 FEET TALL. DISCONTINUED EXC/				

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HAND-A	UGER NO. TPR11-15-8	SHEET	⁻ 1 OF	1	
EATURE: REACHES 9 OCATION: PIPELINE COORDINATES: N 1,71	GR 6,515 E 2,447,324 ME	DJECT: NGWSP OUND ELEVATION: 6297.1 THOD OF EXPLORATION: CASE 680 L BAC	KHOE			
		GGED BY: J. GILBERT TE EXCAVATED: 10/21/2015				
DEFINITO WATER. W	INE DATE: 10/21/2013 DA	12 LAGAVATED. 10/21/2013	%	PLUS	3 in	
CLASSIFICATION GROUP SYMBOI	CLASSIFICATION AND DESC	RIPTION OF MATERIAL		1	LUME)	
SYMBOL	(SEE USBR 50	00, 5005)	3 - 5 in	5 - 12 in	PLU 12 ir	
SP-SM	0.0 to 1.2 ft POORLY GRADED SAND \ 10% non plastic fines with no toughness sand; no reaction with HCI.					
SM	IN-PLACE CONDITION: Tan in color, di	у				
	GEOLOGIC INTERPRETATION: Quate 1.2 to 14.6 ft SILTY SAND: About 80% f low toughness, low to no dry strength; m HCI.	ine sand; about 20% nonplastic fine				
-	IN-PLACE CONDITION: Tan in color, di	у				
-	IN-PLACE UNIT WEIGHT AND MOISTU Total: 95.8 lbs. / cu ft., 3.7 %.(88.6 % cc LAB TEST DATA: 72.7% sand, 21.4 % 1	mpaction)	SPG			
-	=2.64 Maximum dry density= 108.1 lbs. / cu ft. Laboratory classification is SILTY SAND					
IN-PLACE DENSITY TAKEN AT 7.0 FEET	GEOLOGIC INTERPRETATION: Quate	rnary Alluvium (Qal)				
-						
-						
- - - - 14.6 ft (6282.5)						
, , , , , , , , , , , , , , , , , , , ,						
	FACE HEAVILY VEGETATED WITH RUS		. SAGE BI	 RUSH	 ,	
DISC	ONTINUED DUE TO LIMIT OF EQUIPME	NI.				

Bureau of Reclamation			SHEET		2
FEATURE: REACHES _OCATION: PIPELINE	9, 10 AND 11	PROJECT: NGWSP GROUND ELEVATION: 6315.5			
COORDINATES: N 1,71	4 685 F 2 447 172	METHOD OF EXPLORATION: CASE 680 L BACKHO)E		
	SIONS: 15.0'X10.0'X13.0'	LOGGED BY: J. GILBERT			
	'LNE DATE: 10/20/2015	DATE EXCAVATED: 10/20/2015			
				PLUS	
	CLASSIFICATIO	N AND DESCRIPTION OF MATERIAL			<u> </u>
SYMBOL	(5	SEE USBR 5000, 5005)	3 - 5 in	5 - 12 in	PLU 12 in
SC (VISUAL) SM (LAB CLASS)		ND: About 75% fine sand; about 25% fines with toughness, medium dry strength and slow dilatancy strong reaction with HCI.	;		
-	IN-PLACE CONDITION: Rethroughout.	eddish brown in color; calcite cement, roots			
	Total: 102.9 lbs. / cu ft., 4.8 LAB TEST DATA: 70.6% s	and, 29.4 % fines, LL= NA, PI= NP_SPG= 2.65 .3 lbs. / cu ft., optimum water content = 14.2%			
-	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal).			
IN-PLACE DENSITY TAKEN AT 7.0 FEET					
 - - -)					
- - - - 11.4 ft (6304.1)-					
s(CL)		AN CLAY: About 50% medium plastic fines with ium toughness; about 50% fine sand; maximum size HCI.	,		
-12.8 ft (6302.7) SANDSPOND		TION: Quaternary Alluvium (Qal).	1		
		NE: Fine grained, tan in color, moderately soft (H5),		<u> </u>	<u> </u>
OMMENTS: SUF	RFACE HEAVILY VEGETATED CONTINUED DUE TO REFUS	D WITH RUSSIAN THISTLE, AND OCCASOINAL S/ SAL ON BEDROCK.	AGE BI	RUSH	Н.

7 B	-1336-A (1-86) Bureau of Reclamation	LOG OF TEST-PIT/HANI	D-AUGER NO. TPR11-15-9	SF	IEET	2 OF	2
FE.	ATURE: REACHES	9, 10 AND 11	PROJECT: NGWSP				
	CATION: PIPELINE		GROUND ELEVATION: 6315.5				
	ORDINATES: N 1,7		METHOD OF EXPLORATION: CASE 680 L BAC	CKHOE			
		SIONS: 15.0'X10.0'X13.0'	LOGGED BY: J. GILBERT				
DE	PTH TO WATER: W	/LNE DATE: 10/20/2015	DATE EXCAVATED: 10/20/2015		0/ 1		0 im
н	CLASSIFICATION	CLASSIFICATION AND E	DESCRIPTION OF MATERIAL		(BY	PLUS : VOLU	ME)
DEPTH	GROUP SYMBOL				3	5 -	PLUS
	STIMBUL	(SEE USE	3R 5000, 5005)	ĺ	5 in	12 in	12 in
		moderately weathered (W5).			1		
					/		
		GEOLOGIC INTERPRETATION: C	Cretaceous Menefee Formation (Kmf)				
				ſ			
				ĺ			
				ĺ			
CO	MMENTS:	L					L
50							

Bureau of Reclámation		HAND-AUGER NO. TPR11-15-10	SHEET	101	
FEATURE: REACHES		PROJECT: NGWSP			
Location: Pipeline Coordinates: N 1,7		GROUND ELEVATION: 6384.4 METHOD OF EXPLORATION: CASE 680 L BACK			
	NSIONS: 15.0' X 10.0' X14.5'	LOGGED BY: J. GILBERT	IOL		
	WLNE DATE: 10/20/2015	DATE EXCAVATED: 10/20/2015			
				PLUS	
	N CLASSIFICATIOI	N AND DESCRIPTION OF MATERIAL	<u>(Вт</u> 3-	VOLU	
5 SYMBOL	(S	EE USBR 5000, 5005)	5 in	12 in	12 12
SC		e: About 75% fine sand; about 25% fines with media ss, medium dry strength and slow dilatancy; maxim tion with HCI.			
- - !	IN-PLACE CONDITION: Re throughout.	IN-PLACE CONDITION: Reddish brown in color; calcite cement, roots throughout.			
	GEOLOGIC INTERPRETA	TION: Quaternary Alluvium (Qal).			
-					
<u>5.9 ft (6378.5)</u>					
6.2 ftst}78.2) SC (VISUAL) s(ML)(LAB		bout 80% fine sand; about 20% nonplastic fines w strength; maximum size, fine sand; strong reaction			
CLASS)	IN-PLACE CONDITION: Br	own in color.			
	6.2 to 14.5 ft CLAYEY SAN	TION: Quaternary Alluvium (Qal). D: About 75% fine sand; about 25% fines with toughness, medium dry strength and slow dilatanc	y;		
- IN-PLACE DENSITY	maximum size, fine sand; si	trong reaction with HCI.			
TAKEN AT 7.0					
1FEET 2	Total: 93.8 lbs. / cu ft., 6.7 % LAB TEST DATA: 52.8% fir	nes, 47.2% sand, LL= 22.2, PI = 3.4 SPG = 2.64 7 lbs. / cu ft., optimum water content = 14.3%			
- - 3-		TION: Quaternary Alluvium (Qal).			
- - 4 -					
- 14.5 ft (6369.9)					$\left \right $
	RFACE HEAVILY VEGETATED) WITH RUSSIAN THISTLE, AND OCCASOINAL S UE TO LIMIT OF EQUIPMENT.	SAGE BF	RUSH	١.

7-1336-A (1-86) Bureau of Reclamation	LOG OF TEST	PIT NO. TPR11-15-12	SHEET	Г 1 OF	1
FEATURE: REACHES		PROJECT: NAVAJO GALLUP WATER SUPPLY	PROJECT		
LOCATION: REACH 11 PIPELINE GROUND ELEVATION: 6376.9					
COORDINATES: N 1,7	DORDINATES: N 1,712,142E 2,443,791METHOD OF EXPLORATION: CASE 580 SUPER				
	SIONS: 15.0'X8.0'X14.0'	LOGGED BY: C. BEYER			
DEPTH TO WATER: W	/LNE DATE: 9/16/2015	DATE EXCAVATED: 9/16/2015		D I 110	<u>.</u>
	CLASSIFICATION A	ND DESCRIPTION OF MATERIAL		PLUS Y VOLL	
	(SFF	USBR 5000, 5005)	3 - 5	5 - 12	PLUS
0	(in	in	in
sc		bout 80% fine sand; about 20% fines with low ry strength and slow dilatancy; maximum size HCI.			
2 -	IN-PLACE CONDITION: Brown 4.3 ft, moderate cementation; r	n in color; becomes grayish brown from 2.2 to roots in top 4 feet.			
3	GEOLOGIC INTERPRETATIO	N: Quaternary Alluvium (Qal)			
5 -					
6 - 6.0 ft (6370.9)					
SANDSTONE	moderately weathered (W6), th oxide staining and calcareous z	ne grained, tan in color, soft (H6), intensely to ninly to moderately bedded; intermittent iron zones. Recovered predominately as 3 to 10 with some as large as 1.6 ft in diameter. No reous zones.			
9 - - - - - - - - - - - - - - - - - - -	GEOLOGIC INTERPRETATIO	N: Cretaceous Menefee Formation (Kmf)			
11					
12-					
¹³ – 13.5 ft (6363.4)					
- 14.0 ft (6362.9)		rey in color, mottled, soft (H6) moderately			
14	weathered (W5), moist, intermi strong reaction with HCI. Recov	ittent iron oxide staining and calcite nodules; vered as 2 to 4 inch subangular fragments.			
	RFACE HEAVILY VEGETATED WI	<u>N: Cretaceous Menefee Formation (Kmf)</u> ITH RUSSIAN THISTLE, AND OCCASIONAL		RUSH	۱. ۱.
		TO REFUSAL ON CLAÝSTONE BEDROCK			

PROJECT: Navajo Gallup Water Supply Project

DHR9-15-1

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T-CT-	CONSISTENC
I-CI-AVIIIA	IN PERCENT

IS	D-ΛΥΓΩΕ - %	I							
COMPACTION TESTS	BERETRATION PEUETRATION	I							
APACTI	CONTENT - % OPTIMUM MOISTURE	ı							
CON	DENSILA - ÞGI MVXIMNM DKA	ı							
2	MINUS No. 4 SPECIFIC GRAVITY	2.63							
JENSIT	brns nº. 4 Sdecific gryvity	ı							
IN-PLACE DENSITY	CONTENT- % FILL MOISTURE	3.9							
NI	DKA DENSITY- Pcf	I							
LIMITS	% - LIMII E9VXNIXHS	ı							
CONSISTENCY LIMITS	% - XƏDNI ALIƏILSVƏ	NP							
CONSIS	ΓΙΔΩΙ ΓΙΜΙΙ - %	NP							
ERCENT	(127mm) (127mm) (127mm)	0.0							
	to 5., (127mm) to 2., (127mm)	0.0							
PARTICLE SIZE FRACTIONS IN PI	to 3., (76.2mm) to 3., (76.2mm)	0.0							
ZE FRAG	(mm270.0) 002# <u>ANAS</u> (mm7.4) 44 of	71.8							
FICLE SI	 mm ⁴ 70.0 of 200.0	14.3							
PAR	NAHT RAULUER THAN	13.9							
	ZAMBOL CLASSIFICATION	SM		 		 	 	 	
IDENTIFICATION	DEPTH - feet	5.0-6.5							
IDEN	SAMPLE NUMBER	SPT #1							

PROJECT: Navajo Gallup Water Supply Project

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COMPACTION TESTS

IN-PLACE DENSITY

CONSISTENCY LIMITS

PARTICLE SIZE FRACTIONS IN PERCENT

IDENTIFICATION

FINES

D-VALUE - %

RESISTANCE - psi

DENETRATION

CONTENT - %

OPTIMUM MOISTURE

DENSITY - pcf

WAXIMUM DRY

VIINUS No. 4

SPECIFIC GRAVITY

PLUS No. 4

SPECIFIC GRAVITY

CONTENT- %

EILL MOISTURE

DRY DENSITY- pcf

% - LIWIT E TIMIL - %

brysticity index - %

. ТІМІІ ЦІОІІ

(ww_271)

OVERSIZE Larger than 5"

(mm721) "2 of

COBBLES 3" (76.2mm)

(mm2.07) "E of

GRAVEL #4 (4.76mm)

(mmð7.4) 44 ot

(mm²70.0) 002# <u>dNAS</u>

mm⁴70.0 of 200.0

mm200.0

SMALLER THAN

SYMBOL

CLASSIFICATION

DEPTH - feet

SAMPLE NUMBER

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13.5 - 15.0

SPT #5

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36.9

16.0 - 17.5

SPT #6

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SPT #2

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SPT #1

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12.8

13.9

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8.5

#3

SPT

2.63

3.0

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0.0

0.0

20.6

37.0

42.4

11.0 - 12.5

SPT #4

NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *** Atterberg Limits Lab samples not-labeled.

PROJECT: Navajo Gallup Water Supply Project

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		T										
SL	D-AVFAE - %		ı	ı	ı	ı	·	'				
COMPACTION TESTS	PEUETRAUCE - psi PEUETRATION		I		ı	1	ı	ı				
MPACT	CONTENT - % TIMUM MOISTURE	10	I	-	ı	1	ı	ı				
C0]	DENSILA - ^{del} Wyximum dka		I	I	ı	ı	ı	I				
Y	MINUS No. 4 PECIFIC GRAVITY	S	2.55	2.56	2.64	2.72	2.69	2.70				
DENSIT	BECIFIC GRAVITY PECIFIC GRAVITY	S	I	2.67	ı	ı	ı	ı				
IN-PLACE DENSITY	CONLENT- % FILL MOISTURE		6.3	4.4	15.0	13.6	16.5	15.9				
II	DKA DENSILA- Þ¢l	[I	-								
LIMITS	KINKVCE FIMIL - %	HS	I	-	10.3	13.3		13.1				
CONSISTENCY LIMITS	% - XƏDNI ALIƏLISV	ΔΓ	15.9	12.4	36.0	27.0	16.6	26.5				
CONSIS	% - ТІМІЛ ЦІОЦІ	[29.3	26.9	56.7	42.5	31.9	44.6				
ENT	(127mm) (127mm) (127mm)	ΙΛΟ	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERCENT	to 5., (127mm) to 2., (127mm)	CO	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN	to 3., (76.2mm) to 3.' (76.2mm)	<u>9</u>	0.0	1.8	0.0	0.0	0.0	0.0				
ZE FRA	(mm470.0) 002# <u>UNA</u> to #4 (4.74mm)	S	49.0	59.4	10.0	15.5	40.9	13.2				
FICLE SI	त्त्र mm ⁴ 70.0 of 200	.0	22.6	16.9	34.9	42.2	34.1	36.0				
PAR	NAHT AƏLLAN mm200.0	NS	28.4	21.9	55.1	42.3	25.0	50.8				
	ZAMBOT CEVZZIEICVLION		s(CL)	SC	СН	(CL) _S	_s (CL)	CL	 	 	 	
IDENTIFICATION	DEPTH - feet		3.5 - 5.0	6.0 - 7.5	8.5 - 10.0	11.0 - 12.5	13.5 - 15.0	18.5 - 20.0				
IDEN	SYMFLE NUMBER	5	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6				

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SL		D- АУГЛЕ - %	ı	ŗ	ı	ŗ	ı	ŗ	ŗ				
ION TES		BERELEVICE - ^{DSI}	I	ı		ı	ı	ı	ı				
COMPACTION TESTS	E	CONTENT - % OPTIMUM MOISTURI	ı	ı	-	ı	ı	ı	ı				
CON		DENSILA - ÞGI WYXIMUM DKA	I	I	ı	I	I	I	I				
2		WINDS Nº. 4 SLECIEIC CEVALLA	2.61	2.63	2.61	2.62	2.60	2.60	2.63				
DENSITY		bFUS Nº. 4 Sbecific Gravity	ı			NA	ı	2.42	2.42				
IN-PLACE DENSITY		CONLENL- % EIFT WOISLABE	3.0	2.3	4.7	2.9	4.7	1.1	0.6				
Ż		DKA DENSILA- Þej	I	ı	-	ı	ı	ı	ı				
LIMITS	% - TIMII ƏƏANINHR		I		-								
CONSISTENCY LIMITS	%	9 - XƏUNI ALIƏLLA INDEX -	NP	NP	3.5	NP	7.4	NP	NP				
CONSIS	ΓΙ Ο ∪ΙΙ ΓΙΜΙΙ - %			NA	20.1	NA	21.0	NA	NA				
INS	2،،	(127mm) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
N PERCENT	(to 2., (152mm) COBBLEZ 3., (29.7mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN PI		to 3., (76.2mm) (16.2mm) to 3., (76.2mm)	0.0	0.0	0.0	0.1	0.0	21.0	11.0				
ZE FRAG		(mm270.0) 002# <u>dNA2</u> (mm27.4) 44 01	82.6	85.8	6.99	79.6	55.2	65.6	79.1				
TICLE SI	ES	mm470.0 of 200.0	8.9	5.8	15.8	11.3	30.8	9.1	6.5				
PAR	FINES	mm ^{200.0} SMALLER THAN	8.5	8.4	17.3	9.0	14.0	4.3	3.4				
		SAMBOL CEASSIFICATION	SM	SM	SM	SM	sc	(SM)g	SM				
IDENTIFICATION		DEPTH - feet	3.8-5.3	6.3-7.8	8.8-10.3	11.3-12.8	13.8-15.3	16.3-17.8	18.8-20.3				
IDENT		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7				

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SL		D-AVFNE - %	I	ı	I	ı	ı	ı	ı	ı			
COMPACTION TESTS		BESISLANCE - D81 DENELBATION	I	ı	I	ı	ı	ı	ı	I	 	 	
MPACT	Э	CONTENT - % OPTIMUM MOISTURI		·	ı	·				ı			
CON		DENSILA - ^d ci WyXIMUM DKA	-	I	I	I	I	ı	ı	-			
Κ		WINDS Nº. 4 SEECIEIC CEVALLA	2.54	2.62	2.62	2.52	2.54	2.64	2.53	2.59			
DENSIT		DFUS Nº. 4 SPECIFIC GRAVITY	I	ı	I	2.34	2.34	2.39	2.36	2.33			
IN-PLACE DENSITY		CONLENT- % FILL MOISTURE	4.9	6.2	5.9	2.7	3.2	2.9	3.2	8.3			
NI		DKA DENSILA- Þ¢l	I	ı	I	ı	ı	ı	ı	I			
STIMIJ	%	- TIMII ƏƏAMINKAƏ	1	ı	ı	ı	ı	ı	ı				
CONSISTENCY LIMITS	%	PLASTICITY INDEX -	5.0	7.1	6.5	NP	NP	NP	NP	ΝΡ			
CONSIS		ΓΙΟΛΙD ΓΙΜΙΙ - %	23.6	26.6	24.4	NP	NA	NP	NP	NP			
ERCENT	2،،	OVERSIZE Larger than) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	(to 2., (127mm) COBBLES 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
CTIONS		(0,22000) (0,22000) (1,2000) (0.0	0.0	0.0	39.7	24.3	18.0	34.6	1.8			
IZE FRA		(mm470.0) 002# <u>anna</u> (mm7.4) 44 ot	72.3	6.99	67.8	37.5	56.5	68.2	49.3	77.8			
PARTICLE SIZE FRACTIONS IN	FINES	mm470.0 of 200.0	<i>T.T</i>	9.1	10.2	15.3	11.6	8.9	10.2	11.6			
PAR	FIL	mm200.0 SMALLER THAN	20.0	24.0	22.0	7.5	7.6	4.9	5.9	8.8			
ł		TOBWAS CTV82IEICVLION	SC-SM	SC	SC-SM	(GM) _S	(SM) _G	(SM) _G	$(SM)_G$	SM			
IDENTIFICATION		DEPTH - feet	5.0-6.5	7.5-9.0	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0	20.0-21.5	25.0-26.5			
IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8			

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	S	% - A UTE - %	D-V	ı	I						
	COMPACTION TESTS	ETRATION isq - JONATi		ı	ı						
	APACT	NTENT - % M MOISTURE		1	ı						
	COMI	NUM DKY IMUM DKY		ı	ı						
ĺ	Ν.	NUS No. 4 SIC GRAVITY		2.65	2.72						
	IN-PLACE DENSITY	US Nº. 4 SIC GBANITY		ı	T						
	-PLACE	NTENT- % MOISTURE		15.7	9.9						
	IN	iəq -YTI2VAC	ם שאג ו	ı							
	LIMITS	VCE FIMIL - %	SHRINK	14.9	21.2						
	CONSISTENCY LIMITS	% - XHONI ALI;	DITSAJA	94.0	26.3						
-15-7	CONSE	% - TIMII (пди	114.3	40.5						
DHR9-15-7	ENT	Larger than 5" Larger than 5") ZISHINO	0.0	0.0						
	IN PERCENT	(172.000) (172.0000) (172.000) (172.000) (172.000) (172.000) (172.000) (172.000) (1	to 2 COBBT	0.0	0.0						
	PARTICLE SIZE FRACTIONS IN	(mmð7.4) 44 <u>(</u> (mm2.ð7) **		0.0	0.0						
	IZE FRA	(mm470.0) 002 (mm7.4) (4.76mm)		5.7	28.9						
	TICLE S	mm²0.0 o	91 200.0	25.1	47.0						
	PAR	و THAN		69.2	24.1						
	7	KMBOL SIFICATION		CH	(CL)s						
	IDENTIFICATION	PTH - feet	DE	5.0-6.5	7.5-8.0						
	IDEN	ГЕ ИЛМВЕК	AMAS	SPT #1	SPT #2						

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IS		D-АУГЛЕ - %	ı	ı	ı						
COMPACTION TESTS		PENETRATION PENETRATION	-	-	-						
APACT	Э	CONTENT - % OPTIMUM MOISTURI	ı	ı	ı						
CON		DENSITY - PCf DENSITY - PCf	-	-	T						
4		WINNS Nº' † SBECIEIC CBVALLA	I	2.50	2.61						
IN-PLACE DENSITY		DECIFIC GRAVITY SPECIFIC GRAVITY	2.40	2.51	-						
I-PLACE		CONLENT- % FILL MOISTURE	2.6	4.0	14.4						
AI		DRY DENSITY- pcf		·	ı						
TIMITS	9/	SHBINKAGE LIMIT - 9	I	I	4.9						
CONSISTENCY LIMITS	%	6 - XƏUNI ALIƏLISVƏ	0.7	15.1	40.4						
CONSE		ΓΙΟΛΙD ΓΙΜΙΙ - %	19.2	29.4	62.4						
ENT	2.,	OVERSIZE Larger than (127mm)	0.0	0.0	0.0						
IN PERCENT	(to 2., (127mm) to 2., (127mm)	0.0	0.0	0.0						
CTIONS]		to 3., (76.2mm) (76.2mm) to 3., (76.2mm)	4.5	31.8	0.0						
ZE FRA		(mm\$7.0) 002# <u>01A88</u> (mm27.4) 4200 (mm27.4)	67.8	34.3	5.2						
PARTICLE SIZE FRACTIONS IN	FINES	mm 1 70.0 of 200.0	16.7	18.7	26.8						
PAR	FIN	MAHT AALLER THAN mm200.0	11.0	15.2	68.0						
		SAMBOL CLASSIFICATION	WS	(SC) _G	НЭ						
IDENTIFICATION		1991 - HTYAD	5.0-5.7	0.9-2.T	10.0-11.5						
IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3						

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COMPACTION TESTS		BENELBANCE - D ^{si} BENELBVLION	I	I	ı	ı	I					
MPACTI	Έ	CONTENT - % OPTIMUM MOISTURE	I	-	I	I	I					
C0]		DENSITY - pcf MAXIMUM DRY	I	I	ı	ı	I					
Y		WINUS No. 4 SPECIFIC GRAVITY	2.62	2.60	2.64	ı	2.68					
DENSIT		LLUS No. 4 SPECIFIC GRAVITY	ı	ı	ı		ī					
IN-PLACE DENSITY		CONTENT- % FILL MOISTURE	3.9	5.0	5.8	1.3	2.3					
IN		DKA DENSILA- Pet	-	-	T		-					
LIMITS	%	8 - SHRINKVGE FIMIL - %	1		ı		-					
CONSISTENCY LIMITS	%	PLASTICITY INDEX - 9	4.4	9.1	14.8	N/P	Λ/Ρ					
CONSIS		корания и мали и ма	22.3	24.6	27.3	N/A	N/A					
ENT	2،،	OVERSIZE Larger than) (127mm)	0.0	0.0	0.0	0.0	0.0					
IN PERCENT	(to 2., (157mm) COBBLES 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0					
CTIONS I		to 3., (76.2mm) GRAVEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0					
ZE FRA((mm470.0) 002# <u>dNA2</u> (mm7.4) 44 01	57.7	58.1	47.3	70.7	72.2					
PARTICLE SIZE FRACTIONS IN	ES	mm470.0 of 200.0	23.5	17.4	21.9	15.4	16.9					
PARJ	FINES	mm200.0 SMALLER THAN	18.8	24.5	30.8	13.9	10.9				 	
7		SYMBOL CLASSIFICATION	SC-SM	SC	_s (CL)	SM	SM					
IDENTIFICATION		DEPTH - feet	3.4 -4.9	5.9 - 7.4	8.4 - 9.9	10.9 - 12.4	13.4 - 14.9					
IDE		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5					

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IS		D-АУГЛЕ - %	ı							
COMPACTION TESTS		BENELKATION PENETRATION	I							
APACT	E	CONTENT - % OPTIMUM MOISTURI	ı							
CON		DENSILA - ^d ei MVXIMUM DKX	-							
7		WINNS Nº: † SLECIEIC CBVAILA	2.54							
IN-PLACE DENSITY		DLUS No. 4 SPECIFIC GRAVITY	2.38							
I-PLACE		CONLENT- % FILL MOISTURE	4.8							
NI.		DKA DENSILA- Pct	ŗ							
TIMITS	%	5 - TIMIJ ƏƏANIAHS	1							
CONSISTENCY LIMITS	%	D- XJULI INDEX -	dN							
CONSI		гіблір гіміт - %	NP							
	2،،	OVERSIZE Larger than (127mm)	0.0							
IN PERCENT	(to 2., (127mm) COBBLES 3., (76.2mm	0.0							
PARTICLE SIZE FRACTIONS IN		(0,220 (4.76mm) (19.720 #4 (4.76mm)	49.2							
IZE FRA		(mm470.0) 002# <u>anns</u> (mm27.4) 44 of	35.4							
TICLE S	ES	mm470.0 of 200.0	7.3							
PAR	FINES	MALLER THAN 0.000mm	8.1							
		ZAMBOL CEASSIFICATION	(GM) _S							
IDENTIFICATION		DEPTH - feet	0.0-2.5							
IDEN		SAMPLE NUMBER	BAG #1							

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IS		D-АУГЛЕ - %	I	ı	ı	ı	ı	1	ı	ı			
COMPACTION TESTS		PENETRATION PENETRATION	I	I	I	I	I	I	ı	-			
MPACT	Έ	CONTENT - % OPTIMUM MOISTURI	I	I	I	I	I	I	I	I			
CON		DENSILA - ^D GL WYXIWNW DBA	I	I	I	I	ı	ı	ı	ı			
Κ		WINUS No. 4 SPECIFIC GRAVITY	2.60	2.61	2.58	2.61	2.65	2.54	NA	2.57			
DENSIT		DEUIS No. 4 SPECIFIC GRAVITY	I	I	NA	I	NA		ı	2.42			
IN-PLACE DENSITY		CONLENT- % FILL MOISTURE	3.3	5.3	1.5	4.1	1.7	9.7	5.7	2.4			
ZI		DKA DENSILA- Þ¢l	ı	ı	ı			ı	,	-			
STIMIJ	9/	- TIMIT EDARMER	ı	ı				12.2	10.5				
CONSISTENCY LIMITS	%	5 - XƏUNI ALIƏLLAVI	NP	5.8	NP	7.2	NP	23.8	32.0	NP			
CONSIS		гіблір гіміт - %	NA	24.8	21.1	22.5	NA	42.3	46.7	NA			
ENT	<u>،،</u>	(127mm) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IN PERCENT		to 2., (157mm) COBBLEZ 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PARTICLE SIZE FRACTIONS IN		10 3 (76.2mm) (76.2mm) (76.2mm)	0.0	0.0	0.9	0.0	0.8	0.0	0.0	12.8			
IZE FRA		(mm470.0) 002# <u>dNA8</u> (mm7.4) 44 01	66.2	50.5	81.8	57.3	79.5	38.7	25.9	69.7			
TICLE S	ES	mm470.0 of 200.0	20.6	30.9	8.9	28.3	11.9	24.5	32.3	6.9		 	
PAR'.	FINES	MALLER THAN 0.005mm	13.2	18.6	8.4	14.4	7.8	36.8	41.8	10.6		 	
		ZAMBOT CEASSIFICATION	SM	SC-SM	SM	SC	SM	s(CL)	(CL) _s	SM			
IDENTIFICATION		DEPTH - feet	3.5-5.0	6.0-7.5	8.5-10.0	11.0-12.5	13.5-15.0	16.0-17.5	18.5-20.0	23.5-25.0			
IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8			

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IS		Ю-АУГЛЕ - %		ı			ı	·	·	·			
COMPACTION TESTS		BENELEVACE - psi BENELEVELION	I	-	ı	-	ı	ı	ı	-			
MPACT	1	CONTENT - % OPTIMUM MOISTURF	ı	ı	ı			ı	ı	ı			
CON		DENSITY - PCI MAXIMUM DRY	ı		1	ı	ı	1	ı	ı			
Y		WINUS No. 4 SPECIFIC GRAVITY	2.55	2.61	2.63	2.57	2.64	2.56	2.63	2.64			
DENSIT		DEUIS No. 4 SPECIFIC GRAVITY	ı	·		ı	ı	·	ı	2.23			
IN-PLACE DENSITY		CONTENT- % FILL MOISTURE	4.4	7.6	7.2	8.3	5.0	3.8	3.7	3.8			
NI		DKA DENSILA- Pet	I	-	ı	-	-	-	I	-			
STIMIT	%	8 - SHRINKAGE LIMIT - 9	I	-	ı	-	-	-	I	I			
CONSISTENCY LIMITS	%	PLASTICITY INDEX - 9	3.7	4.5	NP	5.3	NP	NP	NP	NP			
CONSIS		гіблір гіміт - %	21.7	23.2	NA	25.1	NA	NA	NA	NA			
ENT CONS	<u>،،</u>	OVERSIZE Larger than: (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
N PERCENT		to 5., (127mm) (76.2mm) (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
I SNOIL		to 3., (76.2mm) to 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3			
ZE FRAC		(mm470.0) 002# <u>dNAS</u> (mm7.4) 44 01	65.0	50.2	59.4	40.3	61.0	64.2	66.3	62.4			
PARTICLE SIZE FRACTIONS IN	ES	mm470.0 of 200.0	22.7	32.6	27.6	43.7	26.4	24.6	23.4	22.9			
PART	FINES	WWS00.0 SMALLER THAN	12.3	17.2	13.0	16.0	12.6	11.2	10.3	12.4			
NOI		SAMBOL CLASSIFICATION	SM	SC-SM	SM	s(CL-ML)	SM	SM	SM	SM			
IDENTIFICATION		DEPTH - feet	5.0-6.5	7.5-9.0	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0	20.0-21.5	25.0-26.5			
Ξ		SAMPLE NUMBER	SPT #1	2H T42	SPT #3	SPT #4	SPT #5	SPT #6	L# LdS	8# LdS			

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ST	D-АУГЛЕ - %	·	I	I	I	I	ı	ı	ı				
COMPACTION TESTS	BERETRAUCE - psi PEUETRATION	ı	ı	ı		ı	·		·				
APACT	CONTENT - % OPTIMUM MOISTURE		I	I	I	I	ı	I	ı				
CON	DENSITY - pcf DAXIMUM DRY	ı	ı	ı	1	ı	ı		ı				
N .	MINUS Nº. 4 SPECIFIC GRAVITY	2.61	2.56	2.63	2.65	2.60	2.62	2.52	2.67				
IN-PLACE DENSITY	LLUS No. 4 SPECIFIC GRAVITY	2.36	2.43	2.44	I	I	2.26	I	I				
-PLACE	CONLENL- % EITT WOISLINE	2.5	4.2	3.9	4.3	4.1	3.7	4.5	9.7				
NI	DKA DENSILA- Þei	ı	ı	ı	ı	ı							
STIMIJ	% - LIWIT EVANIS	ı	ı	ı		ı	1		1				
CONSISTENCY LIMITS	6 STREET NUDEX - %	NP	14.5	7.0	NP	8.0	NP	NP	22.0				
CONSIG	гіблір гіміт - %	NP	32.1	20.6	NP	23.2	NP	NP	34.0				
RCENT	OVERSIZE Larger than 5" (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERC	to 2., (127mm) to 2., (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN PE	to 3., (76.2mm) <u>CBAVEL</u> #4 (4.76mm)	14.4	14.6	1.9	0.0	0.0	1.9	0.0	0.0				
ZE FRA	(mm470.0) 002# <u>ANAS</u> (mm7.4) 44 01	69.1	23.7	66.5	64.5	55.4	63.7	55.4	37.5				
TICLE S	الح سس470.0 of 200.0	6.6	39.0	16.7	20.4	27.4	22.8	29.7	30.9				
PAR'	NAHT AZJIAMS	6.6	22.7	14.9	15.1	17.2	11.6	14.9	31.6				
1	SAMBOL CLASSIFICATION	SM	s(CL)	SC-SM	SM	SC	SM	SM	s(CL)				
IDENTIFICATION	DEPTH - feet	3.1 - 4.6	5.6-7.1	8.1 - 9.6	10.6 - 12.1	13.1 – 14.6	15.6-17.1	18.1 – 19.6	23.6 - 25.1				
IDEN	SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8				

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	IS	% - ЭПТУА-	a								
	COMPACTION TESTS	NETRATION SISTANCE - psi									
	APACT	ONLENL - % NUM MOISTURE									
	CON	ENSITY - pcf XIMUM DRY									
	r	VIINUS Nº: † SIEIC EBVALLA		2.60							
	DENSITY	DEUS No. 4 SIFIC GRAVITY	SPEC	2.46							
	IN-PLACE DENSITY	ONTENT- % L MOISTURE		2.6							
		Z DENSILA- bci	ЪВЛ								
	STENCY LIMITS	KAGE LIMIT - %	NINHS	1							
	CONSISTENCY LIMITS	ICILA INDEX - %	TSAJA	dN							
-15-15		% - TIMIJ (IU)	гіб	NA							
DHR9-15-15		<u>IZE</u> Larger than 5" (127mm)	OVERS	0.0							
	IN PERCENT) 2., (17,100) TES 3., (17,000)		0.0							
	CTIONS) 3., (76.2mm) 7., (76.2mm)		10.3							
	IZE FRA	(mm470.0) 0024 <u>(</u> (mm70.0) 44 (68.4							
	IDENTIFICATION PARTICLE SIZE FRACTIONS IN	mm ^{200.}	S00'0	11.7							
		LER THAN		9.6							
Í		SAMBOT VSSIEICVLION	GFV	SM							
)EPTH - feet	I	5.0-6.1							
	IDE	ILLE NUMBER	NVS	SPT# 1							

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IS		D-АУГЛЕ - %	I	ı	ı	ı	ı	ı	ı	ı			
COMPACTION TESTS		PENETRAUCE - psi PENETRATION	I	I	I	I	I	I	I	T			
MPACT	Ξ	CONTENT - % OPTIMUM MOISTURI	ŗ	ı	I	ı	I	ı	I	ı			
CON		DENSITY - PCf MAXIMUM DRY				1	ı	ı	ı				
Y		WINUS No. 4 SPECIFIC GRAVITY	2.59	2.58	2.59	2.65	2.55	2.62	2.62	2.64			
DENSIT		LUUS N₀. 4 SPECIFIC GRAVITY	ı	·			I	·	ı	ı			
IN-PLACE DENSITY		CONTENT- % FILL MOISTURE	3.3	7.4	3.0	4.3	6.4	3.5	4.9	4.6			
IN		DKA DENSILA- Pet					ı	1	I				
STIMITS	%	8 - SHKINKVGE FIMIL - %	I	-	ı	ı	I	ı	I	I			
CONSISTENCY LIMITS	%	6 - XƏDI ALIƏLLA INDEX - 6	NP	19.5	NP	1.2	24.6	NP	2.4	2.3			
CONSE		κ ΤΙΜΙΙ ΠΙΟΟΙΙ	NA	31.8	NA	22.0	40.4	NA	24.1	22.9			
ENT	2،،	OVERSIZE Larger than) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IN PERCENT		to 5" (76.2mm) COBBLES 3" (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PARTICLE SIZE FRACTIONS IN		to 3., (76.2mm) GBAVEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IZE FRA		(mm470.0) 002# <u>dNAS</u> (mm7.4) 44 01	66.7	45.6	64.9	50.5	17.0	64.6	39.7	49.1			
ICLE S	ES	mm 1 70.0 of 200.0	22.3	23.3	24.8	32.8	42.6	22.3	43.7	34.0			
PART	FINES	mm ^{200.0} MARLER THAN	11.0	31.1	10.3	16.7	40.4	13.1	16.6	16.9			
7		SAMBOL CLASSIFICATION	SM	s(CL)	SM	SM	(CL)s	SM	s(ML)	s(ML)			
IDENTIFICATION		DEPTH - féet	5.0-6.5	7.5-8.7	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0	20.0-21.5	25.0-26.5			
IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8			

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rs		D- АУГЛЕ - %	I	I	I	I	-	ı	ı	I			
COMPACTION TESTS		BENELBANCE - Dei BENELBVLION	I	I	I	I	I	I	-	I			
MPACT	2	CONTENT - % OPTIMUM MOISTURF	I	I	I	I	-		·	I			
COI		DENSITY - PCI MAXIMUM DRY	I	ı	I	ı	I	ı	ı	I			
K		WINUS No. 4 SPECIFIC GRAVITY	2.55	2.62	2.64	2.60	2.52	2.63	2.59	2.61			
DENSIT		DLUS No. 4 SPECIFIC GRAVITY	I	ı	ı	ı	I	ı	I	ı			
IN-PLACE DENSITY		CONTENT- % FILL MOISTURE	7.0	9.6	7.0	5.3	7.3	6.2	4.5	6.3			
NI		DKA DENSILA- Pet	I	I	I	I	I	-	-	-			
STIMIJ	%	8 - SHKINKVCE FIMIL - %	15.6	11.7	ı	ı	10.6	14.0	ı	I			
CONSISTENCY LIMITS	%	brysticity index - %	26.2	30.6	11.0	5.4	34.0	72.1	2.0	2.3			
CONSE		иоди и кила и	41.5	46.1	28.8	23.2	47.8	88.0	22.2	21.5			
JENT	<u>،،</u>	OVERSIZE Larger than (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IN PERCENT	,	to 5., (127mm) COBBLES 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PARTICLE SIZE FRACTIONS IN		to 3., (76.2mm) to 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IZE FRA		(mm\$70.0) 002# <u>dNAS</u> (mm7.4) 44 01	20.9	46.3	28.0	66.8	19.4	19.8	52.9	47.3			
IICLE S	ES	mm 1 70.0 of 200.0	35.5	15.1	45.1	14.9	34.5	44.5	31.8	34.3			
PARI	FINES	mm ^{200.0}	43.6	38.6	26.9	18.3	46.1	35.7	15.3	18.4	 		
7		SXMBOL CLASSIFICATION	(CL)s	s(CL)	(CL)s	SC-SM	(CL)s	(CH)s	MS	s(ML)			
IDENTIFICATION		1991 - HTAAD	5.0-6.5	7.5-9.0	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0	20.0-21.5	25.0-26.5			
IDE		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8			

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IS		D- АУГЛЕ - %	ı	ı	ı	ı	ı	ı	ı	ı			
COMPACTION TESTS		BENELEVACE - psi PENETRATION		I	I	I	I	I	I	I			
MPACT	1	CONTENT - % OPTIMUM MOISTURF	-	I	I		-	I	I	I			
CON		DENSITY - PCI MAXIMUM DRY	-	-	-		ı	I	I	-			
Y		WINUS No. 4 SPECIFIC GRAVITY	2.64	2.54	2.64	2.52	2.62	2.62	2.56	2.58			
DENSIT		DLUS No. 4 SPECIFIC GRAVITY	-	ı	I	ı	I	I	I	ı			
IN-PLACE DENSITY		CONTENT- % FILL MOISTURE	10.7	10.6	11.3	5.2	2.2	3.6	10.5	5.0			
NI		DKA DENSILA- ^D cl	ı	ı	I	ı	I	I	I	ı			
STIMIJ	%	8 - SHRINKVGE FIMIL	11.9	13.4	I		I	I	10.4	I			
CONSISTENCY LIMITS	%	6 - XAUNI ALIOILSA - %	25.2	35.8	19.2	12.4	NP	NP	30.1	14.7			
CONSIS		κισυπ μινη	49.0	66.0	39.6	30.8	NA	NA	56.8	29.3			
ENT CON	<u>،،</u> 2	OVERSIZE Larger than (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IN PERCENT		to 5" (76.2mm) COBBLES 3" (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PARTICLE SIZE FRACTIONS IN		to 3., (76.2mm) (MM7EL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IZE FRA		(mm470.0) 002# <u>dNA8</u> (mm7.4) 44 01	30.2	6.8	22.0	17.5	82.3	74.3	19.9	55.0			
JCLE S	ES	mm470.0 of 200.0	18.6	25.2	29.6	48.7	9.2	10.2	20.7	16.0			
PART	FINES	mm ^{200.0}	51.2	68.0	48.4	33.8	8.5	15.5	59.4	29.0			
7		SAMBOL CLASSIFICATION	s(CL)	CH	(CL)s	(CL)s	SM	SM	(CH)s	SC			
IDENTIFICATION		DEPTH - fleet	5.0-6.5	0.9-2.7	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0	20.0-20.9	20.9-21.5			
IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7A	SPT #7B			

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S	гле - %	ул-а	I	ı	ı	ı	ı	ı	ı				
COMPACTION TESTS	ANCE - psi RATION		I	ı	I	ı	ı	ı	ı				
IPACTI	LENT - % MOISTURE		ı	1	1	ı	ı	ı	ı				
CON	ITY - pcf AUM DRY		ı	I	ı	I	ı						
2	NS Nº: 4 C GBVAILA		2.62	2.65	2.55	2.65	2.63	2.62	2.69				
DENSITY	IS No. 4 C GRAVITY		2.53		ı	-	-	ı					
IN-PLACE DENSITY	LENT- % OISTURE		7.4	6.3	6.3	6.7	L'L	15.4	7.4				
N	ioq - YTISN	DKA DE	I	ı	ı	-	-	ı	ı				
STIMIJ	3E LIMIT - %	SHRINKA	ı		ı	·	12.1	12.0	16.3				
CONSISTENCY LIMITS	% - XƏQNI AJ	LIDITZAJA	10.8	18.0	15.9	d/Ν	61.3	63.3	38.6				
CONSIS	% - TIMIJ	гібпі	25.2	31.0	31.8	N/A	82.5	84.1	54.5				
TNE	7mm) Larger than 5"		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERCENT	(mm7.07) (12.2 (mm7.1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN	(mm2.97) (mm2.97)		2.1	0.0	0.0	0.0	0.0	0.0	0.0				
ZE FRAG	(mm470.0) 0((mmð7.4)		57.6	49.6	60.1	72.1	5.0	3.8	14.9				
IICLE SI	<u>S</u> mm₽70.(0 of 200.0	16.7	20.0	15.2	11.3	23.2	22.2	43.4				
PAR		9.003 SMALLE	23.6	30.4	24.7	16.6	71.8	74.0	41.7				
	MBOL EICATION		SC	s(CL)	SC	SM	СН	СН	CH				
IDENTIFICATION	j99î - HT	DEL	3.5 - 5.0	6.0 – 7.5	8.5 - 10.0	11.0 - 12.5	13.5 - 15.0	16.0 - 17.5	18.5 - 20.0				
IDEN	E NUMBER	TIIMWS	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7				

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ST	D-АУГЛЕ - %	I	ı	ı	·					
COMPACTION TESTS	BENELBAICE - psi benelbation	I	ı	ı	ı					
MPACTI	CONTENT - % OPTIMUM MOISTURE	I	I	I	I					
CON	DENSILA - PCI WYXIMUM DKA	ı		ı	-					
Y	MINUS No. 4 SPECIFIC GRAVITY	2.61	2.62	2.67	2.63					
DENSITY	ЬГЛЗ И°' † Sbecific Grvaila	ı		,						
IN-PLACE DENSITY	CONLENT- % FILL MOISTURE	7.6	4.1	5.7	3.0					
NI	DKA DENSILA- Þ¢l	I	ı	ı	ı					
STIMIJ	% - TIMII ƏDANIMHS	I	ı	ı	-					
CONSISTENCY LIMITS	brysticity index - %	19.1	N/P	5.5	***					
CONSIS	ΓΙΟ ŪΙ D ΓΙΜΙ Τ - %	31.3	N/P	24.6	***					
RCENT	OVERSIZE Larger than 5" (127mm)	0.0	0.0	0.0	0.0					
	to 2." (127mm) to 5." (127mm)	0.0	0.0	0.0	0.0					
PARTICLE SIZE FRACTIONS IN PF	to 3., (J6.2mm) EBAVED #4 (4.76mm)	0.0	0.0	0.0	0.0					
ZE FRAG	(mm270.0) #200 (0.074mm) to #4 (4.76mm)	47.0	79.2	74.5	80.7					
LICLE SI		21.8	7.3	10.2	8.1					
PARI	FI MMR200.0 NAHT AZUAMS	31.2	13.5	15.3	11.2					
	ZAMBOL CLASSIFICATION	s(CL)	SM	SC-SM	***					
IDENTIFICATION	DEPTH - feet	3.2 - 4.7	5.7 - 7.2	8.2 - 9.7	10.7 - 12.2					
IDEN	SYMFLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4					

NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *** Not enough material to run Atterberg Limits/PI

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s		D-АУГЛЕ - %	I	I	I	I	I					
COMPACTION TESTS		PENETRAUCE - psi RESISTANCE - psi		1	ı	ı	ı					
APACTI	Ξ	CONTENT - % OPTIMUM MOISTURI	1		ı	I	ı					
CON		DENSITY - PCf MAXIMUM DRY	-	ı	ı	I	T					
Z		WINOS Nº. 4 SLECIEIC CEVALLA	2.65	2.74	2.72	2.70	2.73					
DENSITY		bFN8 Nº. 4 Sbecific Grvaity	-	1	ı	ı	ı					
IN-PLACE DENSITY		CONLENL- % EIFT WOISLABE	3.9	16.3	15.5	11.9	13.7					
NI		DKA DENSILA- Þel	-		ı	ı	ı					
CIMITS	%	8 - SHRINKAGE LIMIT - %	-	12.8	12.8	11.7	-					
CONSISTENCY LIMITS	%	6 - XHOLLA INDEX - %	<i>P</i> .7	39.5	36.3	30.7	25.4					
CONSIS		ки - тимп шидил	21.3	67.7	60.9	53.4	50.6					
INE	2،،	(127mm) (127mm)	0.0	0.0	0.0	0.0	0.0					
N PERCENT	(to 2., (157mm) COBBLEZ 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0					
PARTICLE SIZE FRACTIONS IN P		to 3., (76.2mm) GBAVEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0					
ZE FRAG		(mm470.0) 002# <u>dNA8</u> (mm7.4) 44 01	69.6	1.3	1.7	6.3	5.7					
LICLE SI	ES	mm 1 70.0 of 200.0	11.5	11.6	16.3	30.1	46.8					
PAR	FINES	mm ^{200.0}	18.9	87.1	82.0	63.6	47.5					
7		SZMBOL CFVSSIEICVLION	SC	CH	CH	CH	CH					
IDENTIFICATION		DEPTH - feet	3.5 - 5.0	6.0 - 7.5	8.5 - 10.0	11.0 - 12.5	13.5 - 15.0					
IŪ		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5					

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IS	D-AVFAE - %		ı	ı							
COMPACTION TESTS	BERETRACE - Psi PENETRATION	ı	ı	ı	-	ı					
MPACT	CONLENL - % OLLIWNW WOISLNBE	ı	ı	ı	ı						
COI	DENSILA - ^d gi Wyximum dka	Į	I	ı	ı	ı	ı				
γ	WINDS Nº. 4 SLECILIC CBVALLA	2.66	2.64	2.64	2.64	2.55	2.51				
IN-PLACE DENSITY	ЬГПЗ И°' ל SLECIEIC CEVVILA	I	I	I	ı	ı	ı				
-PLACE	CONLENT- % FILL MOISTURE	7.0	3.2	3.7	3.3	6.5	6.9				
N	DKA DENSILA- <mark>Þ</mark> el	Į	I	I	I	ı	ı				
LIMITS	% - LIMIT ƏƏVƏNINHS	I	I	ı	I	ı	12.7				
CONSISTENCY LIMITS	% - XƏDNI ALIƏLLSVƏ	12.9	N/P	N/P	6.0	12.5	25.6				
CONSIS	ΓΙΔΩΙ ΓΙΜΙΙ - %	27.4	N/A	N/A	21.2	30.7	44.0				
ENT	(127mm) (127mm) OVERSIZE Larger than 5°	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERCENT	to 5" (127mm) to 5" (127mm)	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN	to 3., (76.2mm) EXAVEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0				
ZE FRA	(mm270.0) 002# <u>ANAS</u> (mm7.4) 4200	43.7	76.5	65.9	66.8	36.5	16.2				
LICLE SI		30.1	9.6	16.7	18.2	34.9	35.8				
PAR	NAHT RAULUS INALLER THAN	26.2	13.9	17.4	15.0	28.6	48.0				
7	ZAMBOT CEASSIFICATION	s(CL)	SM	SM	SC-SM	s(CL)	(CL) _S				
IDENTIFICATION	DEPTH - feet	3.2 - 4.7	5.7 - 7.2	8.2 – 9.7	10.7 - 12.2	13.2 - 14.7	18.2 - 19.7				
IDF	SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6				

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ST	Β-ΛΨΓΩΕ - %		ı	ı	Т	Т	I	ı				
COMPACTION TESTS	PENETRATION PENETRATION	ı	ı	I	ı	I	ı	-				
MPACT	CONTENT - % OPTIMUM MOISTURE	ı	I	ı	I	I	I	I				
CO	DENSITY - PCI MAXIMUM DRY	ı	1	I	I	I	1	ı				
2	WIIAAS Nº. † SBECIEIC CBVAILA	2.65	ı	2.66	2.64	I	ı	2.61				
DENSITY	bFUS Nº. 4 Sbecific Grvaily	ı	ı	I	ı	ı						
IN-PLACE DENSITY	CONTENT- % FILL MOISTURE	9.0	3.4	4.9	5.8	8.2	6.4	4.2				
NI	DKA DENSILA- Þej	I	ı	I	I	I	I	ı				
STIMIJ	% - TIMIT - %	14.7	ı	ı	15.0	11.3	12.1	ı				
CONSISTENCY LIMITS	% - XƏDNI ALIƏLISV'I	21.1	N/P	2.8	16.6	26.1	20.6	2.0				
CONSIS	ж- тимп пидил	37.5	N/A	23.9	33.8	43.1	37.1	20.4				
TNE	VERSIZE Larger than 5" (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERCENT	to 2., (17,100) COBBLES 3., (20,2000)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN P	to 3., (76.2mm) (mm2.97) #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
ZE FRAG	(mm470.0) 002# <u>ANA2</u> (mm7.4) 44 ot	26.4	61.6	51.7	18.1	21.2	21.0	68.3				
TICLE SI		30.7	15.7	26.6	48.9	29.6	34.0	16.3				
PAR	NAHT AƏJJAMS mm200.0	42.9	22.7	21.7	33.0	49.2	45.0	15.4				
	ZAMBOT CEVZZIŁICVLION	(CL) _S	SM	SM	(CL) _S	(CL) _S	(CL) _S	SM				
IDENTIFICATION	DEPTH - feet	3.5 - 5.0	6.0 - 7.5	8.5 - 10.0	11.0 - 12.5	13.5 - 15.0	18.5 - 20.0	23.5 - 25.0				
IDEN.	SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7				

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ST	Ъ-УАГИЕ - %	ı	ı	ı	ı	T	ı				
COMPACTION TESTS	BENETRATION PENETRATION	1	I	I	ı	I	ı				
MPACTI	CONTENT - % OPTIMUM MOISTURE	I	I	I	ı	I	-				
COI	DENSINUM DRY DENSINUM DRY	ı	ı	ı	1	ı	ı				
7	WINUS No. 4 SPECIFIC GRAVITY	2.60	2.61	2.60	2.56	2.52	2.55				
DENSITY	LLUS No. 4 SPECIFIC GRAVITY	ı	ı	ı	ı	-	-				
IN-PLACE DENSITY	CONTENT- % FILL MOISTURE	4.4	5.8	6.5	6.6	7.5	6.2				
IN	DKA DENZILA- Det	I	I	I	I	I	ı				
STIMIJ	8 - SHRINKAGE LIMIT - %		ı	ı		9.5	NA				
CONSISTENCY LIMITS	brysticity index - %	5.7	13.7	13.6	13.8	40.1	23.0				
CONSIS	% - ТІМІЛ ПІЛОІЛ	22.3	26.9	26.8	26.9	55.9	41.0				
ENT	OVERSIZE Larger than 5" (127mm)	0.0	0.0	0.0	0.0	0.0	0.0				
IN PERCENT	to 2., (127mm) COBBLES 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN	to 3., (76.2mm) to 3., (76.2mm)	0.0	0.0	0.0	0.0	0.0	0.0				
ZE FRA	(mm470.0) 002# <u>dNA2</u> (mm7.4) 44 of	62.3	50.3	56.1	56.4	17.5	16.1				
ICLE SI	ਨ] mm470.0 of 200.0	18.5	23.9	19.3	16.8	31.7	47.9				
PART	NAHT AƏLIAMS R R NAMƏRIA NAMƏR	19.2	25.8	24.6	26.8	50.8	36.0				
7	TOBINAS CFV828IEICVLION	SC-SM	SC	SC	SC	(CH) _s	(CL) _s				
IDENTIFICATION	DEPTH - feet	3.3-4.8	5.8-7.3	8.3-9.8	10.8-12.3	13.3-14.8	15.8-17.3				
IDE	SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6				

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ž	2	D-ΛΥΓΩΕ - %	I							
COMPACTION TESTS		PENETRATION RESISTANCE - psi								
APACTI		CONTENT - % OPTIMUM MOISTURE	ı							
CON	50	DENSITY - pcf MAXIMUM DRY	ı							
		WINDS Nº. 4 SLECIEIC CEVALLA	2.57							
IN-PLACE DENSITY		DEUS No. 4 SPECIFIC GRAVITY								
LPLACE	-LLAUE	CONLENT- % FILL MOISTURE	2.1							
2		DKA DENSILA- Þ¢l	ı							
STIML	CITAT	% - LIWIT ESVABINKVCE FIMIL - %	ı							
-15-2 CONSISTENCY LIMITS	IONALO	% - XƏDNI ALIƏLLSVƏ	NP							
LSISNOD	TENTON	м - тимп шиди	NA							
DHK10-15-2		(127mm) (127mm) (127mm)	0.0							
DH IN PERCENT		to 2., (157mm) to 5., (127mm)	0.0							
PARTICLE SIZE FRACTIONS IN	CNOTO	to 3., (76.2mm) CKAVEL #4 (4.76mm)	0.0							
IZE FRA		(mm470.0) 002# <u>dNAS</u> (mm70.0) 04.4 (4.76mm)	80.4							
LCL E S		문 8	9.1							
PAR	IAN	NAHT RELLER THAN mm200.0	10.5							
7		TOSUBOT CEASSIFICATION	SM							
IDENTIFICATION		DEPTH - feet	5.0-6.5							
IDE	IDENTI	SAMPLE NUMBER	SPT #1							

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S		D-АУГЛЕ - %	ı		ı						
COMPACTION TESTS		BENELENCE - psi beneleyence		ı							
APACT	3	CONTENT - % OPTIMUM MOISTURE	ı	I	ı						
CON		DENSITY - pcf MAXIMUM DRY	-	-	-						
N.		WINUS No. 4 SPECIFIC GRAVITY	2.65	2.64	2.62						
IN-PLACE DENSITY		DECIFIC GRAVITY SPECIFIC GRAVITY	I	I	ı						
-PLACE		CONLENL- % EIIT WOISLINE	4.6	3.8	3.4						
NI		DKA DENZILA- ^{Del}	-	-	-						
LIMITS	%	8 - SHRINKVCE FIMIL - %	ı	ı	ı						
CONSISTENCY LIMITS	%	6 - XHOLLA INDEX - %	2.0	NP	NP						
CONSIS		% - ТІМІІ ЦІЧІІ - %	21.0	ΝA	ΝA						
ENT	2	OVERSIZE Larger than (127mm)	0.0	0.0	0.0						
N PERCENT		60 2., (15,12mm) COBBLEZ 3., (26,5mm)	0.0	0.0	0.0						
I SNOIL		to 3., (76.2mm) CBAVEL #4 (4.76mm)	0.0	0.0	0.0						
ZE FRAC		(mm ² 70.0) 002# <u>01</u> (mm ² 70.0) ⁴ 4 (4.7)	65.3	65.2	57.5						
PARTICLE SIZE FRACTIONS IN	IES	mm470.0 of 200.0	19.4	22.5	26.2						
PARJ	FINES	шш ₅₀₀ .0 SMALLER THAN	15.3	12.3	16.3						
NOI		STMBOL CLASSIFICATION	SM	SM	SM						
IDENTIFICATION		DEPTH - feet	5.0-6.5	0.9-2.7	10.0-11.5						
I		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3						

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ST		D- АУГЛЕ - %	ı									
COMPACTION TESTS		BENELKATION PENETRATION	I	ı	ı	ı	I					
MPACT	Ξ	CONTENT - % OPTIMUM MOISTURI	Ī	I	I	I	I					
CON		DENSILA - DCI WYXIWOW DKA	-	-	1	-	-					
2		WINDS Nº. 4 SPECIFIC GRAVITY	2.54	2.64	2.68	ı						
DENSITY		DECIFIC GRAVITY SPECIFIC GRAVITY	I	I	ı	I	I					
IN-PLACE DENSITY		CONLENT- % FILL MOISTURE	5.4	3.4	8.4	5.1	9.6					
Ż		DKA DENSILA- ^d el	I	I	ı	I	I					
STIMIJ	0/	SHBINKVCE FIMIL - %	-	-	ı	-	10.4					
CONSISTENCY LIMITS	%	5 - XƏUNI ALIƏLLƏV	11.8	NP	17.8	17.2	62.7					
CONSIG		гіблір гіміт - %	28.4	NA	34.5	36.2	81.9					
TNE	"S	OVERSIZE Larger than : (127mm)	0.0	0.0	0.0	0.0	0.0					
N PERCENT	(to 2., (17,10m) COBBLES 3., (76,2mm)	0.0	0.0	0.0	0.0	0.0					
PARTICLE SIZE FRACTIONS IN		to 3" (76.2mm) (FRAVEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0					
ZE FRAG		(mm270.0) 002# <u>dNAS</u> (mm27.4) 44 of	32.7	54.3	39.8	34.9	3.1					
LICLE SI	ES	mm470.0 of 200.0	32.3	22.0	20.5	32.5	28.9			 	 	
PAR'	FINES	mm ^{200.0} SMALLER THAN	35.0	23.7	39.7	32.6	68.0					
		SYMBOL CLASSIFICATION	s(CL)	МS	s(CL)	s(CL)	СН					
IDENTIFICATION		DEPTH - feet	3.0-4.5	5.5-7.0	8.0-9.5	10.5-12.0	13.0-14.5					
IDEN		SAMPLE NUMBER	SPT #1	ZH TAS	SPT #3	t# LdS	SH TY					

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ST		D-АУГЛЕ - %	ı	ı	ı			I	I	I			
COMPACTION TESTS		PENETRATION PENETRATION	ı	ı	I		I	I	I	I			
MPACT	Έ	CONTENT - % OPTIMUM MOISTURI	-	ı	-	-	I	I	I	I			
COI		DENSITY - PCf DAXIMUM DRY	ı	ı	I	T	I	I	I	I			
2		WINUS No. 4 SPECIFIC GRAVITY	-	2.59	-	2.47	ı	2.59	I	2.56			
DENSIT		DLUS No. 4 SPECIFIC GRAVITY	I	I	I	-	I	I	I	I			
IN-PLACE DENSITY		CONLENL- % EIFT WOISLABE	4.3	4.5	8.5	12.7	4.3	4.4	10.7	4.2			
Ň		DKA DENSILA- Þ¢l	-	ı	-	ı	ı	ı	ı	ı			
STIMITS	9/	SHBINKVGE FIMIL - %	-	ı	13.0	8.0	I	I	9.2	I			
CONSISTENCY LIMITS	%	PLASTICITY INDEX - 9	NP	17.0	25.8	42.7	6.5	7.2	39.7	NP			
CONSIS		гіблір гіміт - %	NA	31.0	45.6	72.6	25.7	25.1	66.6	NA			
TNE	"S	OVERSIZE Larger than) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
N PERCENT		to 2" (15,2mm) COBBLEZ 3., (76,2mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
I SNOIL		to 3., (76.2mm) (0.287VEL #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
ZE FRAC		(mm27.4) 4# 01 (mm27.4) 4# 01	60.2	46.1	2.7	2.4	58.1	50.6	2.5	59.3			
PARTICLE SIZE FRACTIONS IN P	ES	mm470.0 of 200.0	21.5	26.4	41.9	16.7	11.9	21.6	24.8	20.9			
PARJ	FINES	mm200.0 SMALLER THAN	18.3	27.5	55.4	80.9	30.0	27.8	72.7	19.8			
N		SAMBOL CLASSIFICATION	SM	s(CL)	CL	СН	SC-SM	SC	CH	SM			
IDENTIFICATION		DEPTH - feet	3.2-4.7	5.7-7.2	8.2-9.7	10.7-12.2	13.2-14.7	15.7-17.2	18.2-19.7	20.7-22.2			
IDE		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7	SPT #8			

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	S		D-АУГЛЕ - %	ı	I	I	I						
	COMPACTION TESTS		BENELKVLION BENELKVLION	I	ı	ı	ı						
	APACTI	Ξ	CONTENT - % OPTIMUM MOISTURE	I	ı	ı	ı						
	CON		DENSILA - DCL WYXIWUM DKA	ı	ı	ı	ı						
	Z		WINDS Nº. 4 SLECIEIC CEVALLA	2.67	2.68	2.73	2.53						
	DENSITY		LLUS No. 4 SPECIFIC GRAVITY	2.66	ı	ı	ı						
	IN-PLACE DENSITY		CONLENL- % EIIT WOISLINE	4.7	4.9	11.9	8.0						
	NI		DKA DENZILA- ^D CL	·									
	LIMITS	%	SHBINKAGE LIMIT - 9		ı	15.1	22.2						
	CONSISTENCY LIMITS	%	brysticity index - 9	6.2	6.1	20.9	20.6						
C-CT-T	CONSI		гіблір гіміт - %	24.3	24.2	39.9	42.0						
CT-TINITA	ENT	"S	OVERSIZE Larger than (127mm)	0.0	0.0	0.0	0.0						
	IN PERCENT	(to 2., (127mm) COBBLEZ 3., (76.2mm)	0.0	0.0	0.0	0.0) above.
	PARTICLE SIZE FRACTIONS IN		to 3., (76.2mm) CBAVEL #4 (4.76mm)	1.5	0.0	0.0	0.0						rs directly
	IZE FRA		(mm470.0) 002# <u>dNAS</u> (mm7.4) 44 01	54.5	51.7	16.2	21.1						of number
	TICLE S	FINES	mm470.0 of 200.0	25.3	28.4	30.9	46.0						ivalents c
	PAR	FIN	шш _{200.0} SMALLER THAN	18.7	19.9	52.9	32.9						vetric equ
	Z		SZMBOL CFVSSIEICVLION	SC-SM	SC-SM	(CL)s	(CL)s	_					neses are m
	IDENTIFICATION		DEPTH - feet	5.0-6.5	7.5-9.0	10.0-11.5	12.5-14.0						rs in parenth
	IDEN		SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4						NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

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S		D-VALUE - %	ı	ı													
ION TEST		PENETRATION PENETRATION	I	ı													
IPACTI	Ξ	CONTENT - % OPTIMUM MOISTURI		I													
CON		DENSILA - DCL WYXIWNW DKA	I	ı													
ζ		WINDS Nº. 4 SLECIEIC CEVALLA	2.60	NA													
DENSITY		ЬГЛЗ И ^{о.} † Sdecific Gbyalla	I	I													
PLACE		CONLENL- % EIIT WOISLINE	7.4	3.4													
IN		DKA DENZILA- Pet	I	I													
LIMITS	%	8 - SHBINKVCE FIMIL - 8	I	I													
STENCY	%	6 FV3LICILX INDEX -	NP	NP													
CONSE		гіблір гіміт - %	NA	NA													
ENT	"S	(127mm) (127mm)	0.0	0.0													
	(to 2% (127mm) COBBLES 3% (76.2mm)	0.0	0.0													
CTIONS]		60 32. (16.2mm) 687AED #4 (4.76mm)	0.0	0.0													
ZE FRA		(mm270.0) 002# <u>dNA2</u> (mm27.4) 44 01	67.1	68.6													
LICLE SI	ES	mm470.0 of 200.0	16.6	15.0													
PARJ	FIN	MMALLER THAN 0.005mm	16.3	16.4													
		SAMBOL CLASSIFICATION	SM	SM													
VIIFICATION		DEPTH - feet	3.8-5.3	6.3-7.1													
IDEN		SAMPLE NUMBER	I# TqS	SPT #2													
	IDENTIFICATION PARTICLE SIZE FRACTIONS IN PERCENT CONSISTENCY LIMITS IN-PLACE DENSITY COMPACTION TESTS	PARTICLE SIZE FRACTIONS IN PERCENT CONSISTENCY LIMITS IN-PLACE DENSITY FINES 5 5 5	Base Base	$\left \begin{array}{c} Integration of the set of th$	Image: Description of the state of the s	CONTRATING Contration 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MINICUTURE MINICUCE - bail Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraints Image: Selected constraint Image: Selected constraints </th <th>$\begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</th> <th>MINICIPAL MINICLE POLIZION Image: selected selected</th> <th>Matrix Matrix Matrix</th> <th>$\begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</th> <th>March of the set of</th> <th>$\begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</th> <th>$\begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</th> <th>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</th> <th>March March <t< th=""><th>MULTING MULTING <</th></t<></th>	$\begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	MINICIPAL MINICLE POLIZION Image: selected	Matrix Matrix	$\begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	March of the set of	$\begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	March March <t< th=""><th>MULTING MULTING <</th></t<>	MULTING <

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COMPACTION TESTS	PENETRATION PENETRATION	I	I	I	I	1	-	ı				
MPACT	CONTENT - % OPTIMUM MOISTURE	I	I	I	I	I	I	ı				
CON	DENSILA - DCI WYXIMOM DKA	ı	1	ı			1					
7	WINUS No. 4 SPECIFIC GRAVITY	2.62	2.62	2.68	2.66	2.64	2.69	2.67				
DENSITY	DEUIS No. 4 SPECIFIC GRAVITY	ı		ı	1		-	1				
IN-PLACE DENSITY	CONLENT- % FILL MOISTURE	6.7	7.1	5.4	4.3	4.9	11.2	12.6				
II	DKA DENSITY- pcf	ı		ı			-					
STIMIJ	% - LIWIT EDVXNIXHS	ı		ı	·	ı	12.0	16.0				
CONSISTENCY LIMITS	brysticity index - %	5.1	11.8	5.7	NP	NP	25.1	23.9				
CONSIS	ΓΙΟΛΙD ΓΙΜΙΤ - %	23.2	25.5	22.9	NP	25.0	40.5	44.5				
RCENT	(127mm) (127mm) (127mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
	to 2., (17,100) to 2., (17,100)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
PARTICLE SIZE FRACTIONS IN PE	to 3., (J6.2mm) <u>EBAVET</u> #4 (4.76mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
ZE FRAC	(mm270.0) 4200 (mm270.0) 4200 (mm270.0) 44 of	55.2	51.1	60.0	58.1	37.8	22.7	15.6				
TICLE SI		18.0	22.0	20.1	24.9	44.3	30.4	38.8				
PARJ	AMMENT AND A CONTRACT	26.8	26.9	19.9	17.0	17.9	46.9	45.6				
N	SAMBOL CLASSIFICATION	SC-SM	SC	SC-SM	SM	s(ML)	(CL) _S	(CL)s				
IDENTIFICATION	DEPTH - feet	2.5-4.0	5.0-6.5	7.5-9.0	10.0-11.5	12.5-14.0	15.0-16.5	17.5-19.0				
IDE	SAMPLE NUMBER	SPT #1	SPT #2	SPT #3	SPT #4	SPT #5	SPT #6	SPT #7				

ĬC	IDENTIFICATION		-	PARTIC	LE SIZE FRA IN PERCENT	PARTICLE SIZE FRACT IN PERCENT	IIONS		CON	CONSISTENCY LIMITS	CY		IN-PLACE DENSITY	ACE		CON	COMPACTION TESTS	ON TES	ST
1			FINES	ES			(1			9/	%								
DEPTH – feet	CLASSIFICATION	TOBWAS	MM 200,0 MM 200,0	mm 1 70.0 of 200.0	(mm \$70.0) 002# <u>dNAS</u>	to 3., (26'5' mm) CBVAET #4 (4'26 mm)	to 5 (127 mm) to 5 (127 mm)	OVERSIZE Larger than 5" (127 mm)	гіблір гіміт-%	6 - XƏUNI ALIƏLISVIA	8 - SHBINKVCE FIMIL	DKA DENSILA - Þel	CONLENL - % EIIT MVLEK	bros cento con translation of the contract of	WINDS NO. 4 SLECIEIC CEVALLA	DENSILA - ÞCI MVXIMNM DKA	CONTENT - % OPTIMUM WATER	BERISTANCE - psi PEUETRATION	D-АУГЛЕ - %
7.0		SM	7.5	8.9	83.5	0.1	0.0	0.0	N/P	N/P	1	96.2	2.6	1	2.63	103.1	14.3		93.3
7.0		(SM) _G	6.2	8.2	67.9	17.7	0.0	0.0	N/P	N/P	I	104.7	2.8	2.4	2.64	116.3	11.6	600	90.0
7.0		(CL)s	20.7	62.0	17.3	0.0	0.0	0.0	29.4	8.8	I	103.4	6.2		2.59	106.4	17.2	1250	97.2
7.0		s(CL)	35.0	25.3	39.6	0.1	0.0	0.0	33.1	19.9	I	78.1	9.0	'	2.62	109.0	17.0	300	71.7
7.0		SM	15.3	10.7	74.0	0.0	0.0	0.0	N/P	N/P	I	91.1	3.9		2.65	110.6	14.5	500	82.4

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STS		D- АУГЛЕ - %	89.7	84.8	80.1	83.3	95.9	96.2	83.7	81.1			
COMPACTION TESTS		BENELBALION BENELBATION	700	910	450	590	525	210	700	800			
APACT		CONTENT - % OPTIMUM WATER	14.5	14.0	13.6	15.5	13.7	21.1	14.6	14.5			
COI		DENSLIY - PCf MAXIMUM DRY	113.3	105.4	110.4	110.5	109.3	100.6	110.2	112.9			
		WINGS NO. 4 SPECIFIC GRAVITY	2.61	2.63	2.63	2.65	2.64	2.65	2.67	2.67			
ACE ITY		PLUS NO. 4 SPECIFIC GRAVITY	2.47	I	2.38	I	2.33	I	I	I			
IN-PLACE DENSITY		CONTENT - % FILL WATER	6.3	3.3	4.1	7.2	2.7	9.9	7.2	6.5			
		DKA DENZILA - Þel	101.6	89.4	88.4	92.1	104.8	96.8	92.2	91.6			
VCY	9	6 - LIMIT ƏƏVƏNIMHS	ı	ı	I	I	I	ı	ı	I			
CONSISTENCY LIMITS	9	9 - XƏQNI ALIƏHSVƏ	5.7	N/P	N/P	14.0	N/P	24.6	2.5	6.6			
COL		м-тіміл цілділ	21.9	N/P	N/P	26.8	N/P	36.9	22.8	22.7			
		than 5" (127 mm) OVERSIZE Larger	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IIONS	(1	to 2." (127 mm) COBBLES 3." (76.2 mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
E FRAC CENT		(mm 9/.4 (4.76 mm) to 3" (76.2 mm)	0.4	0.0	4.9	0.0	7.2	0.0	0.0	0.0			
PARTICLE SIZE FRACT IN PERCENT		(mm \$70.0) 002# <u>UNA</u> (mm 70.0) 14 01	62.8	67.4	63.5	49.2	79.1	36.2	57.9	54.8			
PARTIC	ES	mm 1 70.0 of 200.0	13.8	23.1	22.1	19.9	6.8	19.1	21.4	18.9			
	FINES	MAHT AƏLLAMS mm 200.0	23.0	9.5	9.5	30.9	6.9	44.7	20.7	26.3			
NC		CLASSIFICATION CLASSIFICATION	SC-SM	SM	SM	s(CL)	SM	s(CL)	SM	SC-SM			
IDENTIFICATION		DEPTH – feet	7.0	7.0	7.5	7.0	8.0	8.0	7.0	7.0			
IDENT	ξ	TEST PIT NUMBEI	*TPR9-15-14	*TPR9-15-15	*TPR9-15-16	*TPR9-15-17	*TPR9-15-19	*TPR9-15-20	*TPR9-15-23	*TPR9-15-26			

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NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

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D-ΛΥΓΩΕ - %

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	\mathbf{TS}			•							
	COMPACTION TESTS		BENELBANCE - psi benelbarlon	ı							
	MPACT	Э	CONTENT - % OPTIMUM MOISTURI	I							
	CO]		DENSILA - ^d ei MVXIMUM DBA	I							
	Y		WINUS No. 4 SPECIFIC GRAVITY	ı							
	DENSIT		LUUS N₀. 4 SPECIFIC GRAVITY	ı							
	IN-PLACE DENSITY		CONLENT- % FILL MOISTURE	I							
	NI		DKA DENSILA- ^{Del}	ļ							
	LIMITS	%	5 - LIMIT EÐVARIS	I							
	CONSISTENCY LIMITS	%	PLASTICITY INDEX -	NP							
81-61	CONSE		инопратит - %	NP							
81-c1-6NAT	ENT	2،،	OVERSIZE Larger than (127mm)	0.0							
	S IN PERCENT	(to 2., (127mm) COBBLES 3., (76.2mm)	0.0							v above.
			to 3" (76.2mm) to 3" (76.2mm)	47.3							rs directl _.
	PARTICLE SIZE FRACTION		(mm470.0) 002# <u>anns</u> (mm27.4) 44 of	43.1							of numbe.
	TICLE S	FINES	mm470.0 of 200.0	4.1							ivalents o
	PAR	FIN	mm200.0 SMALLER THAN	5.5							etric equ
	IION		ZAMBOL CEVSSIFICATION	(GP-GM) _S							NOTE: Numbers in parentheses are metric equivalents of numbers directly above.
	IDENTIFICATION		DEPTH - feet	4.0 - 8.0							bers in par
	IOI		SAMPLE NUMBER	BAG #1							NOTE: Num
-											-

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COMPACTION TESTS

р-лугае - %

BESISTANCE - psi PENETRATION

CONTENT - % OPTIMUM MOISTURE

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COM	DENSITY - PCf MAXIMUM DRY								
Y	WINDS Nº. 4 SLECIEIC CEVALLA	2.61							
IN-PLACE DENSITY	DEUS No. 4 SPECIFIC GRAVITY	ı							
-PLACE	CONLENT- % FILL MOISTURE	11.3							
II	DKA DENSILA- ^d ci	-							
CONSISTENCY LIMITS	% - LIWIT EÐVANINHS	6.2							
STENCY	brysticity index - %	35.1							
CONSI	гіблір гіміт - %	49.0							
ENT	<u>OVERSIZE</u> Larger than 5" (127mm)	0.0							
IN PERC	to 2., (127mm) to 2., (127mm)	0.0							y above.
CTIONS	to 3., (76.2mm) to 3., (76.2mm)	0.0							's directl
SIZE FRACTIONS IN PERCENT	(mm270.0) 4200 (mm270.0) 4200 (mm270.0) 4200 (mm270.0)	23.4							to and the second s
PARTICLE SI	R SI mm ² 00.0 mm ⁴ 70.0 of 200.0	22.6							ivalents c
PAR	wm ^{200.0}	54.0							vetric equ
TION	TOAMYS NOITAOTAION	(CL) _S							NOTE: Numbers in parentheses are metric equivalents of numbers directly above.
IDENTIFICATION	DEPTH - feet	10.0							bers in par
IDI	SAMPLE NUMBER	BAG #1							NOTE: Num.

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9-15
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	S		Β-ΛΥΓΩΕ - %	ı.							
	COMPACTION TESTS		PENETRATION PENETRATION	I							
	MPACTI	Έ	CONTENT - % OPTIMUM MOISTURI	I							
	CO		DENSILA - DCL WYXIWNW DKA	I							
	Y		WINGS Nº. 4 SLECIEIC CEVALLA	2.72							
	DENSIT		LLUS No. 4 SPECIFIC GRAVITY	2.54							
	IN-PLACE DENSITY		CONLENT- % FILL MOISTURE	14.6							
	NI		DKA DENSILA- pcf	ı							
	CONSISTENCY LIMITS	%	8 - SHRINKAGE LIMIT - %	11.3							
	STENCY	%	6 - XƏUNI ALIƏLLA INDEX -	38.0							
77-01	CONSIG		LIQUID LIMIT - %	52.2							
77-CI-6NAI	ENT	°.'S	OVERSIZE Larger than: (127mm)	0.0							
	IN PERCENT	(to 2., (127mm) COBBLES 3., (76.2mm)	0.0							y above.
	CTIONS		(0.286AVEL #4 (4.76mm) to 3" (76.2mm)	1.3							rs directl
	ZE FRA		(mm ² 70.0) 002# <u>0188</u> (mm ² 7.4) ⁴ .760	22.9							of number
	PARTICLE SIZE FRACTIONS	IES	mm 1 70.0 of 200.0	16.8							ivalents c
	PAR	FINES	MALLER THAN 0.005mm	59.0							tetric equ
	NOL		SAMBOL CLASSIFICATION	(CH) _S							NOTE: Numbers in parentheses are metric equivalents of numbers directly
	IDENTIFICATION		DEPTH - féét	0.0 - 1.2							bers in pare
	IDI		SAMPLE NUMBER	BAG #1							NOTE: Num

STS		D-VALUE - %	76.9	80.1	75.3	78.8	83.7	87.6	90.1	74.5			
ION TE		BENETRAUCE - psi PENETRATION	1010	600	930	480	600	580	700	1000			
COMPACTION TESTS		CONTENT - % OPTIMUM WATER	13.6	15.3	14.3	16.5	14.6	14.3	11.6	14.0			
CON		DENSITY - Pet MAXIMUM DRY	112.6	111.3	110.3	106.3	114.4	108.5	112.9	115.9			
		WINGS NO. 4 SLECIELC CEVALLA	2.66	2.62	2.59	2.60	2.61	2.64	2.62	2.62			
ACE ITY		FLUS NO. 4 SPECIFIC GRAVITY	ı	2.35	2.35	ı	ı	ı	2.40	2.28			
IN-PLACE DENSITY		CONTENT - % FILL WATER	6.0	7.2	8.0	4.0	5.3	3.2	3.3	5.7			
		DKA DENZILA - DG	86.6	89.1	83.1	83.8	95.7	95.0	101.7	86.3			
VCY	9	% - TIMIT ƏƏAMINKAGE LIMIT - %	I	ı	I	I	I	I	ı	I			
CONSISTENCY LIMITS	9	6 - XHOLIA INDEX - %	13.4	7.6	11.7	N/P	N/P	N/P	N/P	8.5			
CON		король и порадина. Как и поради и пор	26.8	23.4	26.1	N/P	N/P	N/P	N/P	22.5			
		OVERSIZE Larger than 5" (I27 mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IIONS	(to 2." (127 mm) COBBLES 3." (76.2 mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
E FRAC		(01 (4.76 mm) (76.2 mm) (76.2 mm)	0.0	0.1	0.1	0.0	0.0	0.0	8.4	0.2			
LE SIZE FRA IN PERCENT		(mm \$70.0) 002# <u>UNA</u> (mm 70.0) 14 01	53.5	58.5	46.0	63.8	67.9	76.0	70.7	56.7			
PARTICLE SIZE FRACT IN PERCENT	ES	mm 1 70.0 of 200.0	22.9	16.2	25.0	24.2	15.1	14.6	12.1	25.1			
	FINES	MAHT AƏLLAMS mm 200.0	23.6	25.2	28.9	12.0	17.0	9.4	8.8	18.0			
NC		SAMBOL CFVSSIEICVLION	SC	SC	s(CL)	SM	SM	SM	SM	SC			
IDENTIFICATION		DEPTH – feet	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0			
IDENT	2	TEST PIT NUMBER	*TPR9-15-25	*TPR9-15-27	*TPR9-15-28	*TPR9-15-29	*TPR9-15-30	*TPR9-15-31	*TPR9-15-32	*TPR9-15-33			

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NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

TESTS		D-AVINE - %	72.7	78.9	84.8	77.2	78.5) 76.6	92.3	85.1			
L NOI I		KESISLVACE - Dzi LEAELKVLION	387	600	550	550	750	1150	946	700			
COMPACTION TESTS		CONTENT - % OPTIMUM WATER	18.2	14.5	12.3	18.2	15.2	13.7	14.2	14.5			
CO		DENSITY - PCf DENSITY - PCf	105.8	111.7	111.2	105.0	111.8	114.3	111.3	106.7			
		WINUS NO. 4 SPECIFIC GRAVITY	2.68	2.62	2.61	2.64	2.62	2.56	2.66	2.61			
ACE ITY		DLUS NO. 4 SPECIFIC GRAVITY	ı	ı	2.33	2.35	2.36	2.35	ı	ı			
IN-PLACE DENSITY		CONTENT - % FILL WATER	11.9	4.2	3.4	6.0	4.8	5.7	4.5	2.4			
		DKA DENZILA - Þel	76.9	88.1	94.3	81.1	87.8	87.5	102.7	90.8			
VCY	9	% - LIMIT ƏƏVANIMHS	ı	ı	ı	ı	I	I	·	ı			
CONSISTENCY LIMITS	%	6 - XHONI ALIƏLISVƏL	22.9	2.2	N/P	6.1	N/P	7.3	N/P	N/P			
COL		ж-тіміл апуріл	40.1	20.8	N/P	22.4	N/P	22.3	N/P	N/P			
		than 5" (127 mm) than 5" (127 mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
IIONS	(to 5'' (127 mm) COBBLES 3'' (76.2 mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PARTICLE SIZE FRACT IN PERCENT		to 3., (76.2 mm) GRAVEL #4 (4.76 mm)	0.0	0.0	2.1	0.7	0.3	2.1	0.0	0.0			
LE SIZE FRA IN PERCENT		(mm 270.0) 002# <u>UNA</u> (mm 70.0) 14 of	31.2	9.69	73.0	57.3	67.2	55.4	64.3	82.4			
PARTIC	FINES	mm 1 70.0 of 200.0	27.2	16.5	13.8	21.3	17.2	25.8	22.2	11.1			
	FIL	MMT ZOUOS 100.00 1000	41.6	13.9	11.1	20.7	15.3	16.7	13.5	6.5			
NC		ZAMBOT CEVZZIEICVLION	s(CL)	SM	SM	SC-SM	SM	SC	SM	SM			
IDENTIFICATION		DEPTH – feet	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0			
IDENJ	Ş	TEST PIT NUMBER	*TPR9-15-34	*TPR9-15-35	*TPR9-15-36	*TPR9-15-37	*TPR9-15-38	*TPR9-15-39	*TPR9-15-40	*TPR9-15-42			

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NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

IDENTIFICATION	NOILE		PARTIC	ULE SIZE FRA IN PERCENT	PARTICLE SIZE FRACT IN PERCENT	SNOIL		COL	CONSISTENCY LIMITS	NCY		IN-PLACE DENSITY	ACE ITY		COI	MPACT	COMPACTION TESTS	SL
		FI	FINES			(9	Q								
DEPTH – feet	TOBWAS CEASSIFICATION	MAHT AƏLILAMS Mm 200,0	mm 1 70.0 of 200.0	(mm 270.0) 4240 (mm) (mm 270.0) 4240 (mm)	(1.10 (4.76 mm) (7.10 3.1 (76.2 mm)	to 2.1. (127 mm) COBBLES 3.1. (76.2 mm)	than 5" (127 mm) OVERSIZE Larger	кирин алуг. «	% - XƏQNI ALIƏILSVIƏ	% - TIMIT ƏƏANINHR	DKY DENSITY - pcf	CONTENT - % FILL WATER	DEUS NO. 4 SPECIFIC GRAVITY	MINUS NO. 4 SPECIFIC GRAVITY	DENSITY - PCf MAXIMUM DRY	CONTENT - % OPTIMUM WATER	BESISTANCE - psi PENETRATION	D- АУГЛЕ - %
*TPR9-16-44 7.0	0 s(CL)	31.2	33.2	35.6	0.0	0.0	0.0	30.9	14.6	ı	91.9	7.4	ı	2.61	108.3	16.0	500	84.9
*TPR9-16-45 7.0	0 SM	15.9	15.3	68.1	0.7	0.0	0.0	N/A	N/P	ı	95.0	5.0	2.37	2.57	110.0	13.5	1150	86.4
*TPR9-16-46 7.0	0 SM	20.0	15.3	64.7	0.0	0.0	0.0	N/A	N/P	ı	87.7	5.7	ı	2.65	108.9	14.5	650	80.5
*TPR9-16-47 7.0	0 s(CL)	33.7	32.6	33.7	0.0	0.0	0.0	33.3	19.3	14.4	85.6	8.7	I	2.67	108.9	16.2	575	78.6
*TPR9-16-48 7.0	0 s(CL)	35.5	31.9	32.6	0.0	0.0	0.0	28.6	14.5	I	85.7	7.8	I	2.64	109.9	16.0	507	78.0
*TPR9-16-49 7.0	0 (CL) _S	59.3	23.7	17.0	0.0	0.0	0.0	49.1	33.8	11.2	96.8	13.2	ı	2.61	98.5	23.0	200	98.3
*TPR9-16-50 7.0	0 (CL) _S	30.4	42.5	27.1	0.0	0.0	0.0	29.7	14.1	I	80.6	8.0	I	2.65	103.6	19.4	375	77.8
*TPR9-16-51 7.0	0 (CL) _s	53.5	17.1	29.4	0.0	0.0	0.0	40.7	25.9	10.9	92.1	13.2	I	2.64	101.5	20.9	350	90.7
*TPR9-16-52 7.0	0 CT	47.8	39.2	13.0	0.0	0.0	0.0	37.7	21.7	I	83.9	12.1	I	2.66	103.0	19.5	450	81.5

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NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

(mm 5" (127 mm) 0 <th>IDENTIFICATION</th> <th></th> <th></th> <th>PA FINES</th> <th>ARTIC</th> <th>LE SIZE FRA IN PERCENT</th> <th>PARTICLE SIZE FRACT IN PERCENT ES</th> <th>SNOI</th> <th></th> <th>COL</th> <th>CONSISTENCY LIMITS</th> <th>ЧСҮ</th> <th></th> <th>IN-PLACE DENSITY</th> <th>ACE ITY</th> <th></th> <th>CON</th> <th>MPACT</th> <th>COMPACTION TESTS</th> <th>STS</th>	IDENTIFICATION			PA FINES	ARTIC	LE SIZE FRA IN PERCENT	PARTICLE SIZE FRACT IN PERCENT ES	SNOI		COL	CONSISTENCY LIMITS	ЧСҮ		IN-PLACE DENSITY	ACE ITY		CON	MPACT	COMPACTION TESTS	STS
N/A N/P - 92.0 4.2 - 2.67 113.8 14.3 24.3 10.0 - 88.1 7.3 - 2.65 111.0 16.0 N/A N/P - 96.5 4.0 - 2.66 111.4 14.6 N/A N/P - 94.8 5.9 - 2.66 111.5 16.3 N/A N/P - 94.8 5.9 - 2.66 111.5 16.3 32.5 18.4 15.0 86.8 10.8 - 2.66 108.7 16.3 30.8 13.6 - 88.3 7.9 - 2.66 108.7 16.8 30.5 16.5 14.6 93.8 9.1 - 2.662 108.1 17.0 30.5 16.5 144.6 93.8 9.1 - 2.662 108.1 17.0 49.2 30.5 16.5 144.6 93.8 9.1	DEPTH – feet 0.005 to 0.074 mm	WWW 500'0 NVHL XITTVWS TOBWAS		mm 470.0 of 200.0		(mm 270.0) 002# <u>dNA2</u> (mm 77.4) 4# of	to 3" (76.2 mm) GRAVEL #4 (4.76 mm)	to 2 (172 mm) COBBLES 3 (76.2 mm)	than 5" (127 mm) OVERSIZE Larger		% - XƏDI ALIƏLISVƏ	- TIMIT - %	DKA DENSILA - Þel							Ъ-УАГИЕ - %
24.3 10.0 $ 88.1$ 7.3 $ 2.65$ 111.0 16.0 N/A N/P $ 96.5$ 4.0 $ 2.66$ 111.4 14.6 N/A N/P $ 94.8$ 5.9 $ 2.61$ 111.5 16.3 N/A N/P $ 94.8$ 5.9 $ 2.61$ 111.5 16.3 32.5 18.4 15.0 86.8 10.8 $ 2.67$ 107.6 17.6 30.8 13.6 $ 88.3$ 7.9 $ 2.67$ 107.6 17.6 49.2 31.0 12.8 92.3 15.7 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 93.8 9.1 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 93.8 9.1 $ 2.64$ 96.8 2.64 10.5 16.5 14.6 91.6 14.6	7.0 SM 15.9 13.0	15.9	_	13.0	-	71.1	0.0	0.0	0.0	N/A	N/P	ı	92.0	4.2	I	2.67	113.8	14.3	700	80.8
N/A N/P - 96.5 4.0 - 2.66 111.4 14.6 N/A N/P - 94.8 5.9 - 2.61 111.5 16.3 N/A N/P - 94.8 5.9 - 2.61 111.5 16.3 32.5 18.4 15.0 86.8 10.8 - 2.67 107.6 17.6 30.8 13.6 - 88.3 7.9 - 2.64 96.8 16.8 49.2 31.0 12.8 92.3 15.7 - 2.64 96.8 22.8 30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 30.5 16.5 14.6 93.8 9.1 - 2.64 96.8 22.8 30.5 16.5 14.6 93.8 9.1 - 2.64 96.8 2.64 10 1 - 2.64 96.8 1.70	7.0 SC 31.7 10.6	31.7		10.6	1	57.7	0.0	0.0	0.0	24.3	10.0	ı	88.1	7.3	ı	2.65	111.0	16.0	250	79.4
N/A N/P - 94.8 5.9 - 2.61 111.5 16.3 32.5 18.4 15.0 86.8 10.8 - 2.67 107.6 17.6 30.8 13.6 - 88.3 7.9 - 2.67 108.7 16.8 30.8 13.6 - 88.3 7.9 - 2.66 108.7 16.8 49.2 31.0 12.8 92.3 15.7 - 2.64 96.8 22.8 30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 10 1 - 2.62 108.1 17.0 17.0 10 1 1 - 2.62 108.1 17.0 10 1 1 - 2.62 108.1 17.0 10 1 - <td>7.0 SM 14.0 15.3</td> <td>14.0</td> <td></td> <td>15.3</td> <td></td> <td>70.7</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>N/A</td> <td>N/P</td> <td>ı</td> <td>96.5</td> <td>4.0</td> <td>1</td> <td>2.66</td> <td>111.4</td> <td>14.6</td> <td>950</td> <td>86.6</td>	7.0 SM 14.0 15.3	14.0		15.3		70.7	0.0	0.0	0.0	N/A	N/P	ı	96.5	4.0	1	2.66	111.4	14.6	950	86.6
32.5 18.4 15.0 86.8 10.8 $ 2.67$ 107.6 17.6 30.8 13.6 $ 88.3$ 7.9 $ 2.66$ 108.7 16.8 49.2 31.0 12.8 92.3 15.7 $ 2.64$ 96.8 22.8 49.2 31.0 12.8 92.3 15.7 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 10.5 16.5 14.6 93.8 9.1 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 $ 2.64$ 96.8 2.76 10.5 16.5 15.6 $ 2.64$ 96.8 17.0	7.0 SM 21.7 12.8	21.7		12.8		65.5	0.0	0.0	0.0	N/A	N/P	ı	94.8	5.9	ı	2.61	111.5	16.3	450	85.0
30.8 13.6 $ 88.3$ 7.9 $ 2.66$ 108.7 16.8 49.2 31.0 12.8 92.3 15.7 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 93.8 9.1 $ 2.64$ 96.8 22.8 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 70.1 $ 2.64$ 96.8 2.05 108.1 17.0 70.1 $ 2.64$ 96.8 2.64 96.8 $2.2.8$ 30.5 16.5 14.6 93.8 9.1 $ 2.62$ 108.1 17.0 70.1 $ 2.64$ 96.8 $2.5.6$ 108.1 17.0 17.0 70.1 $ 2.64$ 96.8 2.64 96.8 $2.2.8$ 10.1 </td <td>7.0 s(CL) 42.3 13.1</td> <td>42.3 13.1</td> <td>13.1</td> <td></td> <td></td> <td>44.6</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>32.5</td> <td>18.4</td> <td>15.0</td> <td>86.8</td> <td>10.8</td> <td>I</td> <td>2.67</td> <td>107.6</td> <td>17.6</td> <td>363</td> <td>80.7</td>	7.0 s(CL) 42.3 13.1	42.3 13.1	13.1			44.6	0.0	0.0	0.0	32.5	18.4	15.0	86.8	10.8	I	2.67	107.6	17.6	363	80.7
49.2 31.0 12.8 92.3 15.7 - 2.64 96.8 22.8 30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7.0 s(CL) 31.3 32.6	31.3 32.6	.3 32.6			36.1	0.0	0.0	0.0	30.8	13.6	ı	88.3	7.9	I	2.66	108.7	16.8	650	81.2
30.5 16.5 14.6 93.8 9.1 - 2.62 108.1 17.0 1 1 1 1 1 1 1 1 1 1 <t< td=""><td>7.0 CL 67.7 30.5</td><td>67.7</td><td></td><td>30.5</td><td></td><td>1.8</td><td>0.0</td><td>0.0</td><td>0.0</td><td>49.2</td><td>31.0</td><td>12.8</td><td>92.3</td><td>15.7</td><td>ı</td><td>2.64</td><td>96.8</td><td>22.8</td><td>300</td><td>95.4</td></t<>	7.0 CL 67.7 30.5	67.7		30.5		1.8	0.0	0.0	0.0	49.2	31.0	12.8	92.3	15.7	ı	2.64	96.8	22.8	300	95.4
	7.0 s(CL) 38.3 23.3	38.3 23.3	23.3		``	38.4	0.0	0.0	0.0	30.5	16.5	14.6	93.8	9.1	I	2.62	108.1	17.0	450	86.8
								<u> </u>												

FEATURE: REACH 9

PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT

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NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

$ \begin{array}{ c c c c c c } \hline \hline$	IDEN	IDENTIFICATION	NO		PARTIC	LE SIZE FRA IN PERCENT	PARTICLE SIZE FRACT IN PERCENT	SNOIL		CON	CONSISTENCY LIMITS	CY		IN-PLACE DENSITY	ACE ITY		COL	MPACT.	COMPACTION TESTS	SL
Image: constraints of the second state sta	۶			FIN	IES			(%	9								
70 SM 13.3 9.9 76.8 0.0 0.0 N/A N/P - 90.9 3.5 - 264 70 SM 22.2 22.0 55.8 0.0 0.0 N/P - 91.5 5.3 - 2.64 70 SM 72.2 22.0 55.8 0.0 0.0 56.8 37.6 8.8 90.5 16.3 - 2.67 70 CH 70.0 28.3 1.7 0.0 0.0 57.9 37.0 12.6 85.1 15.7 - 2.67 70 CH 70.0 28.7 9.9 0.0 0.0 0.0 15.5 75.6 15.7 - 2.69 70 CL 51.4 38.7 9.9 0.0 0.0 0.0 15.5 75.6 15.7 - 2.69 70 SM N/P N/P N/P N/P - 85.1 2.63 2.63	TEST PIT NUMBER	DEPTH – feet		mm 200.0 mm 200.0	mm 1 70.0 of 200.0		(0, 2, 0, 2, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,			ж-тіміт апуріт	6 - XƏUNI ALIƏLISVƏ	% - LIMIT ƏƏVANIMHS	DKA DENSILA - ÞGI				DENSILA - DGL WVXIMUM DBA	CONTENT - % OPTIMUM WATER	BENELKVLION BENELKVLION	% - ΞΩΤΥΛ-α
7.0 SM 22.2 22.0 55.8 0.0 0.0 N/A N/P - 91.5 5.3 - 2.60 7.0 CH 74.2 19.5 6.3 0.0 0.0 56.8 37.6 8.8 90.5 16.3 - 2.67 7.0 CH 70.0 28.3 1.7 0.0 0.0 0.0 56.8 37.6 18.7 15.7 - 2.67 7.0 CL 51.4 38.7 9.9 0.0 0.0 0.0 17.6 11.5 - 2.66 7.0 SM 16.9 16.9 66.2 0.0 0.0 0.0 10.6 11.5 - 2.66 7.0 SM 16.9 16.9 66.2 0.0 0.0 0.0 N/P - 96.0 11.5 - 2.66 7.0 SM 2.6 37.0 11.5 87.0 11.5 16.5 16.5 16.6 <t< td=""><td>*TPR9-16-61</td><td>7.0</td><td>SM</td><td>13.3</td><td>9.9</td><td>76.8</td><td>0.0</td><td>0.0</td><td>0.0</td><td>N/A</td><td>N/P</td><td></td><td>90.9</td><td>3.5</td><td></td><td>2.64</td><td>105.0</td><td>14.6</td><td>520</td><td>86.6</td></t<>	*TPR9-16-61	7.0	SM	13.3	9.9	76.8	0.0	0.0	0.0	N/A	N/P		90.9	3.5		2.64	105.0	14.6	520	86.6
7.0 CH 74.2 19.5 6.3 0.0 0.0 56.8 37.6 8.8 90.5 16.3 2.67 7.0 CH 70.0 28.3 1.7 0.0 0.0 57.9 37.0 12.6 85.1 15.7 - 2.69 7.0 CL 51.4 38.7 9.9 0.0 0.0 38.7 19.0 16.5 77.6 11.5 - 2.69 7.0 SM 16.9 16.9 66.2 0.0 0.0 0.0 N/P - 96.0 4.0 - 2.63 7.0 SM 16.9 16.9 66.2 0.0 0.0 N/P - 87.9 85.9 6.5 - 2.63 7.0 SM 16.2 20.1 0.0 0.0 N/P - 87.9 6.5 - 2.64 7.0 SM 16.2 20.1 0.0 0.0 N/P - 87.3<	*TPR9-16-62	7.0	SM	22.2	22.0	55.8	0.0	0.0	0.0	N/A	N/P	'		5.3	1	2.60	109.3	15.6	680	83.7
CH 70.0 28.3 1.7 0.0 0.0 57.9 37.0 12.6 85.1 15.7 - 2.69 CL 51.4 38.7 9.9 0.0 0.0 0.0 38.7 19.0 16.5 77.6 11.5 - 2.63 SM 16.9 16.9 66.2 0.0 0.0 0.0 N/A N/P - 96.0 4.0 - 2.63 SM 16.9 16.9 65.1 0.0 0.0 0.0 N/A N/P - 85.9 6.5 - 2.63 SM 16.2 20.7 63.1 0.0 0.0 N/A N/P - 85.9 6.5 - 2.63 SM 16.2 20.7 63.1 0.0 0.0 14.2 26.3 12.5 78.5 13.2 2.61 2.61 SM 16.2 37.1 6.0 0.0 0.0 14.2 26.3 12.5	*TPR9-16-63	7.0	СН	74.2	19.5	6.3	0.0	0.0	0.0	56.8	37.6	8.8	90.5	16.3	ı	2.67	93.3	25.8	350	97.0
7.0 CL 51.4 38.7 9.9 0.0 0.0 38.7 19.0 16.5 71.6 11.5 $ 2.63$ 7.0 SM 16.9 16.9 16.9 66.2 0.0 0.0 N/A N/P $ 96.0$ 4.0 $ 2.63$ 7.0 SM 25.6 19.0 55.4 0.0 0.0 N/A N/P $ 96.0$ $ 2.63$ 7.0 SM 16.2 20.7 63.1 0.0 0.0 N/A N/P $ 87.3$ 4.3 $ 2.63$ 7.0 SM 16.2 20.7 63.1 0.0 0.0 N/P $ 87.3$ 4.3 $ 2.63$ 7.0 CL 69.4 21.4 9.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	*TPR9-16-64	7.0	СН	70.0	28.3	1.7	0.0	0.0	0.0	57.9	37.0	12.6	85.1	15.7	ı	2.69	93.2	26.7	330	91.3
7.0 SM 16.9 16.6 66.2 0.0 0.0 N/A N/P $ 96.0$ 4.0 $ 2.63$ 7.0 SM 25.6 19.0 55.4 0.0 0.0 N/A N/P $ 85.9$ 6.5 $ 2.61$ 7.0 SM 16.2 20.7 63.1 0.0 0.0 N/A N/P $ 85.9$ 6.5 $ 2.61$ 7.0 SM 16.2 20.7 63.1 0.0 0.0 0.0 N/A N/P $ 87.3$ 4.3 $ 2.63$ 7.0 CL 69.4 21.4 9.2 0.0 0.0 0.0 44.2 26.3 13.2 73.5 13.2 73.5 73.5 73.5 73.5 75.6 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.4 15.5	*TPR9-16-65	7.0	CL	51.4	38.7	9.9	0.0	0.0	0.0	38.7	19.0	16.5	77.6	11.5	ı	2.63	101.7	20.5	500	76.3
7.0 SM 25.6 19.0 55.4 0.0 0.0 N/A N/P $ 85.9$ 6.5 $ 2.61$ 7.0 SM 16.2 20.7 63.1 0.0 0.0 N/A N/P $ 87.3$ 4.3 $ 2.61$ 7.0 CL 69.4 21.4 9.2 0.0 0.0 0.0 44.2 26.3 12.5 78.5 13.2 $ 2.66$ 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.2 $ 2.60$ 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 $ 2.60$ 7.0 CL 36.9 37.1 6.0 0.0 0.0 28.4 13.3 $ 2.60$ $ 2.60$ <	*TPR9-16-66	7.0	SM	16.9	16.9	66.2	0.0	0.0	0.0	N/A	N/P	ı	96.0	4.0	ı	2.63	112.2	13.6	620	85.6
7.0 SM 16.2 20.7 63.1 0.0 0.0 N/A N/P - 87.3 4.3 - 2.59 7.0 CL 69.4 21.4 9.2 0.0 0.0 44.2 26.3 12.5 78.5 13.2 - 2.66 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.1 - 2.60 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.1 - 2.60 7.0 CL 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.2.5 8.3 - 2.60 7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.2.5 8.3 - 2.60 1 M 16.5 16.5 16.5 16.5	*TPR9-16-69	7.0	SM	25.6	19.0	55.4	0.0	0.0	0.0	N/A	N/P	ı	85.9	6.5	ı	2.61	105.9	17.4	500	81.1
7.0 CL 69.4 21.4 9.2 0.0 0.0 44.2 26.3 12.5 78.5 13.2 - 2.66 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.1 - 2.66 7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.1 - 2.60 7.0 CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.3 - 2.60 7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.3 - 2.60 7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.3 - 2.60 70 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 82.2 8.3 - 2.60 70 Y Y	*TPR9-16-70	7.0	SM	16.2	20.7	63.1	0.0	0.0	0.0	N/A	N/P		87.3	4.3	ı	2.59	106.7	15.7	029	81.8
7.0 CL 56.9 37.1 6.0 0.0 0.0 38.1 16.5 16.1 76.5 13.1 - 2.60 7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 8.3 - 2.60 7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 82.2 8.3 - 2.60 1 1 1 26.1 0.0 0.0 0.0 28.4 13.3 - 82.2 8.3 - 2.60 1 1 1 2 1 0.0 0.0 0.0 28.4 13.3 - 8.3 - 2.60 1 1 1 1 1 1 1 1 1 2 1 2.60 1 1 1 1 1 13.3 - 82.2 8.3 - 2.60 1 1 1 1 1 1 1 1 1 1 <	*TPR9-16-71	7.0	CL	69.4	21.4	9.2	0.0	0.0	0.0	44.2	26.3	12.5	78.5	13.2	ı	2.66	7.76	22.5	497	80.3
7.0 (CL)s 33.8 40.1 26.1 0.0 0.0 28.4 13.3 - 82.2 8.3 - 2.60 1 1 1 1 1 1 1 1 1 2	*TPR9-16-72	7.0	CL	56.9	37.1	6.0	0.0	0.0	0.0	38.1	16.5	16.1	76.5	13.1	ı	2.60	0.66	21.1	523	77.3
	*TPR9-16-73	7.0	(CL) _S	33.8	40.1	26.1	0.0	0.0	0.0	28.4	13.3	ı	82.2	8.3	ı	2.60	105.1	17.5	00L	78.2
												<u> </u>								

NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Maximum Density by Proctor)

FEATURE: REACH 9

PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT

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		D- АУГЛЕ - %	86.1	85.0	88.2					
TESTS		isq - JONATZIZA								
L NOE		PECIETANUE	1413	1080	006					
COMPACTION TESTS		CONTENT - % OPTIMUM WATER	14.8	14.4	15.6					
CON		DENSITY - pef MAXIMUM DRY	109.1	110.0	111.0					
		WINUS NO. 4 SPECIFIC GRAVITY	2.64	2.63	2.67					
ACE ITY		LUS NO. ↓ SPECIFIC GRAVITY SPECIFIC GRAVITY	ı	ı	ı					
IN-PLACE DENSITY		CONTENT - % FILL WATER	3.7	3.3	6.0					
		DKA DENSILA - Pet	93.9	93.5	97.9					
VCY	%	8 - SHRINKAGE LIMIT - 9	I	I	I					
CONSISTENCY LIMITS	%	6 - XƏQNI ALIƏLLSV Ə	NP	NP	1.0					
		к-тіміт апурі	NA	NA	27.2					
		OVERSIZE Larger than 5" (127 mm)	0.0	0.0	0.0					
IIONS	(1	to 2." (127 mm) COBBLES 3." (76.2 mm)	0.0	0.0	0.0					
E FRAC CENT		to 3., (76.2 mm) GBAVEL #4 (4.76 mm)	0.0	0.0	0.0					
PARTICLE SIZE FRACTI IN PERCENT		(mm 470.0) 002# <u>MAR</u> (mm 70.0) 44 01	50.7	65.4	77.6					
PARTIC	ES	mm 1 70.0 of 200.0	35.2	22.7	5.6					
	FINES	SMALLER THAN 0.00 mm	14.1	11.9	16.8					
		ZAMBOT CEVZZIŁICVLION	SM	SM	SM					
IDENTIFICATION		DEPTH – feet	7.0	7.0	7.0					
IDENTI	8	TEST PIT NUMBER	*TPR10-15-2	*TPR10-15-3	*TPR10-15-4					

NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Maximum Density by Proctor)

FEATURE: REACH 10

PROJECT: NAVAJO GALLUP WATER SUPPLY PROJECT

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COMPACTION TESTS		D-AVFAE - %	78.3						
		BENETRAUCE - psi PENETRATION	727						
IPACTI	CONTENT - % OPTIMUM WATER								
COM		DENSINUM DRY MAXIMUM DRY	106.0						
		MINUS NO. 4 SPECIFIC GRAVITY	2.61						
ACE ITY		DECIFIC GRAVITY SPECIFIC GRAVITY	ı						
IN-PLACE DENSITY		CONTENT - % FILL WATER	4.9						
		DKA DENZILA - Pet	83.0						
VCY	0	% - TIMIT ƏƏANINHƏ	I						
CONSISTENCY LIMITS	9	6 - XHUI ALIDILSV IA	NP						
		гіблір гіміт-%	NA						
		OVERSIZE Larger than 5" (127 mm)	0.0						
IIONS	(to 2." (127 mm) COBBLES 3." (76.2 mm)	0.0						
E FRAC		to 311 (76.2 mm) to 311 (76.2 mm)	0.0						
PARTICLE SIZE FRACT IN PERCENT		(mm 27.4) 002# <u>MAR</u> (mm 77.4) 44 01	56.7						
PARTIC	ES	mm 1 70.0 of 200.0	24.9						
	FINES	NAHT AƏLIAMS 00.0 mm	18.4						
IDENTIFICATION		SYMBOL CLASSIFICATION	SM						
		1991 – HTAAU	7.0						
	2	TEST PIT NUMBER	*TPR10-16-1						

*Denotes in-place density and 5-point curve.

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ESTS		% - ЭЛТГЛЕ - %	ı	92.3	78.4	77.2	75.2	78.8					
COMPACTION TESTS		BENELBARCE - D ^{si} BENELBALION	ı	483	006	1000	<i>77</i> 0	550					
MPACT		CONTENT - % OPTIMUM WATER	ı	24.4	15.0	15.3	16.3	16.2					
C0]		DENSILA - DCI WVXIMOM DKA	I	93.9	107.2	108.8	107.7	109.0					
		MINUS NO. 4 SPECIFIC GRAVITY	2.55	2.54	2.60	2.58	2.59	2.59					
ACE		ELUS NO. 4 SPECIFIC GRAVITY	ı	ı			ı	I					
IN-PLACE DENSITY		CONTENT - % FILL WATER	15.4	16.3	6.2	4.9	5.7	8.3					
		DKA DENSILA - Pef	ı	86.7	84.0	84.0	81.0	85.9					
NCY	9	6 - JIMIT EDVANISHS	9.4	8.4	ı	ı		ı					
CONSISTENCY LIMITS	%	6 - XƏUNI ALIƏLLSV'Ə	36.9	29.4	6.7	0.7	6.6	18.6					
CO		м-тимп апург	54.7	46.7	26.2	22.1	25.6	33.0					
		OVERSIZE Larger than 5" (127 mm)	0.0	0.0	0.0	0.0	0.0	0.0					
IIONS	(to 2.1. (127 mm) COBBLEZ 3.1 (20.2 mm)	0.0	0.0	0.0	0.0	0.0	0.0					
E FRAC' CENT		to 3., (16.2 mm) CBVAET #4 (4.76 mm)	0.0	0.0	0.0	0.0	0.0	0.0					
PARTICLE SIZE FRACT IN PERCENT		(mm \$70.0) 002# <u>ANAS</u> (mm 77.4) #4 01	8.7	11.4	39.6	62.3	63.1	35.5					,
PARTIC	ES	mm 1 70.0 of 200.0	18.2	22.2	38.0	20.6	17.1	32.9					c
	FINES	MAHT AƏLLAMS 0.005 mm	73.1	66.4	22.4	17.1	19.8	31.6					
NC		ZAMBOL CEASSIFICATION	CH	CL	s(CL-ML)	SM	SC-SM	s(CL)					
IDENTIFICATION		DEPTH – feet	1.0-1.3	6.0	6.0	6.0	6.0	6.0					
IDENT	Z	TEST PIT NUMBEI	TPR11-15-2	*TPR11-15-2	*TPR11-15-3	*TPR11-15-4	*TPR11-15-5	*TPR11-15-6					

NOTE: Numbers in parentheses are metric equivalents of numbers directly above. *Denotes in-place density and 5-point curve.

ST		D- АУГЛЕ - %	88.6	93.3	82.5						
ON TES	BESISTANCE - psi PENETRATION		640	1000	006		 				
COMPACTION TESTS		CONTENT - % OPTIMUM WATER	14.2	14.2	14.3						
CON		DENSITY - pcf MAXIMUM DRY	108.1	110.3	113.7						
		WINUS NO. 4 SPECIFIC GRAVITY	2.64	2.65	2.64						
ACE ITY	LTUS NO. 4 SPECIFIC GRAVITY			ı	ı						
IN-PLACE DENSITY	CONTENT - % FILL WATER			4.8	6.7						
		DKA DENSILA - pet	95.8	102.9	93.8						
VCY	%	6 - SHRINKAGE LIMIT - 9	I	I	I						
CONSISTENCY LIMITS	%	6 - XƏUNI ALIƏLISV IA	N/P	d/N	3.4						
		к тиміт апуды	N/P	N/P	22.2						
		than S'' (127 mm) OVERSIZE Larger	0.0	0.0	0.0						
IIONS	(1	to 5" (127 mm) to 5" (127 mm)	0.0	0.0	0.0						
E FRAC CENT		603 (Je75 mm) 687AET #4 (4.76 mm)	5.9	0.0	0.0						
PARTICLE SIZE FRACT IN PERCENT		(mm 470.0) 0024 <u>UNAS</u> (mm 77.4) 44 of	72.7	70.6	47.2						
PARTIC	ES	mm 1 70.0 of 200.0	11.0	14.0	30.9						
	FINES	MALT FI THAN mm 200.0	10.4	15.4	21.9						
NC		ZAMBOT CEV8281EICVLION	SM	SM	s(ML)						
IDENTIFICATION		DEPTH – feet		7.0	7.0						
IDENT	ξ	TEST PIT NUMBEI	*TPR11-15-8	*TPR11-15-9	*TPR11-15-10						

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