Geotechnical Investigation Report
BIA Project N12 (12-2)(19-2)2&4
Navajo, New Mexico to N64 Junction, Arizona (near Tsaile)
54.5 Kilometers of BIA Route N12
BIA Order No. A13PD00246
BIA Requisition No. 0040100785
Architect – Engineer IDIQ Contract No. A12PC00121

Submitted to:

Bureau of Indian Affairs, Navajo Regional Office
Gallup, New Mexico

Submitted by:

AMEC Environment & Infrastructure, Inc.
Phoenix, Arizona

June 4, 2014

AMEC Project No. 17-2013-4030

Expires 3/31/2017

June 4, 2014
AMEC Project No. 17-2013-4030.0001

Bureau of Indian Affairs, Navajo Regional Office
Division of Acquisition
PO Box 1060
301 West Hill, Room 346
Gallup, New Mexico 87305-1060

Attn: Alfred Myron

Re: Geotechnical Investigation Report
BIA Project N12 (12-2)(19-2)2&4
Navajo, New Mexico to N64 Junction, Arizona (near Tsaile)
54.5 Kilometers of BIA Route N12
BIA Order No. A13PD00246
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AMEC Environment & Infrastructure, Inc. (AMEC) has completed this Geotechnical Investigation of the subsurface conditions on Bureau of Indian Affairs (BIA) Route N12 between Navajo, New Mexico and N64 Junction near Tsaile, Arizona, approximately 54.5 kilometers in length. This work was performed in general accordance with BIA Order No. A13PD00246 dated July 13, 2013. The results of our investigation along with the boring location plans and boring logs are attached.

We at AMEC are committed to providing quality engineering services combined with client satisfaction in order to achieve a continuing relationship with our clients. We appreciate the opportunity to provide these services for you. If you have any questions regarding any of the other engineering and testing services AMEC provides, please do not hesitate to contact us.

Respectfully submitted,

AMEC Environment & Infrastructure, Inc.

Registered Professional Engineer (Civil) CERTIFICATE NO. 41937 MARK HARTIG Date Signed 6-4-14 ARIZONA, U.S.A. Expires 3/31/2017

Mark Hartig, PE
Geotechnical Operations Manager

Reviewed by:

Registered Professional Engineer (Civil) CERTIFICATE NO. 37284 DANIEL N. FRECHETTE Date Signed 6-4-14 ARIZONA, U.S.A. Expires 03/31/2017

Daniel N. Fréchette, PhD, PE
Senior Associate Geotechnical Engineer

c: Addressee (2)

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1.0 PROJECT INFORMATION AND PURPOSE

Included in this report are the results of our investigation along Bureau of Indian Affairs (BIA) Route N12 from Navajo, New Mexico north to N64 Junction near Tsaile, Arizona, approximately 54.5 kilometers in length. At the request of the BIA, our investigation consisted of a soil boring and laboratory program to determine existing asphalt, base course, and fill thicknesses and classifications, and to classify the subgrade soils at approximately 400 meter intervals along this two-lane roadway.

This report does not address any environmental issues related to the site or the project. If you have any questions concerning environmental aspects of this project please contact us and we can discuss additional services with you.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for BIA, Navajo Regional Office for the purpose of providing the information described above. This report has not been prepared for any other parties, and may not contain sufficient information for purposes of other parties. If any of the project information described in Section 2.0 of this report has changed, we should be notified so that we may amend our recommendations, as necessary.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

AMEC Environment & Infrastructure, Inc. (AMEC) advanced one hundred and thirty eight soil borings to approximate depths of 1.52 meters below existing site grades in the BIA Route N12 alignment under the direction of Joseph Zaleski, EIT, AMEC field engineer. The borings were performed in the drive lanes of Route N12, were generally alternated between the north bound and southbound lanes, and were spaced at approximately 400 meter intervals. The borings were performed by Cascade Drilling with a truck-mounted CME 95 drill rig using 203 millimeter diameter hollow stem auger (HSA). Soil borings performed were backfilled with soil cuttings to a depth just below the existing asphalt. The surfaces were then patched with cold patch asphalt, tamped down with a mallet, and were left slightly mounded to allow for some settlement. Soil borings were numbered R-1 through R-138, and started at the north end of the project working sequentially to the south end of the project.

The approximate locations of the soil borings are shown on Figures 1 through 7 - Boring Locations Map. The GPS NAD 83 – UTM Zone 12 coordinates for each location were established using a handheld survey grade GPS unit and are shown on the attached boring logs. The soils encountered at each location were visually classified and recorded on a field log. After completion of the laboratory tests on the samples retrieved, the field logs were reviewed and modified where necessary to produce the final boring logs presented in Appendix A. Our field and final classifications were based on the Unified Soil Classification System (USCS).

2.2 Laboratory Testing

For the purpose of evaluating the pertinent engineering properties of the site soils, laboratory tests were performed on the representative bulk samples obtained during our field exploration. The following tests were performed in general accordance with the applicable American Association of State Highway and Transportation Officials (AASHTO) test methods:

- Plasticity Index (AASHTO T89, T90)
- Sieve Analysis (Gradation and Minus #200 wash) (AASHTO T11,T27)

The results of these tests are presented in summary and graphical format in Appendix B, Laboratory Test Results.

2.3 Geologic Setting

The project area is located in the Colorado Plateau geologic province along the western base of the Chuska Mountains in northeastern Arizona and northwestern New Mexico. The geologic units underlying the project corridor typically consist of recent unconsolidated deposits of varying thickness underlain by Triassic-age rock formations: the Chinle and Windgate Formations (Byers 1980, O'Sullivan and Beikman 1963 and Thaden 1990).

The Chinle Formation is the geologic formation present throughout most of the corridor. It is subdivided into several Members, three of which are present along the project corridor: Red Member, Owl Rock Member, and the Petrified Forest Member. The Red Member of the Chinle Formation is present in the northernmost portion of the corridor and typically consists of dark reddish-brown bentonitic siltstone, sandstone and lime-pellet conglomerate. The Owl Rock Member of the Chinle formation is present along much of the corridor and typically consists of interbedded limestone and reddish-brown, clayey siltstone. The Petrified Forest Member of the Chinle Formation periodically occurs throughout the corridor and typically consists of blue to gray to red to white bentonitic claystone, siltstone and sandstone (Byers 1980, O'Sullivan and Beikman 1963 and Thaden 1990).

Through a portion of the corridor between Whiskey Creek and Coyote Wash (Borings R-71 through R-97) the Rocky Point Member of the Windgate Formation is present. The Rocky Point Member of the Windgate Formation overlies the Chinle Formation and typically consists of reddish-brown, silty sandstone and siltstone (Byers 1980, O'Sullivan and Beikman 1963 and Thaden 1990).

2.4 Geotechnical Profile

Existing asphaltic concrete (AC) along the roadway generally ranged from 114 to 152 millimeters (mm) in thickness. Several outliers ranging from 83 to 102mm were encountered at Borings R-1, R-24, R-25, R-29, R-32, R-38, R-72, R-94, and R-137.

Aggregate Base Course (ABC) was encountered in two borings, R-7 (318 mm) and R-9 (51 mm). Borings R-1 through R-9 generally encountered AC over native subgrade soils except R-7 and R-9 as noted above, which encountered ABC between the AC and native subgrade.

Borings R-10 through R-138 generally encountered AC over varying amounts of granular fill material, over native soils. The granular fill material generally ranged from 241 to 622 mm in thickness, with several outliers ranging from 146 to 191 mm (Borings R-19, R-95, R-107, R-109, R-113, R-125, R-126, R-128, R-132), 965 mm (Boring R-32), and 1,105 mm (Boring R-36). The granular fill consisted of non-plastic silty sands with gravel, sandy gravels, sands with gravel, and gravels with sand. Provided below is a summary of the AC and granular fill thicknesses encountered in the borings:

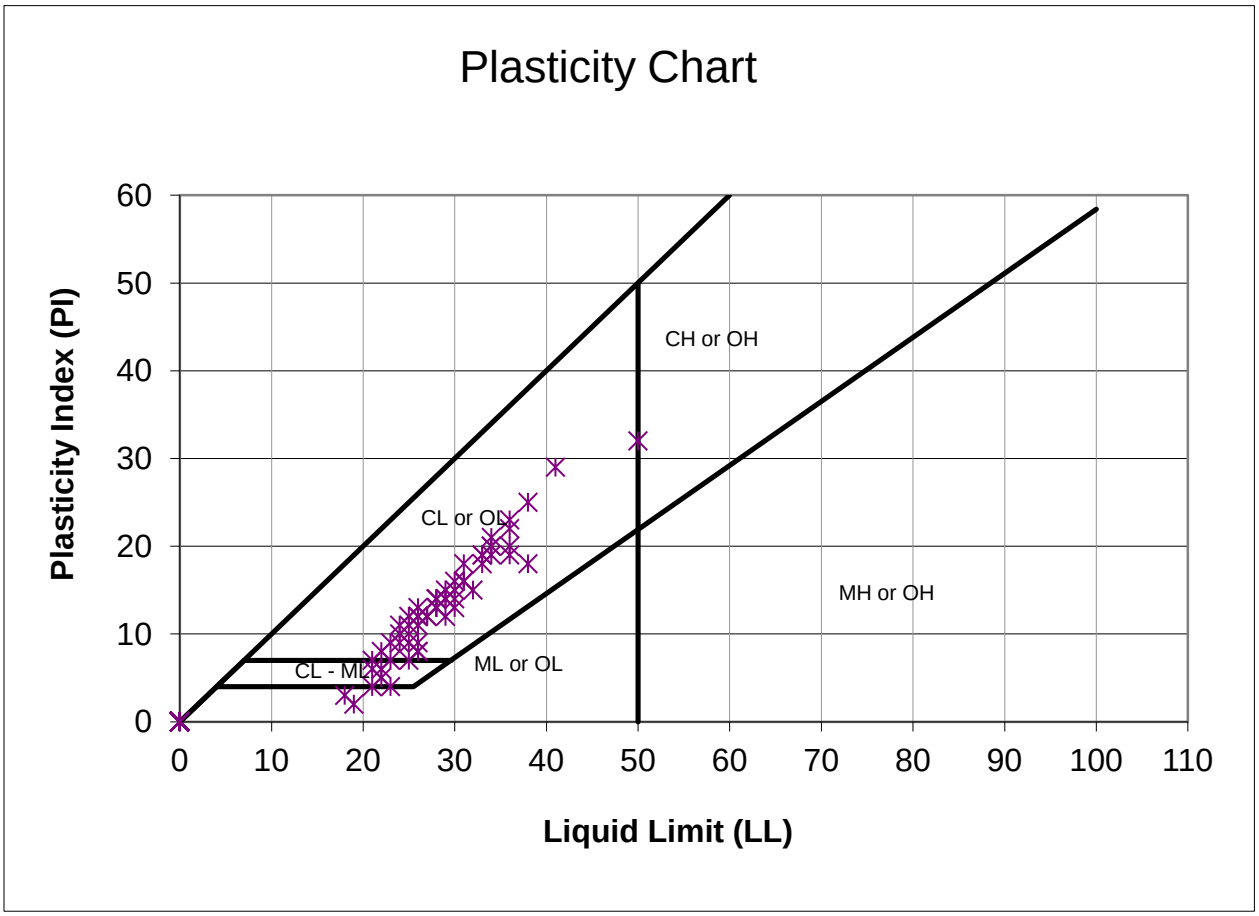
Test Boring Number	Measured AC Thickness (mm)	Measured Fill Thickness (mm)	USCS of Fill
R-1	83	N/A	N/A
R-2	140	N/A	N/A
R-3	140	N/A	N/A
R-4	152	N/A	N/A
R-5	140	N/A	N/A
R-6	146	N/A	N/A
R-7	140	(1)318	N/A
R-8	140	N/A	N/A
R-9	140	(1)51	N/A
R-10	152	457	(2)SM
R-11	152	610	(2)SM
R-12	140	622	(2)SM
R-13	140	622	SM
R-14	140	622	SM
R-15	140	622	(2)SM
R-16	140	622	SM
R-17	127	330	(2)SM
R-18	133	476	SM
R-19	159	146	SM
R-20	140	470	(2)SM
R-21	140	318	(2)SM
R-22	121	489	SM
R-23	127	330	SM
R-24	95	286	(2)SM
R-25	108	337	SM
R-26	133	311	(2)SM
R-27	140	318	(2)SM
R-28	121	337	SM
R-29	89	368	(2)SM
R-30	114	495	SM

Test Boring Number	Measured AC Thickness (mm)	Measured Fill Thickness (mm)	USCS of Fill
R-31	127	330	(2)SM
R-32	102	965	SM
R-33	152	457	(2)SM
R-34	127	330	SM
R-35	140	318	SM
R-36	114	1105	SM
R-37	127	330	(2)SM
R-38	102	356	SM
R-39	140	318	(2)SM
R-40	114	419	SM
R-41	127	330	SP-SM
R-42	127	330	(2)SM
R-43	127	330	SM
R-44	114	343	(2)SM
R-45	127	330	SM
R-46	140	394	SM
R-47	127	330	(2)SM
R-48	114	343	SP-SM
R-49	140	318	(2)SM
R-50	114	343	SM
R-51	127	330	SP-SM
R-52	140	318	SM
R-53	127	330	(2)SM
R-54	114	343	SM
R-55	140	318	(2)SM
R-56	127	330	(2)SM
R-57	140	470	SM
R-58	127	330	SM
R-59	152	305	(2)SM
R-60	152	305	SM

Test Boring Number	Measured AC Thickness (mm)	Measured Fill Thickness (mm)	USCS of Fill
R-61	127	330	SM
R-62	140	318	SP-SM
R-63	127	330	SM
R-64	127	330	SM
R-65	140	470	(2)SM
R-66	127	330	SM
R-67	114	495	SP-SM
R-68	127	330	(2)SM
R-69	140	470	SM
R-70	140	318	SM
R-71	140	394	SM
R-72	102	356	(2)SM
R-73	114	343	SM
R-74	114	343	(2)SM
R-75	140	394	SM
R-76	127	330	SM
R-77	127	330	(2)SM
R-78	127	254	SM
R-79	127	330	SM
R-80	114	343	(2)SM
R-81	140	318	SM
R-82	114	267	(2)SM
R-83	127	406	SM
R-84	127	330	(2)SM
R-85	140	318	GP-GM
R-86	127	330	(2)SM
R-87	140	318	SM
R-88	127	330	SM
R-89	127	330	(2)SM
R-90	114	343	(2)SM
R-91	127	406	GM
R-92	127	330	(2)GM
R-93	127	330	SM
R-94	102	356	SP-SM
R-95	127	178	(2)SM
R-96	140	318	SM
R-97	114	343	GP-GM
R-98	127	406	(2)GP-GM
R-99	127	330	(2)GP-GM
R-100	140	394	GP-GM
R-101	127	254	(2)SM
R-102	127	483	SM
R-103	140	318	(2)SM
R-104	127	330	(2)SM
R-105	133	248	(2)SM
R-106	146	311	SM
R-107	140	165	(2)SM
R-108	114	419	SM
R-109	127	178	(2)SM
R-110	127	254	(2)SM
R-111	152	305	SM
R-112	127	330	SM
R-113	133	171	(2)SM
R-114	146	311	(2)SM
R-115	133	324	(2)SM
R-116	146	387	(2)SM
R-117	146	311	(2)SM
R-118	146	387	SM
R-119	127	406	(2)SM
R-120	127	406	SP-SM
R-121	144	343	(2)SM
R-122	140	394	SM
R-123	140	241	(2)SM
R-124	127	330	GM
R-125	114	191	(2)SM
R-126	114	191	(2)SM
R-127	127	330	SP-SM
R-128	114	191	(2)SM
R-129	140	318	SM
R-130	121	260	(2)SM
R-131	146	311	SM
R-132	140	165	(2)SM
R-133	127	330	SP-SM
R-134	133	324	(2)SM
R-135	140	394	SP-SM
R-136	114	343	(2)SM
R-137	95	514	SM
R-138	114	343	(2)SM

Notes: (1) Possible Aggregate Base Course
(2) Visual classifications only

Native subgrade soils consisted of sandy clays, clayey sands, silty sands, silty sandy clays, and clayey gravels. Plasticity ranged from nonplastic to low plasticity for the silty sands, and from low to medium in plasticity for clayey sands and sandy clays. Groundwater was not encountered in the soil borings performed. Provided below is a Plasticity Chart plotting the Liquid Limit and Plasticity Index of all the samples tested.



3.0 REFERENCES

Byers, V.P., 1980. Geologic Map and Sections of the Sonsela Butte 4 SE Quadrangle, Apache County, Arizona and San Juan and McKinley Counties, New Mexico. U.S. Geological Survey Open-File Report 80-788.

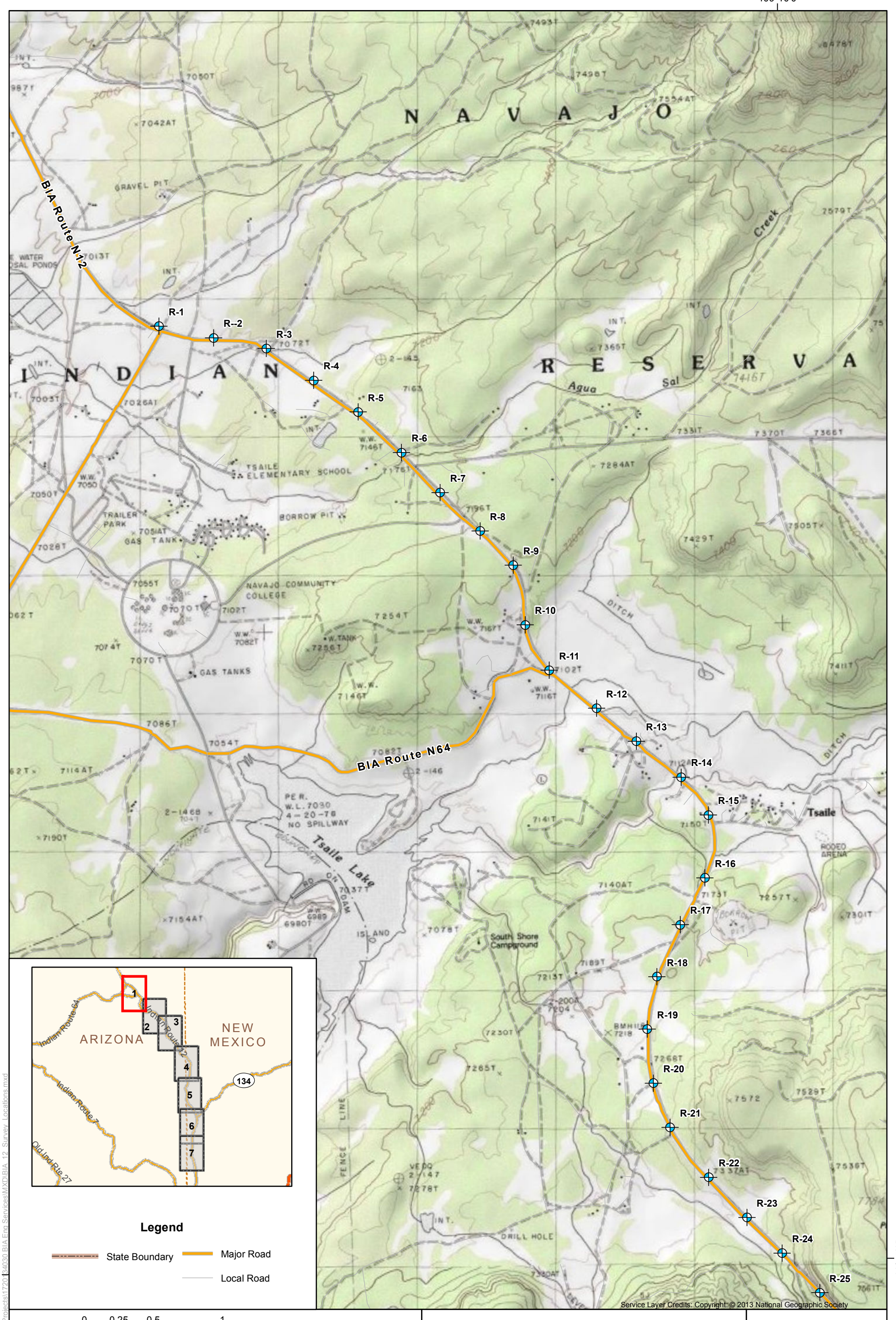
O'Sullivan, R.B. and Beikman, H.M., 1963. Geology, Structure, and Uranium Deposits of the Shiprock Quadrangle, New Mexico and Arizona. U.S. Geological Survey Miscellaneous Geologic Investigations, Map I-345.

Thaden, R.E., 1990. Geologic Map of the Buell Park Quadrangle, Apache County, Arizona and McKinley County, New Mexico. U.S. Geological Survey Geologic Quadrangle Map GQ-1649.

FIGURES

-109°10'0"

36°15'0"



0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

N

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BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE **1**

amec

Path: X:\Projects\2013 Projects\1720134030 BIA Eng Services\MXD\BIA 12 Survey Locations.mxd

-109°10'0"

36°15'0"

R-24
R-25
R-26
R-27
R-28
R-29
R-30
R-31
R-32
R-33
R-34
R-35
R-36
R-37
R-38
R-39
R-40
R-41
R-42
R-43
R-50

BIA Route N12

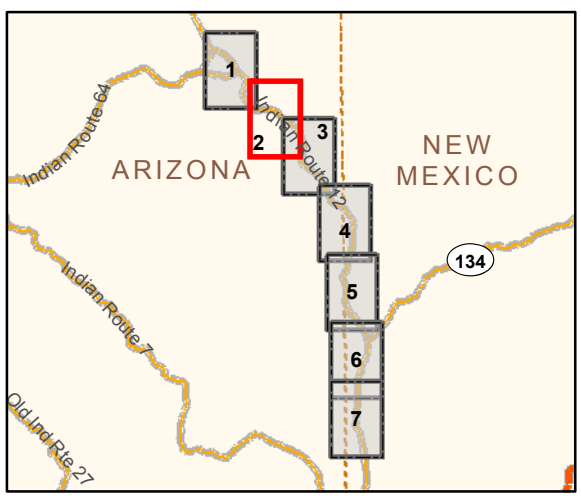
Black Pinnacle

Black Pinnacle Spring

Wheatfields

Horse Spring

Campground



Legend

State Boundary

Major Road

Local Road

0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

N

BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE
2

amec

Path: X:\Projects\2013 Projects\1720134030 BIA Eng Services\MXD\BIA_12_Survey_Locations.mxd

-109°5'0"

36°10'0"

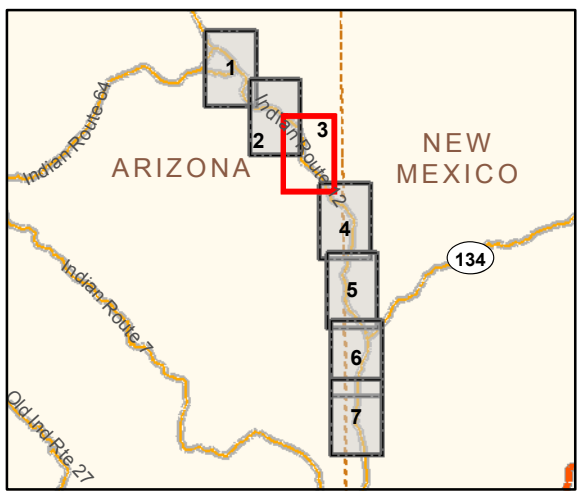
R-35
R-36
R-37
R-38
R-39
R-40
R-41
R-42
R-43
R-44
R-45
R-46
R-47
R-48
R-49
R-50
R-51
R-52
R-53
R-54
R-55
R-56
R-57
R-58
R-59
R-60
R-61
R-62
R-63
R-64

BIA Route N12

Horse Spring
Wheatfields
Upper Wheatfields Creek
Wheatfields Lake
Lower Wheatfields
Bubbling Spring Valley
White Cone
Campground
DITCH
CORRAL

N A V A J O

N D I A N R



Legend

State Boundary
Major Road
Local Road

0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

N

BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE
3

amec

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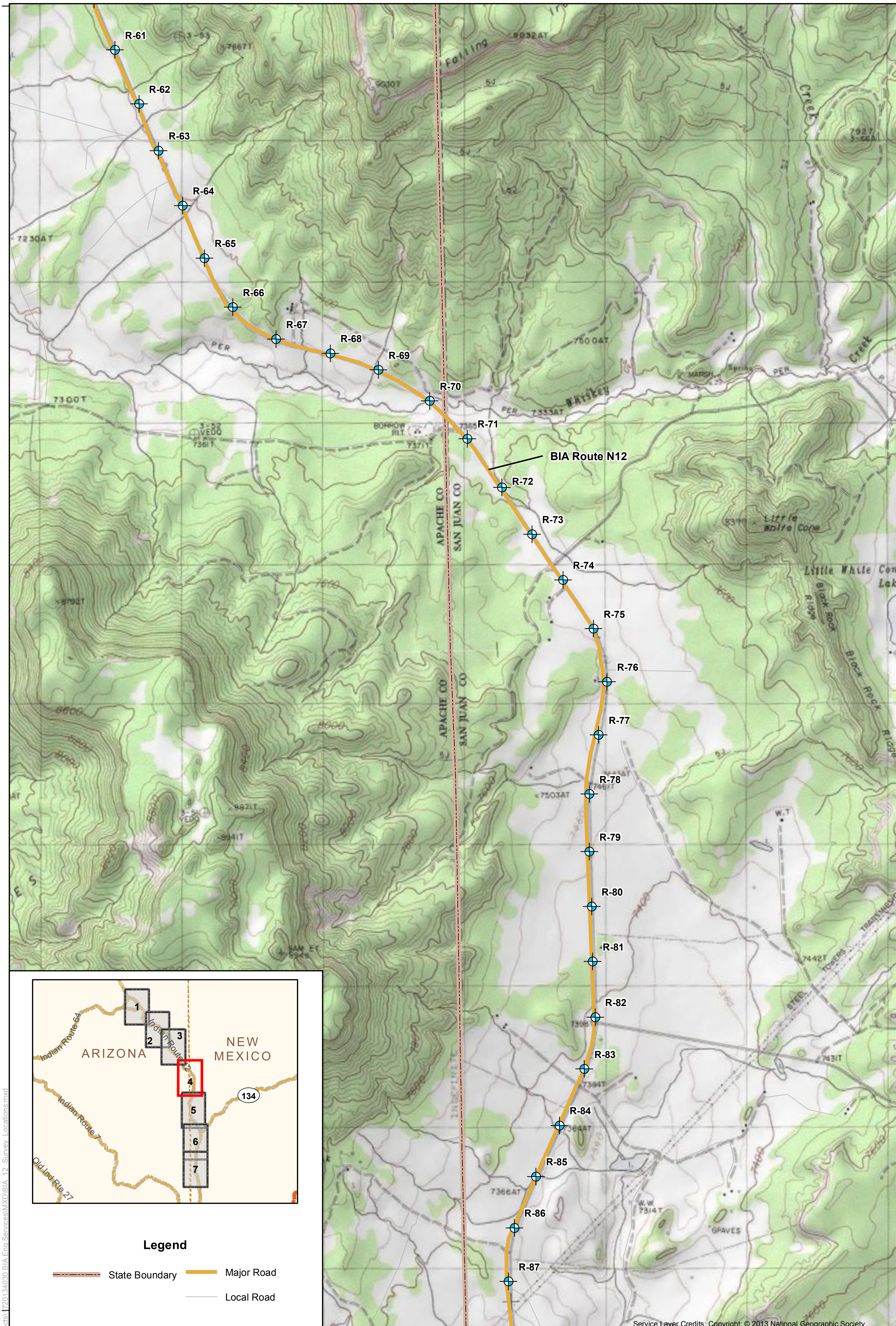

0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

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BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE
4

amec

Path: X:\Projects\2013 Projects\1720134030 BIA Eng Services\MXD\BIA_12_Survey_Locations.mxd

36°5'0"

36°5'0"

R-85
R-86
R-87
R-88
R-89
R-90
R-91
R-92
R-93
R-94
R-95
R-96
R-97
R-98
R-99
R-100
R-101
R-102
R-103
R-104
R-105
R-106
R-107
R-108
R-109
R-110

BIA Route N12

A V A J O

R E S E R V A T I Ø N

White Bridge

Green Crystal Meadows Creek

Black Lake

Sand Spring

Hidden Spring

NEW MEXICO

ARIZONA

Indian Route 64

Indian Route 12

Indian Route 7

Old Ind Rte 27

134

1 2 3 4 5 6 7

Legend

State Boundary

Major Road

Local Road

0 0.25 0.5 1 Kilometers

N

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE **5**

amec

Path: X:\Projects\2013 Projects\1720134030 BIA Eng Services\MXD\BIA_12_Survey_Locations.mxd

-109°0'0"

36°0'0"

R-107
R-108
R-109
R-110
R-111
R-112
R-113
R-114
R-115
R-116
R-117
R-118
R-119
R-120
R-121
R-122
R-123
R-124
R-125
R-126
R-127
R-128
R-129
R-130
R-131

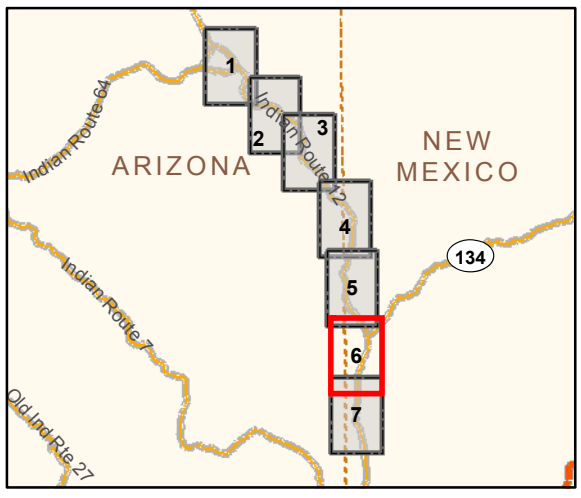
134

BIA Route N12

SAN JUAN CO
MC KINLEY CO

APACHE CO
SAN JUAN CO
MC KINLEY CO

Red Valley



Legend

State Boundary
Major Road
Local Road

0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

N

BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE
6

amec

-109°0'0"

35°55'0"

R-127
R-128
R-129
R-130
R-131
R-132
R-133
R-134
R-135
R-136
R-137
R-138

RESERVATION

ARIZONA
NEW MEXICO

RED LAKE

ELEV. TOP OF DAM 7084.9
ELEV. TOP OF SPILLWAY 7079.3
W.L. 9-15-77 7070.4

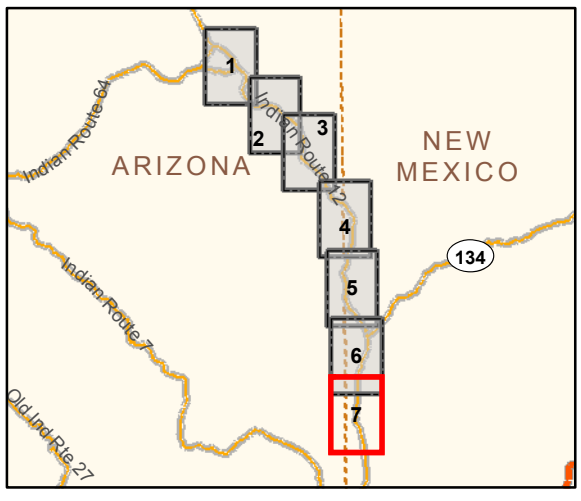
Red Lake Chapter House

Navajo

Tohdidenih Wash

Ziildiltol Mtn

BIA Route N12



Legend

State Boundary
Major Road
Local Road

0 0.25 0.5 1 Kilometers

Job No.	1720134030
PM:	MH
Date:	11/15/2013
Scale:	1 cm = 0.25 km

N

BIA Project N12 (12-2) (19-2) 2&4
Navajo, New Mexico to N64 Junction, Arizona

Boring Locations Map

FIGURE
7

amec

Path: X:\Projects\2013 Projects\1720134030 BIA Eng Services\MXD\BIA_12_Survey_Locations.mxd

APPENDIX A

FIELD INVESTIGATION

TEST DRILLING EQUIPMENT AND PROCEDURES

Description of Subsurface Exploration Methods

Auger Boring Drilling through overburden soils is performed with 6 5/8-inch O.D., 3 1/4-inch I.D. hollow stem auger or 4 1/2-inch solid stem continuous flight auger. Carbide insert teeth are normally used on bits so they can penetrate soft rock or very strongly cemented soils. A CME-75 truck-mounted drill rig is used to advance the auger. The drill rigs are powered with six-cylinder Cummins diesel engines capable of delivering about 11.4 kN-m torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 90 kN (20,000 pounds) downward force.

Generally, refusal to penetration of the auger is adopted as top of the SGC or "river-run" material or harder bedrock, which require other techniques for penetration. Grab samples or auger cuttings may be taken as necessary. Standard penetration tests or 2.42-inch diameter ring samples are taken in conjunction with the auger borings as needed, with the sampling interval and type being indicated on the boring logs.

Hammer Drill Drilling with the Hammer drill is accomplished with a Drill Systems AP-1000 drill rig advancing a double-walled drive casing with a link-belt 180 diesel pile driving hammer, having a rated energy of 8,100 foot-pounds per blow. Where noted on the boring log, the hammer is equipped with a supercharger which can boost the energy to approximately 12,000 foot-pounds per blow. The supercharger is used only in portions of the boring where blow counts are relatively high. Cuttings are removed with compressed air by a reverse circulation process, and are collected in a cyclone from which grab samples are obtained. The drive casing is either 9-inch O.D. by 6-inch I.D. or 6 5/8-inch O.D. by 4-inch I.D. and employs an expendable bit of slightly larger diameter than the O.D. of the casing. Hammer blows required to advance the drive casing are recorded in 1-foot increments, as noted on the boring logs. Standard penetration tests or 2.42-inch diameter ring samples taken are noted on the boring logs.

Core Boring Rock core samples are retrieved using a CME-75 drill rig, SAITECH GH 3 rig or Burley 2500, 4500 or 4000. The GH 3 is a portable hydraulic core drill. The GH 3 is powered by a Kohler two-cylinder 25-horsepower engine. The hydraulics motor which feeds a two-speed transmission and powers the BW spindle. This unit has a 3-foot stroke and is hand-fed with a 2,000 pound push-pull capability. The GH 3 has the capability of drilling with either B- or N-size core steel using standard or wireline systems. N-size core is the preferred size and it has a nominal O.D. of about 2 inches. The Burley 2500 and 4500 series are portable hydraulic core drills. The 4500 series is capable of a track-mounted or skid-type chassis. The Burley 2500 and 4500 series are powered by 44 and 75 HP power units, respectively, provide up to 2,000 foot-pounds (ft.-lbs.) of torque and in excess of 1,000 revolutions per minute (RPM) of spindle speed. Both rigs are capable of retrieving either N- or H-sized core using wireline systems. The N-size core has a nominal O.D. of about 2 inches and the H-size of about 2.4 inches. The Burley 4000 is a track-mounted core drill.

The CME-75 utilizes a wireline core drilling system that takes N-size cores. Using the NQ wireline system, core is recovered quickly by retrieving the core-laden inner tube through the drill string.

TEST DRILLING EQUIPMENT AND PROCEDURES (Cont.)

Sampling Procedures Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In many cases, 2-inch O.D., 1 3/8-inch I.D. samples are used to obtain the standard penetration resistance. “Undisturbed” samples of firmer soils are often obtained with 3-inch O.D. samples lined with 2.42-inch I.D. brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samples in 6-inch increments. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. These values are expressed in blows per 6 inches on the boring logs. "Undisturbed" sampling of softer soils is sometimes performed with thin walled Shelby tubes (ASTM D1587), pitcher samplers, Denison samplers or continuous CME samplers. Where samples of rock are required, they are obtained by NQ diamond core drilling (ASTM D2113). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Also, representative samples are obtained from the cuttings from the hammer and Schramm drill rig.

Boring Records Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares the boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the boring logs.

TERMINOLOGY USED TO DESCRIBE THE RELATIVE DENSITY, CONSISTENCY OR FIRMNESS OF SOILS

The terminology used on the boring logs to describe the relative density, consistency or firmness of soils relative to the standard penetration resistance is presented below. The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. **Relative Density.** Terms for description of relative density of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0-4	Very loose
5-10	Loose
11-30	Medium dense
31-50	Dense
50+	Very dense

2. **Relative Consistency.** Terms for description of clays which are saturated or near saturation.

N	Relative Consistency	Remarks
0-2	Very soft	Easily penetrated several inches with fist.
3-4	Soft	Easily penetrated several inches with thumb.
5-8	Medium stiff	Can be penetrated several inches with thumb with moderate effort.
9-15	Stiff	Readily indented with thumb, but penetrated only with great effort.
16-30	Very stiff	Readily indented with thumbnail.
30+	Hard	Indented only with difficulty by thumbnail.

3. **Relative Firmness.** Terms for description of partially saturated and/or cemented soils which commonly occur in the Southwest including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0-4	Very soft
5-8	Soft
9-15	Moderately firm
16-30	Firm
31-50	Very firm
50+	Hard

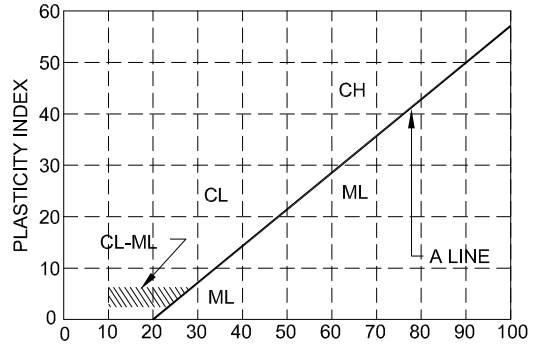
UNIFIED CLASSIFICATION SYSTEM FOR SOILS

Soils are visually classified by the United Soil Classification System on the boring logs presented in this report. Grain-size analysis and Atterberg Limits Tests are often performed on selected samples to aid in classification. The classification system is briefly outlined on this chart. For a more detailed description of the system, see " The Unified Soil Classification System " ASTM Designation: D2487

MAJOR DIVISION				GRAPH SYMBOL	GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (50% or less of coarse fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)			GW	Well graded gravels, gravel-sized mixtures or sand-gravel-cobble mixture.
					GP	Poorly graded gravels, gravel-sized mixtures or sand-gravel-cobble mixture.
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart		GM	Silty gravels, gravel-sand-silt mixture.
			Limits plot below "A" line & hatched zone on plasticity chart		GC	Clayey gravels, gravel-sand-clay mixture.
	SANDS (More than 50% of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)			SW	Well graded sands, gravelly sands.
					SP	Poorly graded sands, gravelly sands.
		SANDS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart		SM	Silty sands, sand-silt mixtures.
			Limits plot below "A" line & hatched zone on plasticity chart		SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS LIMITS PLOT BELOW "A" LINE & HATCH ZONE ON PLASTICITY CHART	SILTS OF LOW PLASTICITY (Liquid limit less than 50)			ML	Inorganic silts, clayey silts with slight plasticity.
		SILTS OF HIGH PLASTICITY (Liquid limit more than 50)			MH	Inorganic silts of high plasticity, silty soils, elastic silts.
	CLAYS LIMITS PLOT BELOW "A" LINE & HATCH ZONE ON PLASTICITY CHART	CLAYS OF LOW PLASTICITY (Liquid limit less than 50)			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		CLAYS OF HIGH PLASTICITY (Liquid limit more than 50)			CH	Inorganic clays of high plasticity, fat clays, silty and sandy clays of high plasticity.

NOTE: Coarse-grained soils with between 5% to 12% passing the No. 200 sieve and fine-grained soils with limits plotting in the hatched zone on the plasticity chart to have dual symbol.

PLASTICITY CHART



DEFINITIONS OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Boulders	Above 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Gravel	75mm (3in.) to No. 4 sieve
Coarse gravel	75mm to 19mm (3in to 3/4in.)
Fine gravel	19mm (3/4in.) to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019992.354
E. 660073.4256
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										83mm Asphaltic Concrete
				A				SM		**SILTY SAND,** trace clay, predominantly fine grained, subangular to subrounded sand, low plasticity, brown to light brown with reddish-brown
				S	10-11-11				slightly moist to moist firm	note: reacts to HCl
0.5										
1.0										
										note: color change to light brown at 1.37m
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-1

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019909.505
E. 660468.8416
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A S	17-23-23			GC	moist very firm	**CLAYEY GRAVEL,** some predominantly medium to coarse grained, subangular sand, predominantly fine grained, subangular to subrounded gravel maximum diameter from 51mm to 76mm, low plasticity, brown note: reacts with HCl
0.5										
				A				CL	moist	**SANDY CLAY,** considerable predominantly fine grained, subangular sand, low to medium plasticity, brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-2

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019832.112
E. 660850.3274
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A S	12-27-28			SM	moist hard	**SILTY SAND,** trace coarse grained, subangular gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown to brown with dark brown lenses note: occasional CH lenses 25mm thick note: increase in clay with depth note: reacts with HCl
0.5										
1.0										
				A				CL	moist	**SANDY CLAY,** low plasticity, dark brown note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-3

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019602.141
E. 661192.6889
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				S A	15-13-11			SM	moist firm	**SILTY SAND,** trace predominantly fine grained, subangular gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown note: does not react with HCl
0.5										
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-4

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019372.769
E. 661514.6949
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				U A	44			SM		**SILTY SAND,** trace predominantly fine grained gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown
0.5									moist	note: does not react with HCl
									firm	
1.0										**Lense of medium to high plasticity clay** note: vegetation roots, color change to pink to brown from 0.91m to 1.22m
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-5

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/4/13

LOCATION **N.** 4019079.91
E. 661828.4328
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				A				SM		**SILTY SAND,** predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown
				U	57					note: clay lenses, red in color
0.5									moist	note: does not react with HCl
									very firm	
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-6

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4018789.023
E. 662107.9791
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0				A						140mm Asphaltic Concrete over 318mm Aggregate Base Course
				S	23-21-16					
0.5								SC-SM	moist very firm	**SILTY CLAYEY SAND,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, low plasticity, light brown to brown note: reacts with HCl
1.0										
1.5				A				CL	moist	**SANDY CLAY,** predominantly fine grained, subangular to subrounded gravel, predominantly coarse to medium grained, subangular to subrounded sand, low to medium plasticity, brown note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-7

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4018511.139
E. 662397.485
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				U A	29			CL		**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown with black lenses
0.5									moist	note: possible organics
									firm	note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-8

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4018263.761
E. 662637.0778
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete over 51mm Aggregate Base Course
				S A	7-15- 22			CL		**SANDY CLAY,** occasional predominantly fine grained, subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown
0.5									moist	
									note: reacts with HCl	
									very firm	
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-9

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4017832.593
E. 662722.7496
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly coarse to medium grained, subangular to subrounded sand, nonplastic, brown with red note: does not react with HCl
0.5										
				U	27			CL	moist firm	**SANDY CLAY,** occasional predominantly fine grained gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: reacts with HCl
1.0										
				A				CL	slightly moist	**CLAY WITH SILT,** low to medium plasticity, light tan to whitish color note: reacts with HCl
1.5				S	50/ 127mm					
										Stopped Auger at 1.52m Stopped Sampler at 1.65m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-10

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4017504.092
E. 662897.7276
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND,** occasional gravel up to 51mm in diameter, some predominantly coarse grained, subangular gravel, predominantly fine to medium grained, subangular to subrounded sand, low plasticity, brown with red note: does not react with HCl
0.5										
				S	15-17-23			CL	moist very firm	**CLAY WITH GRAVEL,** some predominantly coarse grained, subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low plasticity, light tan with white note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-11

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4017228.753
E. 663239.4518
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subrounded to subangular gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5										
1.0				S A	9-22-27			CL	slightly moist very firm	**SANDY CLAY,** considerable predominantly fine to medium grained, subangular to subrounded sand, uncemented (reacts to HCl), medium to high plasticity, brown to purple with white lenses
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-12

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4016990.099
E. 663527.3277
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S A	19-12- 12			SM	slightly moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly coarse to medium grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown note: reacts with HCl
0.5										
				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-13

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4016729.929
E. 663852.5113
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5										note: reacts with HCl
				S A	7-13-16			CL	slightly moist firm	**SANDY CLAY,** considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, gray with brown to yellow lenses note: reacts with HCl note: increased plasticity with depth
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-14

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4016457.417
E. 664047.9184
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5										
				U A	30			SC	moist firm	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, fine grained, subangular to subrounded sand, uncemented (reacts with HCL), low to medium plasticity, dark brown with brown lenses note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-15

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4016002.174
E. 664022.7996
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S A	16-12- 15			SM	slightly moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown with red note: reacts with HCl
0.5										
				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: does not react with HCl
1.0										
				A				GC		**CLAYEY GRAVEL,** some predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, low to medium plasticity, gray to light tan note: does not react with HCl
1.5										
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-16

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4015663.143
E. 663845.1806
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				S A	10-16- 27			CL		note: reacts with HCl
									moist very firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown with black roots
1.0										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-17

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4015285.019
E. 663676.3152
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown with red
0.5				U A	76					note: reacts with HCl
				A				CL	slightly moist hard	**SANDY CLAY WITH SILT,** trace predominantly fine grained, subangular to subrounded sand, low plasticity, purple with lenses of yellow & light gray note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-18

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4014906.473
E. 663606.1959
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										159mm Asphaltic Concrete
				S	14-11-			SM		**FILL**
				A	14					**SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown with red
				A				CL	slightly moist	note: reacts with HCl
0.5										
									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to dark brown (purplish) becomes darker with depth
1.0									firm	note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-19

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4014516.424
E. 663650.97
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown with red note: reacts with HCl
0.5										
				S A	6-12- 15			SC	moist firm	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown note: reacts with HCl note: becomes darker with depth
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-20

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4014195.348
E. 663771.3096
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S A	8-11- 14			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown with red note: reacts with HCl
0.5				A				CL	firm moist	**SANDY CLAY,** rare predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown (purplish) with black roots note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-21

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4013834.526
E. 664051.7291
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										121mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, brown to dark brown with red note: reacts with HCl
0.5										
				S A	8-8-12			CL	moist firm	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low plasticity, purplish-brown & white to brown lenses, possible root material note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-22

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/5/13

LOCATION **N.** 4013543.572
E. 664327.4269
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S A	37-25- 12			SM	slightly moist to moist very firm	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red to purplish-brown note: reacts with HCl
0.5				A				SC	moist	**CLAYEY SAND,** predominantly fine grained, subangular to subrounded sand, low plasticity, purplish-brown with white lenses note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-23

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4013285.733
E. 664582.4419
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										95mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A				SC		note: reacts with HCl
0.5									slightly moist	**CLAYEY SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, rare fine grained, subangular to subrounded gravel, low to medium plasticity, light purplish-brown becomes whiter with depth
				U	53				very firm	note: reacts with HCl
1.0										
				A						
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-24

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012999.312
E. 664854.1609
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										108mm Asphaltic Concrete
				S	28-40-			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	27					
0.5				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** predominantly fine grained, subangular to subrounded sand, low plasticity, purplish-brown with white & green lenses
1.0										note: reacts to HCl
										note: decrease sand & increase clay with depth
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-25

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012771.704
E. 665233.4148
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				S	20-14-			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	17				firm to very firm	
0.5				A				SC		note: does not react with HCl
									moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, light brown to brown
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-26

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012831.745
E. 665585.1895
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown to red note: reacts with HCl
0.5				U A	22- 50/ 76mm			SC	moist hard	**CLAYEY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown, white lenses of sand note: reacts with HCl
1.0				A				SC	slightly moist	**CLAYEY SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, light tan with white, clumps of brown note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-27

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012902.019
E. 666021.5776
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										121mm Asphaltic Concrete
				S	15-22-			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	19					
0.5				A				SC		note: reacts with HCl
									slightly moist very firm	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, weakly cemented calcium carbonate filaments & small nodules, low plasticity, brown to dark brown with white nodules
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-28

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012905.563
E. 666419.8936
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										89mm Asphaltic Concrete
				S	16-12-			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	5				firm	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** some predominantly fine grained, subangular to subrounded sand, medium plasticity, dark purple becomes lighter with depth
1.0										note: less plastic with depth
										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-29

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012915.638
E. 666803.9691
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** some fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red note: gravel up to 51mm in diameter
0.5										note: reacts with HCl
				U A	17			SC	moist moderately firm	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown with lenses of dark purple & black, slight odor indicating possible organics note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-30

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012872.834
E. 667216.0258
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	18-16-			SM	slightly moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown wih red
				A	8					
0.5				A				CL		note: gravel up to 51mm in diameter note: reacts with HCl
									moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown to dark brown with white lenses note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-31

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012729.082
E. 667581.7843
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										102mm Asphaltic Concrete
				A				SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** some fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red note: reacts with HCl
0.5				S A	12-27-33					
1.0				A				CL	moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, gray with brown note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-32

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012505.938
E. 667868.3494
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
0.5										note: reacts with HCl
				U A	23			CH	moist moderately firm	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, medium to high plasticity, gray with purple, brown, white clay/sand lenses
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-33

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4012187.559
E. 668124.7945
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	15-12-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	8				firm	
0.5				A				CL		note: gravels up to 51mm in diameter
										note: reacts with HCl
1.0									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, purplish-brown to dark brown with white, gray, dark brown lenses
										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-34

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4011930.864
E. 668415.3234
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
0.5				S A	7-7-9			CL		note: gravels up to 51mm in diameter note: reacts with HCl
									moist firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable fine grained, subangular to subrounded sand, low to medium plasticity, gray to purple with purple lenses, white, yellow brown lenses note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-35

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/6/13

LOCATION **N.** 4011715.223
E. 668728.1343
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	50-30-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
0.5				A	40				hard	note: reacts with HCl
1.0										
				A				CL	moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to purple (clay)
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-36

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4011465.789
E. 669030.2897
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
								SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A						
0.5				S A	6-10- 11			CL		note: reacts with HCl note: increase in clay content
									moist firm	**SANDY CLAY,** occasional predominantly fine grained gravel, considerable predominantly fine grained, subangular to subrounded sand, medium plasticity, brown with purple & white lenses note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-37

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4011239.591
E. 669438.0637
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										102mm Asphaltic Concrete
				S	29-29-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, pedominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	27				hard	
0.5				A				SC		note: gravel up to 51mm in diameter note: reacts with HCl
									slightly moist	**CLAYEY SAND,** considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: reacts with HCl
1.0				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-38

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4010942.183
E. 669733.3554
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
0.5				U A	31			SC		note: reacts with HCl
									moist firm	**CLAYEY SAND,** some predominantly fine grained gravel, considerable predominantly medium to fine grained, subangular to subrounded sand, low plasticity, dark purple to black
1.0								CL		note: does not react with HCl
									moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low plasticity, purple with white sand lenses & brown sand
1.5										note: increase in clay note: does not react with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-39

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4010744.542
E. 670023.3376
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	11-19-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
				A	50/				hard	
					127mm					note: cobbles up to 51mm in diameter
0.5								SM		note: reacts with HCl
				A					slightly moist	**SILTY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, light brown to brown
1.0										note: becomes darker with depth
										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-40

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4010432.546
E. 670321.2363
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SP-SM	slightly moist	**FILL** **SAND WITH SILT & GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, moderately to strongly cemented, nonplastic, light brown with white filaments & nodules note: reacts with HCl
0.5				S A	11-23-35			SM		
									slightly moist hard	**SILTY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly medium to fine grained, subrounded sand, nonplastic, light brown with white & brown lenses note: reacts with HCl
1.0										
				A				SC	moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, low plasticity, white sand, brown clay note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-41

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4010085.204
E. 670461.7565
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red
0.5				U A	50-50/ 152mm			SM		note: gravel up to 51mm in diameter note: reacts with HCl
									slightly moist hard	**SILTY SAND,** some predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, nonplastic, light brown with white & brown lenses
1.0				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded, low to medium plasticity, white sand with pink to brown clay lenses
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

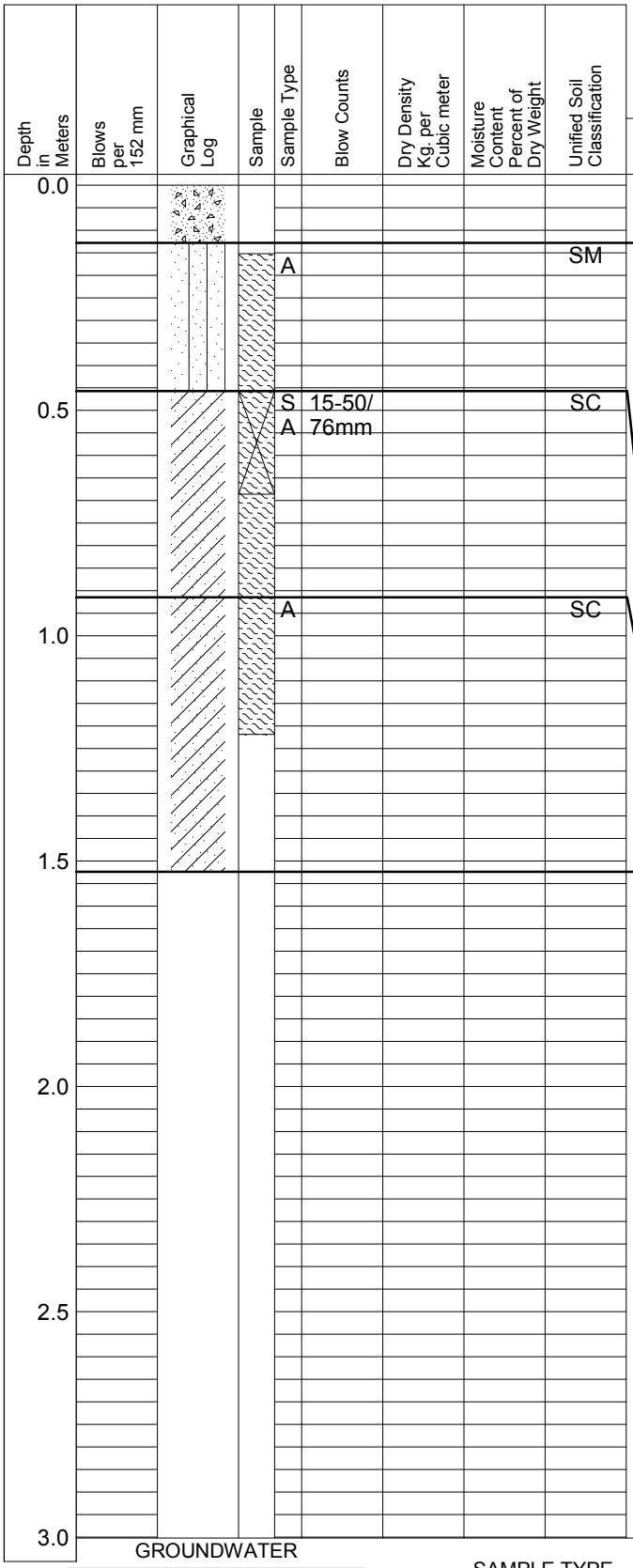
SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-42

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4009716.911
E. 670602.196
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12



REMARKS	VISUAL CLASSIFICATION
	127mm Asphaltic Concrete
slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, light brown with red note: reacts with HCl
slightly moist hard	**CLAYEY SAND,** some predominantly fine grained gravel, predominantly fine grained, subangular to subrounded sand, low plasticity, dark brown to black with white sand lenses note: does not react with HCl
slightly moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly medium to fine grained, subrounded sand, low to medium plasticity, white sand with brown clay lenses note: reacts with HCl
	Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-43

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4009332.642
E. 670738.5539
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	22-27-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	18				very firm	
0.5				A				SC		note: reacts with HCl
									moist	**CLAYEY SAND,** some predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low plasticity, dark brown with black
1.0									very firm	note: reacts with HCl
				A				CL	slightly moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, light purple with dark brown clay
1.5										note: does not react with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-44

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4008950.187
E. 670864.9156
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				U A	58			CL		note: reacts with HCl
									slightly moist to moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, dark purple with white to green lenses
				A				CL	very firm	note: reacts with HCl
1.0									slightly moist to moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown with purple clay
1.5										note: reacts with HCl
										note: gets lighter with depth & less plastic
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-45

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4008706.883
E. 670944.3815
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5								CL		
				S A	11-20-26				moist very firm	**CLAY WITH SAND,** occasional predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown note: does not react with HCl
1.0				A				CL		
									slightly moist	**CLAY WITH SAND,** some predominantly fine grained, subangular to subrounded sand, low to medium plasticity, purple with white lenses note: does not react with HCl
1.5										Stopped Auger at 1.52mm Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-46

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4008174.191
E. 670861.9084
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5				U A	33			SC	moist very firm	**CLAYEY SAND,** trace predominantly fine grained gravel, considerable predominantly fine grained sand, low to medium plasticity, red with brown sand note: reacts with HCl
				A				CL	moist	**CLAY WITH SAND,** occasional predominantly fine grained, subangular to subrounded gravel, some predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown to dark brown (clay) note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-47

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4007770.571
E. 670848.4346
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SP-SM	slightly moist to moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red
0.5				S	11-18-22			CL		note: reacts with HCl
				A						
				A				CL	moist very firm	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown with purple clay
1.0										note: reacts with HCl
				A					moist	**CLAY WITH SAND,** some predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown
1.5										note: reacts with HCl
										Stopped Auger at 1.52mm Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-48

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4007460.899
E. 670731.0252
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S A	25-15- 10			SM	slightly moist to moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5				A				CL	slightly moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, medium plasticity, brown with purple clay note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-49

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4007049.001
E. 670644.5398
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red
0.5				U A	28			CL		note: reacts with HCl
				A				CL	moist firm	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, purple with white, dark purple & brown lenses
1.0										note: reacts with HCl
									moist	**CLAY WITH SAND,** some predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown with red, darker with depth
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-50

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4006649.19
E. 670749.3061
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	23-14-			SP-SM	slightly moist to moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red
				A	6				firm	
0.5				A				CL		note: reacts with HCl
									slightly moist to moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, plasticity increases with depth, black with brown to red with brown
1.0										note: black soil has odor, possible organics
										note: reacts with HCl
				A				CH	moist	**CLAY WITH SAND,** trace predominantly fine grained, subangular to subrounded gravel, medium to high plasticity, red
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-51

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4006351.855
E. 671026.2441
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				S A	6-6-10			CL		note: reacts with HCl
				A				CH	slightly moist to moist moderately firm to firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, dark brown to black (slight odor), roots present note: reacts with HCl
1.0									moist	**CLAY WITH SAND,** trace predominantly fine grained, subangular to subrounded gravel, medium to high plasticity, red note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-52

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/7/13

LOCATION **N.** 4006109.61
E. 671363.2576
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	30-37-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	13				very firm to hard	
0.5				A				SC-SM		note: reacts with HCl
									moist	**SILTY CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown with dark brown clay
1.0				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** some clay, predominantly fine grained, subrounded, low to medium plasticity, red with brown clay
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-53

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4005888.703
E. 671684.9171
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	25-17-			SM	slightly moist to moist very firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly medium to fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	17					
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, dark brown to black
1.0				A				SC		note: reacts with HCl
									moist	**CLAYEY SAND,** some clay, predominantly fine grained, subrounded, low to medium plasticity, red
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-54

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4005665.272
E. 671994.2823
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, brown to red
0.5				S A	18-25-25			SM		note: reacts with HCl
									slightly moist hard	**SILTY SAND,** rare predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, brown to red
				A				SM		note: reacts with HCl
1.0									slightly moist	**SILTY SAND,** trace clay, predominantly fine grained, subrounded, low plasticity, brown to black with odor
										note: reacts with HCl
1.5										Stopped Auger at 1.52m
										Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-55

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4005414.971
E. 672332.2163
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S A	30-15- 13			SM	slightly moist to moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to red
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, red note: reacts with HCl
1.0										
				A				CL		**CLAY WITH SAND,** some predominantly fine grained, subrounded sand, low to medium plasticity, brown to dark brown
									moist	note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-56

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4005163.415
E. 672608.0741
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown to red note: gravel up to 51mm in diameter
0.5										note: reacts with HCl
				U A	65			SM	slightly moist to moist very firm	**SILTY SAND,** trace predominantly coarse grained, subangular to subrounded gravel, predominantly fine grained, subrounded, nonplastic, brown to reddish-brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-57

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4004900.307
E. 672905.4362
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	38-32-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	16				very firm to hard	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to red
1.0										note: reacts with HCl
				A				SP	slightly moist	**POORLY GRADED SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, brown
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-58

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4004569.79
E. 673147.2976
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red
0.5				S A	8-11-16			CL		note: reacts with HCl
									moist firm	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-59

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4004193.266
E. 673319.0711
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				S	15-24-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	35				hard	note: reacts with HCl
0.5				A				CL	moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low plasticity, red (hint of brown)
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-60

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4003833.898
E. 673467.5332
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5				U A	52			CL	moist very firm	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subrounded sand, low plasticity, brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-61

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4003451.229
E. 673638.1799
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S	20-32-			SP-SM	slightly moist to moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	50				hard	
0.5				A				SC		note: reacts with HCl
										CLAYEY SAND, some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, low to medium plasticity, reddish-brown to brown
1.0									slightly moist	note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-62

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4003119.632
E. 673776.4632
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, low plasticity, brown with red
0.5				S A	24-50-50			SC		note: reacts with HCl
									slightly moist hard	**CLAYEY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subrounded sand, low plasticity, brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-63

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4002730.105
E. 673948.3153
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	20-18-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic to low plasticity, brown with red
				A	23				very firm	
0.5				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, low plasticity, brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-64

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4002357.87
E. 674103.0962
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained sand, nonplastic, brown with red note: reacts with HCl
0.5										
				U A	80			SM	slightly moist hard	**SILTY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, black to brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-65

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4002010.167
E. 674304.3017
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	25-25-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained sand, nonplastic, brown with red
				A	33				hard	
0.5				A				SM		note: reacts with HCl
									slightly moist	**SILTY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-66

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/8/13

LOCATION **N.** 4001783.323
E. 674611.1421
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SP-SM	slightly moist to moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red note: reacts with HCl
0.5										
				S A	27-20-17			SM	slightly moist very firm	**SILTY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subrounded sand, nonplastic, red to reddish-brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-67

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 4001682.796
E. 674995.9054
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	23-17-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	17				very firm	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown with dark brown to red
1.0										note: redder with depth
										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-68

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 4001565.106
E. 675336.3511
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5										note: reacts with HCl
				S A	35-63-27			SM	slightly moist hard	**SILTY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, reddish-brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-69

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 4001345.592
E. 675701.6194
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				U	46			SM		note: reacts with HCl
				A					slightly moist very firm	**SILTY SAND,** considerable predominantly fine grained, subangular to subrounded sand, nonplastic, brown to dark brown
1.0										note: reacts to HCl
				A						
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-70

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 4001077.568
E. 675968.0966
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine to medium grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				U A	50-50/ 102mm			SM		note: reacts with HCl
				A				SP	moist hard	**SILTY SAND,** some predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, dark brown
1.0										note: reacts with HCl
									slightly moist	**POORLY GRADED SAND,** predominantly fine to medium grained, subrounded sand, nonplastic, light brown to white
1.5										note: does not react with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-71

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 4000730.847
E. 676213.4442
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										102mm Asphaltic Concrete
				S	17-27-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	20				very firm	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low plasticity, red
										note: reacts with HCl
1.0				A						note: dark brown with red
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-72

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 4000400.435
E. 676426.7915
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5				S A	19-28-35			SC	moist hard	**CLAYEY SAND,** trace silt, occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, low plasticity, red with brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-73

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 4000076.554
E. 676646.2923
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	20-18-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	18				very firm	
0.5				A				SC/SM		note: gravel up to 51mm in diameter note: reacts with HCl
1.0									moist	**CLAYEY SAND TO SILTY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained sand, low plasticity, black with brown & black note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-74

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3999730.006
E. 676863.2563
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				U A	43					note: reacts with HCl
								CL/ML	moist very firm	**SANDY CLAY TO SANDY SILT,** occasional predominantly fine grained gravel, considerable predominantly fine grained sand, low to medium plasticity, dark brown with black & light red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-75

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3999353.907
E. 676958.2604
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	20-30-50/127mm			SM	slightly moist to moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				A				SP		note: reacts with HCl
									slightly moist	**POORLY GRADED SAND,** occasional predominantly fine grained, subangular to subrounded gravel, trace silt, predominantly fine grained, subangular to subrounded sand, possible cementation, dark red with white
1.0										note: slight reaction to HCl
				A				SM	dry to slightly moist	**SILTY SAND,** predominantly fine grained, subangular to subrounded, nonplastic, light red note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-76

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3998976.551
E. 676899.7032
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				S A	10-25-33			CL-ML		note: reacts with HCl
									slightly moist hard	**SANDY SILTY CLAY,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained sand, low plasticity, light red to dark brown
1.0										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-77

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3998557.974
E. 676833.5701
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	22-50/			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A	152mm					
								SM	hard	
0.5				A						note: reacts with HCl
									slightly moist	**SILTY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, nonplastic, light brown to dark brown
1.0										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-78

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3998149.301
E. 676833.4976
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown to brown with red
0.5				S A	18-27-40			SM		note: reacts with HCl
									slightly moist hard	**SILTY SAND,** considerable predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown to black
1.0										note: does not react with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-79

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/10/13

LOCATION **N.** 3997759.151
E. 676849.3065
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	24-22-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine to medium grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown to brown with red
				A	22				very firm	
0.5				A				SM		note: reacts with HCl
									slightly moist	**SILTY SAND,** predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown to black
1.0										note: does not react with HCl
				A				CL	moist	**CLAY WITH SAND,** some predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, dark brown with brown sand
1.5										note: reacts with HCl
										Stopped Auger at 1.52m
										Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-80

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3997369.864
E. 676857.532
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red note: reacts with HCl
0.5				U A	37			CL-ML	moist firm	**SANDY SILTY CLAY,** occasional predominantly medium to fine grained, subangular to subrounded gravel, considerable predominantly medium to fine grained, subangular to subrounded sand, low to medium plasticity, dark brown to red note: plasticity increases with depth note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-81

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3996975.05
E. 676874.616
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	30-30-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
				A	30					
								CL-ML	hard	note: reacts with HCl
0.5				A						
									slightly moist	**SANDY SILTY CLAY,** predominantly fine to medium grained, subangular to subrounded sand, low plasticity, brown to red to light red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m
										Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-82

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3996608.072
E. 676796.8474
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown to brown with red note: reacts with HCl
0.5				S A	9-6-6			CL/ML	slightly moist moderately firm	**SANDY CLAY TO SANDY SILT,** rare predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, low plasticity, red with brown note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-83

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3996207.468
E. 676621.4367
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	18-11-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
				A	11				firm	
0.5				A				CL-ML		note: reacts with HCl
									moist	**SANDY SILTY CLAY,** rare predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to dark brown
1.0										note: reacts with HCl
				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained gravel, considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, dark brown
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-84

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3995845.306
E. 676454.0329
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				GP-GM	slightly moist to moist	**FILL** **GRAVEL WITH SILT & SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red
0.5				U A	45			CL		note: reacts with HCl
									slightly moist firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, red
1.0										note: reacts with HCl
				A				CL	moist	**SANDY CLAY,** considerable predominantly fine grained, subrounded sand, low to medium plasticity, red with brown
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-85

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3995480.463
E. 676300.9951
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	23-17-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
				A	17				very firm	
0.5				A				CL		note: reacts with HCl note: gravel up to 51mm in diameter
										SANDY CLAY, trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, dark brown with brown sand to red
1.0									moist	note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-86

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3995100.601
E. 676259.7319
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	5-8-12			CL		note: reacts with HCl
									moist firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-87

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3994682.961
E. 676285.2307
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	25-17-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
				A	22				very firm	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to red to dark brown
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-88

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3994317.695
E. 676236.0378
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				U A	37			SM		note: reacts with HCl
									slightly moist very firm	**SILTY SAND,** trace predominantly fine grained gravel, considerable predominantly fine grained, subrounded, nonplastic, red to brown note: does not react with HCl
1.0										
				A				CL	moist	**SANDY CLAY,** considerable predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to dark brown note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-89

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3993906.4
E. 676088.6946
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	25-20-			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
				A	14				very firm	
0.5				A				SC/SM		note: reacts with HCl
									slightly moist	**CLAYEY SAND TO SILTY SAND,** rare predominantly fine grained gravel, considerable predominantly fine grained, subrounded sand, low plasticity, reddish-dark brown
1.0										note: plasticity increases with depth
										note: reacts with HCl
1.5										Stopped Auger at 1.52m
										Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-90

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 3993620.921
E. 675902.0157
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	23-12-			GM	slightly moist to moist	**FILL** **SILTY GRAVEL WITH SAND,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, brown with red
				A	12				firm	
0.5				A						note: reacts with HCl
								CL		**CLAY WITH SAND,** occasional predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained sand, low to medium plasticity, brown with dark brown
1.0									moist	note: plasticity decreases with depth
										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-91

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 3993208.24
E. 675679.394
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				GM	slightly moist to moist	**FILL** **SILTY GRAVEL WITH SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, brown with red note: reacts with HCl
0.5				S A	4-10-13			SC	moist firm	**CLAYEY SAND WITH GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular to subrounded sand, low plasticity, brown to red with black lenses note: roots present note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-92

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 3992832.441
E. 675721.2678
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	20-10-			SM	slightly moist to moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, brown with red
				A	10				firm	
0.5				A				CL		note: reacts with HCl
									moist	**CLAY WITH SAND & GRAVEL,** some predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown with dark brown
1.0										note: reacts with HCl
				A				SM	slightly moist	**SILTY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, nonplastic, light red to pink
1.5										note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-93

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 3992461.994
E. 675876.7722
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										102mm Asphaltic Concrete
				A				SP-SM	slightly moist to moist	**FILL** **POORLY GRADED SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
0.5				U A	16- 50/2"			CL		note: reacts with HCl
				A				SM	moist hard	**CLAY WITH SAND,** occasional to some predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subrounded sand, low to medium plasticity, red
1.0										note: reacts with HCl
									slightly moist hard	**SILTY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, weakly to moderately cemented, nonplastic, pink with white calcium carbonate nodules & filaments
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-94

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/9/13

LOCATION **N.** 3992083.286
E. 676026.2979
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	26-11-			SM		**FILL**
				A	23					**SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, brown with red
				A				CL	slightly moist	note: does not react with HCl
0.5										**CLAY WITH SAND,** some predominantly fine to coarse grained sand, trace calcium carbonate nodules, low plasticity, very reddish-orange
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-95

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3991719.84
E. 676168.478
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM		**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				U A	48-50/ 127mm			CL		note: reacts with HCl
									slightly moist to moist hard	**CLAY WITH SAND & SILT,** some fine to coarse grained sand, trace calcium carbonate nodules, low plasticity, light reddish-orange note: nodules possibly from cementation, high HCl effervescence
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-96

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3991345.619
E. 676172.0961
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	20-14-			GP-GM	slightly moist	**FILL** **GRAVEL WITH SILT & SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red
				A	30				very firm	
0.5				A				CL		note: reacts with HCl
									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown with dark brown clay
1.0				A				SC		note; reacts with HCl
									slightly moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low plasticity, light red
1.5										note: does not react with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-97

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3990930.368
E. 676122.477
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				GP-GM	slightly moist	**FILL** **GRAVEL WITH SILT & SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red note: reacts with HCl
0.5				S A	18-50/ 152mm			CL	slightly moist hard	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly medium to fine grained, subangular to subrounded sand, possible weakly cemented, low plasticity, light red to pink & light green to gray
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-98

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3990543.939
E. 676068.4406
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S A	32-16- 16			GP-GM	slightly moist firm to very firm	**FILL** **GRAVEL WITH SILT & SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red
0.5				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, possible weakly cemented, low plasticity, light red to pink & light brown to gray
1.0				A				CL		**CLAY WITH SAND,** occasional predominantly fine grained, subangular to subrounded gravel, trace predominantly fine grained, subangular to subrounded sand, medium to high plasticity, purple with red
1.5									moist	note: reacts with HCl
										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-99

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/11/13

LOCATION **N.** 3990119.56
E. 676044.4863
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				GP-GM	slightly moist	**FILL** **GRAVEL WITH SILT & SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, considerable predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red note: reacts with HCl
0.5				U A	21			CL	moist firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, some predominantly fine grained, subangular to subrounded sand, low to medium plasticity, brown to dark brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-100

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3989730.436
E. 676161.1916
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	25-20-18			SM	slightly moist very firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red with white sand & gravel note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-101

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3989391.011
E. 676299.897
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red note: gravel up to 25mm in diameter
0.5				U A	100			CL		note: reacts with HCl
									moist hard	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-102

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3989024.739
E. 676439.6366
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S	50-27-27			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red to brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-103

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3988736.187
E. 676686.5981
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
								SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				S A	11-15- 21			CL	moist very firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly medium to fine grained, subangular to subrounded sand, medium plasticity, red with white note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-104

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3988479.272
E. 676973.8443
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				S	35-47-50/102mm			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	slightly moist	**CLAY WITH SAND,** occasional predominantly fine grained, subangular to subrounded gravel, some predominantly fine to medium grained, subangular to subrounded sand, low plasticity, red to purple with white & green note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-105

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3988220.163
E. 677219.857
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				U A	80			CL	slightly moist hard	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low plasticity, brown with purple note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-106

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3987829.015
E. 677479.044
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S	15-30-50			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
				A				CL	hard	note: reacts with HCl
0.5										
									slightly moist to moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown with black
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-107

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3987477.572
E. 677718.3025
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				U A	67					note: reacts with HCl
								CL	moist hard	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low plasticity, brown with dark brown to red to brown with dark brown
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-108

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3987149.68
E. 677931.8752
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	29-10-			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained sand, nonplastic, dark brown with red
				A	14					
				A				CL	firm	note: reacts with HCl
0.5										
									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, purple with brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-109

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3986840.719
E. 678144.4226
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	29-15-15			SM	slightly moist firm to very firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				SC	slightly moist to moist	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown with red to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-110

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3986505.324
E. 678361.852
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										152mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				S A	11-17- 30			SC		
									moist very firm	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, dark brown to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-111

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3986147.096
E. 678571.6851
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				U A	73			CL	moist very firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown to dark brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-112

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3985774.521
E. 678679.9266
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				S	27-17-35			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly medium to fine grained, subangular to subrounded sand, nonplastic, dark brown with red
				A				CL	very firm	note: reacts with HCl
0.5										
									moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, brown with dark brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-113

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3985363.472
E. 678733.4316
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				S A	29-27- 27			SC		
									slightly moist to moist hard	**CLAYEY SAND,** trace silt, some predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subrounded sand, low to medium plasticity, brownish-red with white note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-114

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3984937.607
E. 678773.8521
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				S	29-17-11			SM	slightly moist firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, some predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red with brown sand to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-115

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3984555.613
E. 678817.9693
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
								SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				U A	100/4"					note: reacts with HCl
								SC	slightly moist hard	**CLAYEY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly medium to coarse grained, subangular to subrounded sand, low plasticity, light red with white filaments
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-116

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3984203.025
E. 678719.7849
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				S	58-42-45			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, weakly cemented, low plasticity, light red to red
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-117

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3983828.775
E. 678557.4075
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly medium to fine grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	14-11-18					note: reacts with HCl
								SM	slightly moist to moist firm to very firm	**SILTY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, brown to red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-118

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3983442.248
E. 678380.0832
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				S	29-40-50/102mm			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				GC	slightly moist	**CLAYEY GRAVEL,** trace silt, considerable predominantly medium to fine grained, subangular to subrounded sand, predominantly coarse grained, subangular to subrounded gravel, low plasticity, tan note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-119

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/18/13

LOCATION **N.** 3983118.634
E. 678240.41
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SP-SM	slightly moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				SC		
				U	85				slightly moist hard	**CLAYEY SAND,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, low plasticity, red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-120

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3982730.376
E. 678099.1762
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	50-50-50			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				SC		note: reacts with HCl
									slightly moist	**CLAYEY SAND WITH GRAVEL,** trace silt, some predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red
1.0										note: gravel content increases with depth
										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-121

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3982366.884
E. 678010.1227
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WTH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	85/ 152mm					note: reacts with HCl
								SC	slightly moist hard	**CLAYEY SAND WITH GRAVEL,** trace silt, considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-122

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3981960.006
E. 677899.8661
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S	40-40-42			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	slightly moist to moist	**SANDY CLAY,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subrounded sand, low to medium plasticity, red with dark brown clay note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-123

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3981438.453
E. 677768.3328
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				GM	slightly moist	**FILL** **SILTY GRAVEL WITH SAND,** considerable predominantly fine to medium grained, subangular to subrounded sand, predominantly fine grained, subangular to subrounded gravel, nonplastic, dark brown with red
0.5				U A	93			SM		note: reacts with HCl
									slightly moist hard	**SILTY SAND,** trace clay, occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subrounded sand, nonplastic to low plasticity, red to brown
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-124

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3981210.106
E. 677709.4827
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	13-10-8			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				SC-SM		note: reacts with HCl
									slightly moist to moist firm	**SILTY, CLAYEY SAND,** occasional fine grained gravel, predominantly fine to medium grained, subrounded sand, low plasticity, reddish-brown note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-125

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3980938.472
E. 677640.4683
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	11-6-5			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	moist moderately firm	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine grained, subangular sand, medium plasticity, brown with red, white sand note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-126

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3980398.366
E. 677614.3332
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SP-SM	slightly moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	24-22- 20			SC		note: reacts with HCl
									slightly moist very firm	**CLAYEY SAND,** predominantly fine to medium grained, subrounded sand, low plasticity, green to gray, slight odor note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-127

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3979978.371
E. 677603.6595
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	21-18-26			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				SM		note: gravel up to 25mm in diameter note: reacts with HCl
									slightly moist very firm	**SILTY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subrounded sand, nonplastic, brown with green to red note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-128

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3979610.262
E. 677589.4471
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				U A	88			SC		note: reacts with HCl
									slightly moist hard	**CLAYEY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, weakly cemented, low to medium plasticity, red with white calcium carbonate nodules
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-129

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3979166.613
E. 677582.4752
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										121mm Asphaltic Concrete
				S	32-20-20			SM	slightly moist very firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				CL		note: reacts with HCl
									slightly moist	**SANDY CLAY,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, red to light red
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-130

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3978791.294
E. 677568.9239
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										146mm Asphaltic Concrete
				A				SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				S A	24-24- 13			SC		
									slightly moist very firm	**CLAYEY SAND,** occasional predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, possibly weakly cemented, low to medium plasticity, red with white calcium carbonate nodules note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-131

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3978403.832
E. 677562.725
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				S	35-28-20			SM	slightly moist	**FILL** **SILTY SAND WITH GRAVEL,** predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL		
1.0									slightly moist very firm to firm	**SANDY CLAY,** trace silt, trace predominantly fine grained gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, weakly cemented, low to medium plasticity, red to brown with white calcium carbonate nodules note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-132

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3978016.306
E. 677548.62
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										127mm Asphaltic Concrete
				A				SP-SM	slightly moist	**FILL** **SAND WITH SILT & GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	43-50/ 127mm			SC		note: reacts with HCl
									slightly moist hard	**CLAYEY SAND,** trace silt, predominantly fine to medium grained, subangular to subrounded sand, possibly weakly cemented, low to medium plasticity, red to light red with white calcium carbonate nodules note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-133

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3977597.886
E. 677549.905
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										133mm Asphaltic Concrete
				S	27-30-45			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				SC	slightly moist	**CLAYEY SAND WITH GRAVEL,** trace silt, some predominantly fine grained, subangular to subrounded gravel, fine to coarse grained, subangular to subrounded sand, possibly weakly cemented, low to medium plasticity, red to light red with white calcium carbonate nodules note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-134

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3977215.441
E. 677543.5706
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										140mm Asphaltic Concrete
				A				SP-SM	slightly moist	**FILL** **SAND WITH SILT,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				S A	14-14-18			SC		note: gravel up to 51mm in diameter note: reacts with HCl
1.0									slightly moist firm to very firm	**CLAYEY SAND,** trace silt, trace predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, possibly weakly cemented, low to medium plasticity, red to light red with white calcium carbonate nodules note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-135

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3976815.809
E. 677545.9124
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	20-24-13			SM	slightly moist very firm	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red note: reacts with HCl
0.5				A				CL	moist	**SANDY CLAY,** trace predominantly fine grained, subangular to subrounded gravel, considerable predominantly fine to medium grained, subangular to subrounded sand, low to medium plasticity, redish-brown with occasional black layer note: reacts with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-136

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3976448
E. 677517.2032
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										95mm Asphaltic Concrete
								SM		**FILL**
				A					slightly moist	**SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5										note: reacts with HCl
				U A	27			SM	slightly moist firm	**SILTY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, reddish-brown
1.0										note: reacts with HCl
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-137

PROJECT BIA Project N12 (12-2) (19-2) 2 & 4
Navajo, New Mexico to N64 Junction, Arizona

JOB NO. 17-2013-4030 **DATE** 9/19/13

LOCATION **N.** 3976002.872
E. 677447.0453
RIG TYPE CME-95
BORING TYPE 203mm Hollow Stem Auger
SURFACE ELEV.
DATUM GPS NAD 83 - UTM Zone 12

Depth in Meters	Blows per 152 mm	Graphical Log	Sample	Sample Type	Blow Counts	Dry Density Kg. per Cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0.0										114mm Asphaltic Concrete
				S	28-42-45			SM	slightly moist hard	**FILL** **SILTY SAND WITH GRAVEL,** considerable predominantly fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, nonplastic, dark brown with red
0.5				A				SM		note: reacts with HCl
									moist	**SILTY SAND,** trace predominantly fine grained, subangular to subrounded gravel, predominantly fine grained, subrounded sand, nonplastic, brown to dark brown to black note: does not react with HCl
1.0										
1.5										Stopped Auger at 1.52m Backfilled with drill cuttings & cold patch
2.0										
2.5										
3.0										

GROUNDWATER

DEPTH (m)	HOUR	DATE
	none	

SAMPLE TYPE
A - Auger cuttings; NR-No Recovery
S - 51mm O.D. 35mm I.D. tube sample.
U - 76mm O.D. 61mm I.D. tube sample.
T - 25mm O.D. thin-walled tube sample

LOG OF TEST BORING NO. R-138

APPENDIX B

LABORATORY TEST RESULTS

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

Liquid Limit, Plastic Limit & Plasticity Index (AASHTO T89-10 & T90-00)
Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

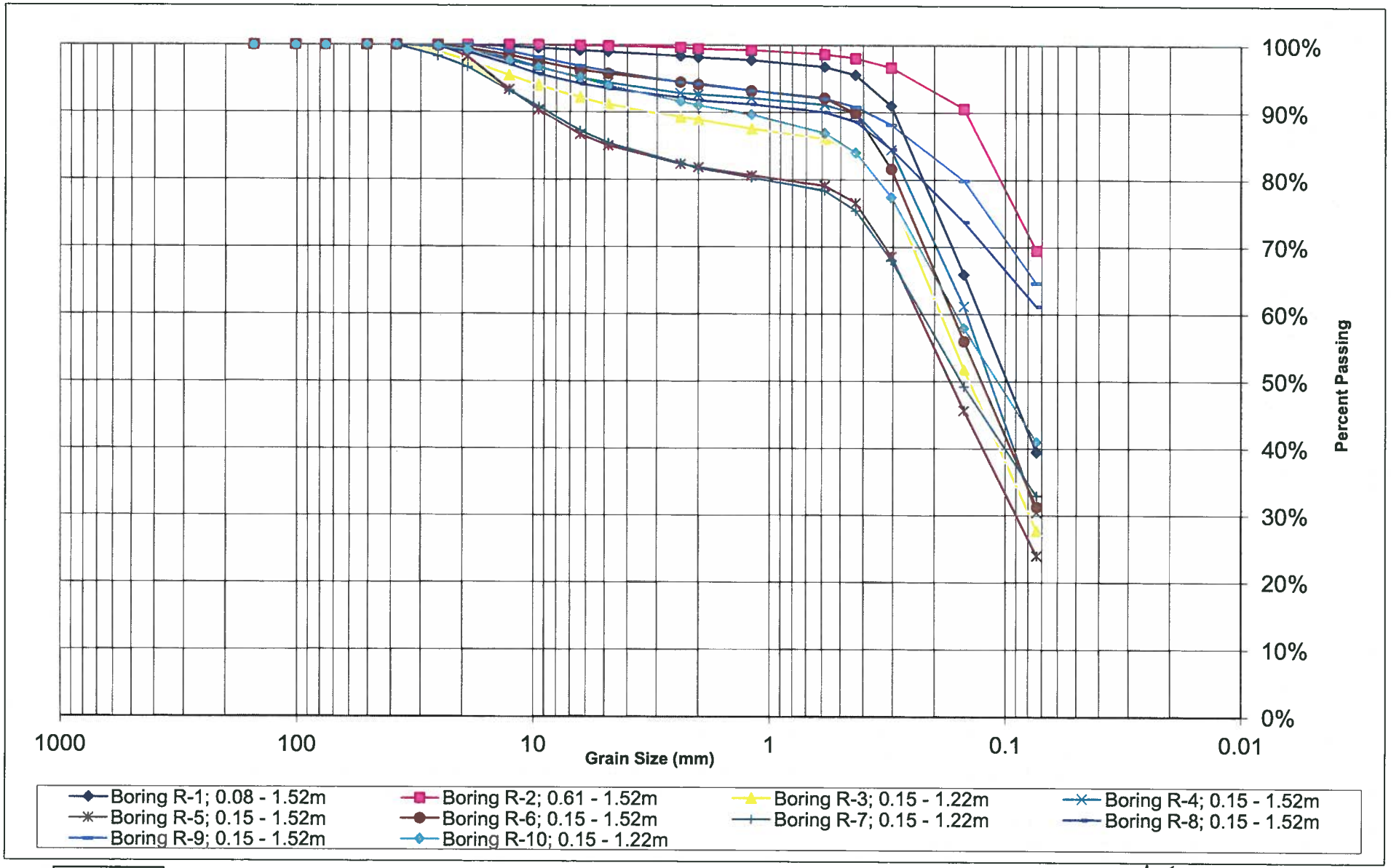
Boring R-1; 0.08 - 1.52m	SM	19	2	39	66	91	96	97	98	98	98	99	99	100	100	100	100	100	100	100	100	100	1
Boring R-2; 0.61 - 1.52m	CL	29	14	70	91	97	98	99	99	99	100	100	100	100	100	100	100	100	100	100	100	100	3
Boring R-3; 0.15 - 1.22m	SM	NV	NP	28	52	78	84	86	88	89	89	91	92	94	96	98	99	100	100	100	100	100	4
Boring R-4; 0.15 - 1.52m	SM	NV	NP	30	61	84	90	91	92	93	93	94	95	97	98	99	100	100	100	100	100	100	6
Boring R-5; 0.15 - 1.52m	SM	NV	NP	24	46	69	77	79	81	82	82	85	87	90	93	98	100	100	100	100	100	100	7
Boring R-6; 0.15 - 1.52m	SM	NV	NP	31	56	82	90	92	93	94	94	96	96	98	98	100	100	100	100	100	100	100	8
Boring R-7; 0.15 - 1.22m	SC-SM	21	6	33	49	68	75	78	80	82	82	85	87	91	93	97	98	100	100	100	100	100	9
Boring R-8; 0.15 - 1.52m	CL	31	16	61	74	85	89	90	91	92	92	94	94	96	97	99	100	100	100	100	100	100	11
Boring R-9; 0.15 - 1.52m	CL	32	15	65	80	88	91	92	93	94	94	96	97	98	99	100	100	100	100	100	100	100	12
Boring R-10; 0.15 - 1.22m	SC	30	15	41	58	77	84	87	90	91	92	94	95	97	98	99	100	100	100	100	100	100	13

AASHTO R18

REVIEWED BY _____

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

MECHANICAL SIEVE ANALYSIS



AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

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Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

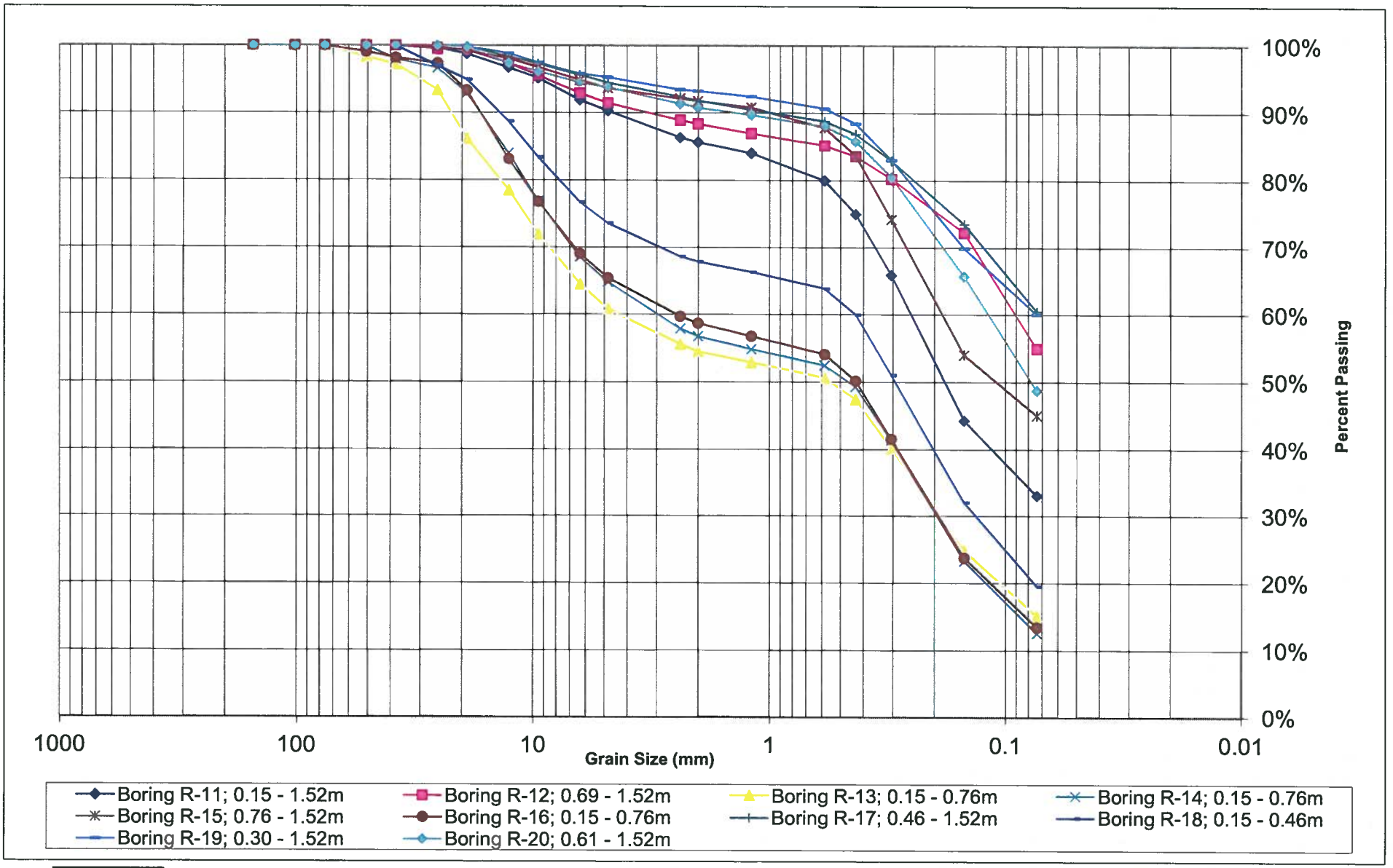
Boring R-11; 0.15 - 1.52m	SC	28	14	33	44	66	75	80	84	86	86	90	92	95	97	99	100	100	100	100	100	100	15
Boring R-12; 0.69 - 1.52m	CL	26	13	55	72	80	84	85	87	88	89	91	93	95	97	99	99	100	100	100	100	100	17
Boring R-13; 0.15 - 0.76m	SM	NV	NP	15	25	40	47	51	53	54	56	61	64	72	78	86	93	97	98	100	100	100	18
Boring R-14; 0.15 - 0.76m	SM	NV	NP	13	23	41	49	52	55	57	58	65	69	77	84	93	97	98	100	100	100	100	20
Boring R-15; 0.76 - 1.52m	SC	26	12	45	54	74	84	88	91	92	92	94	95	97	98	99	100	100	100	100	100	100	23
Boring R-16; 0.15 - 0.76m	SM	NV	NP	13	24	42	50	54	57	59	60	65	69	77	83	93	97	98	99	100	100	100	24
Boring R-17; 0.46 - 1.52m	CL	30	14	60	74	83	87	89	90	92	92	94	96	97	98	100	100	100	100	100	100	100	28
Boring R-18; 0.15 - 0.46m	SM	NV	NP	20	32	51	60	64	66	68	69	74	77	83	89	95	97	100	100	100	100	100	29
Boring R-19; 0.30 - 1.52m	CL	38	25	60	70	83	88	91	92	93	93	95	96	97	99	100	100	100	100	100	100	100	33
Boring R-20; 0.61 - 1.52m	SC	34	20	49	66	80	86	88	90	91	91	94	95	96	97	100	100	100	100	100	100	100	35

AAR AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

MECHANICAL SIEVE ANALYSIS



AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
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Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-21; 0.46 - 1.52m	CL	33	18	62	78	87	91	93	95	96	96	99	99	99	99	100	100	100	100	100	100	100	37
Boring R-22; 0.15 - 0.61m	SM	NV	NP	14	25	44	53	57	60	62	63	69	73	83	90	98	100	100	100	100	100	100	38
Boring R-23; 0.15 - 0.46m	SM	NV	NP	19	30	49	59	63	66	68	70	76	81	89	95	99	99	100	100	100	100	100	40
Boring R-24; 0.38 - 1.22m	SC	34	21	44	52	70	82	89	93	95	95	97	98	99	99	100	100	100	100	100	100	100	43
Boring R-25; 0.15 - 0.46m	SM	NV	NP	13	24	42	49	53	56	58	59	65	69	79	86	97	100	100	100	100	100	100	45
Boring R-26; 0.46 - 1.52m	SC	28	14	42	55	70	74	76	78	80	80	85	87	92	95	98	99	100	100	100	100	100	48
Boring R-27; 0.46 - 0.76m	SC	33	19	50	62	77	81	82	84	85	86	89	90	92	94	96	96	99	100	100	100	100	50
Boring R-28; 0.15 - 0.46m	SM	NV	NP	14	26	45	52	55	57	59	60	67	71	80	87	96	99	100	100	100	100	100	52
Boring R-29; 0.46 - 1.52m	CL	36	23	66	74	86	92	94	96	97	97	99	99	99	100	100	100	100	100	100	100	100	55
Boring R-30; 0.15 - 0.61m	SM	NV	NP	14	28	48	56	59	62	64	65	71	75	83	90	99	100	100	100	100	100	100	56

AAP® AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
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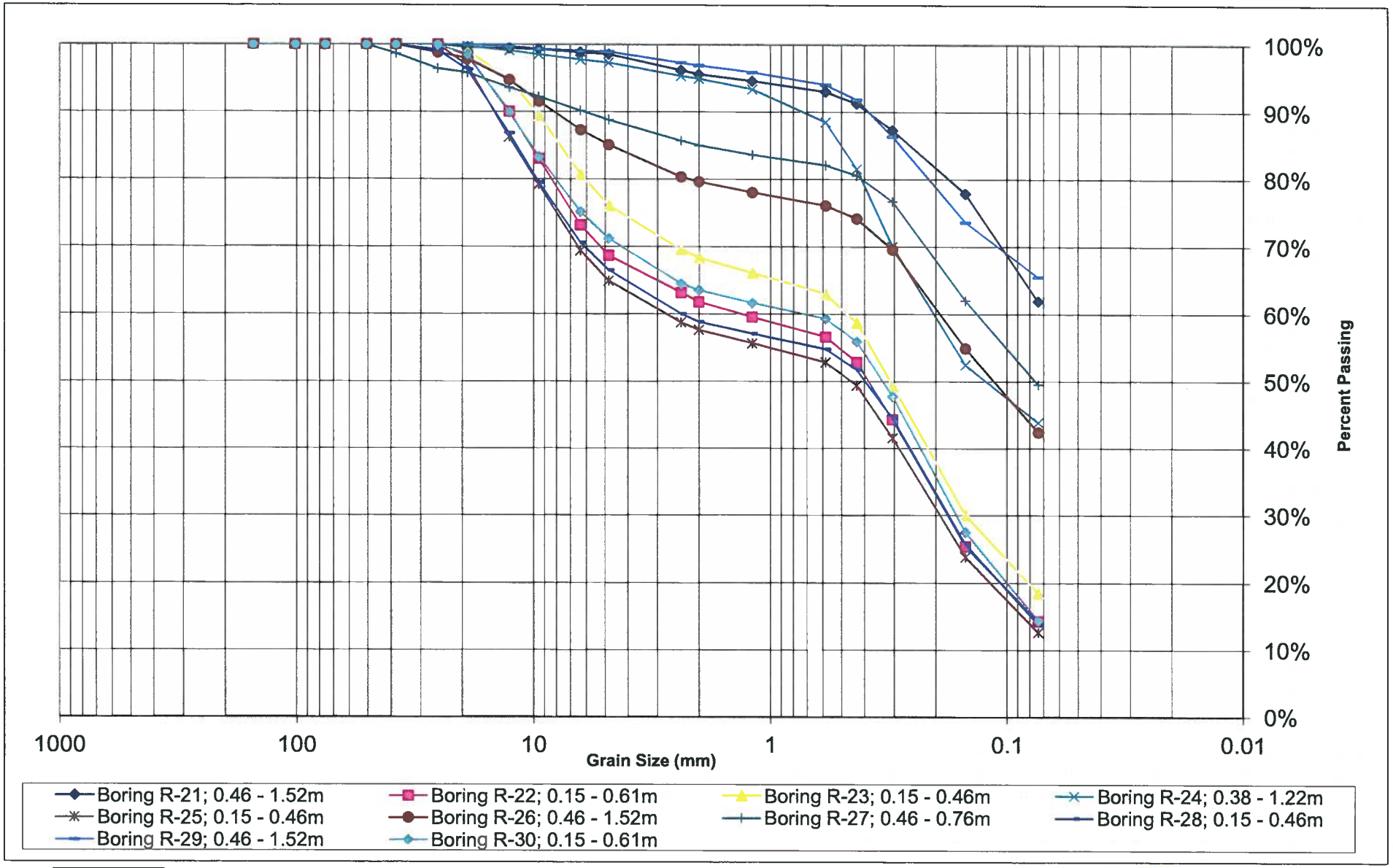
MECHANICAL SIEVE ANALYSIS



AASHTO R18

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GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-31; 0.46 - 1.52m	CL	34	20	51	68	85	90	93	94	95	96	97	98	99	100	100	100	100	100	100	100	100	59
Boring R-32; 0.15 - 0.46m	SM	NV	NP	13	22	36	42	46	53	60	63	77	84	93	96	99	100	100	100	100	100	100	60
Boring R-33; 0.61 - 1.52m	CH	50	32	68	78	89	93	95	96	97	97	98	99	99	100	100	100	100	100	100	100	100	64
Boring R-34; 0.15 - 0.46m	SM	NV	NP	14	25	44	52	56	58	60	61	66	70	77	84	93	97	99	100	100	100	100	65
Boring R-35; 0.15 - 0.46m	SM	NV	NP	16	28	49	58	62	64	66	67	74	78	86	92	98	99	100	100	100	100	100	67
Boring R-36; 0.15 - 1.22m	SM	NV	NP	18	27	41	48	52	57	61	63	73	80	90	94	99	100	100	100	100	100	100	69
Boring R-37; 0.46 - 1.52m	CL	41	29	55	64	78	85	88	90	91	92	94	94	95	97	98	99	99	100	100	100	100	72
Boring R-38; 0.15 - 0.46m	SM	NV	NP	13	26	46	54	57	59	61	61	67	70	79	86	97	99	100	100	100	100	100	73
Boring R-39; 0.46 - 1.52m	SC	27	12	34	46	66	74	76	78	79	80	84	86	90	94	98	100	100	100	100	100	100	77
Boring R-40; 0.15 - 0.53m	SM	NV	NP	14	25	43	51	55	57	59	60	64	68	76	84	95	100	100	100	100	100	100	78

AAP AASHTO R18

REVIEWED BY _____

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
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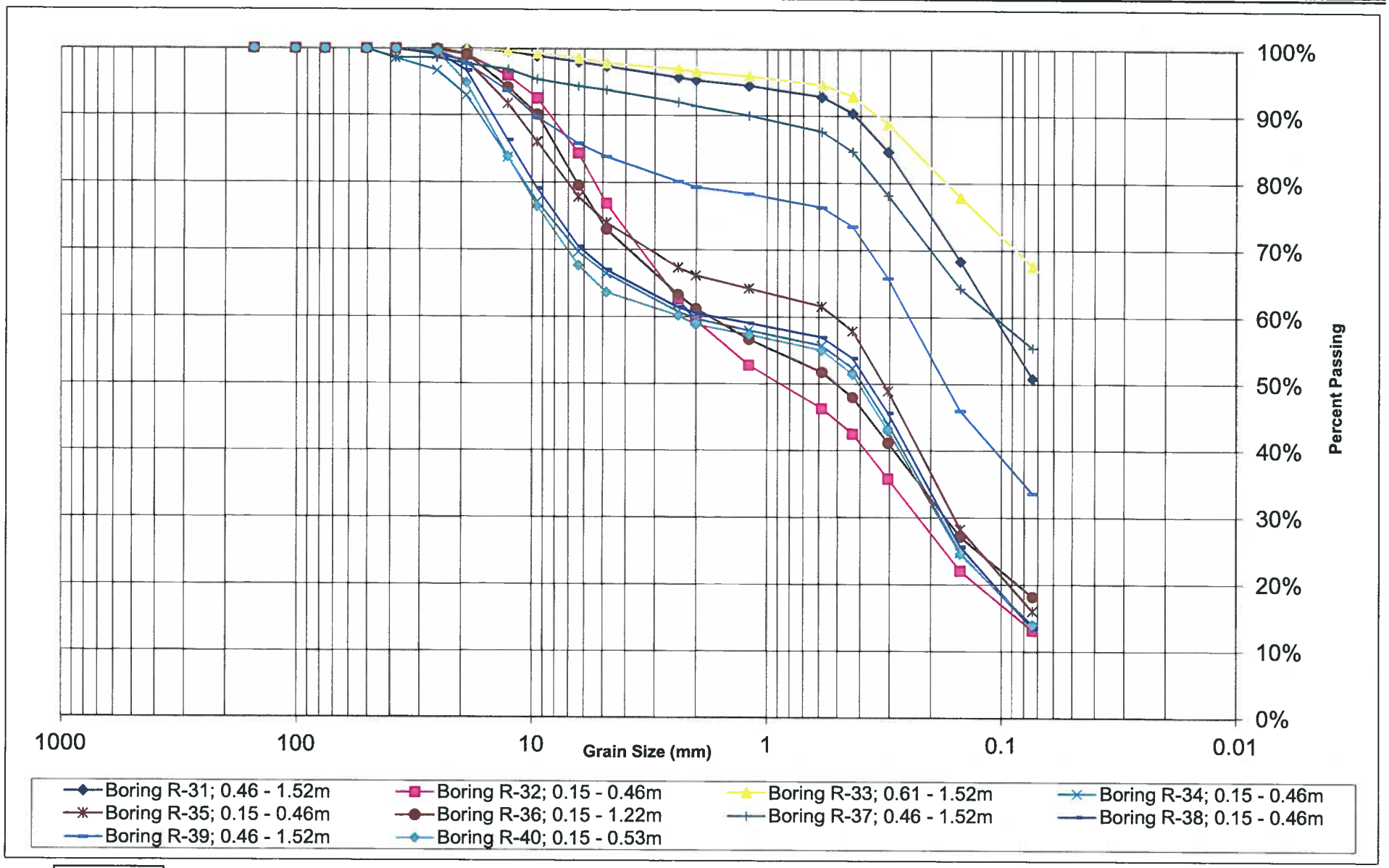

AASHTO R18

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SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #
PERCENT PASSING BY WEIGHT																							
Boring R-41; 0.15 - 0.46m	SP-SM	NV	NP	12	20	32	38	42	48	54	57	73	79	88	93	98	100	100	100	100	100	100	80
Boring R-42; 0.46 - 1.07m	SM	NV	NP	20	27	47	63	71	76	77	78	82	85	90	93	98	99	100	100	100	100	100	84
Boring R-43; 0.15 - 0.46m	SM	NV	NP	12	20	35	43	46	49	51	52	60	64	75	85	97	100	100	100	100	100	100	86
Boring R-44; 0.46 - 1.22m	SC	23	9	30	40	61	68	71	73	75	76	81	84	88	91	96	99	100	100	100	100	100	90
Boring R-45; 0.15 - 0.46m	SM	NV	NP	13	21	35	42	46	49	51	53	61	66	76	85	97	100	100	100	100	100	100	92
Boring R-46; 0.15 - 0.61m	SM	NV	NP	14	23	39	47	51	54	57	58	67	72	82	90	98	100	100	100	100	100	100	95
Boring R-47; 0.46 - 0.91m	SC	28	13	48	59	74	80	83	86	89	90	94	95	97	98	99	100	100	100	100	100	100	99
Boring R-48; 0.15 - 0.46m	SP-SM	NV	NP	11	18	32	39	43	46	49	51	57	63	75	85	98	100	100	100	100	100	100	101
Boring R-49; 0.46 - 1.52m	CL	38	18	62	67	75	78	81	86	89	90	96	97	98	99	99	100	100	100	100	100	100	106
Boring R-50; 0.15 - 0.46m	SM	NV	NP	12	21	35	42	46	48	51	52	59	64	74	84	96	100	100	100	100	100	100	107

AASHTO R18

REVIEWED BY

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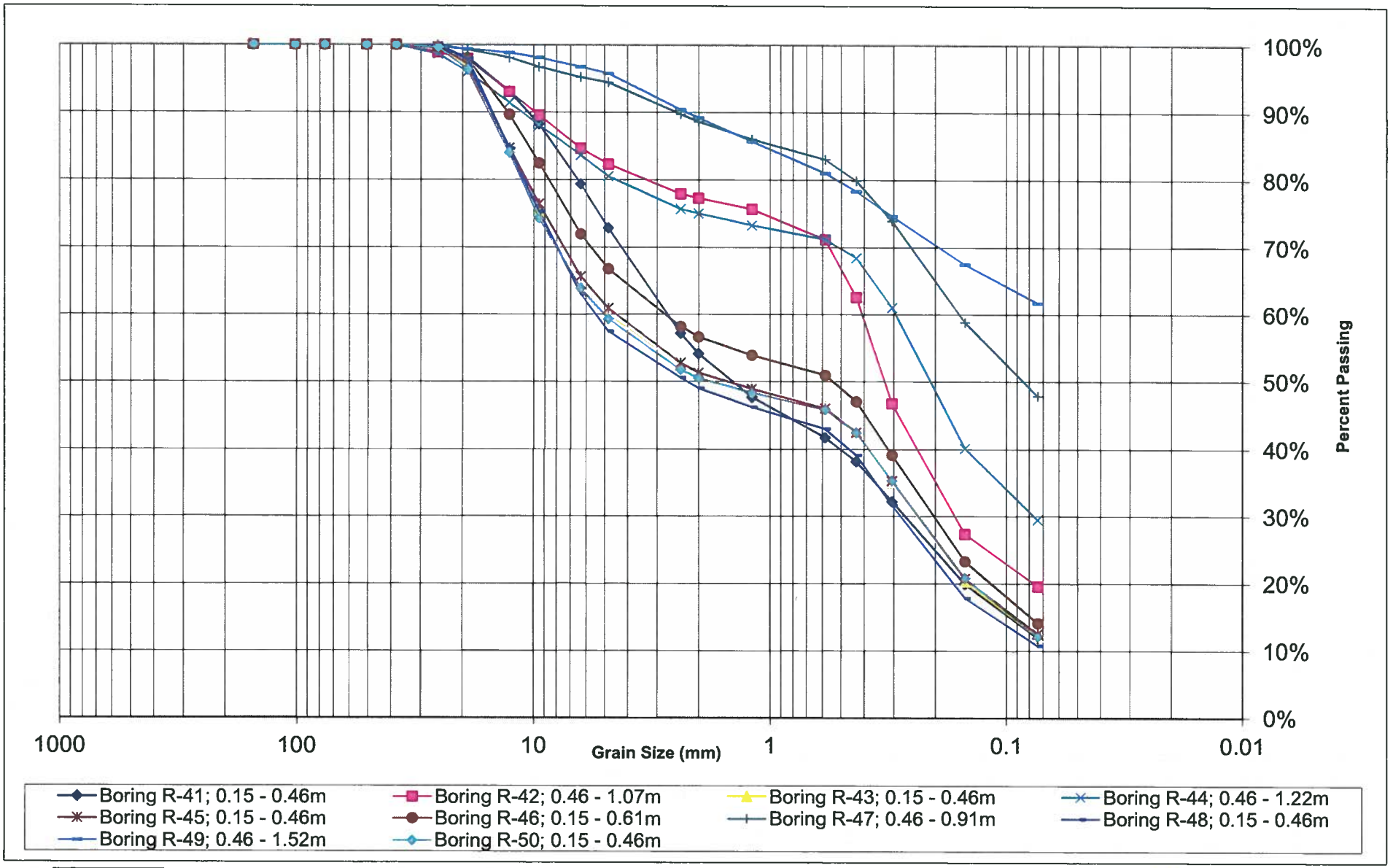
MECHANICAL SIEVE ANALYSIS



AASHTO R18

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SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #
PERCENT PASSING BY WEIGHT																							
Boring R-51; 0.15 - 0.46m	SP-SM	NV	NP	12	21	35	43	46	49	52	54	61	66	77	86	97	100	100	100	100	100	100	110
Boring R-52; 0.15 - 0.46m	SM	NV	NP	13	21	35	42	45	48	51	52	61	66	77	86	97	99	100	100	100	100	100	113
Boring R-53; 0.46 - 0.91m	SC-SM	21	7	34	48	69	77	81	83	85	85	89	91	94	96	98	99	100	100	100	100	100	117
Boring R-54; 0.15 - 0.46m	SM	NV	NP	15	25	41	48	52	54	56	58	64	68	78	85	95	98	100	100	100	100	100	122
Boring R-55; 0.46 - 0.91m	SM	NV	NP	30	53	82	90	94	96	97	97	98	99	100	100	100	100	100	100	100	100	100	126
Boring R-56; 0.46 - 1.07m	CL	31	18	59	69	81	86	88	91	93	93	96	97	98	99	100	100	100	100	100	100	100	129
Boring R-57; 0.15 - 0.61m	SM	NV	NP	14	23	39	47	51	54	57	58	65	69	79	86	95	98	100	100	100	100	100	131
Boring R-58; 0.15 - 0.46m	SM	NV	NP	12	22	36	43	47	49	52	53	60	64	73	81	91	96	99	100	100	100	100	133
Boring R-59; 0.46 - 1.52m	CL	29	12	57	70	80	84	86	88	89	90	94	95	97	98	100	100	100	100	100	100	100	137
Boring R-60; 0.15 - 0.46m	SM	NV	NP	14	24	41	49	53	55	57	57	64	68	77	84	95	98	100	100	100	100	100	138

AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
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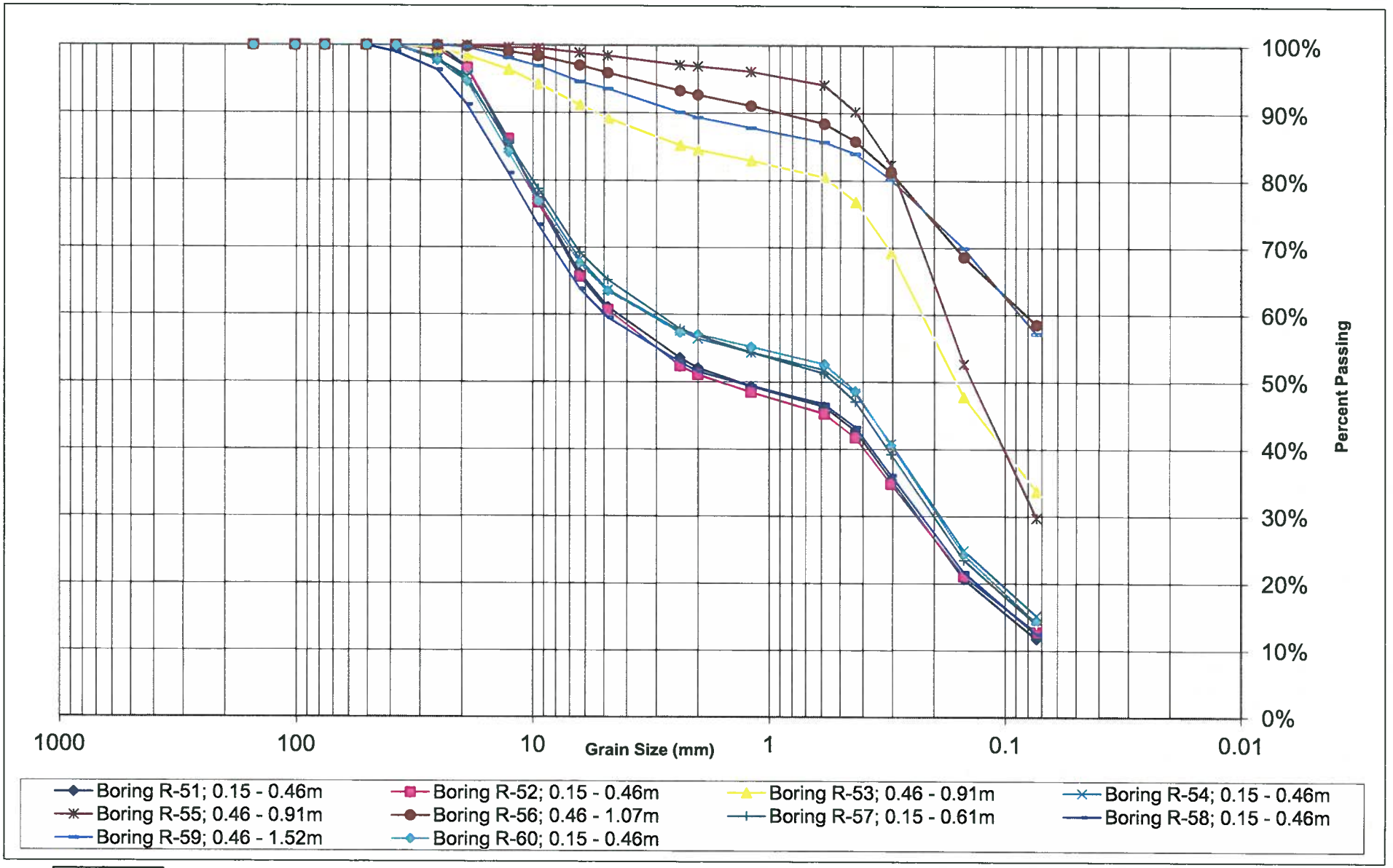

AASHTO R18

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SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

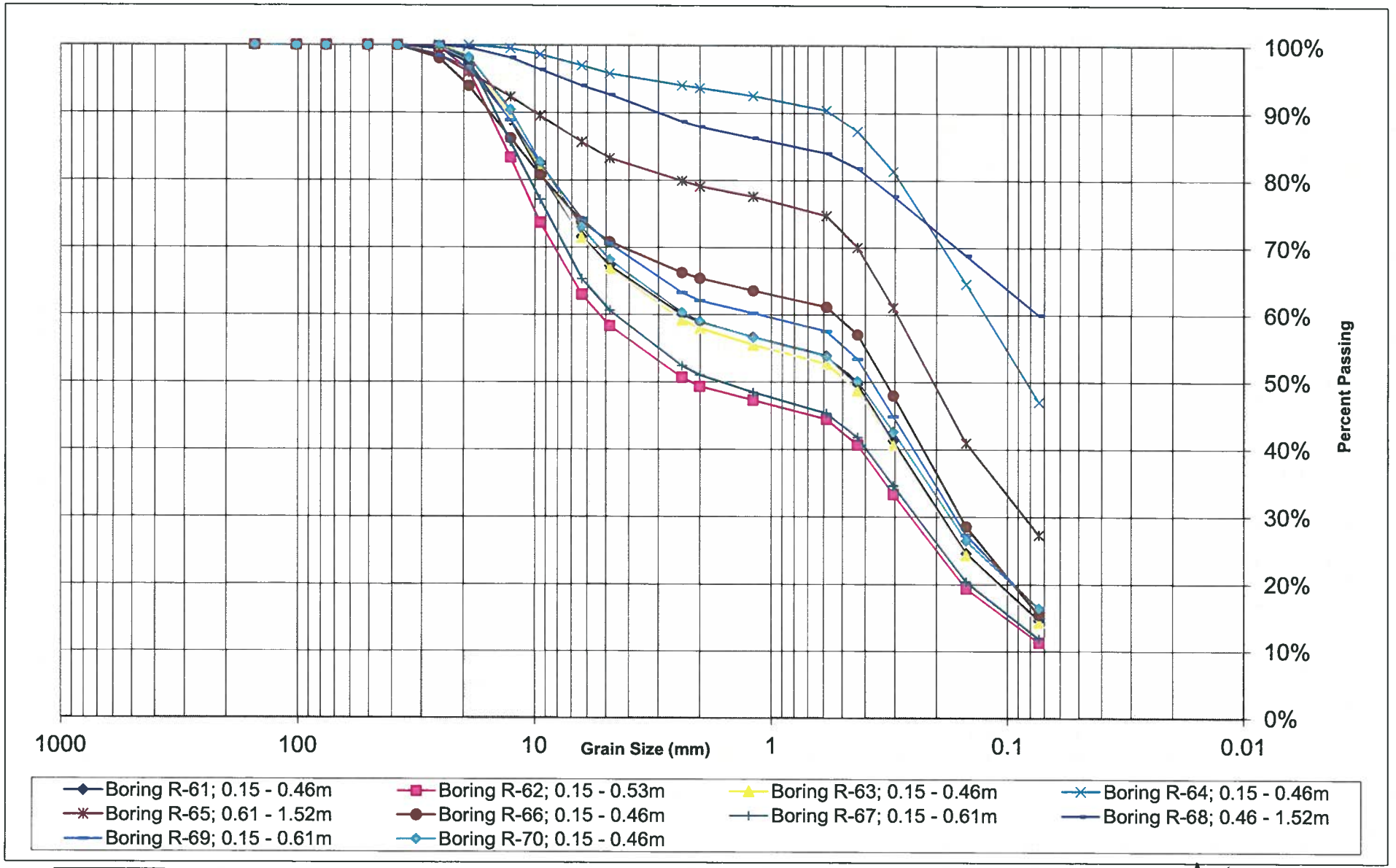
Boring R-61; 0.15 - 0.46m	SM	NV	NP	15	25	41	50	54	57	59	60	67	72	81	89	97	99	100	100	100	100	100	140
Boring R-62; 0.15 - 0.53m	SP-SM	NV	NP	11	19	33	41	45	47	49	51	58	63	74	83	96	100	100	100	100	100	100	142
Boring R-63; 0.15 - 0.46m	SM	NV	NP	14	24	41	49	53	56	58	59	67	72	82	89	99	100	100	100	100	100	100	144
Boring R-64; 0.15 - 0.46m	SM	18	3	47	65	81	87	90	93	94	94	96	97	99	100	100	100	100	100	100	100	100	146
Boring R-65; 0.61 - 1.52m	SM	NV	NP	27	41	61	70	75	78	79	80	83	86	90	92	96	99	100	100	100	100	100	149
Boring R-66; 0.15 - 0.46m	SM	NV	NP	15	29	48	57	61	64	65	66	71	74	81	86	94	98	100	100	100	100	100	150
Boring R-67; 0.15 - 0.61m	SP-SM	NV	NP	12	20	35	42	45	49	51	52	61	65	77	86	98	100	100	100	100	100	100	152
Boring R-68; 0.46 - 1.52m	CL	25	9	60	69	78	82	84	86	88	89	93	94	96	98	100	100	100	100	100	100	100	155
Boring R-69; 0.15 - 0.61m	SM	NV	NP	16	27	45	53	58	60	62	63	70	74	82	89	97	98	100	100	100	100	100	156
Boring R-70; 0.15 - 0.46m	SM	NV	NP	16	27	43	50	54	57	59	60	68	73	83	91	98	100	100	100	100	100	100	158

AAP AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

MECHANICAL SIEVE ANALYSIS



AASHTO R18

REVIEWED BY

PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

Liquid Limit, Plastic Limit & Plasticity Index (AASHTO T89-10 & T90-00)
Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-71; 0.15 - 0.53m	SM	NV	NP	14	21	32	37	40	46	51	53	60	65	75	84	97	100	100	100	100	100	100	161
Boring R-72; 0.46 - 1.07m	CL	26	8	71	83	89	92	94	96	98	99	100	100	100	100	100	100	100	100	100	100	100	165
Boring R-73; 0.15 - 0.46m	SM	NV	NP	16	25	37	43	48	53	57	59	67	71	80	87	97	100	100	100	100	100	100	167
Boring R-74; 0.15 - 1.52m	SC-SM	22	6	42	62	82	88	91	93	94	95	96	97	98	99	99	100	100	100	100	100	100	170
Boring R-75; 0.15 - 0.53m	SM	NV	NP	16	25	36	41	45	50	55	56	65	70	81	90	96	99	100	100	100	100	100	171
Boring R-76; 0.15 - 0.46m	SM	NV	NP	18	26	37	43	47	51	53	54	61	65	74	82	93	98	99	100	100	100	100	173
Boring R-77; 0.46 - 1.52m	CL-ML	23	4	58	76	81	84	85	88	89	90	93	94	96	98	99	100	100	100	100	100	100	177
Boring R-78; 0.15 - 0.38m	SM	NV	NP	15	22	33	38	42	46	49	51	58	62	72	80	94	99	100	100	100	100	100	178
Boring R-79; 0.15 - 0.46m	SM	NV	NP	14	21	30	35	39	45	49	51	59	64	75	83	97	100	100	100	100	100	100	180
Boring R-80; 0.46 - 1.22m	SM	NV	NP	28	52	79	89	95	97	98	98	99	99	99	100	100	100	100	100	100	100	100	183

AASHTO R18

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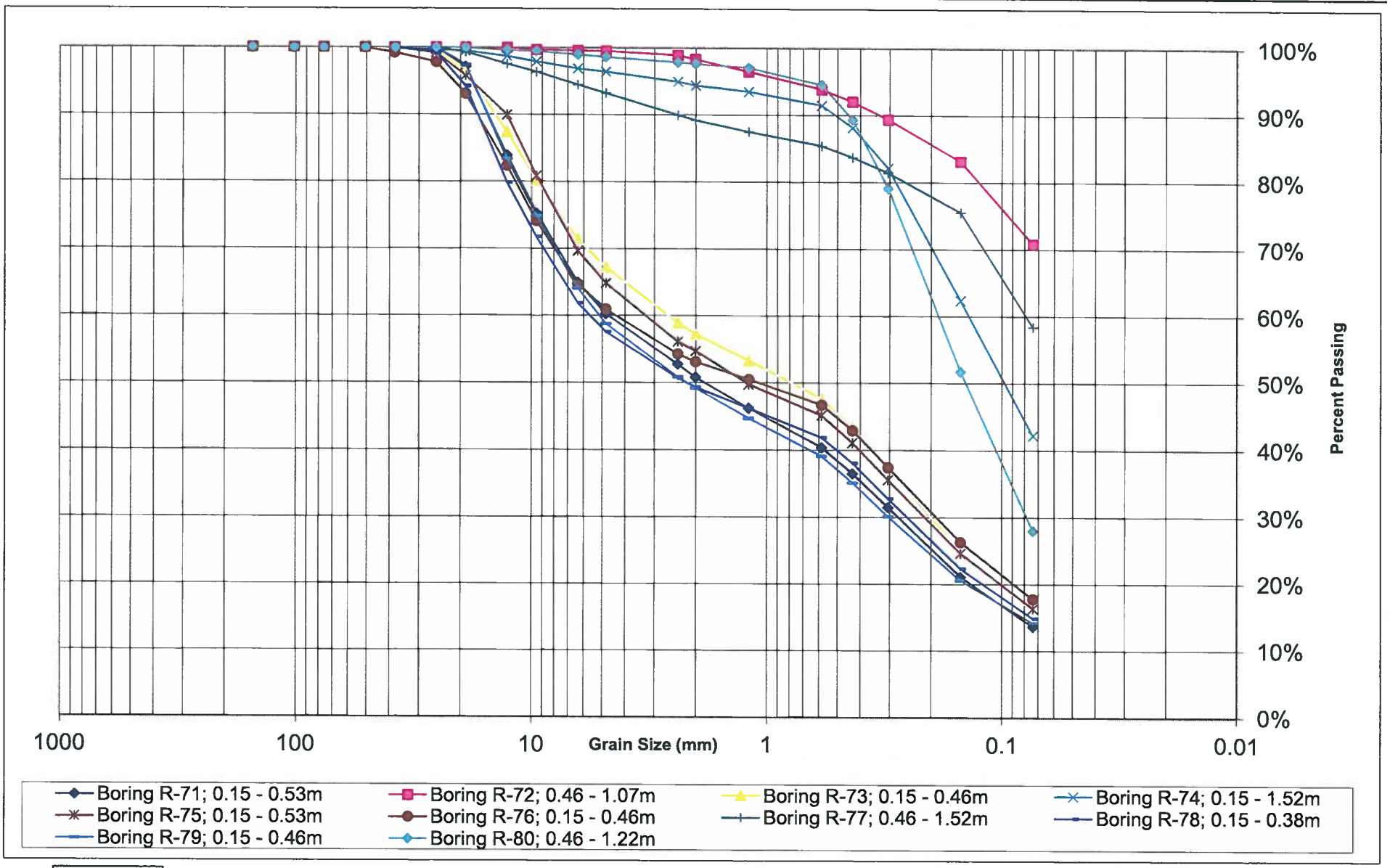
PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

MECHANICAL SIEVE ANALYSIS



AASHTO R18

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PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
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GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-81; 0.15 - 0.46m	SM	NV	NP	17	24	34	39	43	48	52	54	63	68	77	86	96	100	100	100	100	100	100	185
Boring R-82; 0.38 - 1.52m	CL-ML	21	4	59	78	92	95	96	97	98	98	98	99	99	100	100	100	100	100	100	100	100	188
Boring R-83; 0.15 - 0.53m	SM	NV	NP	12	18	28	33	36	42	46	48	57	62	73	82	98	100	100	100	100	100	100	189
Boring R-84; 0.46 - 1.07m	CL-ML	23	7	66	79	88	90	91	93	94	95	97	97	98	99	100	100	100	100	100	100	100	192
Boring R-85; 0.15 - 0.46m	GP-GM	NV	NP	12	17	26	31	34	40	44	46	54	59	70	80	96	100	100	100	100	100	100	194
Boring R-86; 0.46 - 1.52m	CL	30	16	55	62	71	75	78	81	84	85	92	93	95	96	98	98	100	100	100	100	100	198
Boring R-87; 0.15 - 0.46m	SM	NV	NP	13	20	29	34	38	43	48	49	60	64	75	84	97	100	100	100	100	100	100	199
Boring R-88; 0.15 - 0.46m	SM	NV	NP	15	23	33	38	42	46	50	51	58	63	74	83	97	99	100	100	100	100	100	201
Boring R-89; 0.46 - 1.22m	SM	NV	NP	38	54	71	78	83	86	88	89	91	92	95	97	99	100	100	100	100	100	100	204
Boring R-90; 0.46 - 1.52m	SC-SM	22	5	44	65	83	89	92	94	95	96	97	97	98	99	100	100	100	100	100	100	100	207

AASHTO R18

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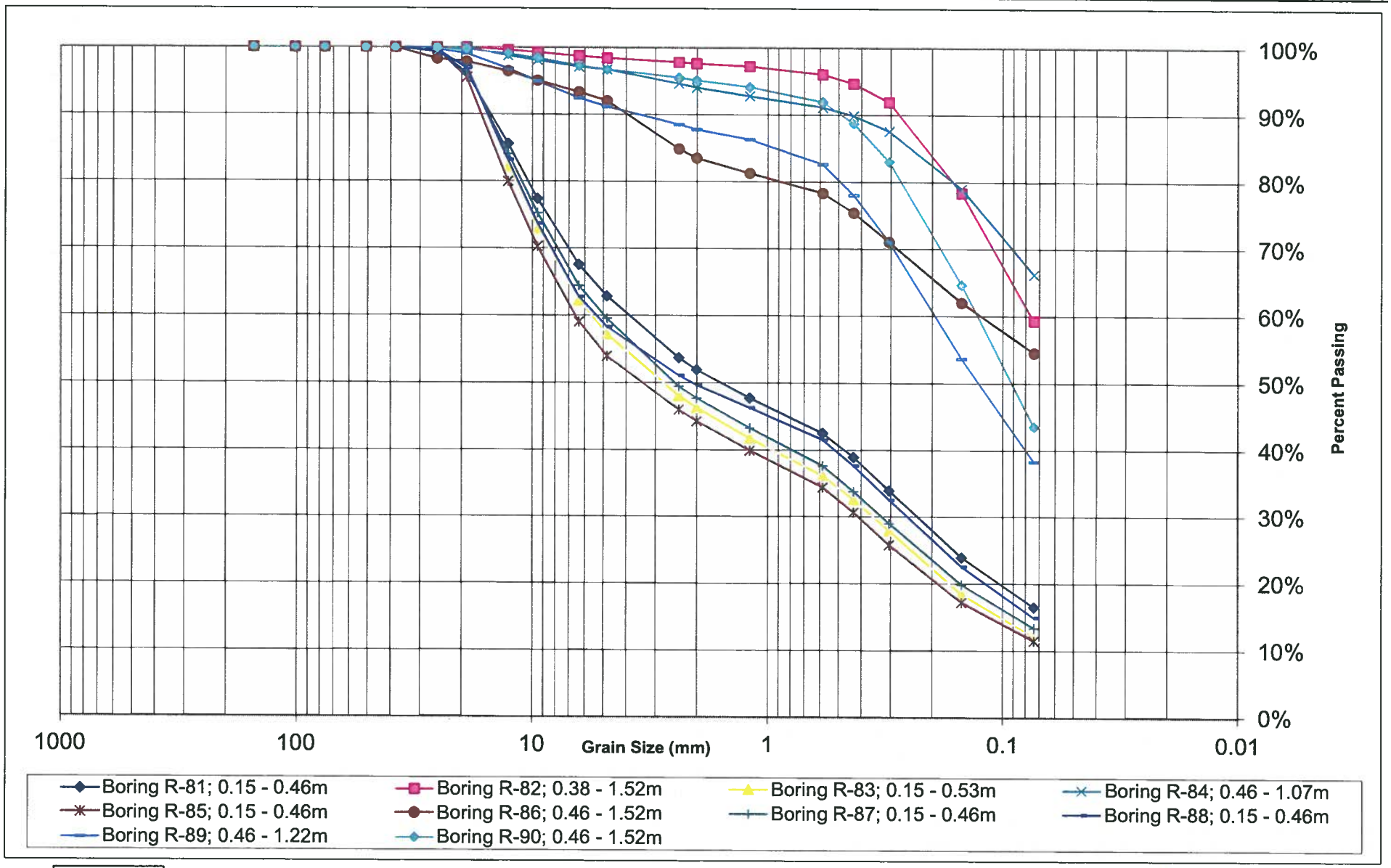
PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/16/13

MECHANICAL SIEVE ANALYSIS



AASHTO R18

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LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	1
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GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #
PERCENT PASSING BY WEIGHT																							
Boring R-91; 0.15 - 0.53m	GM	NV	NP	13	20	29	33	36	39	41	42	49	55	67	79	94	99	100	100	100	100	100	208
Boring R-92; 0.46 - 1.52m	SC	26	11	49	59	67	70	73	76	79	80	84	87	92	94	98	100	100	100	100	100	100	211
Boring R-93; 0.15 - 0.46m	SM	NV	NP	18	24	34	38	42	47	51	53	61	65	74	82	94	98	99	100	100	100	100	212
Boring R-94; 0.15 - 0.46m	SP-SM	NV	NP	9.9	17	27	32	37	43	47	49	58	62	72	81	96	100	100	100	100	100	100	215
Boring R-95; 0.30 - 1.52m	CL	26	8	73	77	80	81	83	86	89	90	96	96	98	99	100	100	100	100	100	100	100	219
Boring R-96; 0.15 - 0.46m	SM	NV	NP	13	20	29	34	38	44	48	50	59	64	74	82	95	100	100	100	100	100	100	220
Boring R-97; 0.15 - 0.46m	GP-GM	NV	NP	11	17	26	30	34	39	42	44	52	56	67	76	92	98	99	100	100	100	100	222
Boring R-98; 0.53 - 1.52m	CL	28	13	57	62	67	70	72	78	83	85	91	93	96	97	99	100	100	100	100	100	100	226
Boring R-99; 0.46 - 1.07m	SC	25	12	49	60	71	76	79	85	88	89	93	95	98	99	100	100	100	100	100	100	100	228
Boring R-100; 0.15 - 0.53m	GP-GM	NV	NP	9.1	15	25	29	33	39	44	46	55	59	69	77	94	99	99	100	100	100	100	230

AASHTO R18

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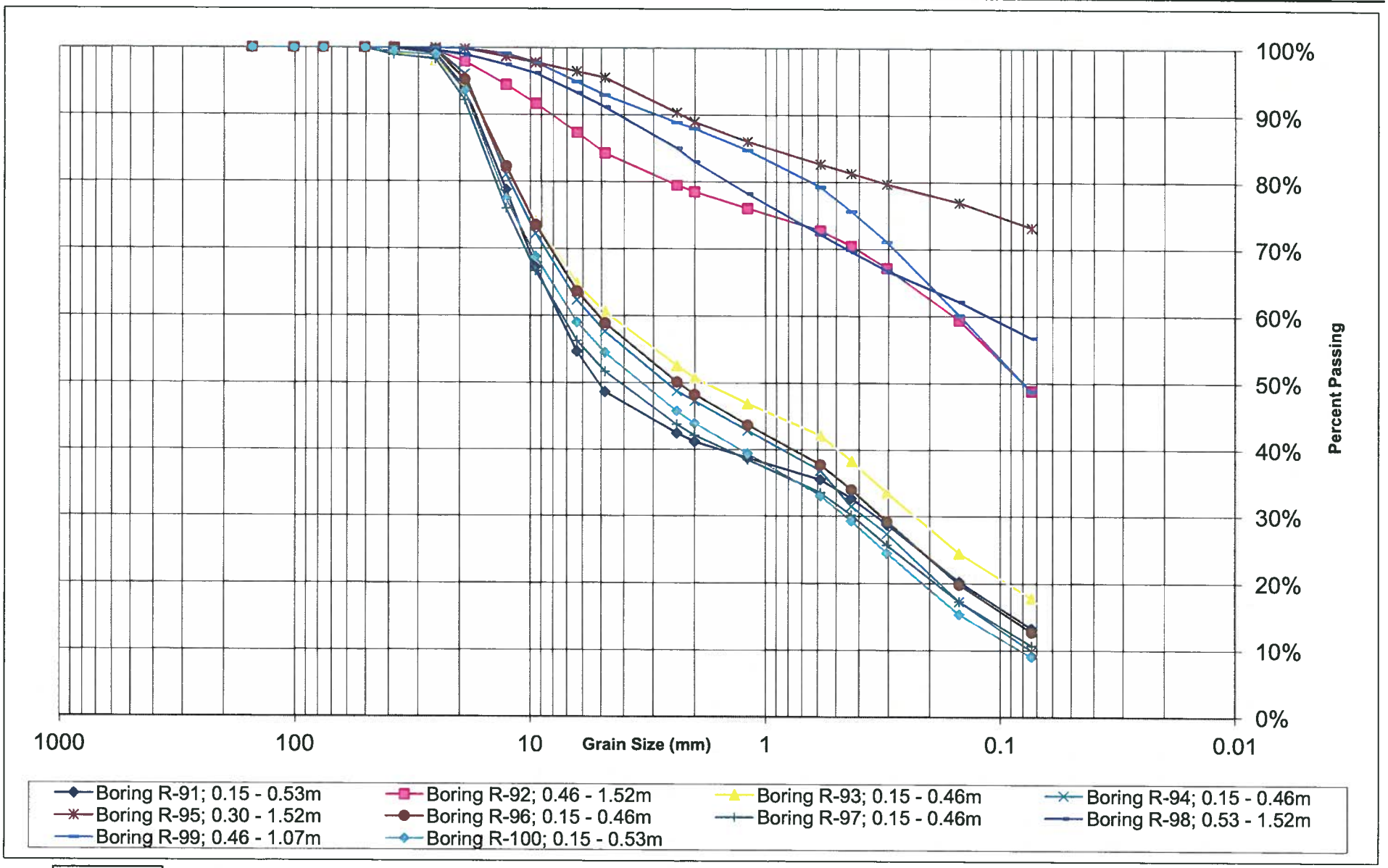

AASHTO R18

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LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	2
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/26/13

Liquid Limit, Plastic Limit & Plasticity Index (AASHTO T89-10 & T90-00)
Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-101; 0.38 - 1.52m	CL	36	22	59	65	70	73	75	80	84	85	92	94	96	98	99	100	100	100	100	100	100	232
Boring R-102; 0.15 - 0.61m	SM	NV	NP	13	22	34	39	43	50	54	55	61	65	73	80	94	98	100	100	100	100	100	233
Boring R-103; 0.46 - 1.52m	CL	34	19	60	66	71	74	76	81	85	87	92	94	97	98	100	100	100	100	100	100	100	235
Boring R-104; 0.46 - 1.52m	CL	36	19	61	66	71	73	75	80	85	87	94	96	99	99	100	100	100	100	100	100	100	236
Boring R-105; 0.38 - 1.22m	CL	26	12	71	74	78	80	83	87	90	91	95	96	98	99	99	100	100	100	100	100	100	237
Boring R-106; 0.15 - 0.46m	SM	NV	NP	14	24	37	44	49	55	60	62	69	72	80	86	96	99	100	100	100	100	100	238
Boring R-107; 0.46 - 1.52m	CL	29	15	52	60	67	70	73	78	82	84	90	92	95	97	99	100	100	100	100	100	100	240
Boring R-108; 0.15 - 0.53m	SM	NV	NP	14	22	33	38	42	48	52	54	62	66	75	83	96	99	100	100	100	100	100	241
Boring R-109; 0.30 - 1.52m	CL	27	12	52	58	65	69	72	77	80	82	88	90	93	95	98	99	100	100	100	100	100	243
Boring R-110; 0.38 - 1.52m	SC	31	16	49	56	63	67	71	78	84	86	91	93	96	98	100	100	100	100	100	100	100	244

AAP AASHTO R18

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LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	2
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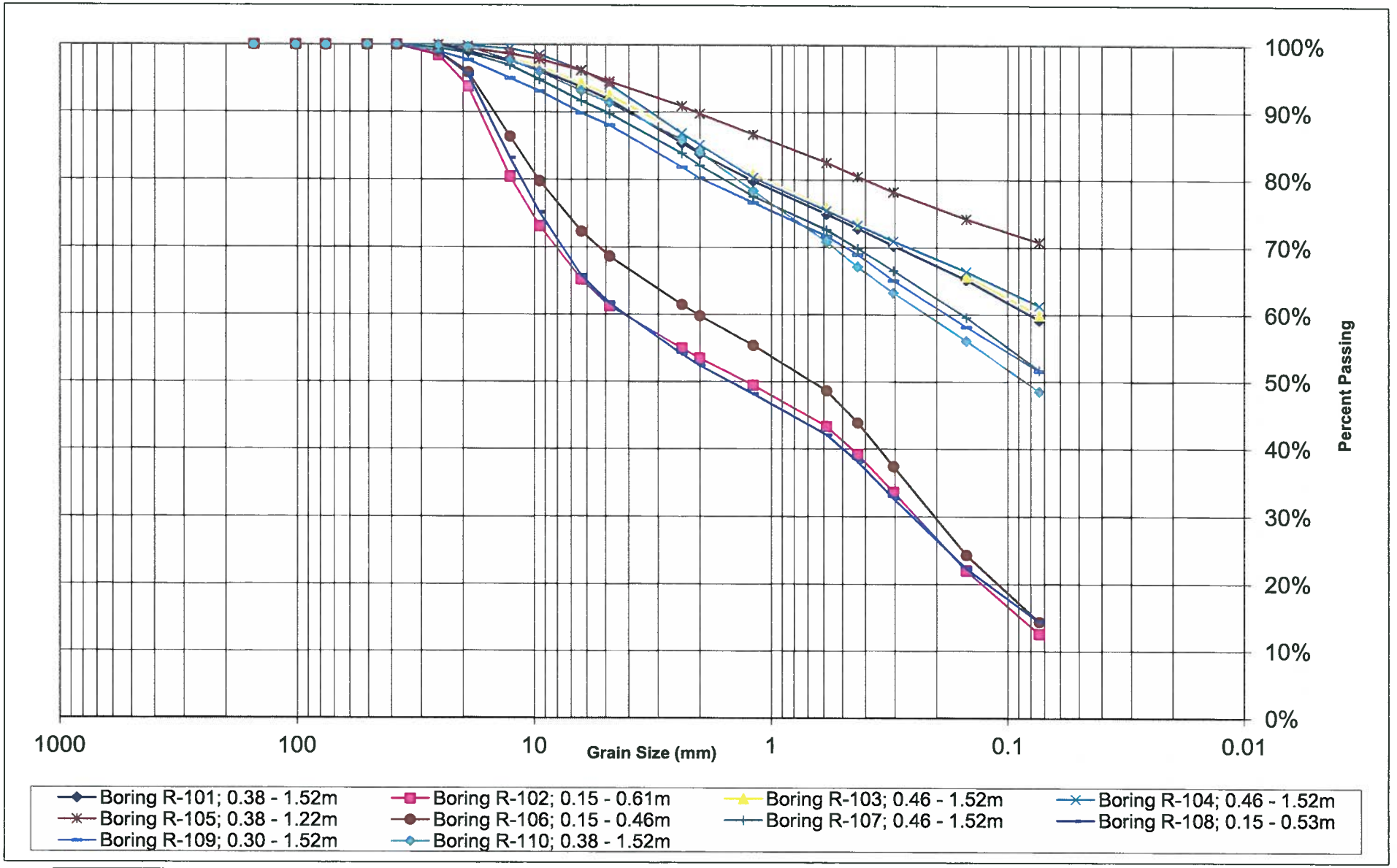
MECHANICAL SIEVE ANALYSIS



AASHTO R18

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GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-111; 0.15 - 0.46m	SM	NV	NP	13	22	32	38	42	47	52	54	61	65	74	82	95	98	100	100	100	100	100	245
Boring R-112; 0.15 - 0.46m	CL	30	13	60	66	72	74	76	80	84	86	91	93	96	97	100	100	100	100	100	100	100	333
Boring R-113; 0.46 - 1.52m	CL	31	16	62	67	72	74	76	80	85	86	92	94	97	98	99	99	100	100	100	100	100	335
Boring R-114; 0.46 - 0.91m	SC	25	11	47	54	61	65	67	72	76	78	83	87	93	96	100	100	100	100	100	100	100	337
Boring R-115; 0.46 - 1.52m	CL	33	19	72	77	82	84	86	89	90	91	94	95	96	97	98	99	100	100	100	100	100	338
Boring R-116; 0.53 - 1.52m	SC	24	9	25	29	34	37	40	47	55	58	72	79	89	94	99	100	100	100	100	100	100	339
Boring R-117; 0.46 - 1.52m	SC	24	10	50	55	59	62	64	69	74	77	87	90	94	97	99	99	100	100	100	100	100	340
Boring R-118; 0.15 - 0.53m	SM	NV	NP	17	29	43	50	54	60	63	65	72	75	82	87	96	99	100	100	100	100	100	341
Boring R-119; 0.53 - 1.52m	GC	22	8	17	21	26	29	31	36	41	43	52	58	68	77	91	97	100	100	100	100	100	343
Boring R-120; 0.15 - 0.53m	SP-SM	NV	NP	12	21	33	38	43	49	54	56	64	68	76	82	90	93	95	95	100	100	100	344

AASHTO R18

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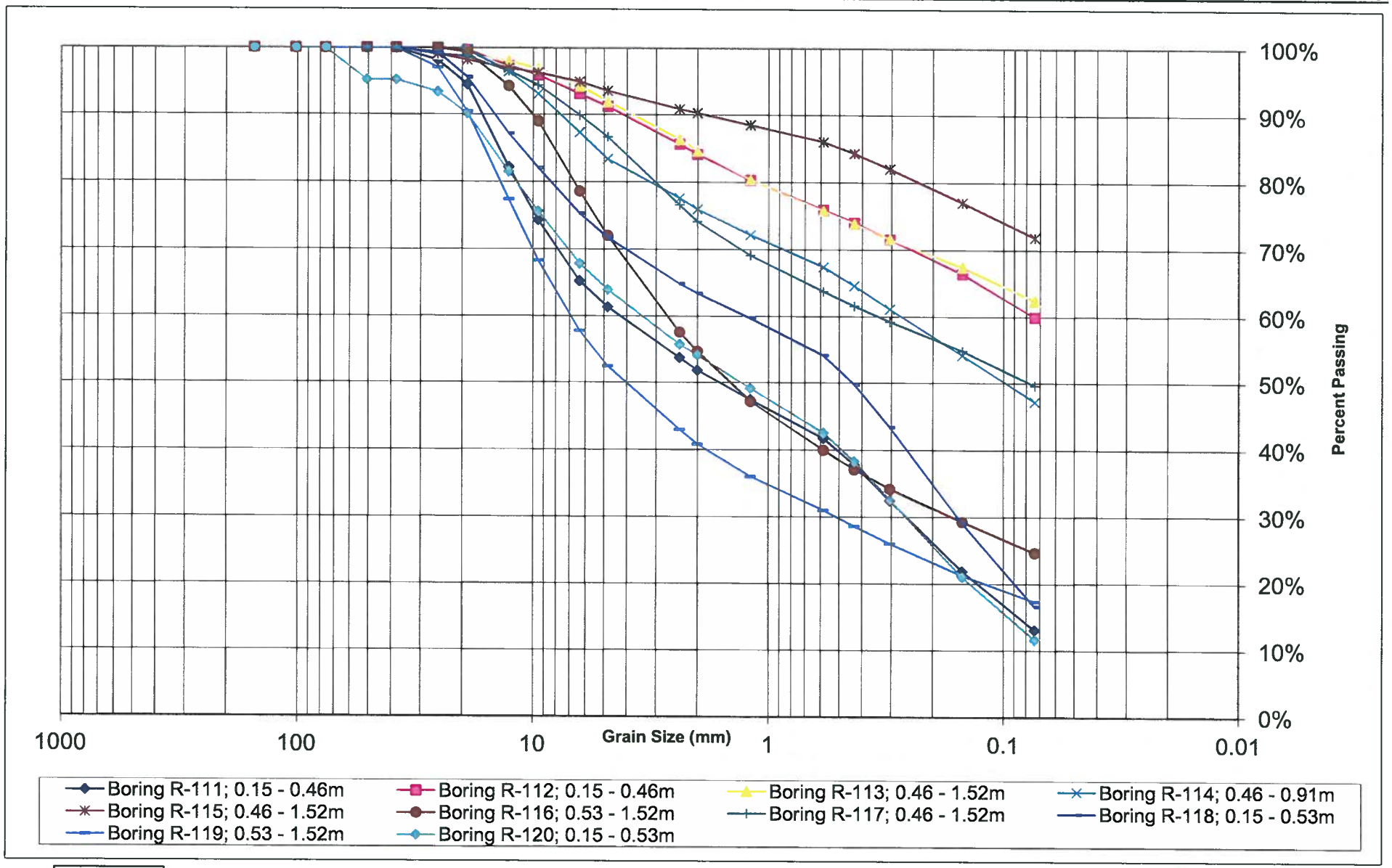

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SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-121; 0.46 - 1.52m	SC	26	12	32	37	43	46	50	57	63	65	76	81	89	93	98	99	100	100	100	100	100	346
Boring R-122; 0.15 - 0.53m	SM	NV	NP	13	22	33	39	43	50	54	56	63	68	76	82	93	96	100	100	100	100	100	347
Boring R-123; 0.38 - 1.22m	CL	24	11	56	73	81	83	85	88	90	91	94	95	97	98	98	100	100	100	100	100	100	349
Boring R-124; 0.15 - 0.46m	GM	NV	NP	12	20	28	32	35	40	43	44	49	54	65	72	83	91	96	100	100	100	100	350
Boring R-125; 0.30 - 1.52m	SC-SM	25	7	50	80	89	91	92	94	95	95	96	97	98	99	100	100	100	100	100	100	100	352
Boring R-126; 0.30 - 1.52m	CL	36	20	53	62	71	76	79	84	86	87	91	92	94	96	97	98	100	100	100	100	100	353
Boring R-127; 0.15 - 0.46m	SP-SM	NV	NP	11	20	32	38	43	50	55	56	64	68	77	84	96	99	99	100	100	100	100	354
Boring R-128; 0.30 - 1.52m	SM	NV	NP	33	67	79	83	86	90	93	93	96	97	98	99	100	100	100	100	100	100	100	356
Boring R-129; 0.15 - 0.46m	SM	NV	NP	13	22	37	44	50	58	63	65	71	74	80	85	90	91	94	94	100	100	100	357
Boring R-130; 0.38 - 1.52m	CL	26	9	52	63	73	78	82	88	90	91	94	95	97	98	99	99	99	100	100	100	100	359

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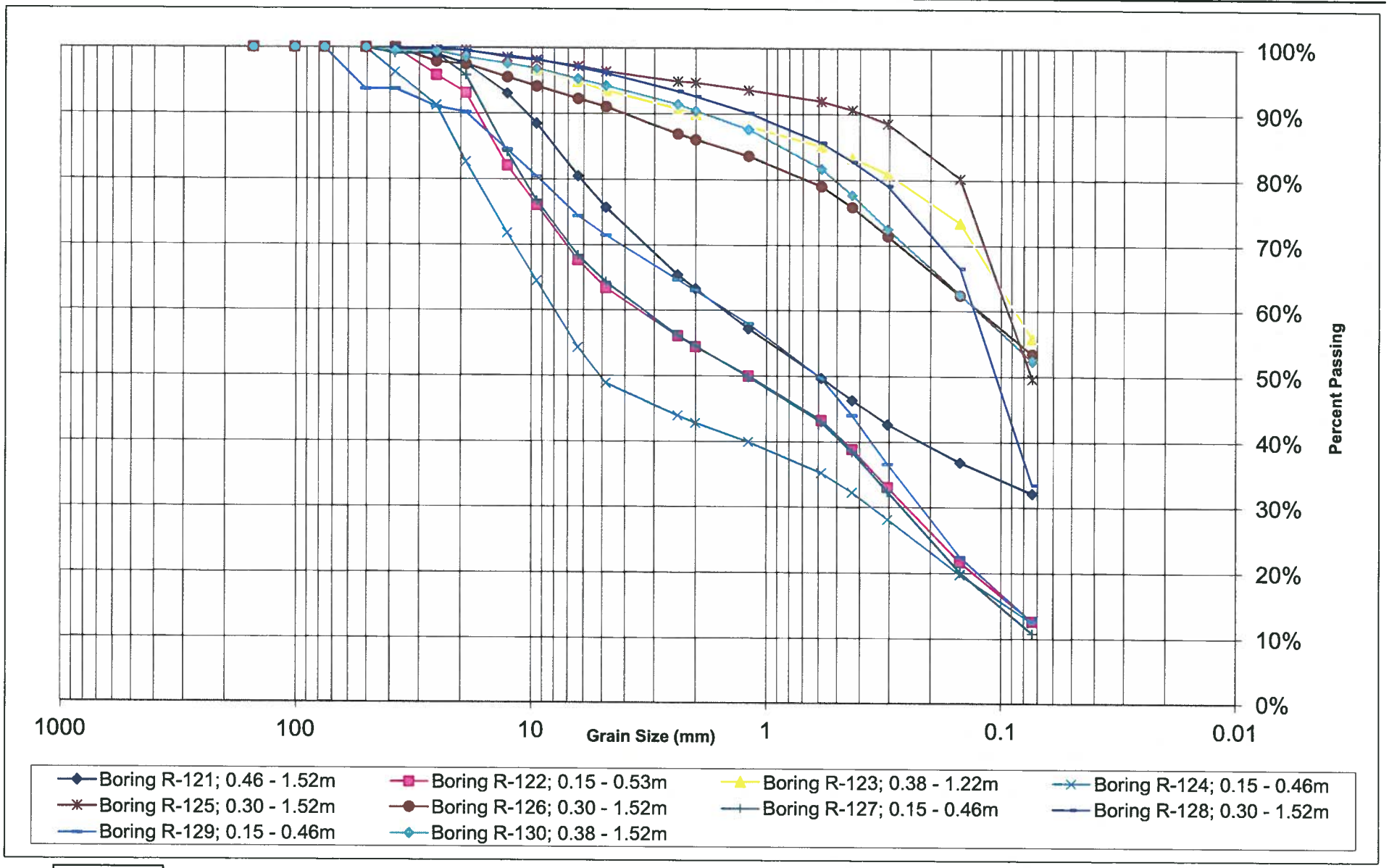

AASHTO R18

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PROJECT:	BIA Project N12 (12-2)(19-2)2&4	**JOB NO:**	1720134030.0001
LOCATION:	Navajo, NM to N64 Junction, AZ (near Tsaile, AZ)	**WORK ORDER NO:**	2
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	9/26/13

Liquid Limit, Plastic Limit & Plasticity Index (AASHTO T89-10 & T90-00)
Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27-11 & T11-05)
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	75um	150um	300um	425um	600um	1.18um	2.00mm	2.36mm	4.75mm	6.3mm	9.5mm	12.5mm	19mm	25mm	31.2mm	37.5mm	50mm	75mm	152mm	Lab #

PERCENT PASSING BY WEIGHT

Boring R-131; 0.15 - 0.46m	SM	NV	NP	12	24	38	45	51	59	63	65	71	74	80	85	95	98	100	100	100	100	100	360
Boring R-132; 0.30 - 1.52m	CL	29	14	57	64	71	74	77	82	85	86	89	92	95	97	100	100	100	100	100	100	100	362
Boring R-133; 0.15 - 0.46m	SP-SM	NV	NP	10	19	30	36	40	46	50	52	60	64	73	81	94	97	97	99	100	100	100	363
Boring R-134; 0.30 - 1.52m	SC	28	14	38	43	49	53	55	62	69	71	81	86	92	96	99	100	100	100	100	100	100	365
Boring R-135; 0.15 - 0.53m	SP-SM	NV	NP	12	24	38	44	49	55	60	61	67	70	77	83	92	95	98	100	100	100	100	366
Boring R-136; 0.46 - 1.52m	CL	28	13	54	64	72	75	78	83	86	87	91	93	95	97	99	99	100	100	100	100	100	368
Boring R-137; 0.08 - 0.61m	SM	NV	NP	18	26	33	38	41	47	51	53	60	64	72	79	91	98	100	100	100	100	100	369
Boring R-138; 0.30 - 1.52m	SM	NV	NP	19	45	72	81	85	90	92	92	94	95	96	97	98	98	99	100	100	100	100	371

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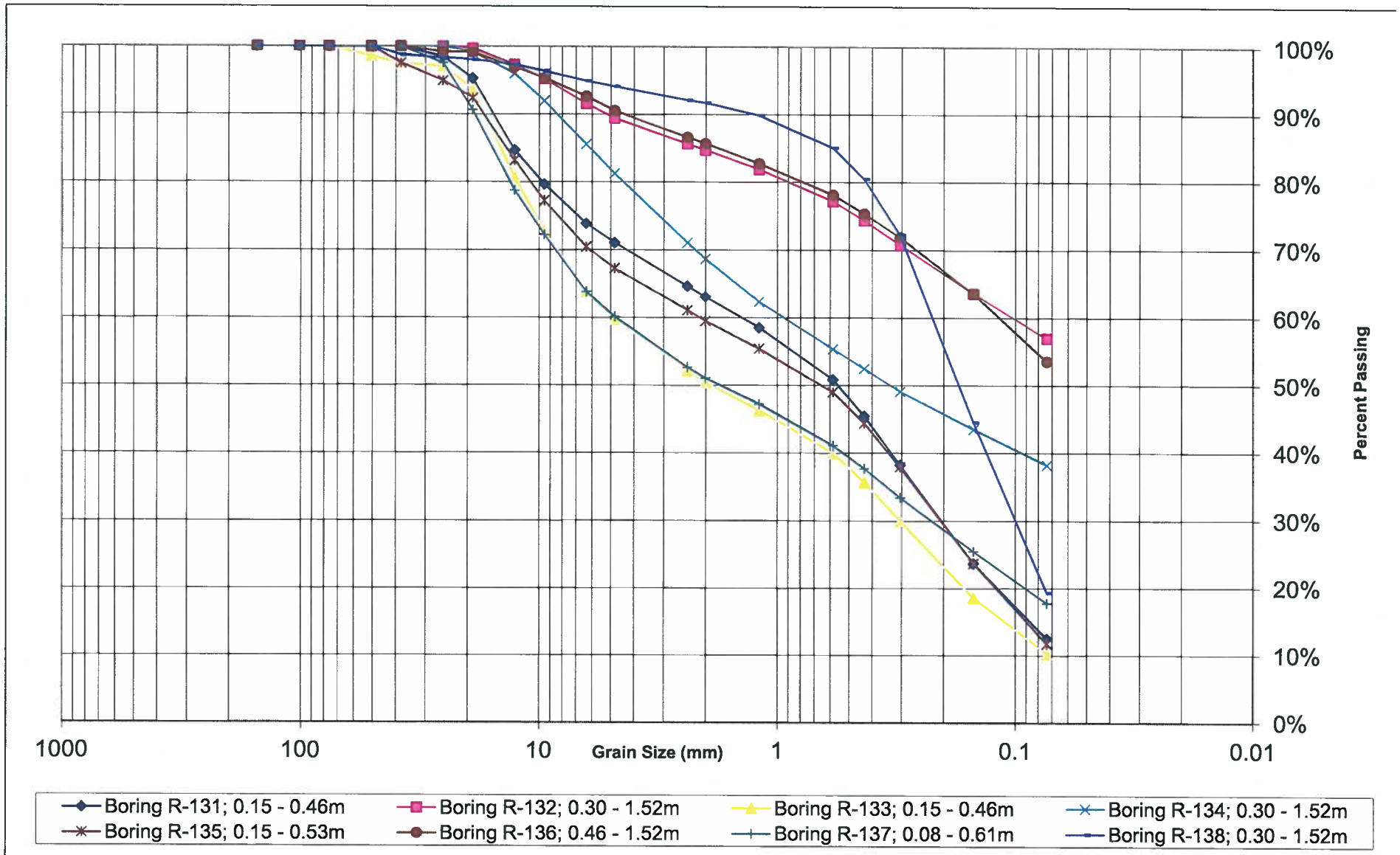
MECHANICAL SIEVE ANALYSIS



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