ADDENDUM #1
TYLER WAY & 18TH STREET SANITARY SEWER CAPACITY IMPROVEMENTS
BID #19/20-023 / PWP #WA-2020-251
BIDS DUE NO LATER THAN: 1:45 PM ON APRIL 15, 2020
PUBLIC BID OPENING: 2:00 PM ON APRIL 15, 2020

This addendum is to notify all potential proposers of clarifications made to the Bid documents as stated below.

REMINDER TO BIDDERS:
Due to issues discovered in previous bids for this and similar construction projects, the City wishes to direct bidders to re-read and observe the following items:

Bid Document Page 9 (Subcontractor Detail) – Potential bidders are reminded that Nevada State Law ***REQUIRES*** bidders to list all subcontractors that will be paid an amount exceeding 5% of their bid price. This requirement extends to the bidder as well. Bidders ***MUST ALSO*** list themselves on this form with the description of work they will self-perform under any contract resulting from this bid. Bidders failing to list themselves on this form will be found "non-responsive" and cannot be considered in the evaluation of bids.

COVID-19 Precautions – Due to the City's response to the COVID-19 virus and associated reduction in staff, in-person staff availability is limited. Bidders wishing to physically deliver their bids on the bid due date shall note that the Purchasing Office will open at 1PM on April 15th for the purpose of receiving bids. Bids are due no later than 1:45PM. The public bid opening will be available to all bidders via WEBEX as detailed in the Notice to Bidders. A complete bid recap will be available on the City's website no later than 5PM on April 15, 2020.

BID ITEM MODIFICATIONS

Question #1:
Bid Item #12 10" DIP Water Main does not account for any of the pipe on the connection details (sheets W8-W9). Please recount and update the bid schedule for this item.

Response:
Updates (additions underlined, deletions ~~strikethrough~~)

Change Bid item 11 to read: ~~215~~ 224 LF, 6-inch or 8-inch Diameter Water Main (Restrained Joint Ductile Iron Pipe with Polywrap)

Change Bid item 12 to read: ~~136~~ 220 LF, 10-inch Diameter Water Main (Restrained Joint Ductile Iron Pipe with Polywrap)

Summary of changes:

1. Sheet W6, +6 LF 8-in RJ-DIP and -6 LF 10-in RJ-DIP; mis-quantified as 10" in profile; ref 3/W9
2. Detail 2/W8, +59 LF 10-in RJ-DIP and +3 LF 6-in RJ-DIP
3. Detail 1/W9, +31 LF 10-in RJ-DIP

Question #2:
Bid Item #4 Inside Drop requires ductile iron pipe per City of Sparks detail S-207. 15" Ductile Iron Pipe does not exist as sheet C-2 calls out. 14" and 16" are the next closest sizes in Ductile Iron Pipe.

Response:
Contractor shall install 16-inch Ductile Iron Pipe for all pipe and fittings wherever 15-inch Ductile Iron Pipe is indicated for the Type V Inside Drop Manhole at Station 15+86.03 on Sheet C-2, and per Detail 3, Sheet D-2.

GEOTECHNICAL REPORT

The geotechnical report authored by Dyer Engineering for the project area is included in the following pages of this addendum.

Please note and adjust your bid according to the revisions, additions, deletions, clarifications or modifications as presented on this Addendum #1, which are made a part of this bid. NOTE: To avoid disqualification, this Addendum 1 (and any other addenda) must be signed by an authorized representative of the bidding firm in the space provided and must be submitted with your firm's sealed proposal. Failure to return this addendum, duly signed, may be cause for rejection of the bid. ALL ADDENDA SHOULD BE SIGNED AND PLACED IN SEQUENTIAL ORDER AND ATTACHED TO THE FRONT OF THE BID PACKAGE, COMPLETE WITH ALL REQUIRED DOCUMENTS.

_____
CONTRACTOR BUSINESS NAME

X_____
Authorized Signature

_____
Printed Name of Person Signing

_____
Dan Marran, C.P.M., CPPO
Contracts and Risk Manager

April 10, 2020

Mr. Lonnie J. Johnson, P.E.
Dyer Engineering Consultants, Inc.
9160 Double Diamond Parkway
Reno, NV 89521

Project No.: 1922-07-1
September 26, 2019

RE: Geotechnical Investigation
Tyler Way and 18th Street Sewer Project
Sparks, Nevada

Dear Mr. Johnson:

Black Eagle Consulting, Inc. (BEC) is pleased to present the results of our geotechnical investigation for the proposed replacement of the existing sewer main along Tyler Way and 18th Street in Sparks, Nevada. Our scope of work included research, field exploration, and field and laboratory testing to develop geotechnical data and to formulate associated geotechnical recommendations for the proposed sanitary sewer improvements.

Project Description

The subject sanitary sewer improvements project will involve capacity upgrades to the approximately 1,250-foot-long sewer line along 18th Street between York Way and Tyler Way and the approximately 1,020-foot-long sewer line along Tyler Way east of 18th Street in Sparks, Nevada (refer to Plate 1 [Plot Plan]).

The existing sewer main will be replaced using new 15-inch-diameter polyvinyl chloride sewer pipes. Replacement of the sewer pipes will require excavation, removal, and replacement of old pipelines and may include changes in the alignment and/or slope of the pipelines to adapt to changes in flow, future demand, or right-of-way considerations. The installation depths of the replacement sewer line are expected to be 8 to 14 feet below the street grade.

Site Conditions

The proposed project lies within the City of Sparks right-of-way for 18th Street and Tyler Way. The project is located within a residential area and is adjacent to Sparks Middle School on 18th Street.

18th Street and Tyler Way are asphalt concrete paved roadways with 2 traffic lanes and 2 parking lanes each. The streets have Portland cement concrete (PCC) curbs, gutters and sidewalks. Within the project limits, 18th Street is approximately 38 feet wide and Tyler Way is approximately 34 feet wide. The existing structural section along the proposed sanitary sewer rehabilitation area consists of approximately 3.5 to 7 inches of asphalt concrete pavement underlain by approximately 6 to 7 inches of aggregate base and asphalt grindings material.

Underground sanitary sewer, water, and gas main lines and laterals are present with the sewer alignment. Underground storm drains are also present in the project area. Overhead power and communication lines run along 18th Street and Tyler Way and extend into the surrounding properties.

Exploration

Prior to site exploration, BEC contacted Underground Service Alert (USA) to identify and mark all utilities in the area of each boring location, and an encroachment permit was obtained from the City of Sparks to work in the right-of-way.

The site was initially explored on July 30, 2019, using a CME 55 soils sampling drill rig but encountered shallow refusal in very dense sand and gravel deposits with cobbles and boulders. Exploration of the site was then completed on September 4, 2019, by drilling 3 test borings using 6-inch-outside-diameter (O.D.), 4.25-inch-inside-diameter (I.D.), hollow stem augers and a truck-mounted Diedrich D-120 soils sampling drill rig. All borings were generally located a minimum of 5 feet from any USA utility location markings. The maximum depth of exploration was 20.5 feet below the existing ground surface. The locations of the test borings are shown on Plate 1.

The subsurface soils were then sampled in-place every 2.5 to 5 feet by use of a standard, 2-inch O.D., 1.25-inch I.D., split-spoon sampler driven by a standard 140-pound drive hammer with a 30-inch stroke. The number of blows to drive the sampler the final 12 inches of an 18-inch penetration (Standard Penetration Test [SPT] – American Society for Testing and Materials [ASTM] D 1586) into undisturbed soil is an indication of the density and consistency of the material.

A 3-½-inch-O.D., split-spoon sampler (ASTM D 3550) was also used to sample soils containing gravel or where approximate in-place densities of subsurface materials were required. Sampling methods used were similar to the SPT but also included the use of 2-½-inch-diameter, 6-inch-long, brass sampling tubes placed inside the split-spoon sampler. Because of the larger diameter of the sampler, blowcounts are typically higher than those obtained with the SPT and should not be directly equated to SPT blowcounts. The logs indicate the type of sampler used for each sample.

Due to the relatively small diameter of the samplers, the maximum particle size that could be obtained was approximately 1.5 inches. The final logs may not, therefore, adequately represent the actual quantity or presence of cobbles or boulders.

The pavement structural section was measured in the field and is summarized in Table 1 (Exploration Summary).

TABLE 1 – EXPLORATION SUMMARY				
Location/Boring #	**Asphalt Thickness (inches)**	**Base Thickness (inches)**	**Subgrade Soil Type (USCS)**	**Depth to Groundwater (feet)**
18th Street, north/B-01	4.5	7.0 (asphalt grindings)	Clayey Sand with Gravel	NE[1]
18th Street, south/B-02	7.0	6.0 (aggregate base)	Clayey Sand with Gravel	20.0
Tyler Way, east/B-03	3.5	7.0 (aggregate base)	Silty Sand	NE[1]
[1]NE - Not Encountered.				

A geologist examined and identified all soils in the field in accordance with ASTM D 2488. During drilling, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada, laboratory for testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing, as described in the Laboratory Testing section. Logs of the borings are presented as Plate 2 (Boring Logs), and an USCS chart has been included as Plate 3 (USCS Soil Classification Chart).

Laboratory Testing

All soils testing performed in BEC's laboratory is conducted in accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards.

Samples of each significant soil type were analyzed to determine their in-situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). The results of these tests are shown on Plate 4 (Index Test Results). Test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate.

A moisture-density relation test (ASTM D 1557) was performed on a representative sample of the native soils. The maximum density shown by this test is compared with field densities to determine the percent of relative compaction. The moisture density curve is included as Plate 5 (Compaction Test Report).

Soluble sulfate testing was performed on representative samples of site soils. The results of the chemical tests are shown on Plate 6 (Chemical Test Results). Chemical testing was performed by Silver State Analytical Laboratories of Reno, Nevada.

General Geologic and Soil Conditions

The Nevada Bureau of Mines and Geology (NBMG) has mapped the majority of the area as *Alluvium*, but the site is located near an approximate boundary with *Tahoe Outwash* (Bonham and Bingler, 1973). The *Alluvium* is described by NBMG as *poorly sorted clayey to silty gravelly sand, poorly bedded to unbedded. Tahoe*

Outwash is described by NBMG as *Boulder to cobble gravel, sandy gravel, and gravely sand. Contains giant boulders. Rock clasts are rounded to subrounded and, in decreasing order of abundance, are granitic, volcanic, and metamorphic*. The soils encountered during exploration are more consistent with *Tahoe Outwash*.

The site soils generally consist of a surficial layer of clayey sand with gravel, silty sand, and sandy lean clay through about 5 to 9 feet depth underlain by poorly graded gravel and clayey gravel soils through the maximum depth of exploration, 20.5 feet beneath the existing pavement. The clayey sand to silty sand soils through an approximate 4- to 5-foot depth are described as brown, moist, medium dense to very dense, and as containing approximately 20 to 30 percent non-plastic to medium plasticity fines, 46 to 75 percent fine to coarse sand, and up to 24 percent gravel. The intermediate depth sandy lean clay encountered in the northern boring, B-01, on 18th Street between 6 and 9 feet below the existing pavement grade is described as brown, moist, very stiff, and as containing 61 percent high plasticity fines, 36 percent sand, and 3 percent fine gravel. The underlying sand and gravel deposits in all borings are described as brown to gray, moist to wet, very dense, and as containing about 10 to 15 percent non-plastic to medium plasticity fines, 35 to 40 percent sand, and 50 to 55 percent subrounded to rounded, fine to coarse gravel. Cobbles and boulders are present as indicated by drilling response; these soils resulted in practical drilling refusal at depths of 5 feet and 12.5 feet with the CME 55 and D-120 drill rigs, respectively, in our exploration.

Groundwater is present at approximately 20 feet depth in boring B-02 and should not significantly affect project design or construction based on the anticipated design depths. Deeper segments of sewer line may require trench bottom stabilization when the trenching extends close to groundwater elevations.

Faulting

The earthquake hazards map for the area (Bingler, 1974) does not show any faults within the vicinity of the project site. Because no fault structures are mapped to cross the sewer line alignment or were identified during exploration on or adjacent to the site, no further fault investigation or hazard mitigation will be necessary for the sewer infrastructure upgrades project.

Discussion and Recommendations

Trenching and Excavation

The native soils encountered are generally granular sand and gravel soils with increasing gravel, cobble and boulder content with depth. Due to the presence of small to possibly large boulders, particularly within the sand and gravel outwash deposits, trenching will be difficult and will require medium to large excavators. Neat-line trenching will also be difficult in most areas and possibly impossible in local areas due to the presence of clean sand and gravel soils, cobbles and potential boulders.

Temporary trenches with near-vertical sidewalls should be stable to a depth of approximately 4 feet. Temporary trenches are defined as those that will be open for less than 24 hours. Excavations to greater depths will require

shoring (e.g., trench shields) or laying back of sidewalls to maintain adequate stability. Regulations contained in Part 1926, Subpart P, of Title 29 of the Code of Federal Regulations (2010) require that temporary sidewall slopes be no greater than those presented in Table 2 (Maximum Allowable Temporary Slopes).

TABLE 2 - MAXIMUM ALLOWABLE TEMPORARY SLOPES

Soil or Rock Type	Maximum Allowable Slopes[1] for Deep Excavations less than 20 Feet Deep[2]
Stable Rock	Vertical (90 degrees)
Type A[3]	3H:4V (53 degrees)
Type B	1H:1V (45 degrees)
Type C	3H:2V (34 degrees)

Notes:

[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
[2] Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
[3] A short-term (open 24 hours or less) maximum allowable slope of 1H:2V ([horizontal to vertical] 63 degrees) is allowed in excavation in Type A soils that are 12 feet or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet in depth shall be 3H:4V (53 degrees).

The State of Nevada, Department of Industrial Relations, Division of Occupational Safety and Health (OSHA) has adopted and strictly enforces these regulations, including the classification system and the maximum slopes. In general, Type A soils are cohesive, non-fissured soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. Type B are cohesive soils with an unconfined compressive strength between 0.5 and 1.5 tsf. Type C soils have an unconfined compressive strength below 0.5 tsf. Numerous additional factors and exclusions are included in the formal definitions. The client, owner, design engineer, and contractor shall refer to Appendix A and B of Subpart P of the previously referenced Federal Register for complete definitions and requirements on sloping and benching of trench sidewalls. Appendices C through F of Subpart P apply to requirements and methodologies for shoring.

On the basis of our exploration, the native soils are predominantly Type C, except for the near-surface clayey sand with gravel and sandy lean clays encountered within the northern portion of 18th Street which can be considered Type B. Any area in question shall be considered Type C unless examined by the geotechnical engineer during construction. All trenching shall be performed and stabilized in accordance with local, state, and OSHA standards.

Site Preparation and Stabilization

The proposed sewer alignment is located within asphalt pavement and close proximity of PCC curbs, gutters and sidewalk. All pavements and, where necessary, PCC flatwork shall be saw-cut removed. In no case shall the saw-

cut be located in or within 12 inches on either side of a wheel path. The existing asphalt pavement and flatwork shall be removed from the site. Existing aggregate base (including recycled aggregate base) may be stockpiled and reused as utility backfill/structural fill, when practical.

The subsurface soils encountered at the bottom of the excavation nearing the groundwater table may be over optimum moisture and difficult to compact. Mechanical stabilization of trench bottoms may be achieved by 12 to 18 inches of over-excavation and by providing a geotextile/gravel system consisting of Class C or D drain rock (*Standard Specifications for Public Works Construction* [*SSPWC*], 2016). The drain rock shall be placed in maximum 12-inch-thick loose lifts each compacted with a vibratory plate until no further deflection is observed.

A minimum of 6 inches of Type 2, Class B aggregate base or Class C drain rock shall be placed beneath the new sewer manholes or vaults (*SSPWC*, 2016). The aggregate base shall be compacted to a minimum of 95 percent relative compaction (ASTM D 1557), while Class C drain rock shall be compacted using a vibratory plate or other appropriate piece of construction equipment until no further consolidation is observed.

Utility Trench Backfill

In general, bedding and initial backfill 12 inches over the pipe will require import and shall conform to the requirements of the utility having jurisdiction.

Final utility trench backfill shall meet the specifications of Class E backfill (*SSPWC*, 2016). The maximum particle size in final trench backfill shall be 4 inches. The native sandy lean clay soils encountered in boring B-01 do not meet the specifications of Class E backfill and should be removed from the site. The native sand and gravel deposits should meet the Class E specifications after removal of oversized material. The oversized particles in the excavated materials are expected to be of significant quantity, requiring screening before the materials can be used as final trench backfill. The moisture content of the excavated materials may also be over-optimum, requiring moisture conditioning to properly compact within the confinement of the trenches.

If imported trench backfill is required on this project, it shall meet the specifications for Class E Backfill (*SSPWC*, 2016).

All utility trench backfill shall be placed in maximum 12-inch-thick loose lifts each densified to at least 90 percent relative compaction (ASTM D 1557).

When drain rock is used as backfill, it shall be considered a rock backfill (greater than 30 percent retained on the 3/4-inch sieve) and should be placed in maximum 12-inch-thick loose lifts, with each lift densified by at least 5 complete passes with approved compaction equipment and until no deflection is observed. A separator geotextile such as Mirafi® 140N shall be placed between the drain rock and any native soil backfill.

Pavement Patching

The pavement section should match the existing structural section or satisfy the minimum section for the corresponding street classification as outlined in Drawing No. S-1 (*Standard Details for Public Works Construction*, 2011), whichever is greater. The existing structural sections and expected minimums for the City of Sparks are summarized in Table 3 (Pavement Patching Summary). The thickness of some asphalt concrete sections is the result of overlays, presumably over asphalt concrete that is well beyond its design life. With this, the City of Sparks minimum sections in Table 3 could be considered for patching and should perform adequately. All aggregate base beneath pavements shall be densified to a minimum of 95 percent relative compaction (ASTM D 1557).

TABLE 3 - PAVEMENT PATCHING SUMMARY

Street/Location	Street Category/Functional Classification*	Boring (B) Number	Existing Structural Section		City of Sparks Minimum	
			Asphalt Concrete (in)	Aggregate Base (in)	Asphalt Concrete (in)	Type 2, Class B Aggregate Base (in)
18th Street	Urban Minor Collector	B-01	4.5	7.0^	4	10
		B-02	7.0	6.0		
Tyler Way	Local	B-03	3.5	7.0	4	8

* Functional dassification per Nevada Department of Transportation (2016).
^ Asphalt grindings (recycled aggregate base)

Where the area to be patched extends well beyond the trench walls, subgrade soils may begin to pump and rut after the existing structural section is removed. It is common to find very moist to wet subgrade soils beneath existing pavements, as verified by our test results. Areas of soft soils will need to be over-excavated and stabilized. Typically, an over-excavation depth of 18 inches below subgrade is adequate if a woven geotextile is placed on the over-excavated surface and backfill consists of compacted aggregate base or asphalt concrete grindings. Shallow utilities may limit the depth of practical over-excavation, such that geogrid/aggregate base "sandwiches" or even cement slurry backfill may need to be used on a case-by-case basis.

Concrete Slabs and Flatwork

Subgrade for PCC curbs, gutters, and sidewalks shall be densified to a minimum of 90 percent relative compaction (ASTM D 1557). All PCC flatwork shall be underlain by a minimum of 6 inches of Class 2, Type B aggregate base (*SSPWC*, 2016). Aggregate base courses shall be densified to a minimum of 95 percent relative compaction (ASTM D 1557).

Soluble sulfate content has been determined for representative samples of the site soils, and the results of the testing indicate that concrete in contact with the site foundation soils should experience minimal degradation due to reaction with soil sulfate in most areas. Therefore, Type 2 cement can be used for any PCC flatwork on this project.

Closing

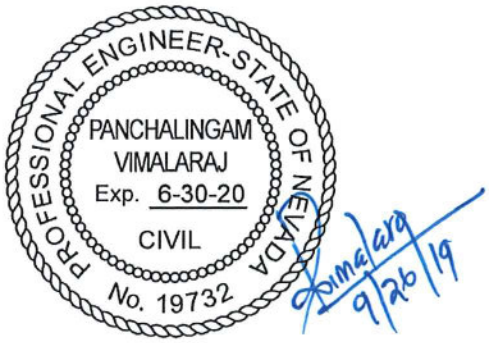
This report has been prepared in accordance with generally accepted geotechnical practices. The information submitted is based on field exploration performed as described in this report. This report does not reflect soils variations that may become evident during the construction period.

This report has been produced to provide information allowing the engineer to design the project. The client is responsible for distributing this report to all designers and contractors whose work is affected by geotechnical aspects. The geotechnical engineer makes no other warranties, either express or implied, as to the information included in this report.

We appreciate being of service to you on this project. If you have any questions or require any additional information, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.



Vimal P. Vimalaraj, P.E.
Engineering Division Manager

JP:PV:cjr

Copies to: Addressee (3 copies and PDF via email)

Enclosures: Plate 1 – Plot Plan
Plate 2 – Boring Logs
Plate 3 – USCS Soil Classification Chart
Plate 4 – Index Test Results
Plate 5 – Compaction Test Report
Plate 6 – Chemical Test Result

References

American Society for Testing and Materials (ASTM), 2018, *Soil and Rock; Dimension Stone; Geosynthetics,* Volume 4.08.

Bingler, E. C., 1974, *Earthquake Hazards Map, Reno Quadrangle*: Nevada Bureau of Mines and Geology, Map 4Ai.

Bonham, H. F. and E. C. Bingler, 1973, *Geologic Map, Reno Quadrangle*: Nevada Bureau of Mines and Geology, Map 4Ag.

Code of Federal Regulations, 2010, Title 29, Part 1926, Subpart P – Excavations.

Nevada Department of Transportation, 2016, Roadway Functional Classification, Reno-Urbanized Sheet B-2 dated 2016, Available online at https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/roadway-systems/functional-classification-maps.

Standard Details for Public Works Construction, 2011 (combined document dated December 29, 2011).

Standard Specifications for Public Works Construction (SSPWC), 2016 (Washoe County, Sparks-Reno, Carson City, Yerington, Nevada).

PLATES

Tyler Way and 18th Street Sewer Project

Dyer Engineering, Inc.
Sparks, Nevada

Black Eagle Consulting, Inc.
Project: 1922-07-1
Plate 1: PLOT PLAN

Legend

- Approximate Project Extent
- B-01 Approximate Boring Location

BORING LOG

BORING NO.: B-01 | DATE: 9/4/2019

TYPE OF BORING: Dietrich D-120: 6" HSA | DEPTH TO GROUND WATER (ft): NE

LOGGED BY: JP | GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								Asphalt Concrete An approximate 4.5-inch-thick-layer of asphalt concrete pavement underlain by an approximate 7-inch-thick-layer of asphalt grindings.
A	MC	50/5"				SC		**Clayey Sand with Gravel** Brown, moist, dense to very dense, with an estimated 20% low to medium plasticity fines, 60% fine to coarse sand, and 20% subrounded fine to coarse gravel. Cobbles and boulders indicated by drilling response.
B	SPT	15, 15, 16 (31)			5			
C	SPT	9, 9, 9 (18)	13.5	26		CL		**Sandy Lean Clay** Brown, moist, very stiff, with 61% high plasticity fines, 36% fine to coarse sand, and 3% of gravel up to 3/8 inch in diameter.
D	MC	50/5"			10	GC		**Clayey Gravel with Sand** Brown, moist, very dense, with an estimated 15% medium plasticity fines, 35% fine to coarse sand, and 50% subrounded fine to coarse gravel. Cobbles and boulders indicated by drilling response.
	AUGER							
E	SPT	30/4"			15			Terminated at target depth = 15 feet. Backfilled with neat cement grout.
					20			

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1345 Capital Blvd., Suite A
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Telephone: (775) 359-6600

Dyer Engineering Consultants, Inc.
Tyler Way and 18th Street Sewer Project
Sparks, Nevada

PROJECT NO.: 1922-07-1

PLATE: 2

SHEET 1 OF 1

BORING_LOG 1922071.GPJ BLKEAGLE.GDT 9/17/19

BORING LOG

BORING NO.: B-02 | DATE: 9/4/2019

TYPE OF BORING: Dietrich D-120: 6" HSA | DEPTH TO GROUND WATER (ft): 20.0

LOGGED BY: JP | GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
					0			**Asphalt Concrete** An approximate 7-inch-thick-layer of asphalt concrete pavement underlain by an approximate 6-inch-thick-layer of aggregate base.
A	SPT	11, 13, 10 (23)				SC		**Clayey Sand with Gravel** Brown, moist, medium dense, with 30% medium plasticity fines, 46% fine to coarse sand, and 24% subrounded gravel up to 1.5 inches in diameter. Bulk sample obtained from 1 to 7 feet beneath ground surface: Plasticity Index = 18, Moisture Content = 8.6%.
B	MC	22, 50/5" (50/5")			5			**Poorly Graded Gravel with Silt and Sand** Brown to gray, moist to wet, very dense, with an estimated 10% non-plastic fines, 35% fine to coarse sand, and 55% subrounded to rounded fine to coarse gravel. Cobbles and boulders indicated by drilling response.
C	SPT	30/2"						
D	MC	50/2"			10	GP-GM		
	AUGER							
E	SPT	22, 27, 27 (54)			15			
F	SPT	32/5"			20 ▼			Terminated at target depth = 20 feet. Backfilled with neat cement grout.

BORING_LOG 1922071.GPJ BLKEAGLE.GDT 9/17/19

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Tyler Way and 18th Street Sewer Project

Sparks, Nevada

PROJECT NO.: 1922-07-1

PLATE: 2

SHEET 1 OF 1

BORING LOG

BORING NO.: B-03 | DATE: 9/4/2019

TYPE OF BORING: Dietrich D-120: 6" HSA | DEPTH TO GROUND WATER (ft): NE

LOGGED BY: JP | GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	BLOWS/6"	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								Asphalt Concrete An approximate 3.5-inch-thick-layer of asphalt concrete pavement underlain by an approximate 7-inch-thick-layer of aggregate base.
A	SPT	9, 9, 7 (16)				SM		**Silty Sand** Brown, moist, medium dense, with an estimated 25% non-plastic to low plasticity fines and 75% fine to medium sand.
B	SPT	18, 15, 20 (35)			5	GP-GM		**Poorly Graded Gravel with Silt and Sand** Brown to gray, moist, dense to very dense, with an estimated 10% non-plastic fines, 40% fine to coarse sand, and 50% subrounded to rounded fine to coarse gravel. Cobbles and boulders inidcated by drilling response.
C	SPT	20, 30/2" (30/2")						No recovery for samples C, D, and E.
D	SPT	15/0"			10			
F	AUGER							
E	SPT	15/0"						
					15			Terminated at 12.5 feet depth due to refusal on cobbles or boulders. Backfilled with neat cement grout.
					20			

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Dyer Engineering Consultants, Inc.
Tyler Way and 18th Street Sewer Project
Sparks, Nevada

PROJECT NO.: 1922-07-1

PLATE: 2

SHEET 1 OF 1

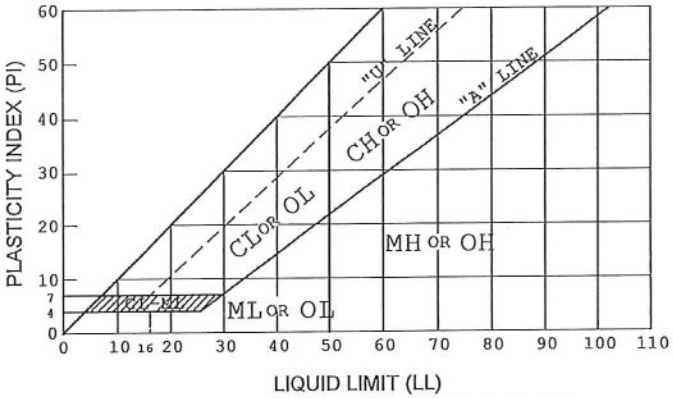
BORING_LOG 1922071.GPJ BLKEAGLE.GDT 9/17/19

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	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 PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	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
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL MATERIAL				--	FILL MATERIAL, NON-NATIVE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

PLASTICITY CHART



FOR CLASSIFICATION OF FINE-GRAINED SOILS AND FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS

EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample		Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	# 4 to #200 sieve (4.75mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

Black Eagle Consulting, Inc.
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Reno, Nevada 89502-7140
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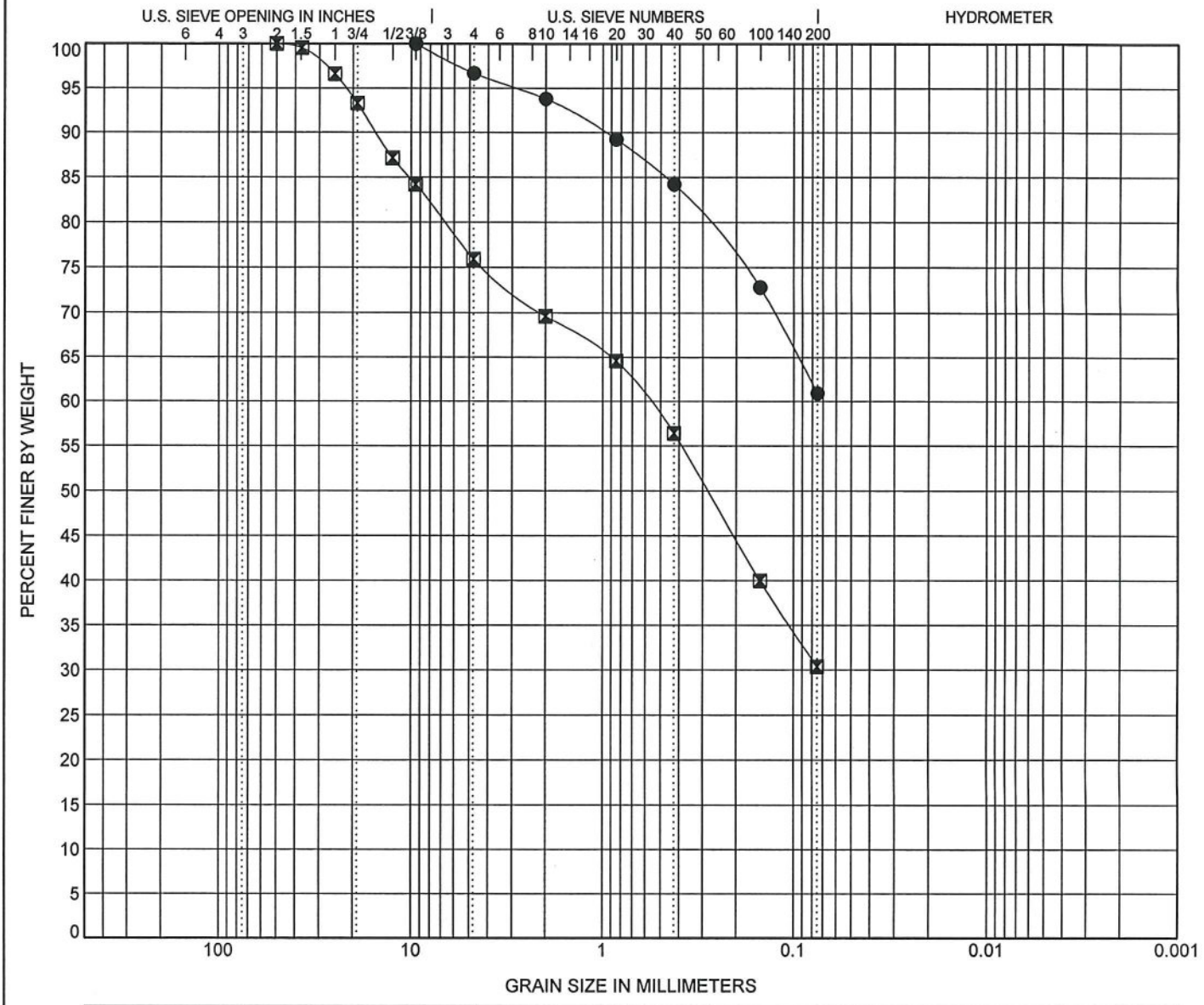
Fax: (775) 359-7766

USCS Soil Classification Chart

Project: Tyler Way and 18th Street Sewer Project
Location: Sparks, Nevada
Project Number: 1922-07-1 Plate: 3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-01	7.5	SANDY LEAN CLAY(CL)	43	17	26		
⊠	B-02	1.0	CLAYEY SAND with GRAVEL(SC)	34	16	18		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	7.5	9.5				3.3	35.8	60.9	
⊠	B-02	1.0	50	0.577			24.1	45.5	30.4	

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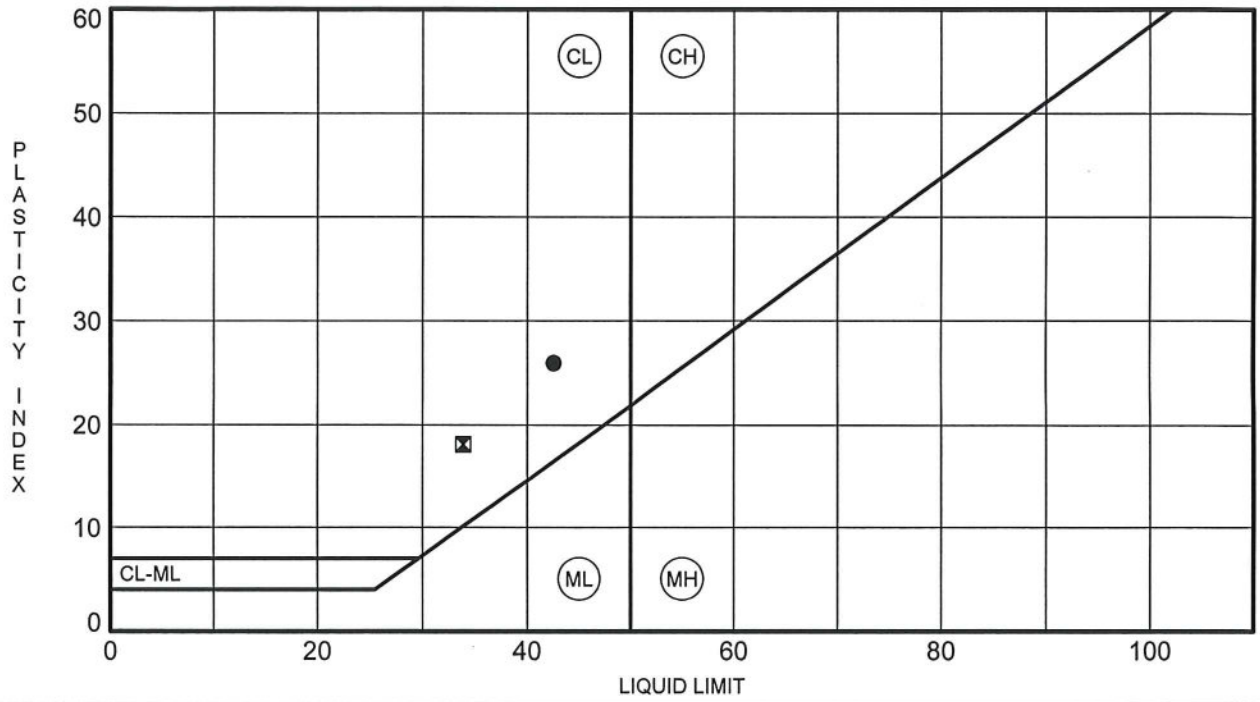
GRAIN SIZE DISTRIBUTION

Project: Tyler Way and 18th Street Sewer Project
Loction: Sparks, Nevada
Project Number: 1922-07-1

PLATE: 4a



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-01**	**7.5**	**43**	**17**	**26**	**61**	**SANDY LEAN CLAY(CL)**
⊠	**B-02**	**1.0**	**34**	**16**	**18**	**30**	**CLAYEY SAND with GRAVEL(SC)**

Black Eagle Consulting, Inc.
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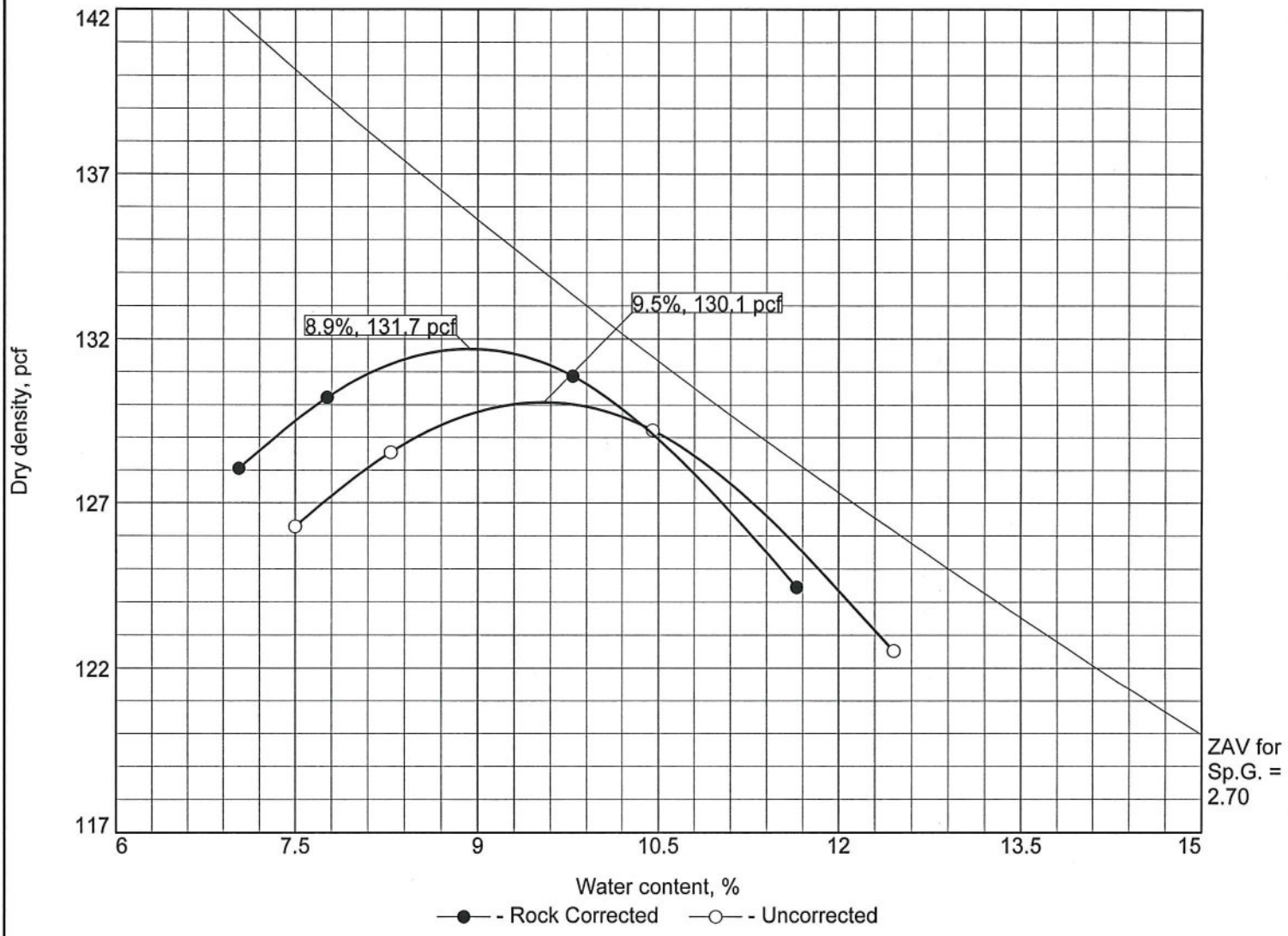
Telephone: (775) 359-6600

ATTERBERG LIMITS RESULTS

Project: Tyler Way and 18th Street Sewer Project
Loction: Sparks, Nevada
Project Number: 1922-07-1

PLATE: 4b

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method C Modified
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
1	SC		8.6		34	18	6.7	30.4

ROCK CORRECTED TEST RESULTS

Maximum dry density = 131.7 pcf

Optimum moisture = 8.9 %

MATERIAL DESCRIPTION

Clayey Sand with Gravel

Project No. 1922-07-1 **Client:** Dyer Engineering

Project: Tyler Way and 18th Street Sewer Project

○ **Source of Sample:** B-02 **Sample Number:** Bulk

BLACK EAGLE CONSULTING, INC.

Reno, Nevada

Remarks:

Laboratory Log 7683
Mechanical Sector Face Hammer Used

Figure 5

Tested By: BH **Checked By:** LO

SilverState Analytical Laboratories
Sierra Environmental Monitoring
Silver State Labs-Reno
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400 FAX: (888) 398-7002
www.ssalabs.com

Analytical Report

Workorder#: **19090315**
Date Reported: **9/12/2019**

Client: Black Eagle Consulting, Inc
Project Name: 1922-07-1 / B-01 7.5'
PO #:

Sampled By: J Payne

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
19090315-01	1922-07-1 / B-01 7.5'	09/04/2019 12:30	9/6/2019

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Sulfate	EPA 9056	44	mg/Kg	2	MA	09/10/2019 19:35	