FINAL GEOTECHNICAL DATA REPORT

AMADOR STREET PAVEMENT REHABILITATION

SAN FRANCISCO, CALIFORNIA

AGS Job No. AGS-15-025

Prepared for:

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS

Prepared by:

AGS

APRIL 2016

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1.0 INTRODUCTION

1.1 GENERAL

This geotechnical data report presents the results of a subsurface exploration for Amador Street in San Francisco, California. This work was performed for the City and County of San Francisco Department of Public Works (SFDPW). The scope of this report is limited to field exploration and laboratory testing for the purpose of providing SFDPW Engineering Services Department geotechnical data for their evaluation and design of pavement repair for this existing road.

The findings presented in this report are based on the subsurface conditions encountered at the locations of the borings excavated for this study, and the results of geotechnical laboratory testing samples obtained from the borings. The findings presented in this report should not be extrapolated to other areas, or used for other facilities and structures without prior review by AGS, Inc. (AGS).

1.2 PROJECT DESCRIPTION

The subject site is an approximately 2,300 foot long section of Amador Street, located from the intersection of Illinois Street and Cargo Way at the western end to Hanson Aggregates at the eastern end. The approximate location of the site is shown on Plate 1. We understand that the existing pavement surface has various degrees of rutting, undulating, and cracking, and the SFDPW is looking at the feasibility of rehabilitations of the road.

1.3 WORK PERFORMED

The work performed by AGS for this project was outlined in AGS' proposal letter dated November 10th, 2015. A brief summary of the completed tasks is outlined below.

1.3.1 Review of Available Data

AGS reviewed the available published geotechnical and geologic data pertaining to the project site and its vicinity. This task included a review of Treadwell and Rollo and Robert Y. Chew Geotechnical (T&R/RYCG) geotechnical investigation report dated July 5th, 2012 for the Pier 94 Backlands Improvements project. The Pier 94 Backlands Improvement project is a larger site that encompasses a portion of Amador Street, our review was limited to the geologic characterization, boring logs, and site history relevant to the subject portion of the roadway.

1.3.2 Utility Clearance

Following an initial site visit to evaluate the project for our proposal, AGS conducted a site visit on December 4th 2015 and January 12th, 2016 to mark prospective boring locations. Each location was marked with white paint, and Underground Service Alert (USA) was notified (Ticket Nos. 0022947 and 0022963).

At the time of our site visit, we observed two excavations made within Amador Street pavement by others for the purpose of utility repair. One excavation pit was located near Illinois Street and another excavation was approximately at the midpoint of Amador Street as shown on Plate 2 – Boring Location Map. We photographed and measured the existing asphalt thickness exposed in the sidewall of these excavation pits.

1.3.3 Field Exploration

AGS conducted a field exploration program consisting of drilling five (5) borings at the approximate borehole locations shown on Plate 2 – Boring Location Map. The purpose of these borings was to sample near surface soils for lab testing and gather data required for pavement design. The borings were drilled on March 17, 2016 using a truck-mounted drill rig to depths ranging from 4 to 5.5 feet below the ground surface (bgs). Following the completion of drilling, each borehole was backfilled with a cement

grout mixture and the pavement surface at the top of boring was patched with rapid setting concrete.

Details of the field exploration program, including the compiled boring logs are presented in Appendix A - Field Exploration and Sampling.

1.3.4 Geotechnical Laboratory Testing

We provided bulk samples from each of the five boreholes to Cooper Testing Laboratory, who conducted R-value testing in accordance with Caltrans Test Methods 301. Test results are presented in Appendix B.

1.3.5 Report Preparation

We prepared this geotechnical data report which includes the following:

- Generalized site and local geologic conditions;
- Description of the subsurface exploration methods;
- Summarize the subsurface and groundwater conditions encountered; and
- Present the results of laboratory testing.

2.0 FINDINGS

2.1 SITE DESCRIPTION AND HISTORY

Amador Street is a public roadway within a parcel that is under the jurisdiction of the Port of San Francisco. The subject street is approximately 2,300 feet long (in the east-west direction) and 40 feet wide two-way street, with one lane in each direction. The site is generally flat along its length, with an average slope gradient of 4 percent or flatter and site elevations varying between -2 feet to +2 feet[1]. The pavement surface is crowned to shed water to either side of the roadway, where it flows in a shallow concrete lined drainage swale to drain inlets spaced approximately every 130 feet. This swale extends along the majority of the southern boundary of the street, but is present on the northern boundary for only about 500 feet on the west side of the site. The site area is zoned for heavy industrial use and the Amador Street provides access for various business that result in regular truck traffic carrying cement, aggregates, and building materials. There are several rail sidings both extending parallel and crossing the street; a rail siding along about 2/3 the length of the southern side of the road appears to still be in use and others appear to have been abandoned in place and paved over with asphalt. The street surface is asphalt concrete (AC), and the condition is generally poor. There are cracks along the edges of former utility trenches and buried rail sidings, alligator/fatigue cracking within the asphalt, undulations in the ground surface, and a patchwork of asphalt overlays to fill pot holes and utility cuts. These overlays have become delaminated and are weathering/raveling in many places. The pavement along the last 600 feet of the street on the eastern side of the side is in better condition, with less severe alligator cracks and weathering of the overlays.

As part of their investigation for development of the Pier 94 backlands, T&R/RYCG have reported the site history and mapped the shoreline location for various years, which shows a history of incremental filling from various sources. We have summarized this information below and overlaid the historic shorelines on Plate 2 for reference.

[1] Elevations cited in this report are based on the San Francisco City Datum, unless otherwise noted

Areas west of the 1961 shoreline are underlain with historic fill between 25 to 40 feet thick. The majority of this historic fill appears to have been placed prior to 1938, and it is reported to consist of clay, silt, sand and gravel with occasional brick, concrete and asphalt debris.

In 1961, a debris dike was constructed to the north and east of Amador Street. In 1964, approximately 2.5 million cubic yards of dredge spoils was hydraulically placed inboard (south and west) of the debris dike. This material was not compacted and is estimated to be on the order of 20 to 30 feet thick.

A portion of the site is underlain by a regulated landfill area, which consists of construction and municipal waste mixed with soil placed between 1965 and 1975. The landfill area was capped in 1977 with between 2.5 and 8 feet of sand and gravel with variable amounts of silt and clay.

In their 2012 report, T&R/RYCG have estimated time-dependent settlement is currently ongoing for the reclaimed land due to both primary consolidation and secondary settlement of Bay Mud and the municipal waste.

2.2 GEOLOGY

The project site is in central area of San Francisco and is located within the Coast Ranges geomorphic province. The province is tectonically active and characterized by northwest-trending mountains, valleys, and faults. In particular, the San Francisco Peninsula is formed from a northwest-trending structural high, known as the Bay Block, which was isolated by rising seas during Pleistocene time. The Bay Block is bounded by the San Andreas Fault to the west and by the Hayward Fault to the east.

The geology of the area is shown on Plate 3 – Geology Map, based on the recent

Geologic Map of the San Francisco Bay Area (Graymer et al, 2006). The site and its vicinity are underlain by artificial fill placed along the margins of the bay, where marshland and tidelands once covered by shallow water. The artificial fill is underlain by Young Bay Mud (YBM), a holocene-age soft and unconsolidated clay, with interbedded silt and peat. The next underlying sequence is a very dense fine grained alluvial sand, which was encountered to only be on the order of 3 feet thick within the onsite borings by others. Below alluvium is the Old Bay Mud layer, which is a silty/sandy clay unit that was deposited in similar conditions to that of the YBM deposits, but has been consolidated to a stiff to very stiff clay by the overlying sediments. These deposits are generally underlain by the Franciscan Complex basement bedrock. Special Report 97 by the California Division of mines and Geology map depth to bedrock to be on the order of 200 feet in this area.

2.3 SUBSURFACE CONDITIONS

AGS performed a subsurface exploration in order to characterize the near surface soils underlying the pavement section of Amador Street. The following summary of the encountered subsurface conditions is based on the data obtained from Borings B-1 through B-5. Complete logs of the borings are presented in Appendix A.

Each of the borings was drilled through the roadway pavement which consisted of between 6- and 16-inches of asphalt concrete (AC) and Portland cement concrete (PCC). A mixture of different granular soil (fill) types were encountered under the AC and PCC layers, varying from silty- and clayey-sand, to silty- and clayey-gravel, to relatively clean poorly graded gravel. The table below summarizes the pavement type, thickness and laboratory determined R-value of the underlying fill.

TABLE 1

SUMMARY OF PAVEMENT AND SUBGRADE

Layer	B-1	B-2	B-3	B-4	B-5	TP1	TP2
AC Thickness (inches)	2	1.5	10*	3.5	3	--	10
PCC Thickness (inches)	6	4.5	0	8	13	10.5	--
Fill R-Value	18	13	39	51	66	--	--

*pavement consisted of two full section AC layers separated by 3.5 inches of clayey gravel

2.4 GROUNDWATER

Groundwater was encountered within Borings B-1, B-2, B-3 and B-5 at approximate depths ranging from of 4.75 to 5 feet below the existing ground surface (top of pavement). This corresponds with an elevation of about -5 feet. Groundwater was not encountered in Boring B-4 at the time of our exploration.

T&R/RYCG encountered groundwater within two of their four exploration points located within the current Amador Street alignment, reported at a depth between 7 to 10 feet below ground surface (bgs). This corresponds with an elevation of about -9 to -10 feet. As part of their investigation, T&R/RYCG summarized groundwater monitoring by Geo/Resource Consultants, Inc. (GRC, 1990) which is reported to indicate a groundwater level of elevation -7 feet within the subject portion of the site. We have not been provided or reviewed the original GRC (1990) report. The report states that groundwater levels are tidally influenced and are expected to vary based on seasonal rainfall and sea level changes.

CLOSURE

This geotechnical data report has been prepared in accordance with generally accepted professional geotechnical engineering practice for the exclusive use of the City and

County of San Francisco Department of Public Works. No other warranty, either expressed or implied, is made.

The findings presented in this report are based upon the data obtained from the borings drilled for this study. The nature and extent of variations from the encountered conditions may not become evident until construction. In the event variations occur, it will be necessary to reevaluate the findings of this data report.

It is the responsibility of the owner or its representative to ensure that the applicable provisions of this report are incorporated into the plans and specifications, and that the necessary steps are taken to see that the contractor carry out such provisions.

Respectfully submitted,
AGS, Inc.

Kamran Ghiassi, Ph.D.
Geotechnical Engineer 2792

3.0 REFERENCES

Blake, M.C., Graymer, R.W., Jones, D.L., and Soule, Adam, 2000, Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-2337, scale 1:75000.

Bonilla, M.G., 1998, Preliminary geologic map of the San Francisco South 7.5' quadrangle and part of the Hunters Point 7.5' quadrangle, San Francisco Bay area, California: A digital database

Graymer, R.W., 2000, Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-2342, scale 1:50000.

Graymer, R.W., 2006, Geologic Map of the San Francisco Bay Region http://geomaps.wr.usgs.gov/sfgeo/geologic/downloads.html

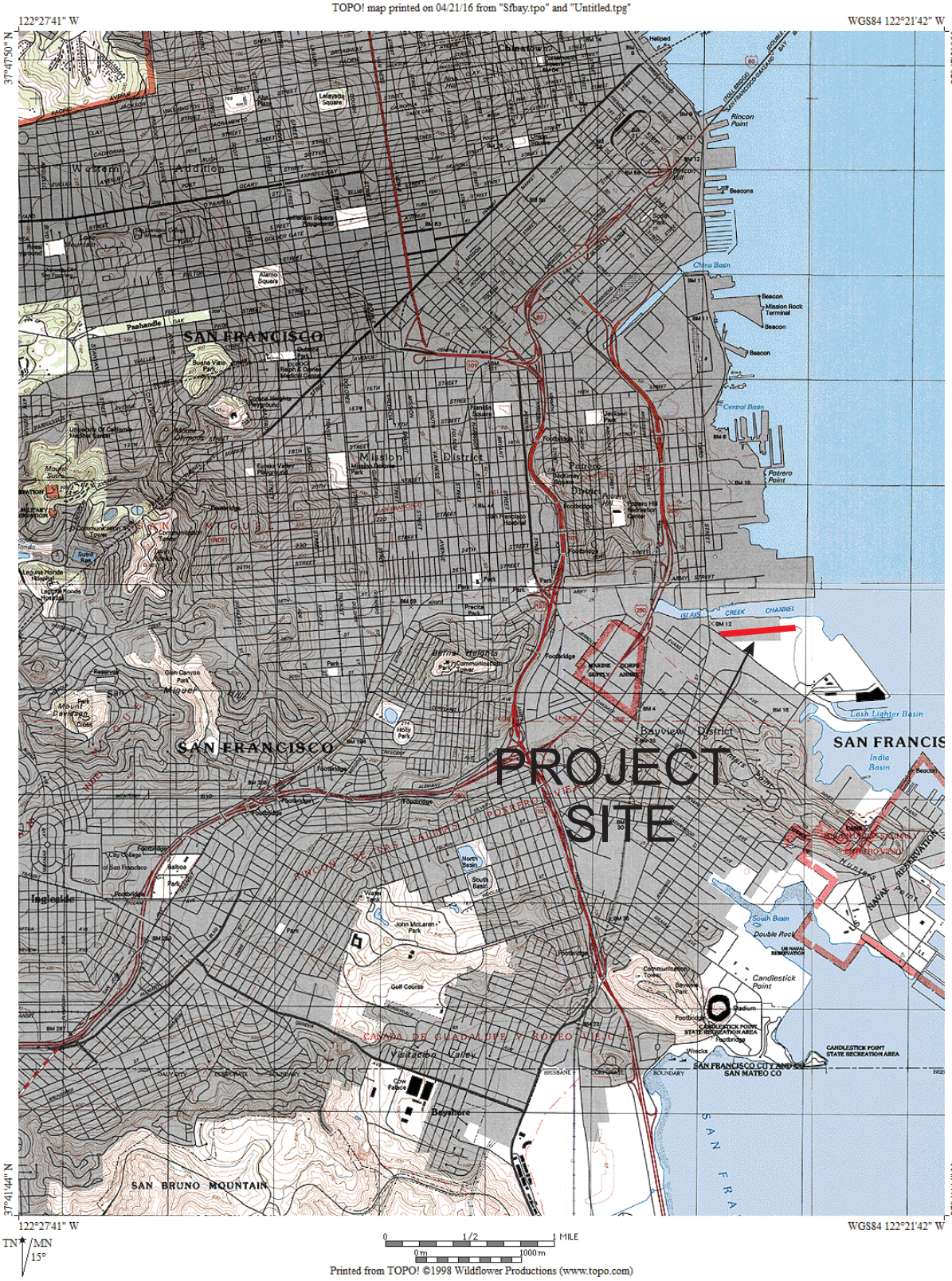
Joyner, 1982, Map showing the 200-foot thickness contour of surficial deposits and the landward limit of bay mud deposits of San Francisco, California, U.S. Geological Survey, Miscellaneous Field Studies Map MF-1376, scale 1:124000.

Schlocker, J., 1974, Geology of the San Francisco North quadrangle, USGS Professional Paper 782, 109 pp.: 62, 63.

Treadwell and Rollo, 2012, Geotechnical Investigation Pier 94 Backland Improvements, Project No. 730509401

United States Geological Survey, 1980, South San Francisco 7.5 Minute Topographical Quadrangle, 1:24,000.

PLATES



Project Alignment

SITE LOCATION MAP

Geotechnical Data Report
Amador Street Pavement Rehabilitation
San Francisco, California

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JOB NO. AGS 15-025	DATE: APRIL 2016	PLATE 1

CARGO WAY

ILLINOIS ST.

WESTERN SITE LIMIT

AMADOR ST.

TP-1

B-1

B-2

TP-2

MATCH LINE A

MATCH LINE A

AMADOR ST.

B-3

B-4

MATCH LINE B

MATCH LINE B

AMADOR ST.

B-5

EASTERN SITE LIMIT

0 30 60 feet

Approximate Scale

N

LEGEND

1961 Debris Dike (mapped by T&R/RYCG)

Former RWQCB Regulated Landfill Area (mapped by T&R/RYCG)

Shoreline Location from 1946 to 1961 (mapped by T&R/RYCG)

B-5 Approximate Location of Boring

TP-2 Approximate Location of Test Pit (Utility Excavation by Others)

BORING LOCATIONS MAP

Geotechnical Data Report
Amador Street Pavement Rehabilitation
San Francisco CA

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JOB: AGS-15-025	DATE: APRIL 2016	PLATE 2

LEGEND

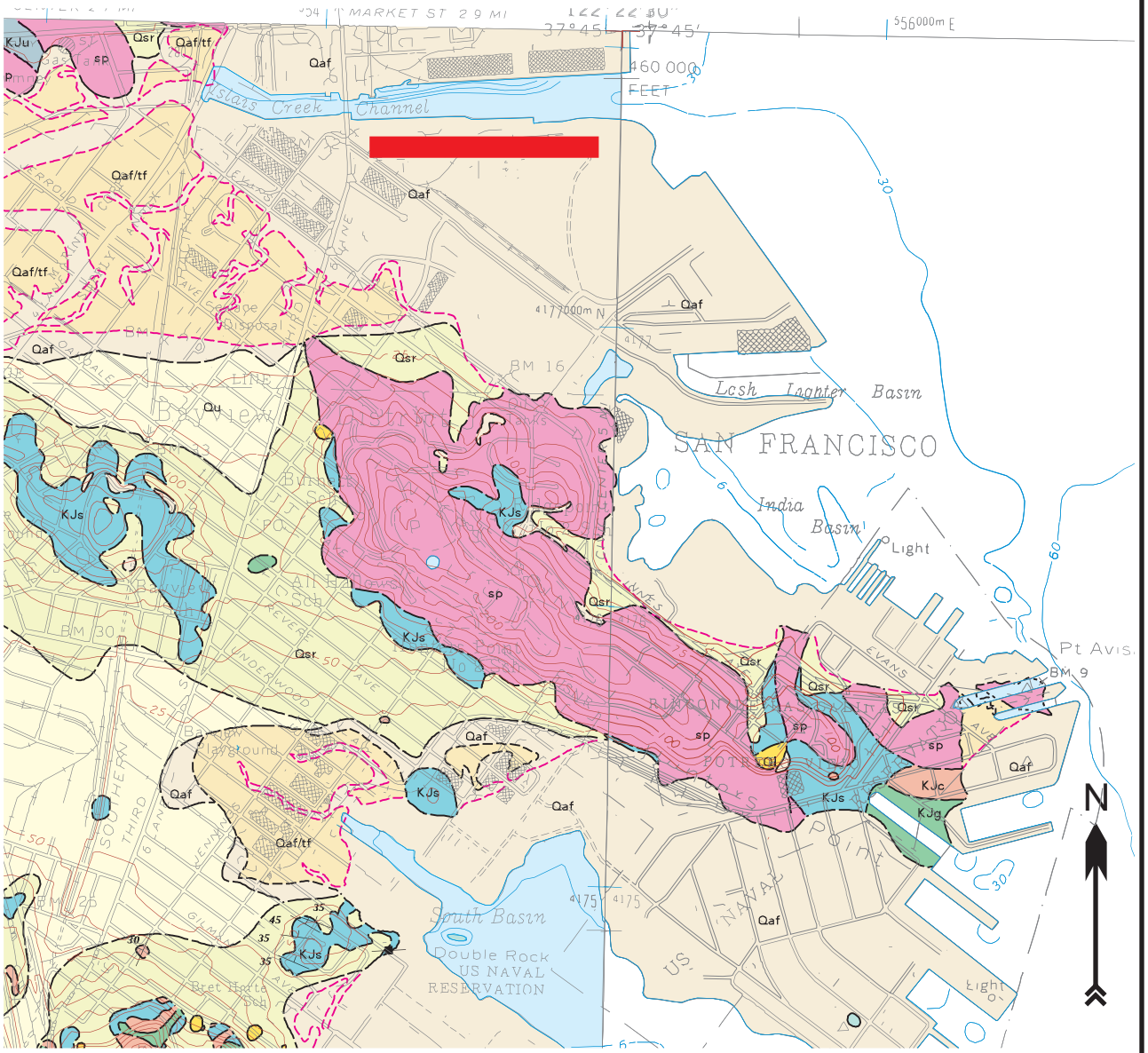
Qaf — **Artificial Fill** - Clay, silt, sand, rock fragments, organic matter, and man-made debris

Qaf/tf — **Artificial Fill over Tidal Flat** - Clay, silt, sand, rock fragments, organic matter, and man-made debris placed over tidal flats

sp — **Serpentine** - Hard to soft, generally greenish gray; contains small bodies of grabbro and diabase

Kjs — **Sandstone and Shale** - Interbedded sandstone and shale, hard where fresh and intact, soft where weathered or sheared. Commonly medium dark gray where fresh, olive gray to yellowish brown where moderately weathered, and yellowish orange to yellowish gray where highly weathered

Approximate Site Location



0 *APPROXIMATE SCALE* 1 mile

Source: Bonilla, et al 1998 Preliminary Geologic Map of the San Francisco and Part of the Hunters Point 7-1/2' Quadrangle California; US Geological Survey Miscellaneous Investigations, Scale 1:24,000.

GEOLOGIC MAP

Geotechnical Data Report
Amador Street Pavement Rehabilitation
San Francisco CA

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JOB NO. AGS-15-025	DATE: APRIL 2016	PLATE 3

APPENDIX A
FIELD EXPLORATION AND SAMPLING LOCATIONS

A.1 GENERAL

Prior to field exploration, AGS identified and marked the proposed boring locations with white paint, and notified Underground Service Alert (USA). USA alerted utility companies of the work so that they could mark the locations of any subsurface utilities near the proposed boring locations.

AGS also obtained a drilling permit issued by the San Francisco Department of Public Health (SFDPH), and an encroachment permit from the Port of San Francisco . Field exploration was performed by Gregg Drilling and Testing, Inc. California on March 17th, 2016. Drilling was performed using a truck-mounted Marl M-10 augur drill rig. Following completion of each boring, the holes were backfilled with cement grout, and the pavement patched in accordance with the SFDPH guidelines.

A.2 VISUAL CLASSIFICATION AND LOGGING

The subsurface conditions encountered in the borings were continuously logged in the field during drilling operations by a geologist from AGS. Preliminary visual soil classifications were made in accordance with ASTM D-2488 -93, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Plates A-1.1 through A-1.5, Logs of Boring B-1 through B-5, give descriptions and graphic representations of the encountered materials, the depths at which samples were obtained, and the laboratory tests performed.

A.3 SAMPLING

Bulk soil samples were collected from the fill material underlying the surface AC and PCC pavement section. The samples from each boring are composited from augur cuttings generated over a 2.5 foot to 4 foot length, as shown on each laboratory report sheet. These samples were sealed in plastic bags and delivered to the Cooper Testing Laboratory.

LOG OF BORING B-1

DRILLING DATE: -3/17/16
DRILLING METHOD: Hand Auger & 8" Auger
DRILL RIG TYPE: Marl M-11
HAMMER TYPE:

SURFACE ELEVATION: -2.0 ft
DATUM: SF City Datum
LOGGED BY: DH
CHECKED BY: KF

AGS, Inc. Consulting Engineers

DEPTH (FEET)	SAMPLE TYPE	SAMPLE NO.	BLOW COUNT	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	ADDITIONAL TESTS
					ASPHALTIC CONCRETE (AC)- 2" thick, fair condition [FILL] **PORTLAND CEMENT CONCRETE (PCC)**- 6" thick [FILL]					
		BULK			**CLAYEY SAND WITH GRAVEL (SC)**- moist, dusky red, medium dense, fine- to coarse-grained sand, some fine and coarse angular gravel to 1.5" diameter [FILL]					RV 18
5					**SILTY GRAVEL WITH SAND (GM)**- moist to wet, gray, medium dense, fine and coarse angular gravel to 1" diameter, some fine- to medium-grained sand, moderate petroleum odor [FILL]					
					Boring completed to 5.0 feet below ground surface (bgs). Groundwater encountered at approximately 4.75 feet (bgs) at time of drilling. Boring backfilled with cement grout, pavement patched with rapid-setting concrete.					
10										

LOG OF BORING B-2

DRILLING DATE: -3/17/16
DRILLING METHOD: Hand Auger & 8" Auger
DRILL RIG TYPE: Marl M-11
HAMMER TYPE:

SURFACE ELEVATION: -1.0 ft
DATUM: SF City Datum
LOGGED BY: DH
CHECKED BY: KF

AGS, Inc. Consulting Engineers

DEPTH (FEET)	SAMPLE TYPE	SAMPLE NO.	BLOW COUNT	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	ADDITIONAL TESTS
					ASPHALTIC CONCRETE (AC)- 1.5" thick, fair condition [FILL] **PORTLAND CEMENT CONCRETE (PCC)**- 4.5" thick [FILL]					
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)- moist, gray, medium dense, coarse angular to subrounded gravel to 2" diameter, little to some fine- to coarse-grained sand (railroad ballast) [FILL]					
		BULK			**CLAYEY SAND WITH GRAVEL (SC)**- moist, dark dusky red, medium dense, fine- to coarse-grained sand, some fine and coarse angular gravel to 1" diameter [FILL]					RV 13
5					- change to wet, dark gray, strong petroleum odor (Oily sheen on auger upon extraction from boring.)					
					Boring completed to 5.5 feet below ground surface (bgs). Groundwater encountered at approximately 5.0 feet (bgs) at time of drilling. Boring backfilled with cement grout, pavement patched with rapid-setting concrete.					
10										

LOG OF BORING B-3

DRILLING DATE: -3/17/16
DRILLING METHOD: Hand Auger & 8" Auger
DRILL RIG TYPE: Marl M-11
HAMMER TYPE:

SURFACE ELEVATION: -2.0 ft
DATUM: SF City Datum
LOGGED BY: DH
CHECKED BY: KF

AGS, Inc. Consulting Engineers

DEPTH (FEET)	SAMPLE TYPE	SAMPLE NO.	BLOW COUNT	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	ADDITIONAL TESTS
					ASPHALTIC CONCRETE (AC)- 5" thick, fair condition [FILL]					
					CLAYEY GRAVEL WITH SAND (GC)- moist, dark brownish-red, medium dense [FILL]					
					ASPHALTIC CONCRETE (AC)- 5" thick [FILL]					
		BULK			**CLAYEY GRAVEL WITH SAND (GC)**- moist, dark brownish-red, medium dense, fine and coarse angular to subrounded gravel to 1.5" diameter, some fine- to coarse-grained sand [FILL]					RV 39
5					**SILTY, CLAYEY SAND WITH GRAVEL (SC-SM)**- moist, gray, medium dense, fine- to medium-grained sand, little fine and coarse subangular gravel to 0.75" diameter [FILL]					
					Boring completed to 5.0 feet below ground surface (bgs). Groundwater not encountered. Boring backfilled with cement grout, pavement patched with rapid-setting concrete.					
10										

LOG OF BORING B-4

DRILLING DATE: -3/17/16
DRILLING METHOD: Hand Auger & 8" Auger
DRILL RIG TYPE: Marl M-11
HAMMER TYPE:

SURFACE ELEVATION: -2.0 ft
DATUM: SF City Datum
LOGGED BY: DH
CHECKED BY: KF

AGS, Inc. Consulting Engineers

DEPTH (FEET)	SAMPLE TYPE	SAMPLE NO.	BLOW COUNT	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	ADDITIONAL TESTS
					ASPHALTIC CONCRETE (AC)- 3.5" thick, poor condition [FILL]					
					PORTLAND CEMENT CONCRETE (PCC)- 8" thick [FILL]					
		BULK			**SILTY GRAVEL WITH SAND (GM)**- moist, brownish-gray, medium dense, fine and coarse subangular to rounded gravel to 1" diameter, some fine- to coarse-grained sand [FILL]					RV 51
					CLAYEY SAND WITH GRAVEL (SC)- moist, dark dusky red, medium dense, fine- to coarse-grained sand, some fine and coarse angular gravel to 1.5" diameter [FILL]					
5					Boring completed to 4.16 feet below ground surface (bgs). Groundwater not encountered. Boring backfilled with cement grout, pavement patched with rapid-setting concrete.					
10										

LOG OF BORING B-5

DRILLING DATE: -3/17/16
DRILLING METHOD: 8" Auger
DRILL RIG TYPE: Marl M-11
HAMMER TYPE:

SURFACE ELEVATION: 2.0 ft
DATUM: SF City Datum
LOGGED BY: DH
CHECKED BY: KF

AGS, Inc. Consulting Engineers

DEPTH (FEET)	SAMPLE TYPE	SAMPLE NO.	BLOW COUNT	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	ADDITIONAL TESTS
					ASPHALTIC CONCRETE (AC)- 3" thick, good condition [FILL]					
					PORTLAND CEMENT CONCRETE (PCC)- 13" thick [FILL]					
		BULK			(Encountered 1/2" diameter phone cable in backfill, no warning tape or conduit evident.)					RV 66
5					**SANDY CLAY WITH GRAVEL (CL)**- moist, greenish-gray, stiff, some fine- to medium-grained sand, little fine angular gravel [FILL]					
					Boring completed to 5.0 feet below ground surface (bgs). Groundwater encountered at approximately 4.75 feet (bgs). Boring backfilled with cement grout, pavement patched with rapid-setting concrete.					
10										

JOB NO. AGS-15-025/01 | **PROJECT: Amador Street Pavement** | **SHEET 1 OF 1** | **PLATE A-1.5**

LBGX AGS-15-025-01 AMADOR PAVEMENT.GPJ 4/21/16

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POOORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

◣	Modified California	RV	R-Value
◪	Standard Penetration Test	SA	Sieve Analysis
■	Shelby Push Sample	CV	Corrosivity
▣	Osterberg Piston Sample	TC	Cyclic Triaxial
B	Bulk / Grab Sample	TX	Unconsolidated Undrained Triaxial
◯	Sample Attempt with No Recovery	TV	Torvane Shear
CA	Chemical Analysis	UC	Unconfined Compression
CN	Consolidation	(1.2)	(Shear Strength, ksf)
CBR	California Bearing Ratio	WA	Wash Analysis
CMP	Compaction	(20)	(with % Passing No. 200 Sieve)
HA	Hand Auger	▽	Initial Water Level at Time of Drilling
PP	Pocket Penetrometer	▼	Later Water Level

ADDITIONAL TESTS AND KEY TO TEST DATA

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
Geotechnical Data Report
Amador Street Pavement Rehabiliation
San Francisco, California

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JOB NO.	AGS-16-029	DATE: April 2016		PLATE A-1.6

APPENDIX B
COOPER TESTING LABORATORY

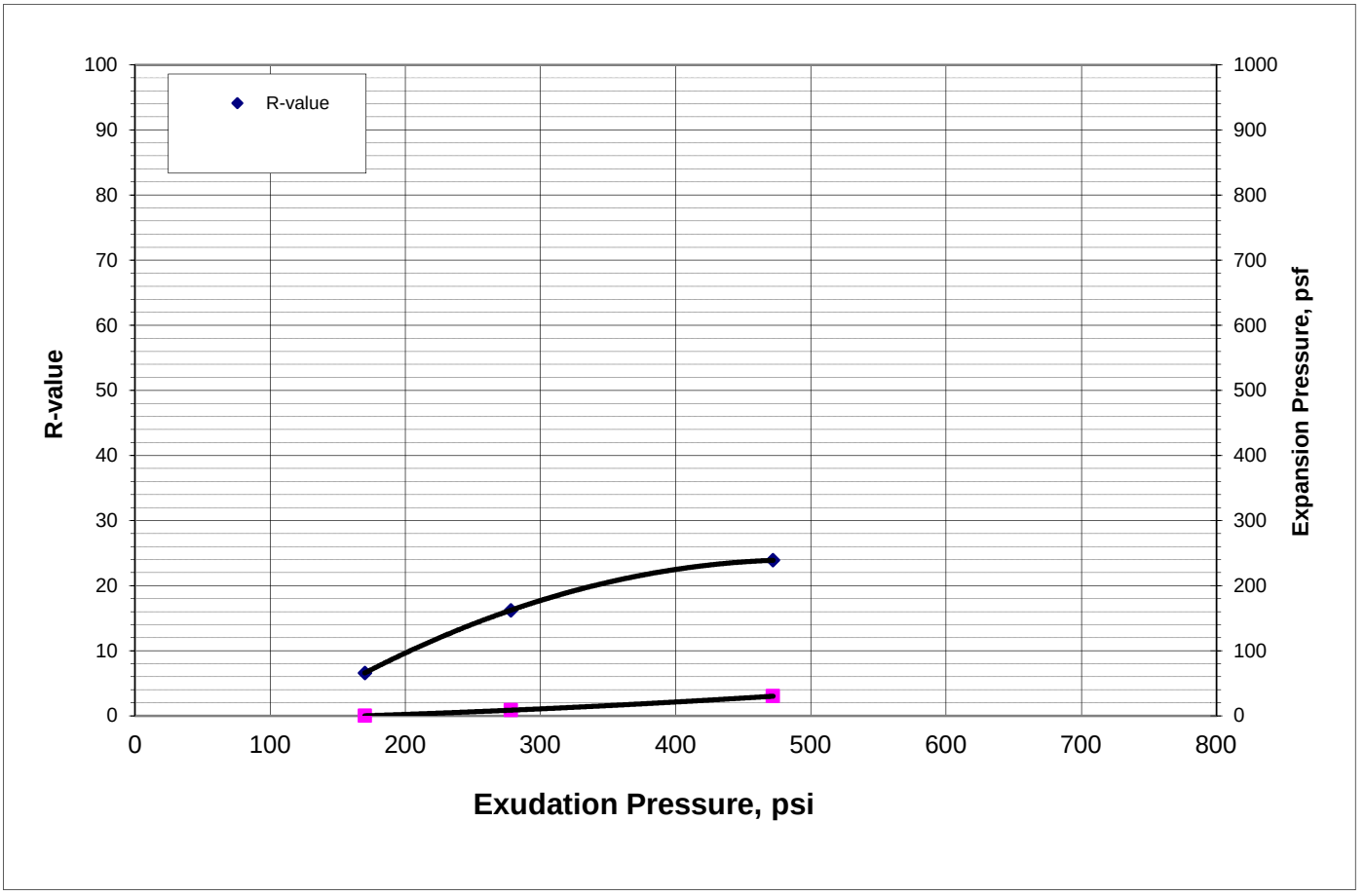
B.1 GENERAL

Bulk soil samples from the Borings B-1 through B-5 were transferred to Cooper Testing Laboratory for R-Value testing in accordance with Caltrans Test Method 301. This test method is used to measure the potential strength of subgrade, subbase, and base course materials for use in road pavement design. The R-value test reports are presented on Plates B-1 through B-5.

R-value Test Report (Caltrans 301)

Job No.:	041-139	**Date:**	04-04-16	**Initial Moisture,**	6.6%
Client:	AGS	**Tested**	MD	**R-value by Stabilometer**	**18**
Project:	AGS-15-025/1	**Reduced**	RU		
Sample	B-1 @ 2-5'	**Checked**	DC	**Expansion Pressure**	**15** **psf**
Soil Type:	Strong Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D	Remarks:
Exudation Pressure, psi	278	170	472	#N/A	
Prepared Weight, grams	1300	1300	1300		
Final Water Added, grams/cc	70	93	52		
Weight of Soil & Mold, grams	3296	3203	3299		
Weight of Mold, grams	2102	2089	2113		
Height After Compaction, in.	2.61	2.49	2.54		
Moisture Content, %	12.3	14.2	10.9		
Dry Density, pcf	123.3	118.6	127.5		
Expansion Pressure, psf	8.6	0.0	30.1		
Stabilometer @ 1000					
Stabilometer @ 2000	132	146	122		
Turns Displacement	2.95	3.4	2.48		
R-value	16	7	24		

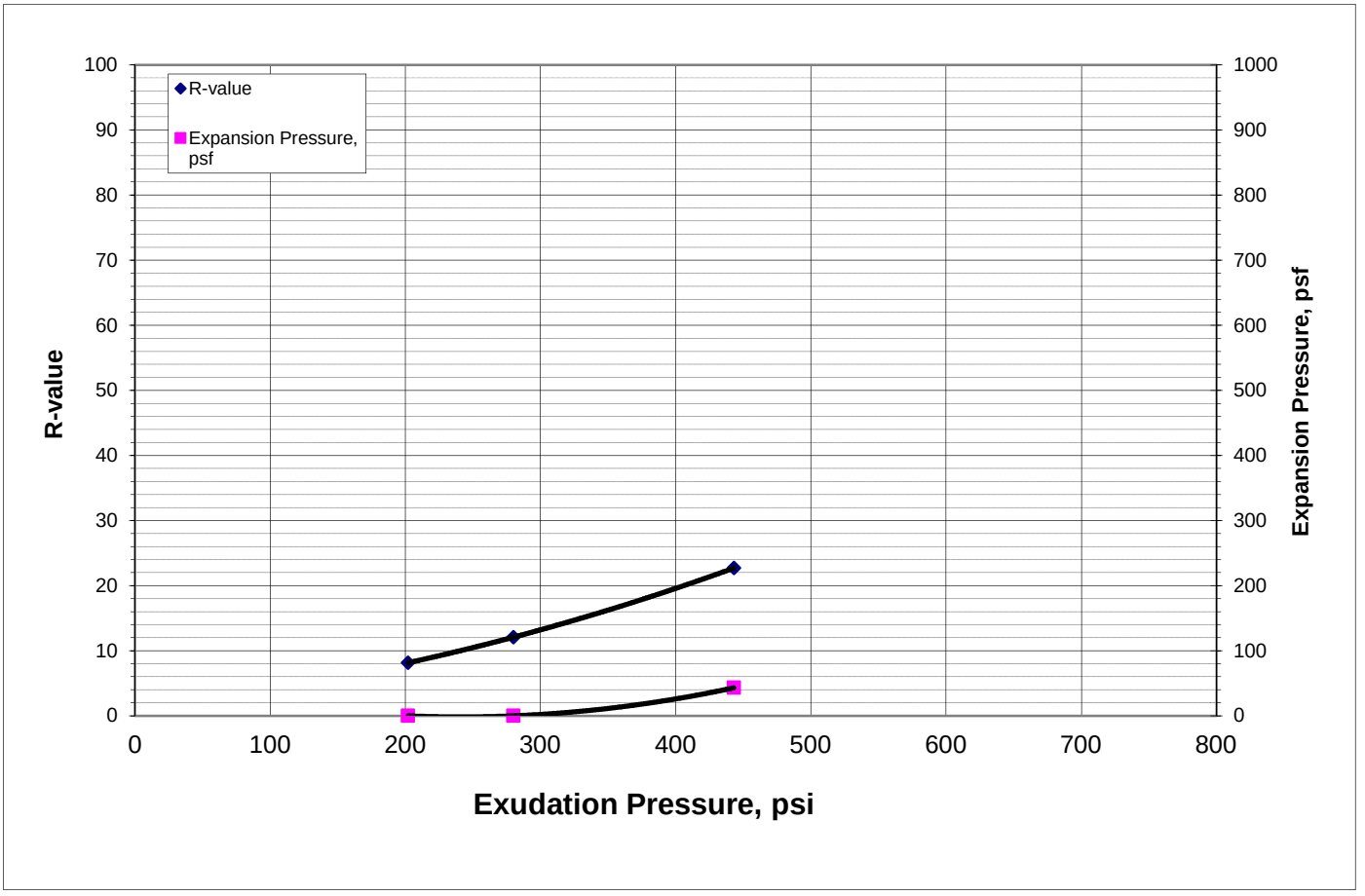


R-value Test Report (Caltrans 301)

Job No.:	041-139	**Date:**	04-04-16	**Initial Moisture,**	7.9%
Client:	AGS	**Tested**	MD	**R-value by Stabilometer**	13
Project:	AGS-15-025/1	**Reduced**	RU		
Sample	B-2 @ 3-5.5'	**Checked**	DC	**Expansion Pressure**	5 psf
Soil Type:	Strong Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D
Exudation Pressure, psi	280	202	443	
Prepared Weight, grams	1300	1300	1300	
Final Water Added, grams/cc	40	62	29	
Weight of Soil & Mold, grams	3230	3246	3216	
Weight of Mold, grams	2106	2084	2064	
Height After Compaction, in.	2.48	2.58	2.45	
Moisture Content, %	11.2	13.0	10.3	
Dry Density, pcf	123.4	120.6	129.1	
Expansion Pressure, psf	0.0	0.0	43.0	
Stabilometer @ 1000				
Stabilometer @ 2000	138	144	122	
Turns Displacement	2.9	3.25	2.55	
R-value	12	8	23	

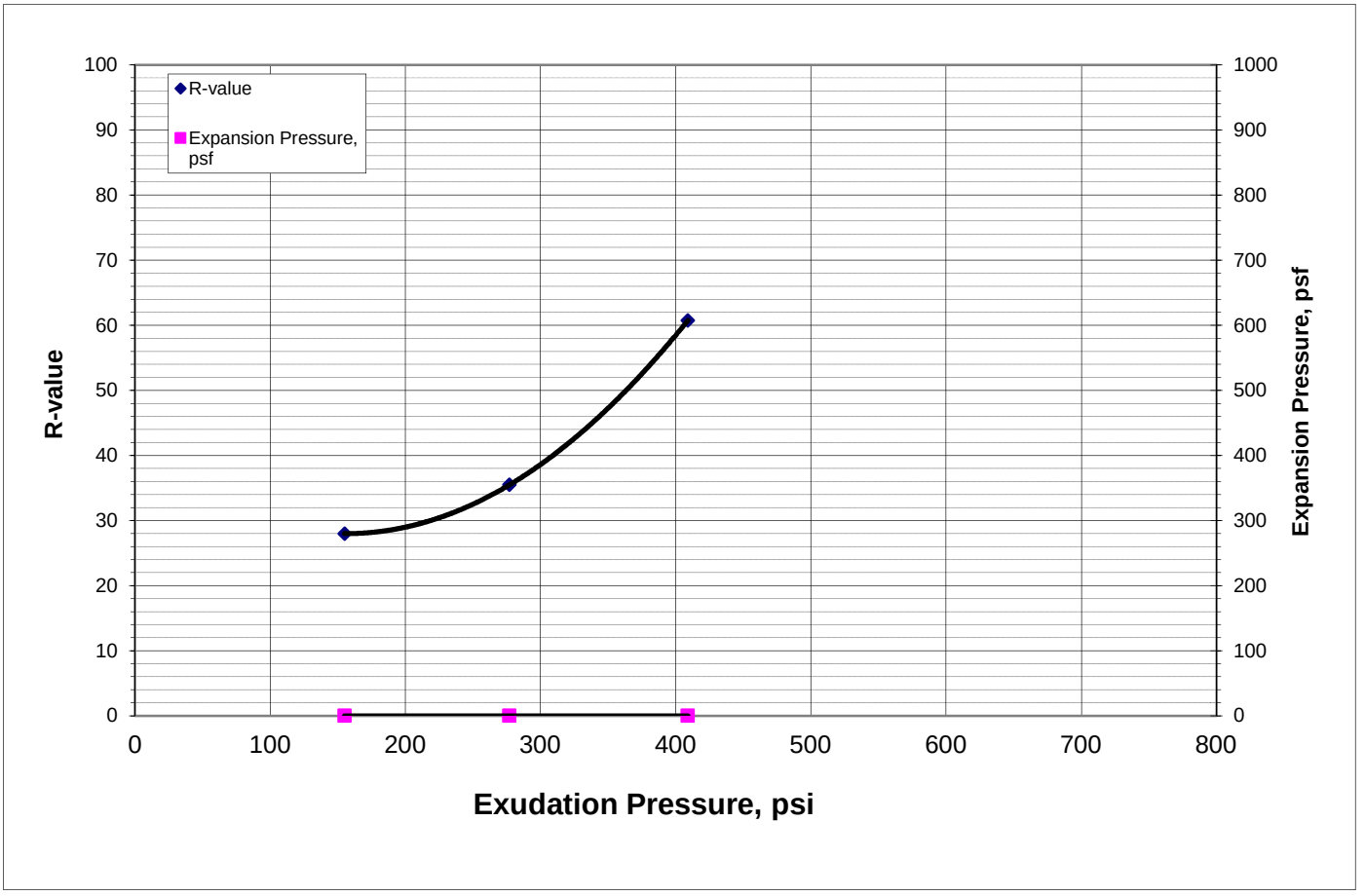
Remarks:



R-value Test Report (Caltrans 301)

Job No.:	041-139	**Date:**	03-31-16	**Initial Moisture,**	8.0%
Client:	AGS	**Tested**	MD	**R-value by Stabilometer**	**39**
Project:	AGS-15-025/1	**Reduced**	RU		
Sample	B-3 @ 1.5-5.5'	**Checked**	DC	**Expansion Pressure**	**0** **psf**
Soil Type:	Strong Brown Clayey SAND w/ Gravel				

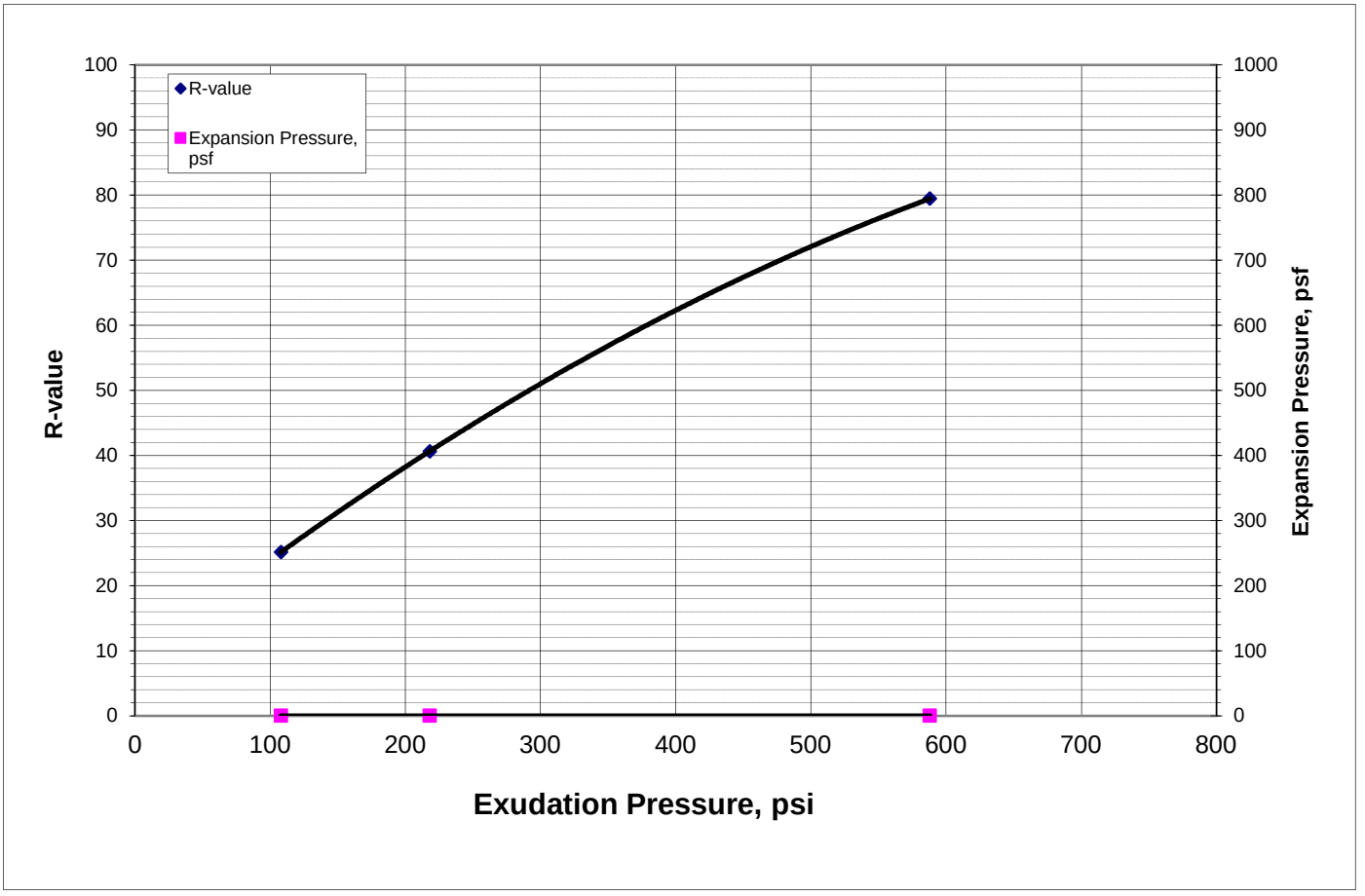
Specimen Number	A	B	C	D	**Remarks:**
Exudation Pressure, psi	409	155	277		
Prepared Weight, grams	1200	1200	1200		
Final Water Added, grams/cc	33	60	43		
Weight of Soil & Mold, grams	3163	3197	3205		
Weight of Mold, grams	2064	2092	2085		
Height After Compaction, in.	2.45	2.46	2.49		
Moisture Content, %	11.0	13.4	11.9		
Dry Density, pcf	122.4	119.9	121.7		
Expansion Pressure, psf	0.0	0.0	0.0		
Stabilometer @ 1000					
Stabilometer @ 2000	66	110	100		
Turns Displacement	2.3	2.82	2.7		
R-value	61	28	35		



R-value Test Report (Caltrans 301)

Job No.:	041-139	**Date:**	04-04-16	**Initial Moisture,**	9.5%
Client:	AGS	**Tested**	MD	**R-value by Stabilometer**	**51**
Project:	AGS-15-025/1	**Reduced**	RU		
Sample	B-4 @ 2.0-4.5'	**Checked**	DC	**Expansion Pressure**	**0** **psf**
Soil Type:	Strong Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D	**Remarks:**
Exudation Pressure, psi	108	588	218		
Prepared Weight, grams	1300	1300	1300		
Final Water Added, grams/cc	36	14	24		
Weight of Soil & Mold, grams	3278	3205	3222		
Weight of Mold, grams	2106	2094	2105		
Height After Compaction, in.	2.52	2.42	2.47		
Moisture Content, %	12.5	10.6	11.5		
Dry Density, pcf	125.2	125.6	122.8		
Expansion Pressure, psf	0.0	0.0	0.0		
Stabilometer @ 1000					
Stabilometer @ 2000	121	27	95		
Turns Displacement	2.4	3	2.42		
R-value	25	79	41		



R-value Test Report (Caltrans 301)

Job No.:	041-139	**Date:**	03-31-16	**Initial Moisture,**	7.6%
Client:	AGS	**Tested**	MD	**R-value by Stabilometer**	66
Project:	AGS-15-025/1	**Reduced**	RU		
Sample	B-5 @ 1.5-4.5'	**Checked**	DC	**Expansion Pressure**	0 psf
Soil Type:	Dark Olive Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D
Exudation Pressure, psi	478	137	230	
Prepared Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	28	63	43	
Weight of Soil & Mold, grams	3176	3230	3185	
Weight of Mold, grams	2113	2105	2101	
Height After Compaction, in.	2.4	2.51	2.44	
Moisture Content, %	10.1	13.2	11.4	
Dry Density, pcf	121.8	119.9	120.7	
Expansion Pressure, psf	0.0	0.0	0.0	
Stabilometer @ 1000				
Stabilometer @ 2000	22	110	64	
Turns Displacement	2.8	3.57	2.71	
R-value	84	24	56	

Remarks: