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Victorville Wellness Center
Victorville, California

Geotechnical Investigation Report

Prepared For: City of Victorville
Prepared By: Merrell Johnson

December 11, 2020

Scott Webb, City Planner
City of Victorville, Development Department
14343 Civic Drive, P. O. Box 5001
Victorville, California 92393-5001

Re: Geotechnical Investigation Report 0| Victorville Wellness Center | Victorville, California | M.J. Project No. 2102.041.500

Mr. Webb,

In accordance with your authorization, we have performed a geotechnical investigation for the above-referenced project and prepared this site-specific report. The report presents our findings based on the results of our field and laboratory programs, data review and engineering analyses.

The investigation was planned and performed using the information provided by the City of Victorville in the development of this project. Our report includes recommendations for the development of this site, and presents an evaluation of existing conditions for the design of proposed foundations.

We trust that the enclosed report provides the information you need at this time. If you have questions, please do not hesitate to contact Merrell Johnson Companies.

Sincerely,

Merrell Engineering Company, Inc.

James J. Stone, Geotechnical Engineer
RGE 808 Exp. 12/31/2021

Table of Contents

Attachments

Introduction

This report presents the results of the geotechnical investigation performed by Merrell Johnson (MJ) for the proposed Victorville Wellness Center in Victorville, California. This report presents our findings based on the results of our field and laboratory programs, data review and engineering analyses. The investigation was planned and performed using the information provided by the City of Victorville, the rough grading plans prepared by the City (undated) , and the “Proposed Victorville Wellness and Recuperative Care Center” updated site plan (undated).

Preliminary geotechnical information for development was previously submitted in a letter report dated November 10, 2020. An Infiltration Test Report was submitted on November 9th, 2020.

The location of the project is shown on the Location Plan in Appendix A.

Proposed Development

The 3.956-acre site will be developed using LifeArk modules to construct 7 Navigation and 3 Recuperative Clusters. Additional facilities will include 2 clinics, 2 toilet/shower buildings, 1 dining building and 1 storage building. Associated site improvements will also be constructed.

Scope of Investigation

The scope of the geotechnical investigation consisted of field exploration, laboratory testing, engineering analysis and preparation of this report presenting conclusions and recommendations regarding:

1. Site and subsurface conditions
2. Earthwork
3. Foundation support for the new buildings
4. Lateral loads on retaining structures along with resistance to lateral loads
5. Temporary excavation support
6. Soil corrosivity with respect to concrete and ferrous metals
7. Seismic design parameters and liquefaction potential, along with measures for mitigating potential settlements due to liquefaction
8. Flexible pavement structural sections.

Field Exploration and Laboratory Testing

Field Exploration

The field exploration program consisted of drilling 10 exploratory borings to depths of 25 to 50 feet at the locations shown on the Boring Location Plan in Appendix A. The borings were logged a MJ representative who also collected samples of the materials encountered for examination and laboratory testing. Soils are described according to the Unified Soil Classification System explained in Appendix B. The logs of the borings are also in Appendix B.

Relatively undisturbed samples were obtained by driving a 2.5-inch inside diameter Modified California sampler with a 140-pound hammer falling 30 inches in general accordance with American Society for Testing and Materials (ASTM) Test Designation D3550. The number of blows required to advance the sampler each 6-inch increment of an 18-inch total drive was recorded and noted on the boring logs as “N Value.” Disturbed samples were obtained from drill cuttings and during Standard Penetration Testing (SPT). The SPTs were performed in accordance with ASTM D1586. Blow counts recorded during SPT are noted on the boring logs in the column headed “N” Value.

Laboratory Testing

The laboratory program consisted of in-place moisture content and dry density determinations, a maximum density/optimum moisture content test, sieve analyses, an R-(Resistance-) value test, and a corrosivity assessment. The tests were performed in accordance with ASTM and California Test procedures. The results of the laboratory tests are summarized in Appendix C.

Site and Subsurface Conditions

Site Conditions

The site consists of vacant land. The surface is nearly level and covered with scattered brush and trees. Several dirt roads traverse the property.

Subsurface Conditions

The site is underlain by relatively clean and silty or clayey, well-graded to poorly-graded sands to the maximum depth explored, 50 feet. The sands are generally medium dense in the upper 5 to 10 feet and loose between depths of about 10 and 20 to 25 feet. The sands are typically medium dense to dense below depths of 25 to 40 feet, and generally increase in density with depth.

Groundwater was encountered at depths of 7 to 11 feet in the test borings. Groundwater levels could rise depending on rainfall runoff and the depth of water in the Mojave River.

Site Class, Site Coefficient and Seismic Design Category

Based on the available information gathered for the proposed project, the soils underlying the site can be classified as Default Site Class according to the 2019 California Building Code (CBC). The Design Acceleration Parameters were determined according ASCE 7-16 following ATC procedures and are provided in the table below.

2019 California Building Code – Seismic Parameters

S_S	1.092	MCE_R ground motion (period=0.2s)
S_1	0.422	MCE_R ground motion (period=1.0s)
S_{MS}	1.31	Site-modified spectral acceleration value
S_{M1}	null	Site-modified spectral acceleration value
S_{DS}	0.873	Numeric seismic design value at 0.2s SA
S_{D1}	null	Numeric seismic design value at 1.0s SA
F_a	1.2	Site amplification factor at 0.2s
PGA	0.469	MCE_G peak ground acceleration
PGA_M	0.562	Site modified peak ground acceleration

Conclusions

Groundwater was encountered at depths of 7 to 11 feet and the subsurface soils between typical depths of 10 and 20 to 25 feet consist of loose, relatively clean sands. Analyses indicate that at some locations the soils between these depths could liquefy during or immediately following a major earthquake. Consequently, there is a potential for ground surface settlements of 4 to 6 inches in the event of a major earthquake. The test borings indicate that liquefaction is somewhat more likely near the perimeter of the site and less likely in the central area, due to both fines content and soil density. Significant differential settlement over close horizontal distances are unlikely.

To minimize the potential effects of liquefaction on the development, a mat of compacted fill can be constructed beneath the structures and pavements, and the new facilities supported on conventional spread footings. This mat would assist in spanning areas of non-uniform support should differential settlement occur due to liquefaction. Alternatively, the structures can be supported on deep foundations that develop support in the relatively dense soils below a depth of about 40 feet below the ground surface, which would minimize deformations and potential damage from liquefaction settlement.

Recommendations

Clearing & Grubbing

Debris, vegetation, irrigation lines and deleterious material should be removed prior to grading. Unsuitable materials should be disposed of off-site in accordance with City instructions. Roots should be removed to a depth of 2 feet below the building pad elevation.

Excavation

Areas to support footings and slabs-on-grade should be over-excavated to a depth of 3 feet below the bottom of the deepest footing or slab. Over-excavation in paved areas should extend at least 2 feet below the bottom of the pavement structural section. Excavation should extend horizontally 5 feet beyond perimeter foundation, slab and pavement lines. Rocks exceeding 6 inches in maximum dimension encountered during excavation should be removed and not used in fill.

Scarification

The surface exposed by excavation should be scarified to a depth of 8 inches, moisture conditioned to within 2 to 4 percentage points of optimum moisture content and compacted to a minimum 95% relative compaction based on the ASTM D1557 laboratory test method. All references to optimum moisture content and maximum density in this report are based on this test method.

Compacted Fill Material

Fill material should consist of clean soils containing no rocks or other particles with a maximum dimension larger than 6 inches. A MJ representative should approve proposed imported fill prior to placement. The on-site soils, except for the oversized particles, debris and organic matter, can be used as fill.

Compacted Fill Placement

Fill materials should be placed in lifts 8 inches or less in loose thickness. Each lift should be moisture conditioned to between 2 and 4 percentage points above optimum moisture content and compacted to at least 95% relative compaction.

Imported Soils

Imported soils should consist of predominantly granular material with an expansion index less than 20 when tested in accordance with ASTM D4829 and should have a minimum R-value of 65. Imported material should be inspected and approved by our Engineer or representative prior to placement. Imported material utilized for trench backfill operations should consist of granular material with a minimum Sand Equivalent of 35.

Foundation Design

Shallow Foundations

If settlement resulting from liquefaction during an earthquake is considered acceptable, the proposed facilities can be supported on shallow spread footing foundations in compacted fill. Foundations should have bottom levels at a minimum depth of 18 inches below the lowest

adjacent finished grade. A minimum width of 18 inches is recommended for continuous footings. Isolated footings should be at least 24 inches wide. Foundation excavations should be observed by MJ personnel to check bearing materials and cleaning.

Foundations can be designed for an allowable vertical bearing capacity of 2500 pounds per square foot (psf) for dead plus long term live loads. This value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. Total settlements under static conditions are expected to be less than 1 inch and differential static settlements less than ½ inch between adjacent isolated footings or between the middle and end of a continuous footing.

Resistance to lateral loads will be provided by passive earth pressure against the faces of foundations and other structural elements below grade, and by friction along the bases of shallow spread footings and slabs. A lateral bearing pressure of 350 psf per foot of depth can be used. Base friction can be taken as 0.35 times the actual dead load. Base friction and passive earth pressure can be combined without reduction.

Caisson (Drilled Pier) Foundations

The soils underlying the site between depths of 10 and 25 to 40 feet are potentially liquefiable and will not provide adequate support for shallow foundations placed above them in the event of an earthquake. If building damage resulting from earthquake-induced settlement is to be minimized, drilled piers or driven piles extending at least 5 feet below the bottom of the liquefiable soil zone could be used for foundation support. For the typical subsurface conditions underlying the site, a 24-inch diameter pier or pile supporting approximately 50 kips should extend at least 45 feet below the existing ground surface. Uplift resistance, if required, can be taken as 40 kips for 45-foot long, 24-inch diameter piers or piles. The lateral load required to induce ¼ inch of movement in a 24-inch diameter, 45-foot long pier or pile can be taken as 14 kips for the free-head condition and 30 kips for the fixed-head condition. MJ should be contacted to develop detailed recommendations for the size and type of deep foundation being considered as the design is developed.

Total and differential settlements of structures supported on piers or piles extending at least 45 feet below the existing ground surface are expected to be less than ½ inch under both static and seismic conditions.

Active and At-Rest Lateral Pressures

Retaining structures free to rotate up to 0.001 radian at the top can be designed for an active equivalent fluid pressure of 35 pounds per cubic foot (pcf), plus additional building or equipment surcharges. Walls restrained against movement at the top should be designed for an at-rest pressure of 45 pcf plus surcharge.

The dynamic load increment imposed on a cantilever wall due to an earthquake can be computed using a factor of 20 pcf added to the static load for level ground conditions. For restrained walls, a factor of 24 pcf can be used. Because the soils are cohesionless, a triangular distribution can be used to evaluate the location of the resultant of dynamic forces.

Retaining walls should be provided with backdrains or weepholes at no more than 6-foot intervals along the wall. Positive surface drainage should be provided in front of the wall to conduct rainfall runoff away from the wall and minimize the potential for ponding.

Slabs on Grade

Slab-on-grade floors should be structurally supported if deep foundations are used. If settlement due to liquefaction in the event of an earthquake is considered acceptable, floor slabs can be supported on-grade. The final pad surface should be proof-rolled to provide a smooth dense surface upon which to place the concrete. A moisture vapor retarder/barrier should be placed beneath slabs where floor coverings will be installed. Typically, plastic is used as a vapor retarder/barrier. If plastic is used, a minimum 10 mils is recommended. The plastic should comply with ASTM E 1745. Plastic installation should comply with ASTM E 1643.

Current construction practice typically includes placement of a 2-inch-thick sand cushion between the bottom of the concrete slab and the moisture vapor retarder/barrier. This cushion can provide some protection to the vapor retarder/barrier during construction, and may assist in reducing the potential for edge curling in the slab during curing. However, the sand layer also provides a source of moisture vapor to the underside of the slab that can increase the time required to reduce moisture vapor emissions to limits acceptable for the type of floor covering placed on top of the slab. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and any treatment needed to reduce moisture vapor emissions to acceptable limits for the particular type of floor covering to be installed.

Drainage

It is important that surface water be kept a minimum of five feet from structures and slabs. No ponding adjacent to buildings/structures should be allowed. Final surfaces should have a two percent minimum slope away from structures.

Shoring

Temporary shoring will be required for those excavations where temporary slopes as described below are not feasible. The static lateral earth pressures listed above for permanent walls can be used for cantilever shoring and walls with one level of bracing. It is recommended that temporary shoring with multiple levels of bracing be designed considering a uniform lateral earth pressure distribution for the full height of the shoring equal to 25H psf, where H is the height of shoring in feet.

The recommended soil pressure applies to level soil conditions behind shoring. Where a combination of sloped embankment and braced shoring is used, the soil pressure will be greater and should be evaluated for actual conditions.

In addition to the above recommended lateral earth pressures, a minimum uniform lateral pressure of 125 psf should be incorporated in the design of the upper 10 feet of shoring when traffic is permitted within 10 feet of the wall.

Temporary Slopes

On-site soils can be classified as Type C in accordance with OSHA and Cal-OSHA guidelines. Temporary excavations should be sloped no steeper than 1-½ horizontal to 1 vertical for excavations up to 20 feet in depth. Compound excavations with vertical sides in lower portions should be properly shielded to a minimum height of 18 inches above the top of the vertical side, with the upper portion having a maximum allowable slope of 1-½ horizontal to 1 vertical.

A Registered Professional Engineer should design slopes for excavations greater than 20 feet in depth. Should running sand conditions be experienced during excavation operations, flattening of cut slope faces, or other special procedures, may be required to achieve stable temporary slopes.

During construction, excavation conditions should be evaluated twice a day by the contractor's competent person before personnel are allowed to enter the excavation.

Corrosivity

Laboratory test results indicate that site soils have a low potential for corrosion with respect to reinforced concrete and ferrous metals. Nevertheless, Type II modified or Type V cement is recommended for use in concrete in contact with the ground. Foundations should be designed with continuous reinforcing steel top and bottom. Reinforcing steel should maintain minimum clearances specified by applicable codes and good construction practice.

Flexible Pavements

One laboratory R-value test was performed on a bulk sample of near surface soil reasonably representative of the materials anticipated at subgrade in the proposed parking area. A value of 65 was measured, indicating good pavement support characteristics.

On this basis, flexible pavement structural section thicknesses were calculated for assumed values of Traffic Index (TI) following Caltrans procedures. Calculated pavement sections are listed in the following table:

FLEXIBLE PAVEMENT STRUCTURAL SECTIONS

Traffic	TI	AC[1] (inches)	AB[2] (inches)
Automobiles and Light Trucks - Parking	5	2-½	4
Automobiles and Light Trucks – Access Roads and Driveways	7	3	4

[1] Asphalt Concrete Surface Course – PG70-10 Asphalt Binder

[2] Class 2 Aggregate Base or Crushed Miscellaneous Base

Limitations

The recommendations in this report are based on the results of field and laboratory studies, combined with interpolation and extrapolation of subsurface conditions between and beyond boring locations. The nature and extent of variations may not become evident until construction. If variations are exposed during construction, MJ should be notified so these variations can be reviewed and the recommendations in this report modified or verified as appropriate.

This report has been prepared to aid in the evaluation of this site and to provide geotechnical recommendations for the design of this project. Any person using this report for bidding or construction purposes should be aware of the limitations of this report and should conduct independent investigations as necessary to satisfy themselves as to the surface and subsurface conditions to be encountered, and the procedures to be used in the performance of work.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances by reputable engineering consultants practicing in similar localities. No other warranty, express or implied, is made as to the professional advice and data included. This report has not been prepared for use by parties other than the addressee, and may not contain sufficient information for purposes of other parties or other users.

Appendix A
Figures

December 11, 2020
Geotechnical Report
Victorville Wellness Center
Victorville, California
MJ Project No. 2102.041.500


2102.041.500
Victorville Wellness Center
River Street, Victorville, CA
City of Victorville
Legend
Eva Dell Park
Site Vicinity
Site Vicinity
Victorville
Mojave Fwy
N D St
I-15 Frontage Rd
Bob Lin
Llanada Ave
Village Dr
Mojave Dr
7th St
Hesperia Rd
D St
Corwin Rd
Outer Hwy 18 S
Apple Valley Rd
Tomahawk Rd
La Paz Dr
Victor St
Roy Rogers Dr
Amargosa Rd
Seneca Rd
18
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December 11, 2020
Geotechnical Report
Victorville Wellness Center
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MJ Project No. 2102.041.500
Attachment A2

Appendix B
Exploratory Logs

December 11, 2020
Geotechnical Report
Victorville Wellness Center
Victorville, California
MJ Project No. 2102.041.500

Soil Classification Key

Unified Soil Classification System (USCS) and Particle Size Limits

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Report Date:	11/04/20
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Unified Soil Classification System (USCS)

Coarse Grained Soils More Than 50% Is Larger Than No. 200 Sieve	Gravel and Gravelly Soils More Than 50% Retained on No. 4 Sieve	Clean Gravels Little Or No Fines	GW		Well-graded gravels, gravel-sand mixtures, little or no fines
			GP		Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravels w/ Fines Appreciable Amount	GM		Silty gravels, gravel-sand-silt mixtures
			GC		Clayey gravels, gravel-sand-clay mixtures
	Sand and Sandy Soils More Than 50% Passing No. 4 Sieve	Clean Sand Little Or No Fines	SW		Well-graded sands, gravelly sands, little or no fines
			SP		Poorly-graded sands, gravelly sands, little or no fines
		Sands w/ Fines Appreciable Amount	SM		Silty-sands, sand-silt mixtures
			SC		Clayey sands, sand-clay mixtures
Fine Grained Soils More Than 50% Is Smaller Than No. 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 silts and organic silty clays of low placticity
	Silts and Clays Liquid Limit Greater Than 50		MH		Inorganic silts, micaceous or diatomaceous fine sand or silty soils
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		PT		Peat, humus, swamp soils with high organic contents

Particle Size Limits

Divison	Silt or Clay	Sand			Gravel		Cobbles	Boulders
		Fine	Medium	Coarse	Fine	Coarse		
U.S. Sieve		No. 200	No. 40	No. 10	No. 4	3/4"	3"	12"
Grain (mm)		0.075	0.420	2.00	4.76	19.1	76.2	305

Soils possessing characteristics of two classifications are designated by group symbol combination. Soils may be classified initially using the visual manual procedure prior to laboratory test.

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	11/04/20
Sheet:	1 of 2
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 1	**Start Date/Time:**	11/4/20 8:40	**End Date/Time:**	-

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	9'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SP		Brown, Moist, Loose, Poorly graded sand	
1	6, 9		3.8	86.4			Bulk sample at 0' to 5' - CRG11042001	SA, MD, CR
	6						Tube sample at 1' - CRG11042002	TD
3	5, 6		2.1	83.9			Tube sample at 3' - CRG11042003	TD
	9							
5	5, 7		3.6	ND			Tube sample at 5' - CRG11042004	TD
	8							
							Ground water encountered at 9'	TD
10	3, 3		10.1	ND			Tube sample at 10' - CRG11042005	
	4							
15	4, 5						SPT sample at 15' - CRG11042006	
	2							
20	3, 3						No recovery at 20'	
	3							
25	3, 4				SW		Brown, Moist, Loose, Well graded sand	
	3						SPT sample at 25' - CRG11042007	SA

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble enountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	11/04/20
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Permit No:	
Client Project No:	
USA Ticket No:	
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DSA LEA No:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 1 (Cont.d)	**Start Date/Time:**	-
End Date/Time:	11/4/20 10:53		

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	9'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
30	5, 5 9						SPT at 30' - CRG11042008	
35	3, 6 8						SPT at 35' - CRG11042009	
40	5, 9 10				SC		Brown, Wet, Loose, Clayey sand SPT at 40' - CRG11042010	SA
45	5, 10 18						SPT at 45' - CRG11042011	SA
50	18, 20 19						SPT at 50' - CRG11042012 Drilling terminated at approximately 50'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	11/04/20
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Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 2	**Start Date/Time:**	11/4/20 11:00	**End Date/Time:**	-

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	7
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SP		Brown, Moist, Loose, Poorly graded sand	
1	7, 9 8		2.3	ND			Tube sample at 1' - CRG11042013	TD
3	5, 8 9		2.0	ND			Tube sample at 3' - CRG11042014	TD
5	3, 8 5		9.9	84.3			Tube sample at 5' - CRG11042015	TD
							Groundwater encountered at 7'	
10	4, 5 7						SPT sample at 10' - CRG11042016	
15	3, 3 5						SPT sample at 15' - CRG11042017	
20	3, 2 3						SPT sample at 20' - CRG11042018	
25	12, 9 9						SPT sample at 25' - CRG11042019	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 2 (Cont.d)	**Start Date/Time:**	-
End Date/Time:	11/4/20 12:21		

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	7'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
30	5, 8 11						SPT at 30' - CRG11042020	
35	13, 4 14						SPT at 35' - CRG11042021	
40	12, 13 18				SC		Brown, Wet, Loose, Clayey sand SPT at 40' - CRG11042022	
45	6, 7 9						SPT at 45' - CRG11042023	
50	10, 8 11						SPT at 50' - CRG11042024 Drilling terminated at approximately 50'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble enountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	11/04/20
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DSA LEA No:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 3	**Start Date/Time:**	11/4/20 12:37	**End Date/Time:**	11/4/20 13:06

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	7'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW		Brown, Moist, Loose, Well graded sand Bulk sample at 0' to 5' - CRG11042025	SA
5	8, 12 17						No recovery at 5' Groundwater encountered at 7'	
10	9, 11 12						No recovery 10'	
15	8, 7 5						No recovery at 15'	
20	5, 6 6						SPT sample at 20' - CRG11042026	
25	6, 6 8				SC		Brown, Wet, Loose, Clayey sand SPT sample at 25' - CRG11042027 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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DSA LEA No:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 4	**Start Date/Time:**	11/4/20 13:17	**End Date/Time:**	11/4/20 13:45

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	8'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW-SM		Brown, Moist, Medium Dense, Well graded sand with silt Bulk sample at 0' to 5' - CRG11042028	SA
5	15, 19 25		3.4	87.1			Tube sample at 5' - CRG11042029	TD
							Groundwater encountered at 8'	
10	6, 7 10		3.8	99.1			Tube sample at 10' - CRG11042030	TD
15	6, 5 14		14.2	99.2			Tube sample at 15' - CRG11042031	TD
20	7, 9 9						SPT sample at 20' - CRG11042032	
25	18, 17 15				SW		Brown, Moist, Medium Dense, Well graded sand SPT sample at 25' - CRG11042033 Drilling terminated at approximately 25'	SA

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 5	**Start Date/Time:**	11/5/20 7:37	**End Date/Time:**	11/5/20 8:13

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	7'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW		Brown, Moist, Medium Dense, Well graded sand	
5	12, 10 10		13.0	ND			Tube sample at 5' - CRG11052001 Groundwater encountered at 7'	TD
15	6, 5 14						SPT sample at 15' - CRG11052002	
25	6, 11 15						SPT sample at 25' - CRG11052003 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble enountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 6	**Start Date/Time:**	11/5/20 8:17	**End Date/Time:**	11/5/20 8:33

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	11'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW		Brown, Moist, Medium Dense, Well graded sand	
5	3, 5 5						SPT sample at 5' - CRG11052004	
10							Groundwater encountered at 11'	
15	5, 9 8						SPT sample at 15' - CRG11052005	SA
20								
25	5, 7 7						SPT sample at 25' - CRG11052006 Drilling terminated at approximately 25'	SA

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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Client Project No:	
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Location No:	Boring 7	**Start Date/Time:**	11/5/20 8:57	**End Date/Time:**	11/5/20 9:19

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	8'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW		Brown, Moist, Loose, Well graded sand Bulk sample at 0' to 5' - CRG11052008	SA
5	3, 4 4						No recovery at 5'	
							Groundwater encountered at 8'	
10	2, 1 3						SPT sample at 10' - CRG11052009	SA
15	4, 3 4						SPT sample at 15' - CRG11052010	
20	1, 3 6						SPT sample at 20' - CRG11052011	
							Gravel encountered at 23'	
25	8, 5 7						SPT sample at 25' - CRG11052012 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 8	**Start Date/Time:**	11/5/20 9:27	**End Date/Time:**	11/5/20 9:47

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	7'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SP-SM		Brown, Moist, Loose, Poorly graded sand with silt Bulk sample at 0' to 5' - CRG11052013	SA, RV
5	5, 6 6		14.5	91.0			Tube sample at 5' - CRG11052014 Groundwater encountered at 7'	TD
10	3, 3 4						SPT sample at 10' - CRG11052015	
15	3, 5 6						SPT sample at 15' - CRG11052016	
20	5, 9 9						SPT sample at 20' - CRG11052017	SA
25	5, 4 6						SPT sample at 25' - CRG11052018 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Location No:	Boring 9	**Start Date/Time:**	11/5/20 10:15	**End Date/Time:**	11/5/20 10:35

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	9'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SP-SM		Brown, Moist, Loose, Poorly graded sand with silt	
5	4, 5 4		10.1	ND			Tube sample at 5' - CRG11052019	TD
							Groundwater encountered at 9'	
10	3, 2 3				SW-SM		Brown, Wet, Loose, Well graded sand with silt and gravel SPT sample at 10' - CRG11052020	SA
15	1, 1 3						SPT sample at 15' - CRG11052021	
20	2, 3 2						SPT sample at 20' - CRG11052022	
25	10, 9 9						SPT sample at 25' - CRG11052023 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble enountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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Location No:	Boring 10	**Start Date/Time:**	11/5/20 11:05	**End Date/Time:**	11/5/20 11:55

Conducted By:	C. Garrison	**Excavation Type:**	Auger Hole	**Elevation:**	
Operator:	C. Hartman	**Dimensions:**	8" x 25'	**Groundwater:**	8'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SW		Brown, Moist, Loose, Well graded sand Bulk sample at 0' to 5' - CRG11052024	SA
5	7, 7 8		16.5	ND			Tube sample at 5' - CRG11052025	TD
							Groundwater encountered at 8'	
10	6, 7 0						SPT sample at 10' - CRG11052026	
15	3, 3 3						No recovery at 15'	
20	2, 1 1						SPT sample at 20' - CRG11052027	
							Medium Dense below 25'	
25	7, 9 11						SPT sample at 25' - CRG11052028 Drilling terminated at approximately 25'	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/cobble encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Appendix C
Laboratory Testing

December 11, 2020
Geotechnical Report
Victorville Wellness Center
Victorville, California
MJ Project No. 2102.041.500

Laboratory Compaction Characteristics

ASTM D1557, D2488

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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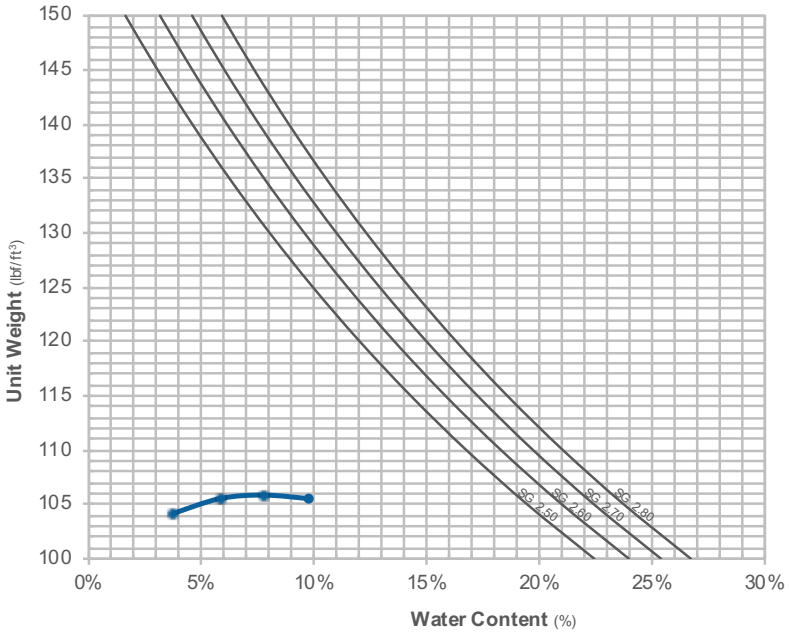
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: CRG11042001 **Maximum Dry Unit Weight** (lb/ft³): 105.9 **Optimum Moisture Content** (%): 7.8

Classification, ASTM D2487: (SP) Poorly graded sand
Sample Origin: Boring One at 0' to 5'
Laboratory Remarks:



Tested By:	James Albornoz
Date Tested:	11/13/20
Received Moisture:	2.4%
Preparation:	Wet
Specific Gravity:	ND
Specific Gravity Method:	NA
Start Weight (lb):	35.0
Retained on 3/4" (lb):	0.0
Retained on 3/8" (lb):	0.0
Retained on No. 4 (lb):	0.1
Retained on 3/4" (%):	0.0%
Retained on 3/8" (%):	0.0%
Retained on No. 4 (%):	0.3%
Oversize Correction:	ND
Mold Volume Factor:	29.94
Tare Weight	4.37
Rammer Used:	Mechanical
Method A:	☑
Method B:	☐
Method C:	☐

Weight of Soil and Tare (lb):	7.98	8.10	8.18	8.24
Wet Weight (g):	301.6	300.3	307.2	307.0
Dry Weight (g):	290.7	283.8	285.1	279.6
Moisture Content (%):	3.7%	5.8%	7.8%	9.8%
Dry Unit Weight (lb/ft³):	104.2	105.5	105.9	105.5

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Clayton Garrison / Laboratory Manager
Name / Title

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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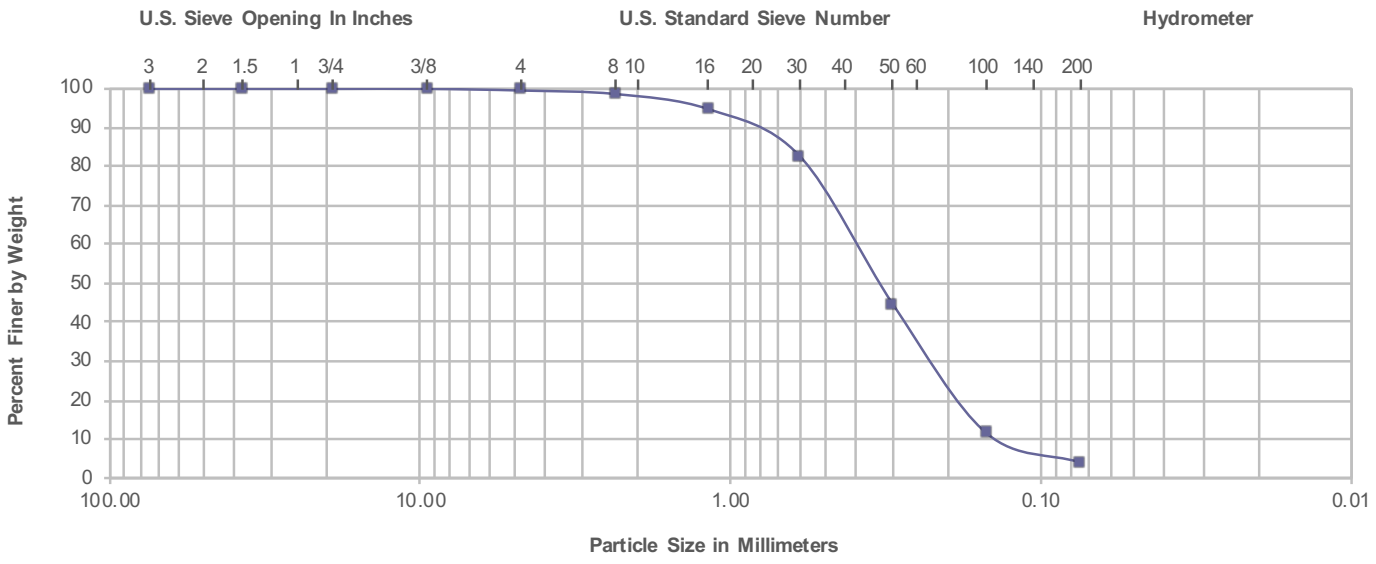
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: CRG11042001 **Gravel** (%): 0.4% **Sand** (%): 95.5% **Fines** (%): 4.0%

Classification, ASTM D2487: (SP) Poorly graded sand
Sample Origin: Boring One at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
3	0	2.4%	4.750	0.395	0.120	0.155	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 515.9
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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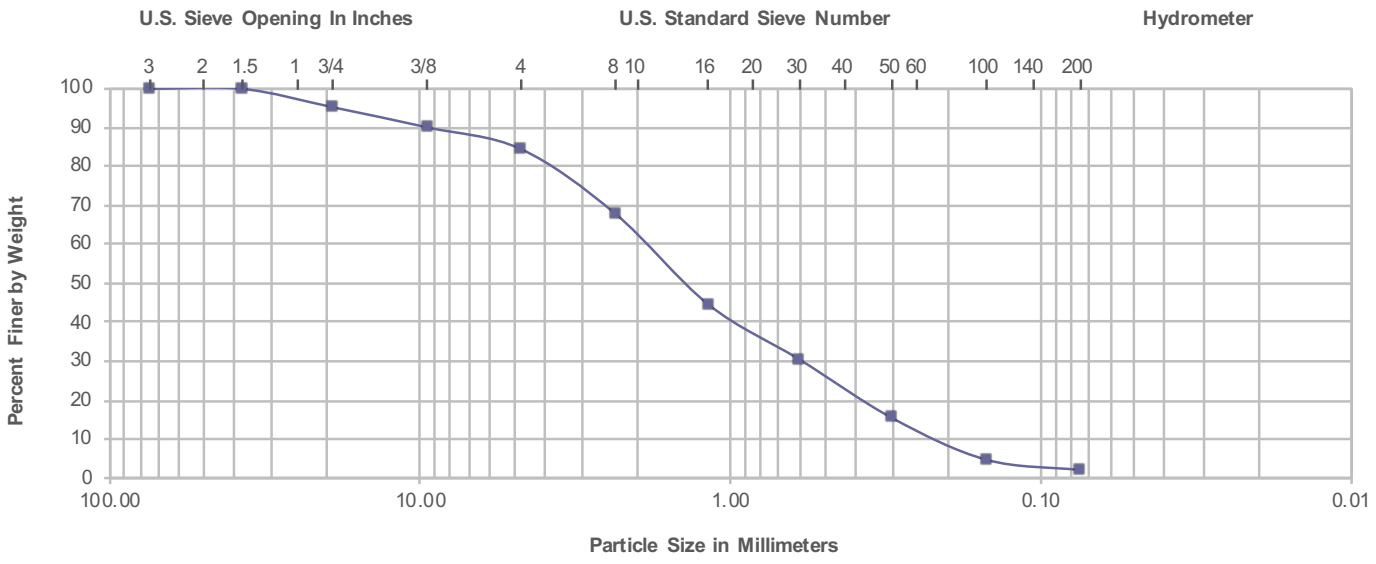
Sample ID: CRG11042007 **Gravel** (%): 15.5% **Sand** (%): 82.5% **Fines** (%): 2.1%

Classification, ASTM D2487: (SW) Well graded sand
Sample Origin: Boring One at 25'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
8	1	18.0%	37.500	1.800	0.600	0.235	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 413.2
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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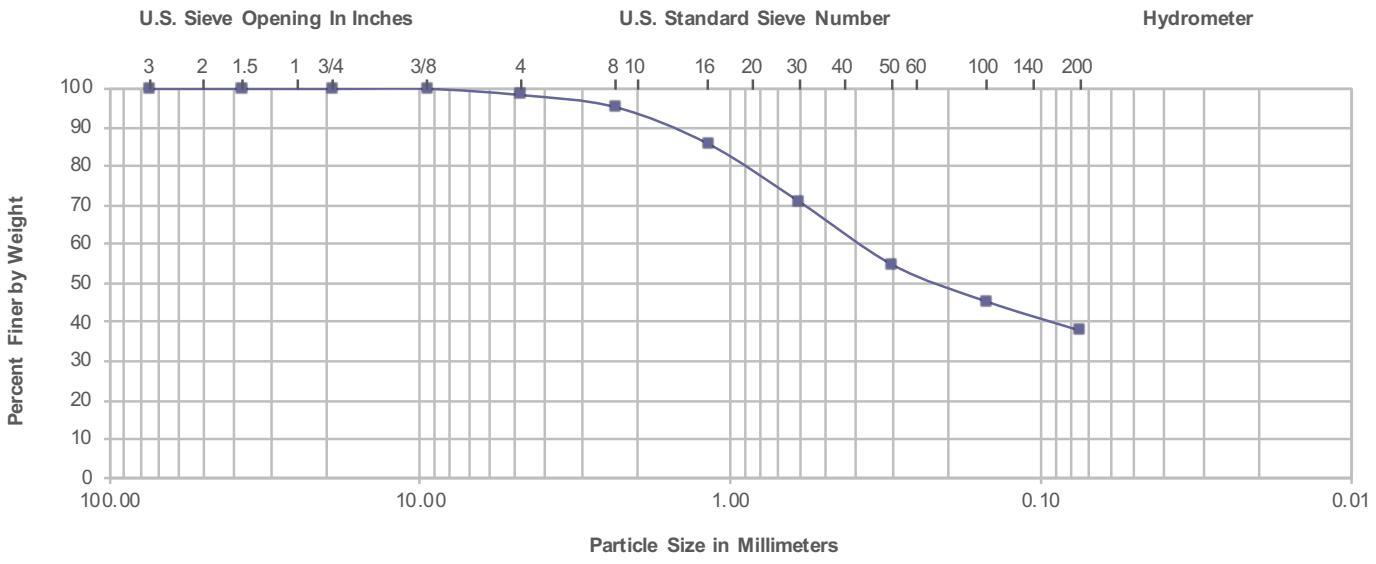
Sample ID: CRG11042010 **Gravel** (%): 1.6% **Sand** (%): 60.5% **Fines** (%): 37.9%

Classification, ASTM D2487: (SC) Clayey sand
Sample Origin: Boring One at 40'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
NA	NA	16.7%	9.500	0.300			ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 457.0
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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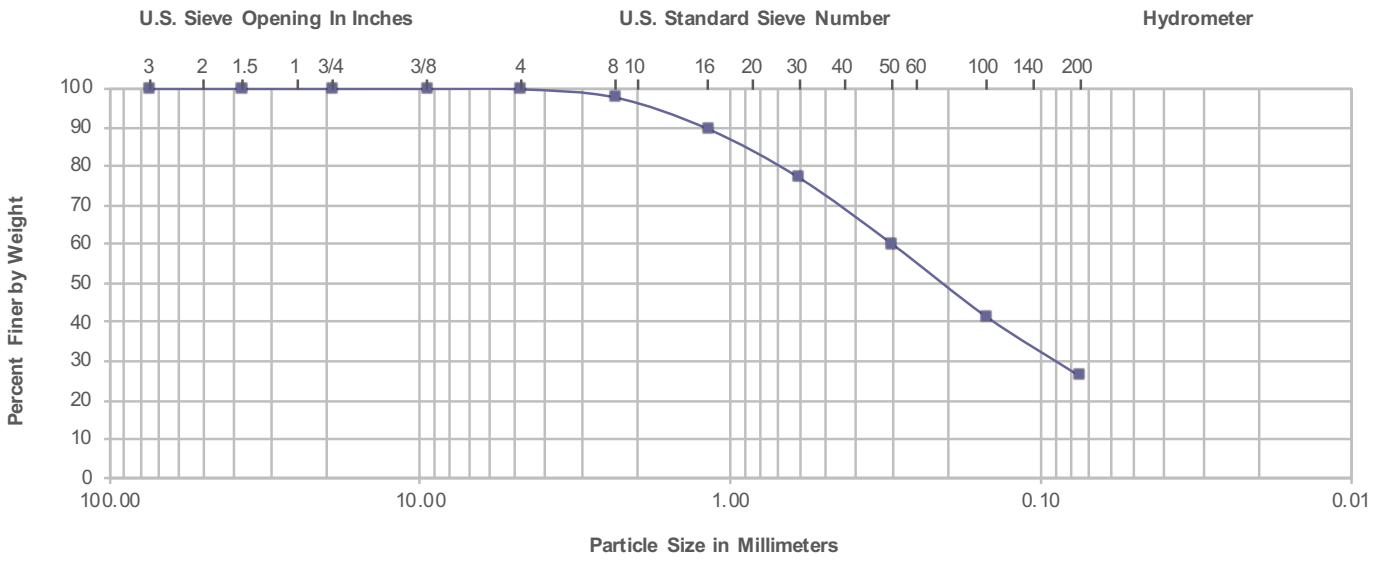
Sample ID: CRG11042011 **Gravel** (%): 0.1% **Sand** (%): 73.8% **Fines** (%): 26.1%

Classification, ASTM D2487: (SC) Clayey sand
Sample Origin: Boring One at 45'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
NA	NA	15.6%	4.750	0.300	0.090		ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 261.0
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
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Particle-Size Analysis of Soil

D422, D1140, D2487

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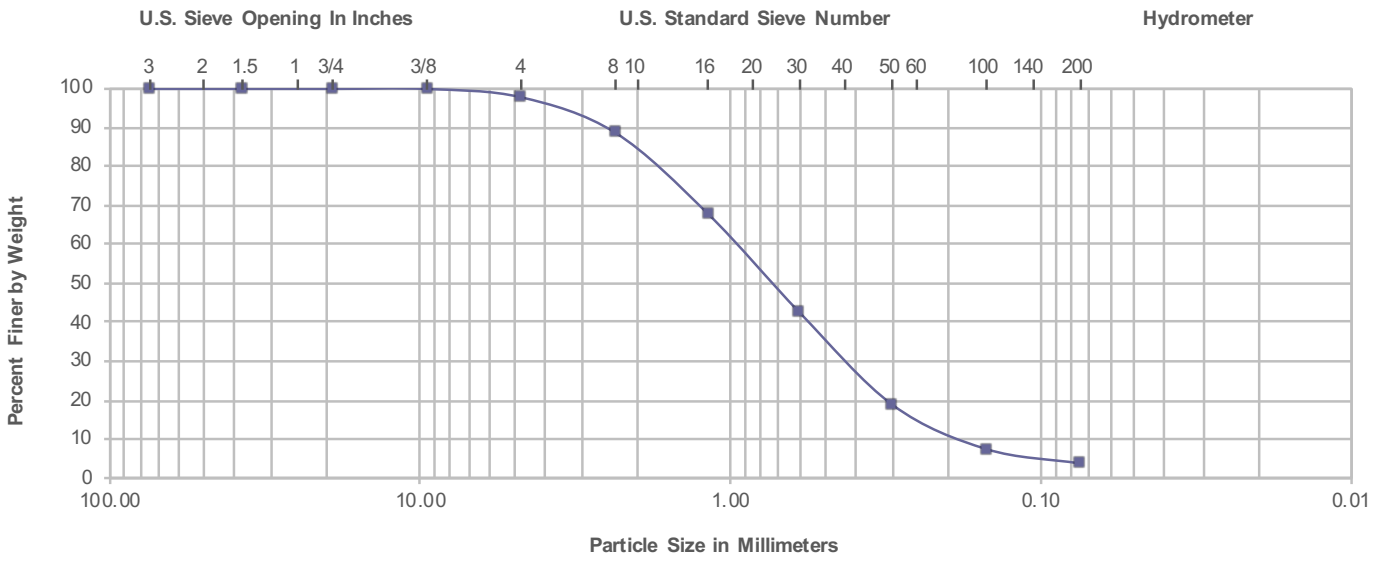
Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Sample ID: CRG11042025 **Gravel** (%): 2.1% **Sand** (%): 94.1% **Fines** (%): 3.8%

Classification, ASTM D2487:	(SW) Well graded sand
Sample Origin:	Boring Three at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
5	1	1.1%	9.500	0.950	0.425	0.195	ND	ND	ND	ND	ND	-

Method / Procudure Used:	D422
Size of Initial Dry Mass (g):	498.2
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/12 hr
Type & Amount of Agent:	Defloc. & 1.0
Comments:	

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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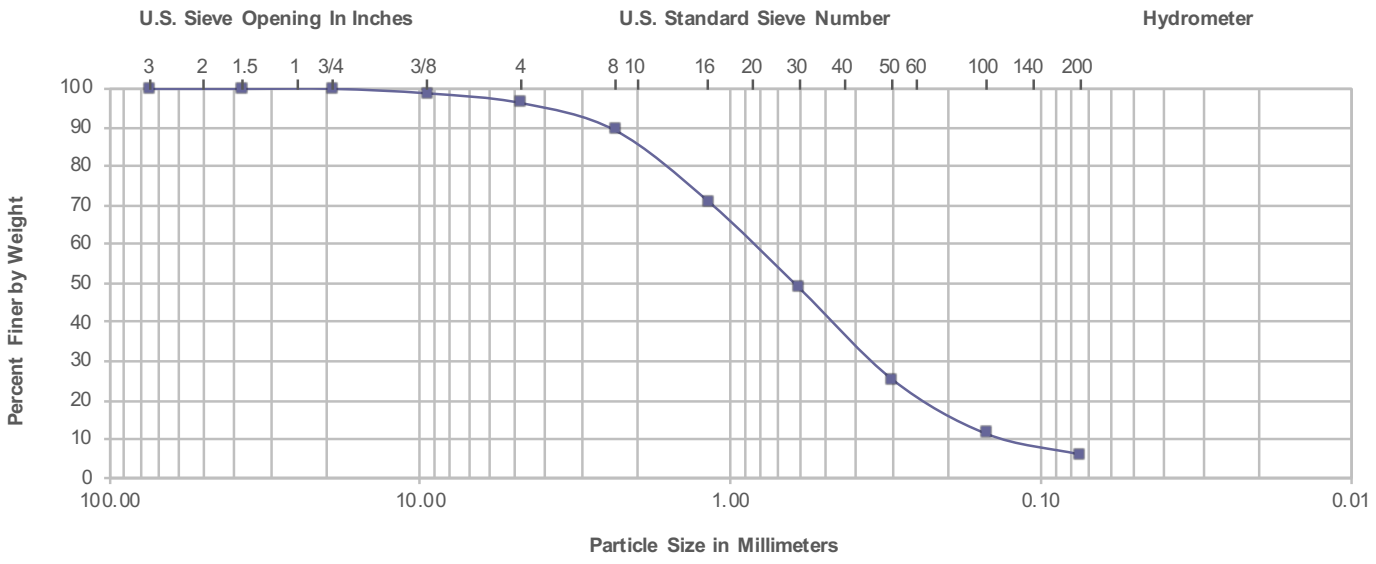
Sample ID: CRG11042028 **Gravel** (%): 3.6% **Sand** (%): 90.3% **Fines** (%): 6.0%

Classification, ASTM D2487: (SW-SM) Well graded sand with silt
Sample Origin: Boring Four at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
6	1	2.5%	19.000	0.850	0.365	0.140	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 527.5
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

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Particle-Size Analysis of Soil

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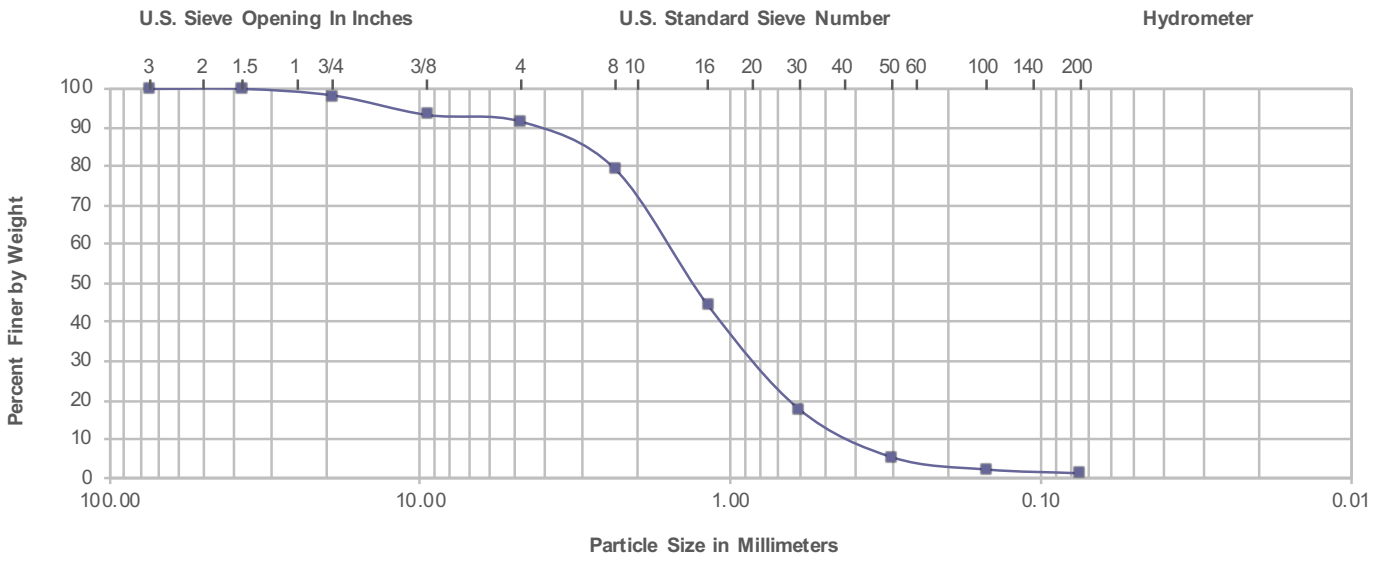
Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Sample ID: CRG11042033 **Gravel** (%): 8.4% **Sand** (%): 90.4% **Fines** (%): 1.2%

Classification, ASTM D2487:	(SW) Well graded sand
Sample Origin:	Boring Four at 25'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
4	1	16.7%	37.500	1.650	0.860	0.415	ND	ND	ND	ND	ND	-

Method / Procudure Used:	D422
Size of Initial Dry Mass (g):	448.1
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/12 hr
Type & Amount of Agent:	Defloc. & 1.0
Comments:	

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Particle-Size Analysis of Soil

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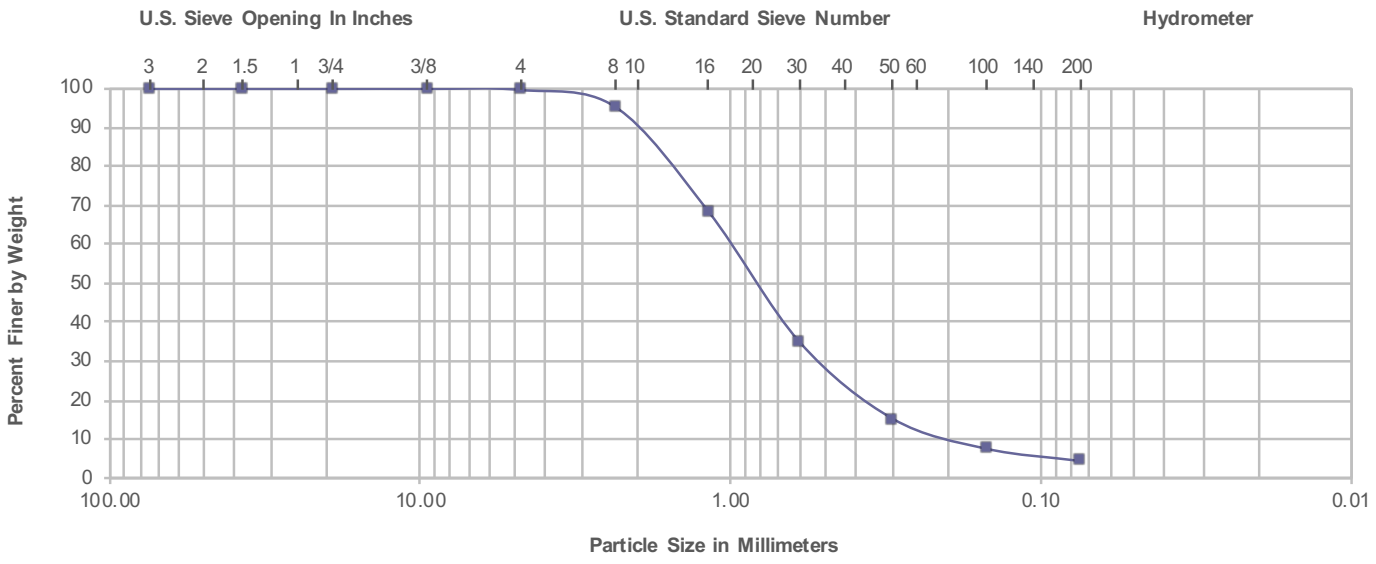
Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Sample ID: CRG11052005 **Gravel** (%): 0.3% **Sand** (%): 95.3% **Fines** (%): 4.4%

Classification, ASTM D2487:	(SW) Well graded sand
Sample Origin:	Boring Six at 15'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
9	2	16.7%	4.750	1.050	0.535	0.115	ND	ND	ND	ND	ND	-

Method / Procudure Used:	D422
Size of Initial Dry Mass (g):	453.5
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/12 hr
Type & Amount of Agent:	Defloc. & 1.0
Comments:	

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Particle-Size Analysis of Soil

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Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
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Client:	City of Victorville

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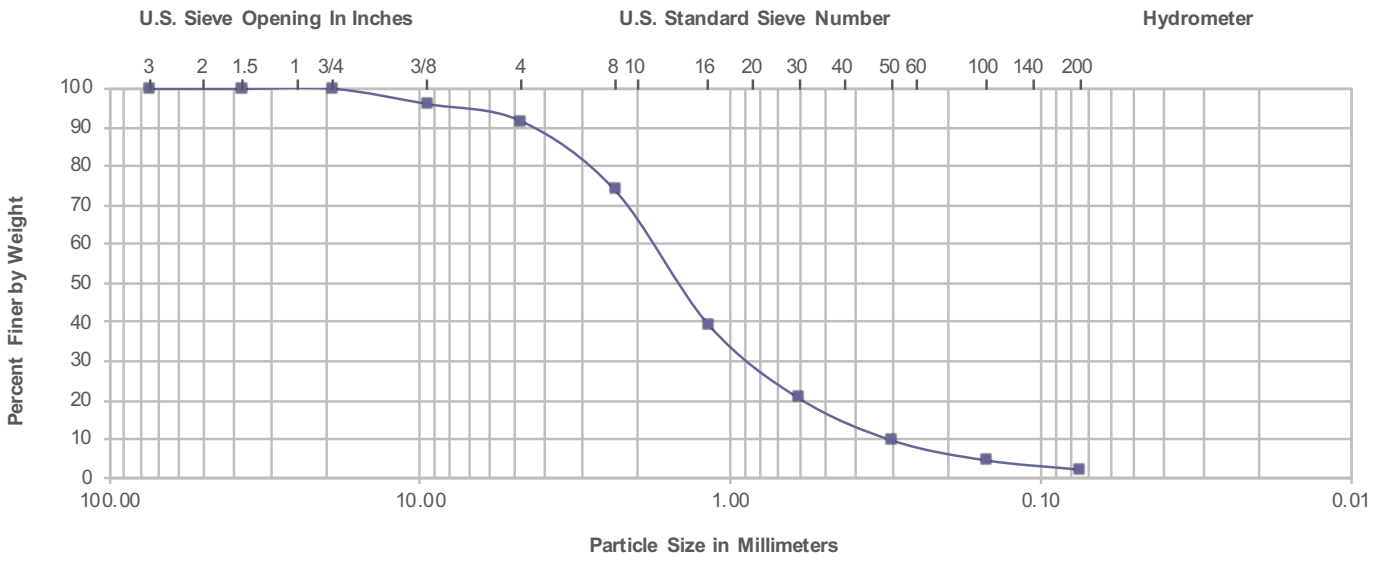
Sample ID: CRG11052006 **Gravel** (%): 8.3% **Sand** (%): 89.6% **Fines** (%): 2.1%

Classification, ASTM D2487: (SW) Well graded sand
Sample Origin: Boring Six at 25'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
6	1	15.3%	19.000	1.850	0.900	0.310	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 455.9
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
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Client:	City of Victorville

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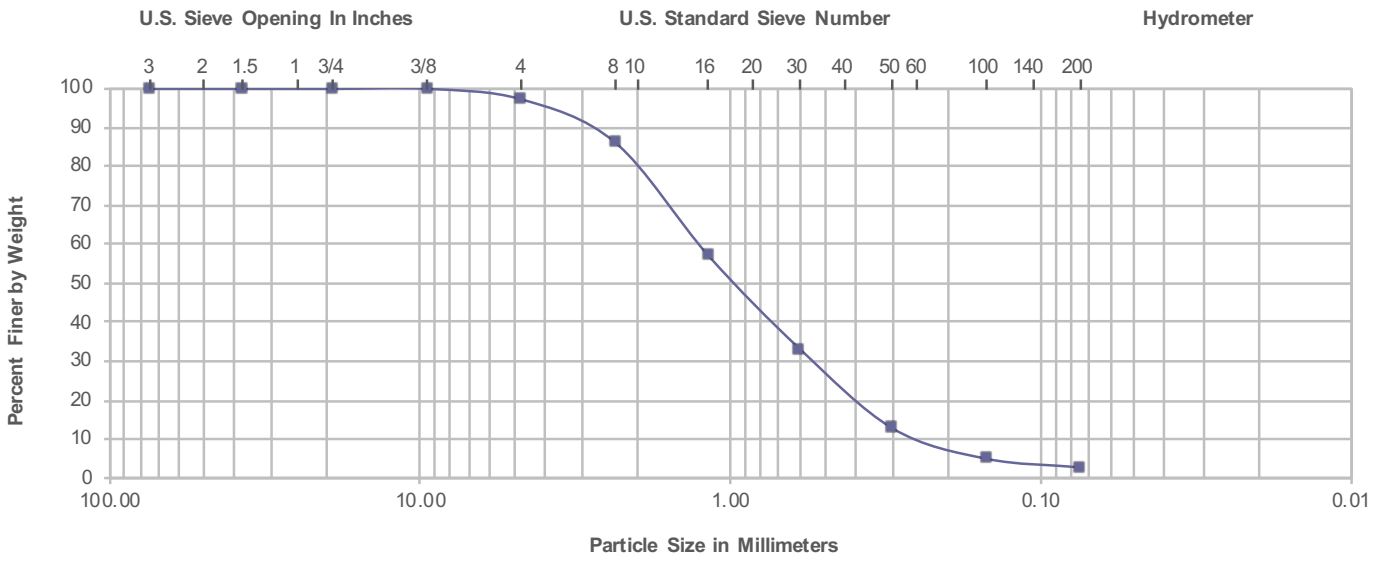
Sample ID: CRG11052008 **Gravel** (%): 2.7% **Sand** (%): 94.6% **Fines** (%): 2.7%

Classification, ASTM D2487: (SW) Well graded sand
Sample Origin: Boring Seven at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
5	1	8.2%	9.500	1.350	0.540	0.270	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 477.2
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

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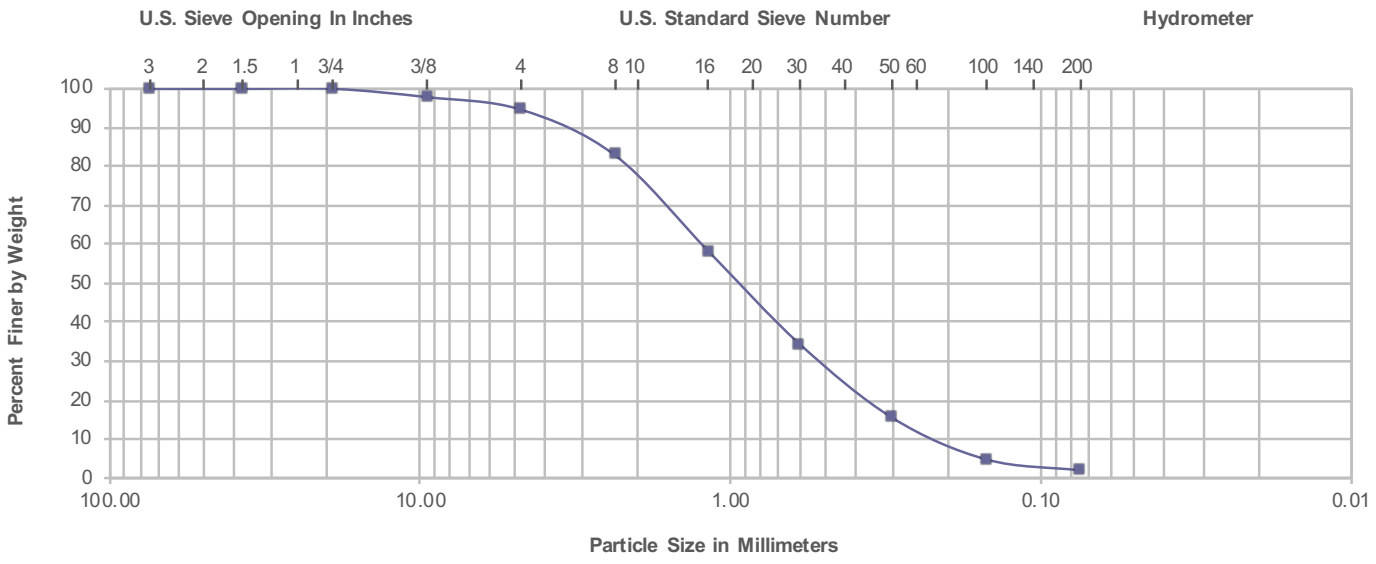
Sample ID: CRG11052009 **Gravel** (%): 5.3% **Sand** (%): 92.7% **Fines** (%): 2.0%

Classification, ASTM D2487: (SW) Well graded sand
Sample Origin: Boring Seven at 10'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
6	1	19.8%	19.000	1.450	0.415	0.230	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 425.8
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

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Particle-Size Analysis of Soil

D422, D1140, D2487

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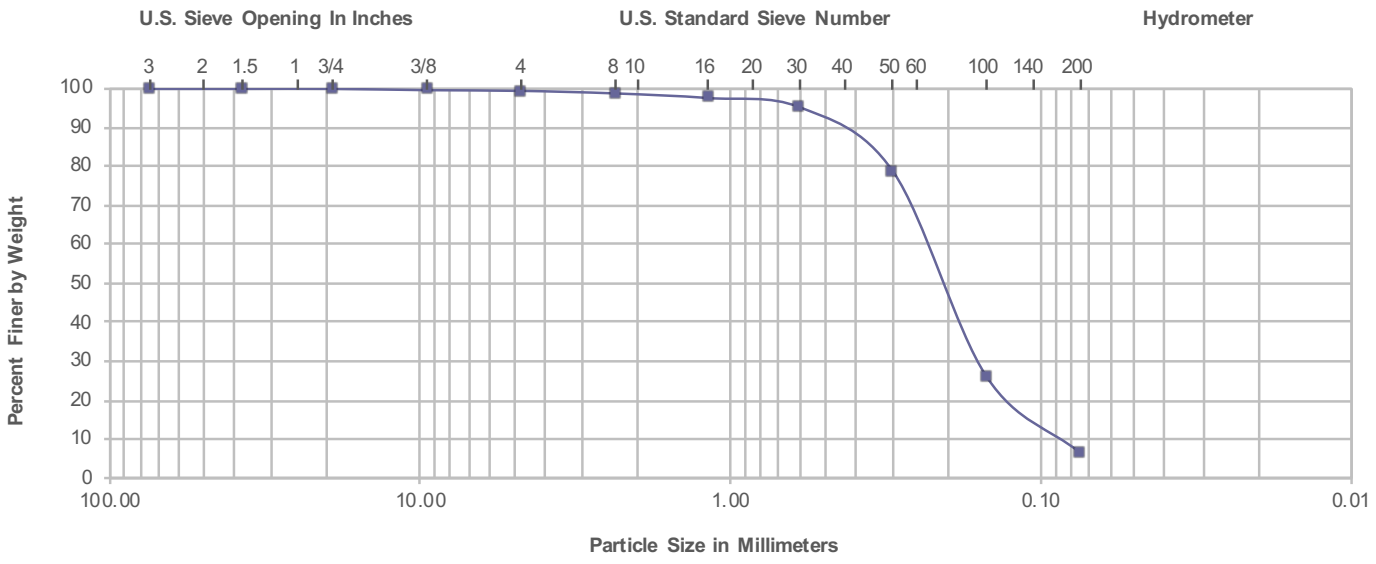
Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Sample ID: CRG11052013 **Gravel** (%): 0.5% **Sand** (%): 93.0% **Fines** (%): 6.5%

Classification, ASTM D2487: (SP-SM) Poorly graded sand with silt
Sample Origin: Boring Eight at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
3	1	1.7%	9.500	0.240	0.170	0.090	ND	ND	ND	ND	ND	-

Method / Procudure Used:	D422
Size of Initial Dry Mass (g):	504.2
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/12 hr
Type & Amount of Agent:	Defloc. & 1.0
Comments:	

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Particle-Size Analysis of Soil

D422, D1140, D2487

Project Number:	2102.041.500
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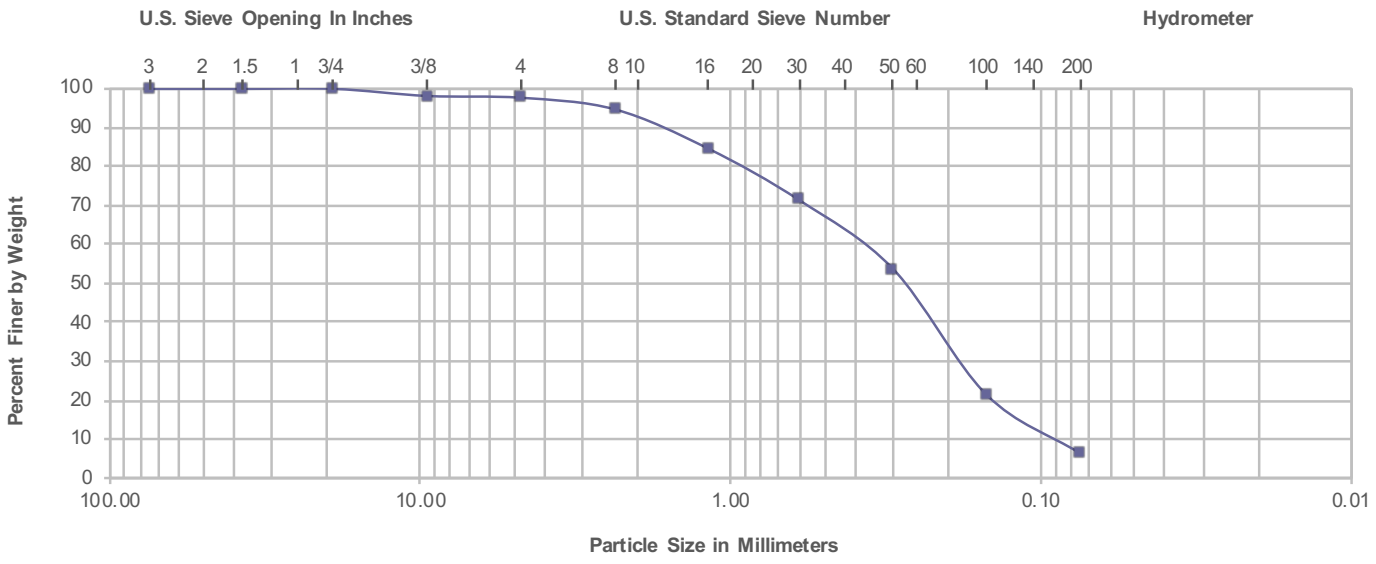
Sample ID: CRG11052017 **Gravel** (%): 2.3% **Sand** (%): 91.3% **Fines** (%): 6.4%

Classification, ASTM D2487: (SP-SM) Poorly graded sand with silt
Sample Origin: Boring Eight at 20'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
4	1	28.2%	19.000	0.375	0.190	0.090	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 350.2
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

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Particle-Size Analysis of Soil

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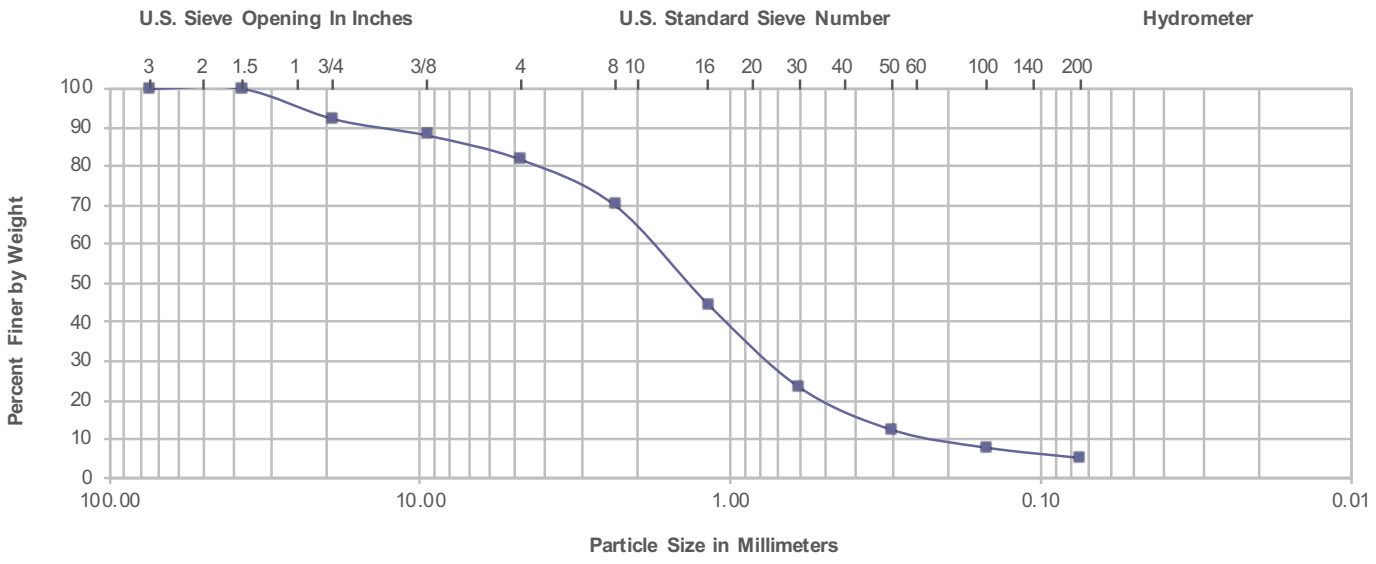
Sample ID: CRG11052020 **Gravel** (%): 18.2% **Sand** (%): 76.6% **Fines** (%): 5.2%

Classification, ASTM D2487: (SW-SM) Well graded sand with silt and gravel
Sample Origin: Boring Nine at 10'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
12	2	14.1%	37.500	1.800	0.800	0.145	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 424.7
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

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Particle-Size Analysis of Soil

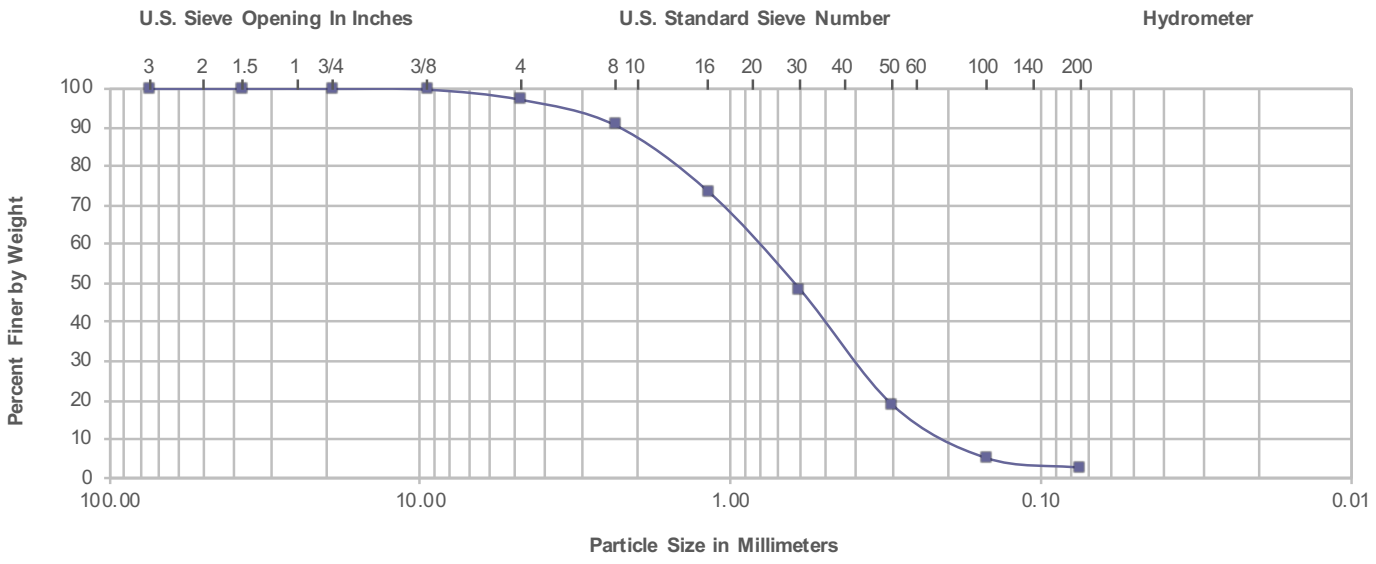
D422, D1140, D2487

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Report Date:	11/04/20
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: CRG110520024 **Gravel** (%): 2.8% **Sand** (%): 94.5% **Fines** (%): 2.7%

Classification, ASTM D2487: (SW) Well graded sand
Sample Origin: Boring Ten at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
7	2	0.4%	9.500	0.800	0.400	0.115	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422
Size of Initial Dry Mass (g): 519.3
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

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R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

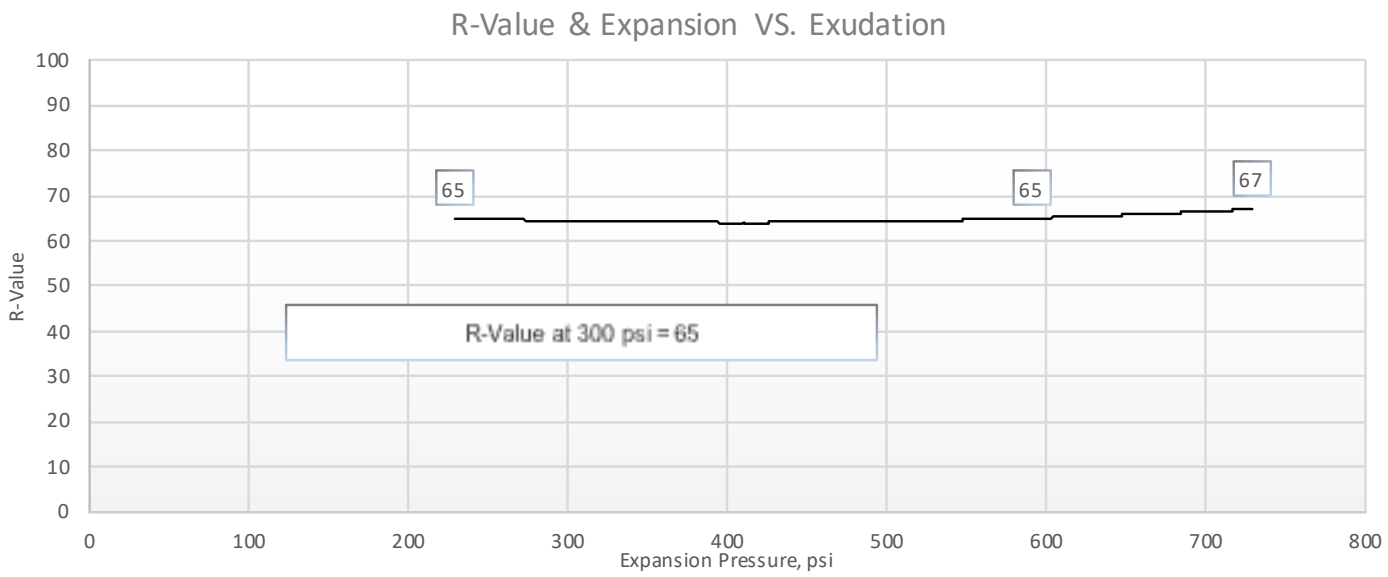
Report Date:	11/05/20
Sheet:	1 *of* 1
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Sample ID: CRG11052013 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SP-SM) Poorly graded sand with silt
Sample Origin:	Boring Eight at 0' to 5'
Tested By:	Clayton Garrison

Briguette Number:	1	2	3
Moisture Content (%):	11.3	12.9	14.9
Dry Density (pcf):	108.3	109.8	108.0
Exudation Pressure (psi):	729	591	229
Expansion Pressure (psf):	0	0	0
R-Value:	67	65	65



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Clayton Garrison / Laboratory Manager
Name / Title

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Corrosion Potential

CT 643, 422, 417, 643

Project Number:	2102.041.500
Project Title:	Victorville Wellness Center
Project Location:	River Street, Victorville, CA
Client:	City of Victorville

Report Date:	11/04/20
Sheet:	1 of 1
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Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: CRG11042001

Classification, ASTM D2488:	(SP) Poorly graded sand
Sample Origin:	Boring One at 0' to 5'
Laboratory Remarks:	

Analysis	Result	Units	Test Method
Saturated Resistivity	4000	ohm-cm	CT 643
Chloride	155	ppm	CT 422
Sulfate	0.003	% by weight	CT 417
pH	8.29	pH units	CT 643

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Clayton Garrison / Laboratory Manager
Name / Title

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