Business Services
Procurement and Contracting
16550 SW Merlo Road
Beaverton, OR 97003
(503) 356-4324

September 16, 2021

SOLICITATION ADDENDUM NO. 2
ITB 21-0006
Mountainside High School Field Turf Remediation

THE FOLLOWING CHANGES/ADDITIONS TO THE ABOVE CITED SOLICITATION ARE ANNOUNCED:

This Addendum modifies the Invitation to Bid (ITB) document(s) only to the extent indicated herein. All other areas not changed or otherwise modified by this Addendum shall remain in full force and effect. This Addendum is hereby made an integral part of the ITB document. Bidder must be responsive to any requirements of this Addendum as if the requirements were set forth in the ITB. Failure to do so may result in Bid rejection. See the ITB regarding requests for clarification or change and protests of this Addendum, and the deadlines for the foregoing.

This addendum is to be acknowledged in the space provided on the Bidder Certification form supplied in the solicitation document. Failure to acknowledge receipt of this addendum may be cause to reject your offer.

The closing date **REMAINS UNCHANGED:**
September 21, 2021 at 2:00 PM Pacific Time

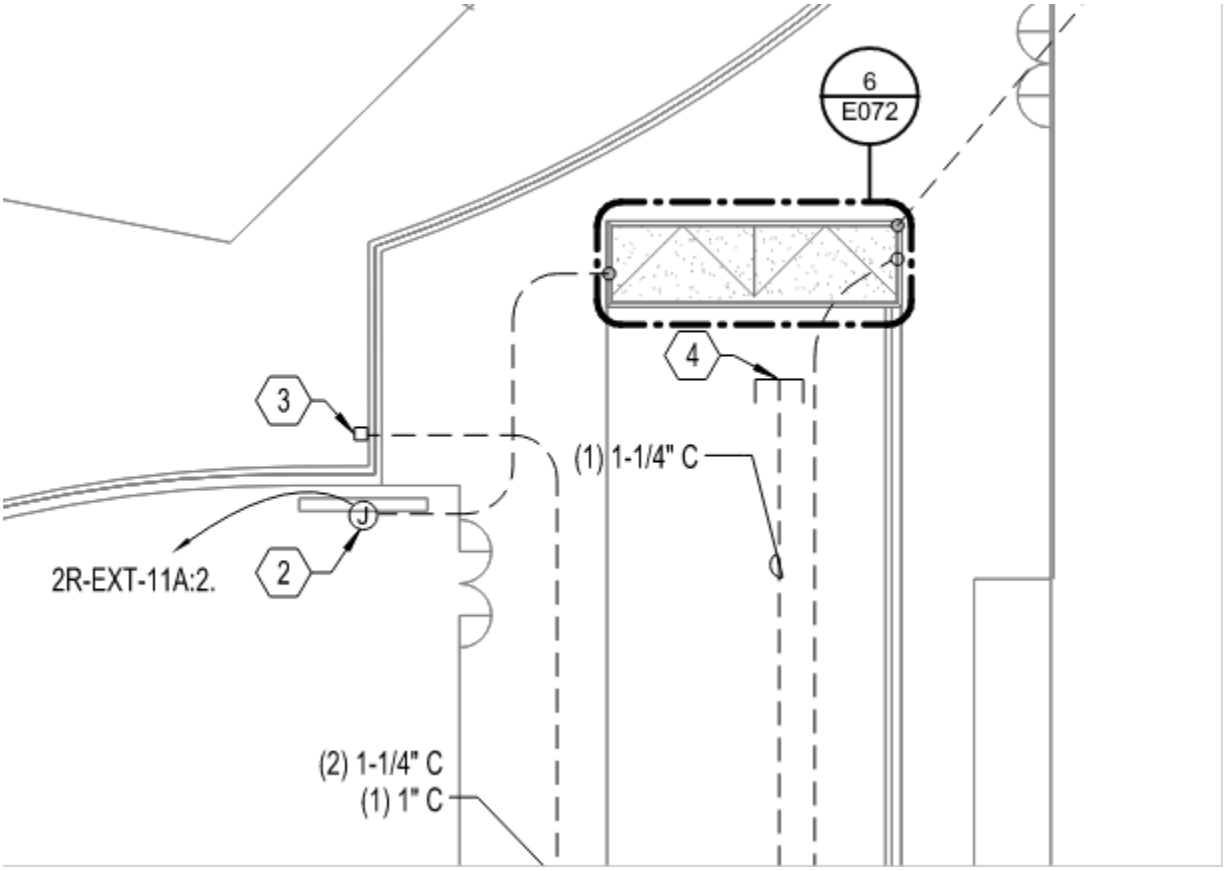
QUESTIONS/ANSWERS:

QUESTION: Do you have any Bentonite reports? Boring or Expansion?
ANSWER: **Attached is the field report from Carlson Testing for borings taken. (G1095187 Geotechnical Data Report)**

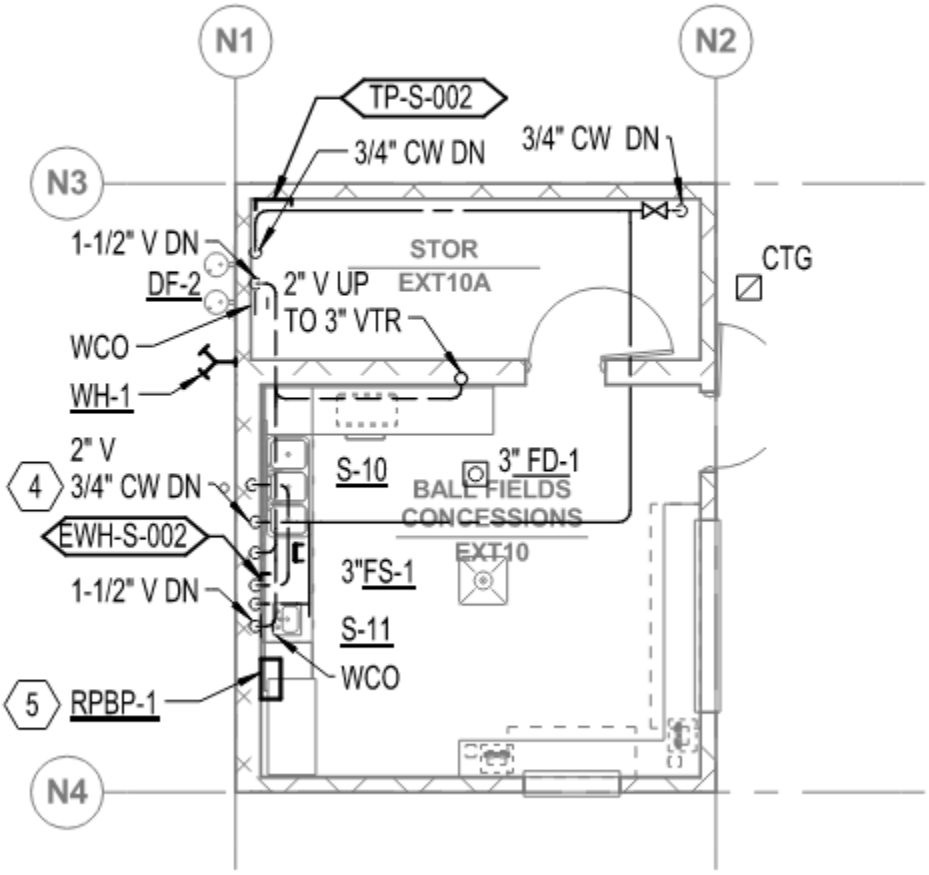
QUESTION: What is the concrete thickness in the area between the fields? For equipment?
ANSWER: **The concrete is vehicle rated - 6" thick with #4 rebar @ 24" oc**.

QUESTION: Is there a geogrid available?
ANSWER: **Geogrid was used in the lock and load retaining walls near the collection trenches. It is not anticipated that the work will impact those grids. Refer to Addendum #1- Background Submittal for the geogrid on the wall.**

QUESTION: What utilities are running across? Is Electrical fed from the slab?
ANSWER: **No, utilities are known to be running across the trenches with the exception of the scoreboard that may be in the vicinity of the work. The electrical conduits to the scoreboard run from the east storage building under the slab to the scoreboard.**



QUESTION: Where is the nearest water source? Access?
ANSWER: **The nearest water spigot is on the concessions building at the southeast side of the varsity field**.



QUESTION: Do you have details for the footings around the sign?

ANSWER: **The softball scoreboard footing submittal is attached showing the details**.

QUESTION: Clarify limits of civil contractor's work in relation to Certified Turf Contractor. Does civil contractor remove, stockpile and replace drain rock layer beneath turf surface and brock pad? Is the removal and replacement of drain rock intended to be performed by a Certified Turf Contractor?

ANSWER: **All work below the turf and brock pad may be performed by the contractor with approval by the Certified Turf Contractor, engineer of records, and owner's representative(s). All material removed shall be placed properly along with any additional rock or backfill material per the details. No, however the Certified Turf Contractor shall approve the completed work prior to placing the brock pad and turf.**

QUESTION: Please confirm existing concrete pavement is capable of supporting the weight of a 7-yard concrete delivery truck

ANSWER: **Exact weights of 7-yard concrete delivery truck are not known, however, the concrete pavement was designed to accommodate vehicular access for maintenance. Contractor will be responsible for damage to the existing concrete and therefore shall take precautions to minimize damage**.

QUESTION: General Note 6 on sheet C101 calls for protective sheeting and equipment to be on turf surface for maximum 4-hours (4-hours on and 4-hours off). Installation of fabric and steel sheets for heavy construction traffic is a time-consuming operation. It seems virtually impossible to construct the surface protection mat any substantial

distance within 4-hours. This leaves no time to perform the work. Please confirm I am interpreting this note correctly.

ANSWER: **Work should be completed on the aggregate surface for the majority of the work after the existing turf is pulled back. Areas where turf is not being removed but is needed for construction access can have the protection in place as long as the ambient temperature is less than 75 degrees for a maximum of 72 hours. The protection shall be moved to a different location or removed completely for the same amount of time it was in place to allow the fibers to relax. Protection is for the subgrade and fibers. Any subgrade that has been compacted by construction equipment shall be scarified and recompacted per Certified Turf Contractor, engineer of record, or owner's representative(s).**

QUESTION: Please confirm grassy area immediately west of the varsity softball field is a suitable stockpile location.

ANSWER: **The grassy area west of the varsity softball field is acceptable by the District as a stockpile location. Cover to protect from run off to adjacent areas.**

QUESTION: Are the existing CDF sidewall/chimney materials precast?

ANSWER: **It is understood the existing CDF was poured to the depth needed for the sidewalls, cured, then excavated through the middle to the proper trench depth**.

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January 20, 2020

Beaverton School District (BSD)
Attn: Mr. Patrick O'Harrow
16550 SW Merlo Road
Beaverton, Oregon 97003

Geotechnical Data Report
Mountainside High School Softball Field
12500 SW 175th Avenue
Beaverton, Oregon

CGT Project Number G1905187.A

1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this geotechnical data report for the Mountainside High School Softball Field. The site is located at 12500 SW 175th Avenue in Beaverton, Oregon. The site is located at 12500 SW 175th Avenue in Beaverton, Oregon, as shown on the attached Site Location, Figure 1. This report was prepared in general accordance with Task 2 outlined in CGT Proposal GP8701, dated October 19, 2019. Written authorization for our services was received on October 24, 2019. A draft version of this report was submitted to BSD on December 16, 2019.

2.0 PROJECT INFORMATION

CGT developed an understanding of site conditions within the subject athletic field based on information provided during a site meeting on October 1, 2019. Based on information provided, we understand that BSD observed drainage "blowouts" below an existing mechanically-stabilized earth (MSE) retaining wall located beyond (west/northwest) of the outfield of the existing softball field. Subsequent to the blowouts, we understand meetings were held and attended by BSD and several team members affiliated with original construction of the subject MSE retaining wall and athletic field. We further understand that BSD proceeded with two rounds of repairs, the first in 2017 and the second round in 2018. We understand the mitigation efforts in 2017 included excavation within a relatively narrow "band" within the outer portion of the entire softball field (along the outfield fence), placement of a layer of granular bentonite and backfilling with controlled density fill (CDF). Subsequent to installation of the CDF, we understand trenching was performed to re-install the perforated collector pipe. The trench was then backfilled with drain rock and synthetic turf materials were reinstalled. Subsequent to the 2017 repairs, the area comprising the buried bentonite experienced upward movement (heave). In 2018, we understand that repair efforts included temporarily removing the turf and lowering (i.e. cutting down) the affected area of the field to meet original design grades. Subsequent to the 2018 repairs, we understand that BSD observed the affected area exhibited additional heave along the same "band", resulting in an uneven playing surface in the outfield area.

BSD requested geotechnical exploration of the area to help ascertain what can be expected in terms of future performance of the affected portion of the softball field, and help identify measure(s) that could be taken to mitigate further heave of the field, if necessary. CGT previously performed a geotechnical review of provided documents related to the above construction and repair efforts (Task 1) and shared results with BSD in early November 2019.

3.0 SCOPE OF SERVICES

Our scope of work under Task 2, as presented in the above referenced proposal, included the following:

- Contact the Oregon Utilities Notification Center to mark the locations of public utilities within a 20-foot radius of our explorations at the site. CGT also subcontracted a private utility locator service to mark the locations of detectable private utilities within the same radius.
- Explore subsurface conditions at the site by advancing five drilled borings to depths of about 6½ to 8½ feet below ground surface (bgs). Details of the subsurface investigation are presented in Appendix A.
- Classify the soils encountered in the explorations in general accordance with ASTM D2488 (Visual-Manual Procedure).
- Conduct laboratory testing on selected samples obtained during site exploration.
- Provide a site vicinity map and a site plan showing the locations of the explorations relative to existing site features.
- Provide logs of the borings.
- Provide this written data report summarizing the results of our site investigation and laboratory testing.

4.0 SITE DESCRIPTION

4.1 Site Surface Conditions

The site consists of the Mountainside High School softball field located in the northwest area of the school grounds. The site was bordered by an MSE retaining wall to the north and west, and additional sports fields to the east and south. Outside of the affected (heaved) area of the softball field, the field was generally level to very gently descending to the northwest. Site layout and surface conditions at the time of our field investigation are shown on the attached Site Plan (Figure 2) and Site Photographs (Figure 3).

4.2 Subsurface Conditions

4.2.1 Subsurface Investigation

Our subsurface investigation consisted of five drilled borings (B-1A, B-1B, B-1C, B-2, and B-3) completed on November 18, 2019. The approximate exploration locations are shown on the Site Plan, attached as Figure 2. In summary, the borings were advanced to depths ranging from about 6½ to 8½ feet bgs. Details regarding the subsurface investigation and logs of the explorations are presented in Appendix A. Subsurface conditions encountered during our investigation are summarized below.

4.2.2 Subsurface Materials

Logs of the explorations are presented in Appendix A. The following describes each of the subsurface materials encountered at the site.

Synthetic Turf Materials: Synthetic turf was encountered at the surface of borings B-1A through B-3 and was about 2 inches thick. Foam board was encountered below the turf in each boring and was about ½ inch thick. The turf and foam had been pulled back prior to drilling activities by others.

Poorly Graded Gravel Fill (GP Fill): Underlying the synthetic turf materials in B-1A through B-3 was poorly graded gravel fill. The poorly graded gravel fill was typically gray, moist, angular, up to about 1½ inches in

diameter, and contained trace medium- to coarse-grained sand. This fill resembled drain rock and extended to depths of about 3 to 5 feet bgs.

Controlled Density Fill: Underlying the poorly graded gravel fill in each boring was controlled density fill (CDF). This cementitious material was generally brown, moist, and contained poorly graded medium-grained sand. This fill extended to depths of about 4¼ to 5¼ feet bgs in borings B-1B through B-3.

Bentonite Fill: Underlying the CDF in B-1B through B-3 was bentonite fill. This material was light to dark gray, moist, and exhibited very high plasticity. The fill contained trace angular gravel up to ½ inch in diameter in borings B-1B and B-1C and an isolated plastic fragment (resembling remnant pipe debris) about 2 inches in diameter in boring B-3. The bentonite fill extended to depths of about 5 to 5¾ feet bgs in borings B-1B through B-3.

Lean Clay Fill (CL Fill): Underlying the poorly graded gravel fill in B-1A and the bentonite fill in B-1B through B-3 was lean clay fill. This fill was brown, moist, exhibited medium plasticity, and contained trace angular gravel up to ½ inch in diameter. The fill contained an isolated plastic fragment up to 1 inch in diameter in boring B1-B. The lean clay fill extended to the full depths explored, about 6½ to 8½ feet bgs.

4.2.3 Groundwater

Perched groundwater was encountered at a depth of about 5 feet bgs within boring B-2 on November 18, 2019. Groundwater was not encountered within the depths explored in the remaining borings.

5.0 LABORATORY TESTING

Laboratory testing was performed on representative samples collected in the field to provide a measure of the in-situ moisture and swell potential of the subsurface materials, notably the buried bentonite fill described above. Laboratory testing included nine moisture content determinations (ASTM D2216), and three one-dimensional swell tests (ASTM D4546, Method "B"). Results of the moisture content tests are shown on the exploration logs presented in the attached Appendix A. Graphical plots of the swell tests are presented in the attached Appendix B. The swell tests were conducted utilizing a vertical stress equal to 520 pounds per square foot (psf); this value was selected to approximate the in-situ vertical stress experienced by the bentonite layer at the project site due to overlying earthen materials.

6.0 LIMITATIONS

This current assignment did not include services related to geotechnical engineering for site repairs or other design and construction related aspects of the project. Descriptions of earthen materials contained in this report were generated from field notes and brief visual examination.

We have prepared this report for use by BSD. The information and data contained within this report are not intended to be, nor should they be construed as a warranty of subsurface conditions, but are forwarded to assist in the planning and design process.

We have made observations based on our explorations that indicate the soil conditions at only those specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between or away from our explorations. If subsurface conditions vary from those encountered in our site explorations, CGT should be alerted to the change in

conditions so that we may provide geotechnical recommendations, if necessary. Observation by experienced geotechnical personnel should be considered an integral part of the construction process.

Geotechnical engineering and the geologic sciences are characterized by a degree of uncertainty. Professional judgments presented in this report are based on our understanding of the proposed construction, familiarity with similar projects in the area, and on general experience. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared; no warranty, expressed or implied, is made. This report is subject to review and should not be relied upon after a period of three years.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions express or implied, should be understood.

We appreciate the opportunity to work with you on this project. Please contact us at 503.601.8250 if you have any questions regarding this report.

Respectfully Submitted,
CARLSON GEOTECHNICAL

Brad M. Wilcox, P.E., G.E.
Principal Geotechnical Engineer
bwilcox@carlsontesting.com

Attachments: Site Location, Figure 1
Site Plan, Figure 2
Site Photographs, Figure 3
Subsurface Investigation & Laboratory Testing, Appendix A
Results of Swell Tests, Appendix B

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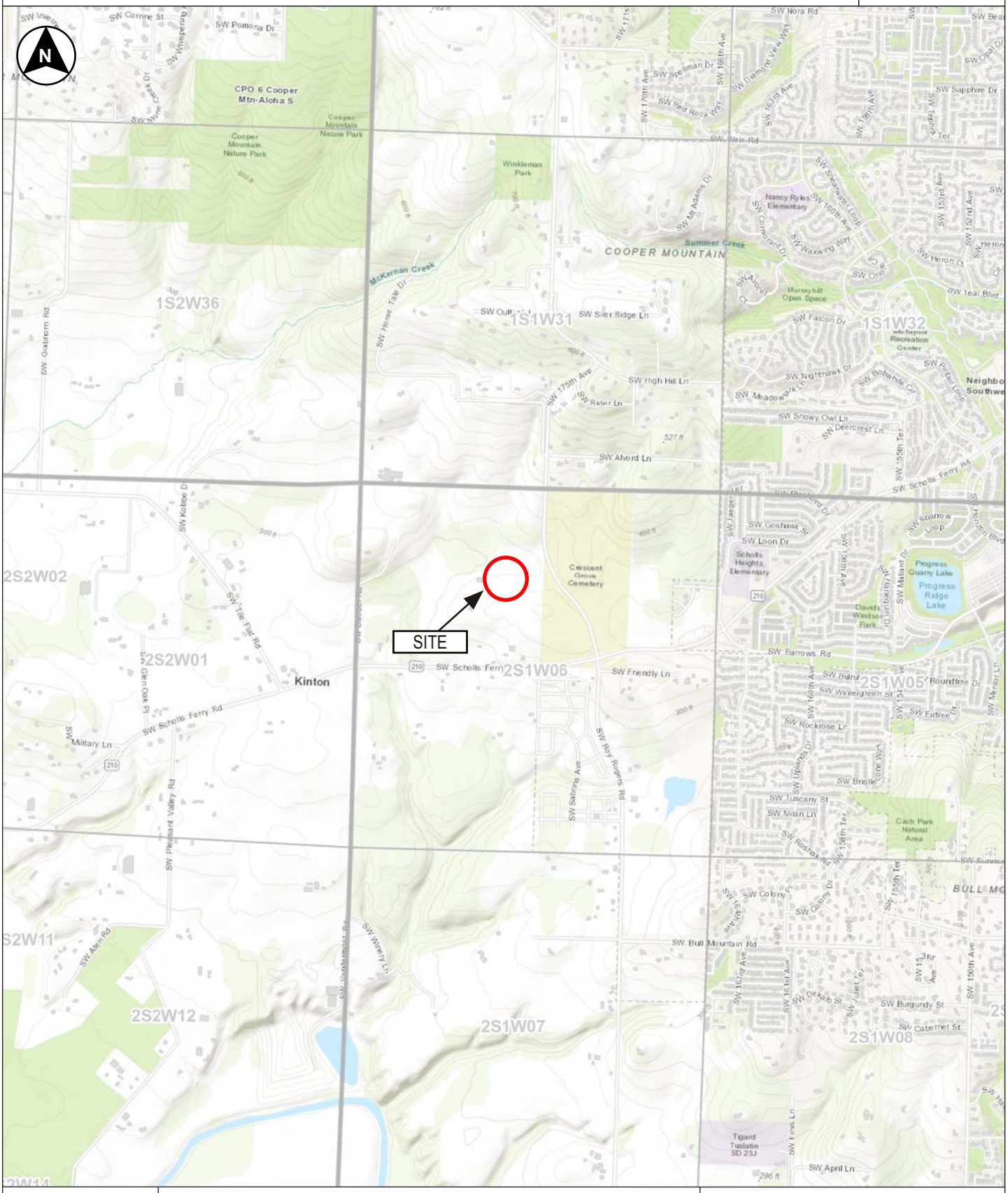
MOUNTAINSIDE HIGH SCHOOL SOFTBALL FIELD - BEAVERTON, OREGON
Project Number G1905187.A

FIGURE 1
Site Location



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503-601-8250
Drafted by: MMS

Map created with ArcGIS Pro 2.4.2, copyright 2019 Esri, Inc.
Township 2 South, Range 1 West, Section 6, Willamette Meridian

Latitude: 45.429380° North
Longitude: 122.855760° West

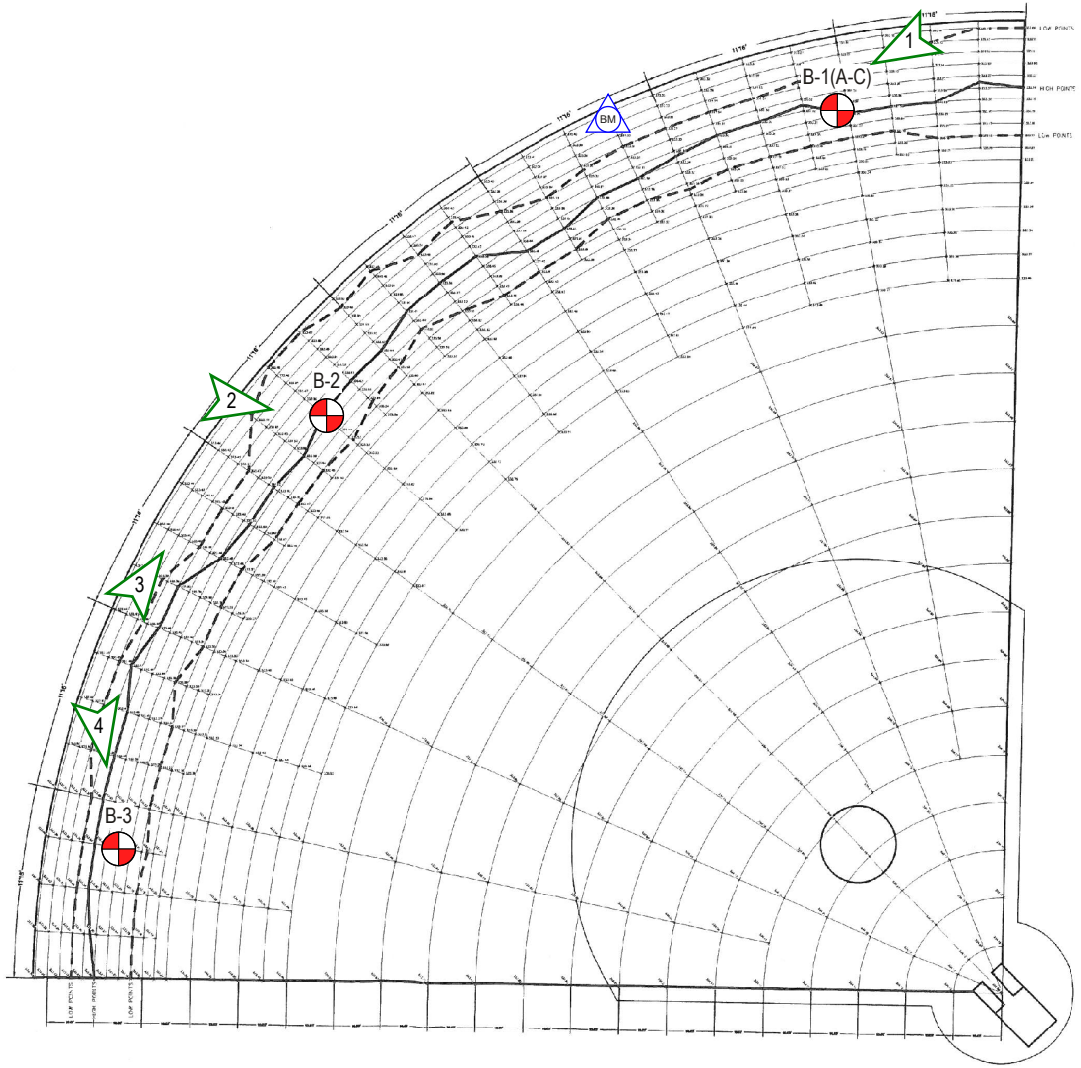
1 Inch = 2,000 feet

0 2000 4000

MOUNTAINSIDE HIGH SCHOOL SOFTBALL FIELD - BEAVERTON, OREGON
Project Number G1905187.A

FIGURE 2

Site Plan



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503-601-8250

Drafted by: MMS

LEGEND

B-1 — Hollow-stem auger boring

BM — Elevation benchmark - Assumed 100-foot elevation at the top of the retaining wall.

1 — Orientation of site photographs shown on Figure 3

1 Inch = 40 Feet

0 40 80

NOTES: Drawing based on observations made while on site and site plan "Varsity Softball Field", dated April 4, 2019, produced by Harper Houf Peterson Righellis, Inc.
All locations are approximate.

Photograph 1

Photograph 2

Photograph 3

Photograph 4

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Appendix A: Subsurface Investigation

Mountainside High School Softball Field
12500 SW 175th Avenue
Beaverton, Oregon

CGT Project Number G1905187.A

January 20, 2020

Prepared For:

Beaverton School District
Attn: Mr. Patrick O'Harrow
16550 SW Merlo Road
Beaverton, Oregon 97003

Prepared by
Carlson Geotechnical

A.1.0 SUBSURFACE INVESTIGATION

Our field investigation consisted of five drilled borings completed in November 2019. The exploration locations are shown on the Site Plan, attached to the geotechnical report as Figure 2. The exploration locations shown therein were determined based on measurements from existing site features (outfield fence, scoreboard, etc.) and are approximate. Surface elevations indicated on the logs were estimated based on a temporary benchmark (assumed 100-foot elevation at the top of the nearby retaining wall) shown on the referenced Site Plan and are approximate. The attached figures detail the exploration methods (Figure A1), soil classification criteria (Figure A2), and present detailed logs of the explorations (Figures A3 through A7), as discussed below.

A.1.1 Drilled Borings

CGT observed the advancement of five drilled borings (B-1A, B-1B, B1-C, B-2, and B-3) at the site on November 18, 2019, using a Geoprobe 7822DT track-mounted drill rig provided and operated by our subcontractor, Western States Soil Conservation of Hubbard, Oregon. The borings were advanced using the hollow-stem auger drilling technique to depths ranging from approximately 6½ to 8½ feet bgs. Upon completion, the borings were backfilled with drilling spoils. Drilling wastes (cuttings) were disposed of offsite by our drilling subcontractor.

A.1.2 In-Situ Testing - Standard Penetration Tests (SPTs)

SPTs were conducted within the borings using a split-spoon sampler in general accordance with ASTM D1586. The SPTs were generally conducted at depths immediately below the advancement of Shelby tube samplers (described below) to the termination depths of the borings. The SPT is described on the attached Exploration Key, Figure A1.

A.1.3 Material Classification & Sampling

Soil samples were obtained at selected intervals in the borings using the referenced split-spoon (SPT) sampler and thin-walled, steel (Shelby) tube samplers, detailed on Figure A1. A qualified member of CGT's geological staff collected the samples and logged the soils in general accordance with the Visual-Manual Procedure (ASTM D2488). An explanation of this classification system is attached as Figure A2. The SPT samples were stored in sealable plastic bags and the Shelby tube samples were sealed with caps and tape and transported to our soils laboratory for further examination and testing. Our geotechnical staff visually examined all samples in order to refine the initial field classifications.

A.1.4 Subsurface Conditions

Subsurface conditions are summarized in Section 2.2 of the geotechnical report. Detailed logs of the explorations are presented on the attached exploration logs, Figures A3 through A7.

MOUNTAINSIDE HIGH SCHOOL SOFTBALL FIELD - BEAVERTON, OREGON *Project Number G1905187.A*	**FIGURE A1** **Exploration Key**

PL — MC — LL	Atterberg limits (plasticity) test results (ASTM D4318): PL = Plastic Limit, LL = Liquid Limit, and MC= Moisture Content (ASTM D2216)
☐ FINES CONTENT (%)	Percentage passing the U.S. Standard No. 200 Sieve (ASTM D1140)

SAMPLING

GRAB	Grab sample
BULK	Bulk sample
SPT	**Standard Penetration Test** (SPT) consists of driving a 2-inch, outside-diameter, split-spoon sampler into the undisturbed formation with repeated blows of a 140-pound, hammer falling a vertical distance of 30 inches (ASTM D1586). The number of blows (N-value) required to drive the sampler the last 12 inches of an 18-inch sample interval is used to characterize the soil consistency or relative density. The drill rig was equipped with an cat-head or automatic hammer to conduct the SPTs. The observed N-values, hammer efficiency, and N_{60} are noted on the boring logs.
MC	**Modified California** sampling consists of 3-inch, outside-diameter, split-spoon sampler (ASTM G3550) driven similarly to the SPT sampling method described above. A sampler diameter correction factor of 0.44 is applied to calculate the equivalent SPT N_{60} value per Lacroix and Horn, 1973.
CORE	**Rock Coring** interval
SH	**Shelby Tube** is a 3-inch, inner-diameter, thin-walled, steel tube push sampler (ASTM D1587) used to collect relatively undisturbed samples of fine-grained soils.
WDCP	**Wildcat Dynamic Cone Penetrometer** (WDCP) test consists of driving 1.1-inch diameter, steel rods with a 1.4-inch diameter, cone tip into the ground using a 35-pound drop hammer with a 15-inch free-fall height. The number of blows required to drive the steel rods is recorded for each 10 centimeters (3.94 inches) of penetration. The blow count for each interval is then converted to the corresponding SPT N_{60} values.
DCP	**Dynamic Cone Penetrometer** (DCP) test consists of driving a 20-millimeter diameter, hardened steel cone on 16-millimeter diameter steel rods into the ground using a 10-kilogram drop hammer with a 460-millimeter free-fall height. The depth of penetration in millimeters is recorded for each drop of the hammer.
POCKET PEN. (tsf)	**Pocket Penetrometer** test is a hand-held instrument that provides an approximation of the unconfined compressive strength in tons per square foot (tsf) of cohesive, fine-grained soils.

CONTACTS

	Observed (measured) contact between soil or rock units.
	Inferred (approximate) contact between soil or rock units.
	Transitional (gradational) contact between soil or rock units.

ADDITIONAL NOTATIONS

Italics	Notes drilling action or digging effort
{ Braces }	Interpretation of material origin/geologic formation (e.g. { Base Rock } or { Columbia River Basalt })

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All measurements are approximate.

MOUNTAINSIDE HIGH SCHOOL SOFTBALL FIELD - BEAVERTON, OREGON
Project Number G1905187.A

FIGURE A2
Soil Classification

Classification of Terms and Content

NAME: Group Name and Symbol
Relative Density or Consistency
Color
Moisture Content
Plasticity
Other Constituents
Other: Grain Shape, Approximate Gradation
Organics, Cement, Structure, Odor, etc.
Geologic Name or Formation

Grain Size

		U.S. Standard Sieve
Fines		<#200 (0.075 mm)
Sand	Fine	#200 - #40 (0.425 mm)
	Medium	#40 - #10 (2 mm)
	Coarse	#10 - #4 (4.75)
Gravel	Fine	#4 - 0.75 inch
	Coarse	0.75 inch - 3 inches
Cobbles		3 to 12 inches
Boulders		> 12 inches

Coarse-Grained (Granular) Soils

Relative Density

SPT N_{60}-Value	Density
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
>50	Very Dense

Minor Constituents

Percent by Volume	Descriptor	Example
0 - 5%	"Trace" as part of soil description	"trace silt"
5 - 15%	"With" as part of group name	"**POORLY GRADED SAND WITH SILT**"
15 - 49%	Modifier to group name	"**SILTY SAND**"

Fine-Grained (Cohesive) Soils

SPT N_{60}-Value	Torvane tsf Shear Strength	Pocket Pen tsf Unconfined	Consistency	Manual Penetration Test
<2	<0.13	<0.25	Very Soft	Thumb penetrates more than 1 inch
2 - 4	0.13 - 0.25	0.25 - 0.50	Soft	Thumb penetrates about 1 inch
4 - 8	0.25 - 0.50	0.50 - 1.00	Medium Stiff	Thumb penetrates about ¼ inch
8 - 15	0.50 - 1.00	1.00 - 2.00	Stiff	Thumb penetrates less than ¼ inch
15 - 30	1.00 - 2.00	2.00 - 4.00	Very Stiff	Readily indented by thumbnail
>30	>2.00	>4.00	Hard	Difficult to indent by thumbnail

Minor Constituents

Percent by Volume	Descriptor	Example
0 - 5%	"Trace" as part of soil description	"trace fine-grained sand"
5 - 15%	"Some" as part of soil description	"some fine-grained sand"
15 - 30%	"With" as part of group name	"**SILT WITH SAND**"
30 - 49%	Modifier to group name	"**SANDY SILT**"

Moisture Content

Dry: Absence of moisture, dusty, dry to the touch

Moist: Leaves moisture on hand

Wet: Visible free water, likely from below water table

	Plasticity	Dry Strength	Dilatancy	Toughness
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Medium	Medium to High	None to Slow	Medium
MH	Medium to High	Low to Medium	None to Slow	Low to Medium
CH	Medium to High	High to Very High	None	High

Structure

Stratified: Alternating layers of material or color >6 mm thick

Laminated: Alternating layers < 6 mm thick

Fissured: Breaks along definite fracture planes

Slickensided: Striated, polished, or glossy fracture planes

Blocky: Cohesive soil that can be broken down into small angular lumps which resist further breakdown

Lenses: Has small pockets of different soils, note thickness

Homogeneous: Same color and appearance throughout

Visual-Manual Classification

Major Divisions			Group Symbols	Typical Names
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: 50% or more *retained* on the No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel/sand mixtures, little or no fines
			GP	Poorly-graded gravels and gravel/sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel/sand/silt mixtures
			GC	Clayey gravels, gravel/sand/clay mixtures
	Sands: More than 50% *passing* the No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand/silt mixtures
			SC	Clayey sands, sand/clay mixtures
Fine-Grained Soils: 50% or more Passes No. 200 Sieve	Silt and Clays Low Plasticity Fines		ML	Inorganic silts, rock flour, clayey silts
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic soil of low plasticity
	Silt and Clays High Plasticity Fines		MH	Inorganic silts, clayey silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic soil of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

CARLSON CGT GEOTECHNICAL 503-601-8250

References:

ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

Terzaghi, K., and Peck, R.B., 1948, Soil Mechanics in Engineering Practice, John Wiley & Sons.

Carlson Geotechnical
A Division of Carlson Testing, Inc.
www.carlsontesting.com

FIGURE A3

Boring B-1A

CLIENT Beaverton School District
PROJECT NAME Mountainside High School Softball Field
PROJECT NUMBER G1905187.A
PROJECT LOCATION 12500 SW 175th Avenue, Beaverton, Oregon
DATE STARTED 11/18/19
GROUND ELEVATION 100 ft
ELEVATION DATUM Top of retaining wall = 100 feet
WEATHER 53 °F
SURFACE Synthetic Turf
LOGGED BY MMS
REVIEWED BY BMW
DRILLING CONTRACTOR Western State Soil Conservation
SEEPAGE ---
EQUIPMENT Geoprobe 7822 DT
GROUNDWATER AT END ---
DRILLING METHOD Hollow Stem 4¼-inch ID Auger
GROUNDWATER AFTER DRILLING ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 81.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ PL LL MC ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
			SYNTHETIC TURF: 2 inches thick.		0						
			FOAM BOARD: ½ inch thick.								
			POORLY GRADED GRAVEL FILL: Gray, moist, angular up to 1½ inches in diameter, trace medium to coarse sand.								
99					1						
98					2						
97		GP FILL			3						
96					4						
95					5						
			LEAN CLAY FILL: Very soft, brown, moist, medium plasticity.								
94		CL FILL			6	SPT 1	50	0-1-0 (1)	1		▲
93			• Borehole terminated at 6½ feet bgs. • No groundwater or caving encountered. • Borehole loosely backfilled with gravel fill.								

CGT BOREHOLE G1905187 LOGS.GPJ 1/21/20 DRAFTED BY: MMS

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FIGURE A4

Boring B-1B

CLIENT Beaverton School District
PROJECT NAME Mountainside High School Softball Field
PROJECT NUMBER G1905187.A
PROJECT LOCATION 12500 SW 175th Avenue, Beaverton, Oregon
DATE STARTED 11/18/19 **GROUND ELEVATION** 100 ft **ELEVATION DATUM** Top of retaining wall = 100 feet
WEATHER 53 °F **SURFACE** Synthetic Turf **LOGGED BY** MMS **REVIEWED BY** BMW
DRILLING CONTRACTOR Western State Soil Conservation **SEEPAGE** ---
EQUIPMENT Geoprobe 7822 DT **GROUNDWATER AT END** ---
DRILLING METHOD Hollow Stem 4¼-inch ID Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 81.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ PL LL MC ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
			SYNTHETIC TURF: 2 inches thick.		0						
			FOAM BOARD: ½ inch thick.								
99		GP FILL	**POORLY GRADED GRAVEL FILL:** Gray, moist, angular up to 1½ inches in diameter, trace medium to coarse sand.		1						
98					2						
97					3						
96			**CONTROLLED DENSITY FILL:** Brown, moist, medium-grained sand. Depth inferred by faster drill speed and driller indicating smooth drilling conditions.		4						
95			**BENTONITE FILL:** Light to dark gray, moist, high plasticity, trace angular gravel up to ½ inch in diameter.		5	SH 1	75				
94		CL FILL	**LEAN CLAY FILL:** Soft, brown, moist, medium plasticity, isolated black plastic fragment up to 1 inch in diameter and 9 inches in length at 5¼ feet bgs.		6						
93					7	SPT 2	67	1-1-2 (3)	3		▲
92			• Borehole terminated at 7½ feet bgs. • No groundwater or caving encountered. • Borehole loosely backfilled with gravel fill.								
91											

CGT BOREHOLE G1905187 LOGS.GPJ 1/21/20 DRAFTED BY: MMS

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FIGURE A5

Boring B-1C

CLIENT Beaverton School District
PROJECT NAME Mountainside High School Softball Field
PROJECT NUMBER G1905187.A
PROJECT LOCATION 12500 SW 175th Avenue, Beaverton, Oregon
DATE STARTED 11/18/19 **GROUND ELEVATION** 100 ft **ELEVATION DATUM** Top of retaining wall = 100 feet
WEATHER 53 °F **SURFACE** Synthetic Turf **LOGGED BY** MMS **REVIEWED BY** BMW
DRILLING CONTRACTOR Western State Soil Conservation **SEEPAGE** ---
EQUIPMENT Geoprobe 7822 DT **GROUNDWATER AT END** ---
DRILLING METHOD Hollow Stem 4¼-inch ID Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 81.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ PL LL MC ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
			SYNTHETIC TURF: 2 inches thick.		0						
			FOAM BOARD: ½ inch thick.								
99		GP FILL	**POORLY GRADED GRAVEL FILL:** Gray, moist, angular up to 1½ inches in diameter, trace medium to coarse sand.		1						
98					2						
97					3						
96			**CONTROLLED DENSITY FILL:** Brown, moist, medium-grained sand. Depth inferred by faster drill speed and driller indicating smooth drilling conditions.		4						
95			**BENTONITE FILL:** Light to dark gray, moist, high plasticity, trace angular gravel up to ½ inch in diameter.		5	SH 1	96				
94		CL FILL	**LEAN CLAY FILL:** Soft to medium stiff, brown, moist, medium plasticity.		6						
93					7	SPT 2	50	1-1-5 (6)	6		▲
92			• Borehole terminated at 7½ feet bgs. • No groundwater or caving encountered. • Borehole loosely backfilled with gravel fill.								
91											

CGT BOREHOLE G1905187 LOGS.GPJ 1/21/20 DRAFTED BY: MMS

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FIGURE A6
Boring B-2

CLIENT Beaverton School District
PROJECT NAME Mountainside High School Softball Field
PROJECT NUMBER G1905187.A
PROJECT LOCATION 12500 SW 175th Avenue, Beaverton, Oregon
DATE STARTED 11/18/19 **GROUND ELEVATION** 100 ft
ELEVATION DATUM Top of retaining wall = 100 feet
WEATHER 53 °F **SURFACE** Synthetic Turf
LOGGED BY MMS **REVIEWED BY** BMW
DRILLING CONTRACTOR Western State Soil Conservation
SEEPAGE 5.0 ft / El. 95.0 ft
EQUIPMENT Geoprobe 7822 DT
GROUNDWATER AT END ---
DRILLING METHOD Hollow Stem 4¼-inch ID Auger
GROUNDWATER AFTER DRILLING ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 81.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ PL LL MC ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
			SYNTHETIC TURF: 2 inches thick.		0						
			FOAM BOARD: ½ inch thick.								
99		GP FILL	**POORLY GRADED GRAVEL FILL:** Gray, moist, angular up to 1½ inches in diameter, trace medium to coarse sand.		1						
98					2						
97					3						
96			**CONTROLLED DENSITY FILL:** Brown, moist, medium-grained sand, trace angular gravel up to 1 inch in diameter. Depth inferred by faster drill speed and driller indicating smooth drilling conditions.		4						
95				≈	5						
			BENTONITE FILL: Light to dark gray, moist, high plasticity.								
94			**LEAN CLAY FILL:** Medium stiff, brown, moist, medium plasticity, trace angular gravel up to ½ inch in diameter.		6	SH 1	94				
93		CL FILL			7						
92					8	SPT 2	50	2-2-5 (7)	7		▲
91			• Borehole terminated at 8½ feet bgs. • Perched groundwater encountered at 5 feet bgs. • No caving encountered. • Borehole loosely backfilled with gravel fill.								

CGT BOREHOLE G1905187 LOGS.GPJ 1/21/20 DRAFTED BY: MMS

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FIGURE A7

Boring B-3

CLIENT Beaverton School District
PROJECT NAME Mountainside High School Softball Field
PROJECT NUMBER G1905187.A
PROJECT LOCATION 12500 SW 175th Avenue, Beaverton, Oregon
DATE STARTED 11/18/19 **GROUND ELEVATION** 100 ft **ELEVATION DATUM** Top of retaining wall = 100 feet
WEATHER 53 °F **SURFACE** Synthetic Turf **LOGGED BY** MMS **REVIEWED BY** BMW
DRILLING CONTRACTOR Western State Soil Conservation **SEEPAGE** ---
EQUIPMENT Geoprobe 7822 DT **GROUNDWATER AT END** ---
DRILLING METHOD Hollow Stem 4¼-inch ID Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 81.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ / PL LL MC / ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
			SYNTHETIC TURF: 2 inches thick.		0						
			FOAM BOARD: ½ inch thick.								
99		GP FILL	**POORLY GRADED GRAVEL FILL:** Gray, moist, angular up to 1½ inches in diameter, trace medium to coarse sand.		1						
98					2						
97					3						
96			**CONTROLLED DENSITY FILL:** Brown, moist, medium-grained sand. Depth inferred by faster drill speed and driller indicating smooth drilling conditions.		4						
95			**BENTONITE FILL:** Light to dark gray, moist, high plasticity, isolated black plastic fragment up to 2 inches in diameter at 4¼ feet bgs.		5	SH 1	88				
94		CL FILL	**LEAN CLAY FILL:** Soft to medium stiff, brown, moist, medium plasticity.		6						
93					7	SPT 2	72	1-1-3 (4)	4		▲
92			• Borehole terminated at 7½ feet bgs. • No groundwater or caving encountered. • Borehole loosely backfilled with gravel fill.								
91											

CGT BOREHOLE G1905187 LOGS.GPJ 1/21/20 DRAFTED BY: MMS

Carlson Geotechnical

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Fax: (503) 601-8254

Bend Office	**(541) 330-9155**
Eugene Office	**(541) 345-0289**
Salem Office	**(503) 589-1252**
Tigard Office	**(503) 684-3460**

Appendix B: Swell Test Results

Mountainside High School Softball Field
12500 SW 175th Avenue
Beaverton, Oregon

CGT Project Number G1905187.A

January 20, 2020

Prepared For:

Beaverton School District
Attn: Mr. Patrick O'Harrow
16550 SW Merlo Road
Beaverton, Oregon 97003

Prepared by
Carlson Geotechnical

Carlson Testing, Inc.

Bend	(541) 330-9155
Eugene	(541) 345-0289
Geotechnical	(503) 601-8250
Salem	(503) 589-1252
Tigard	(503) 684-3460

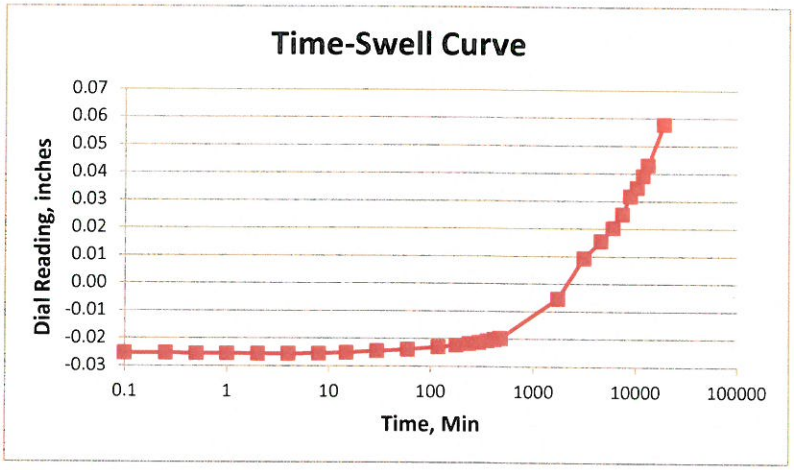
Figure B1

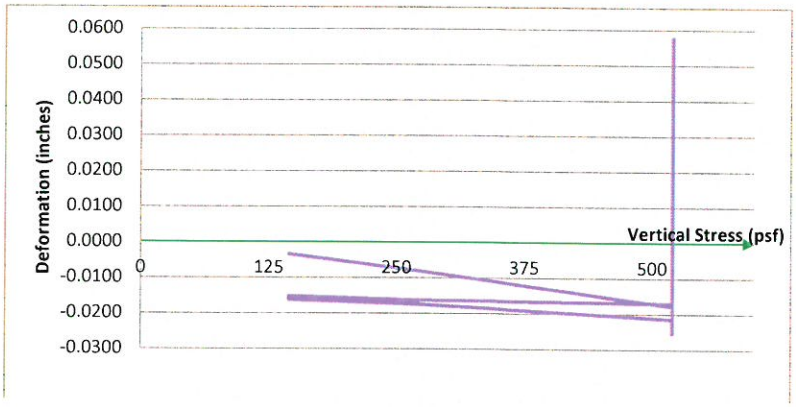
ASTM D4546, Method "B": One Dimensional Swell Test of Soil

Project:	Mountainside High School Softball Field
Project Number:	G1905187
Boring:	B1-C
Sample ID:	SH1
Sample Depth:	4.5'
Soil Type:	Bentonite fill

Initial Specimen Height, h:	0.992	in.
Vertical Stress Value	510	psf
Height after Dry Loading, h1:	0.9668	in.
Final Specimen Height, h2:	1.0246	in.
Initial Moisture Content:	116	%
Final Moisture Content:	138	%
Swell strain, ε_s	6.0	%

Following Specimen Inundation	
Time Elapsed (min.)	Reading (in.)
0.1	-0.0253
0.25	-0.0253
0.5	-0.0254
1	-0.0254
2	-0.0255
4	-0.0255
8	-0.0254
15	-0.0251
30	-0.0245
60	-0.0239
120	-0.023
180	-0.0224
240	-0.0218
300	-0.0213
360	-0.0207
420	-0.0202
480	-0.0197
1740	-0.0054
3120	0.0093
4560	0.0155
6000	0.0203
7440	0.0253
8880	0.0318
10320	0.0349
11760	0.0391
13200	0.0431
18960	0.0578





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Geotechnical	(503) 601-8250
Salem	(503) 589-1252
Tigard	(503) 684-3460

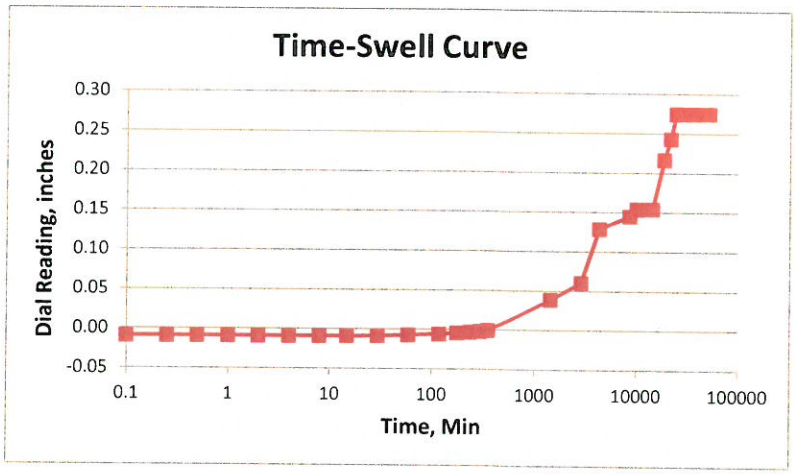
Figure B2

ASTM D4546, Method "B": One Dimensional Swell Test of Soil

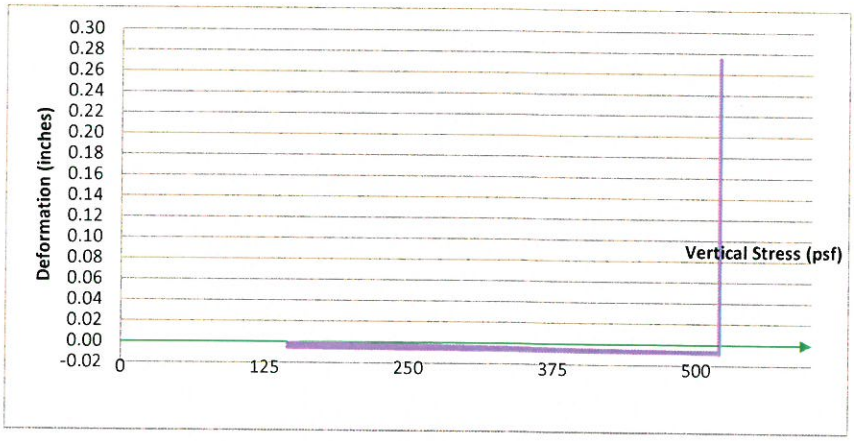
Project:	Mountainside High School Softball Field
Project Number:	G1905187
Boring:	B-2
Sample ID:	SH1
Sample Depth:	5.5'
Soil Type:	Bentonite fill

Initial Specimen Height, h:	0.993	in.
Vertical Stress Value	520	psf
Height after Dry Loading, h1:	0.9838	in.
Final Specimen Height, h2:	1.2004	in.
Initial Moisture Content:	76	%
Final Moisture Content:	115	%
Swell strain, ε_s	22	%

Following Specimen Inundation		
Time Elapsed (min.)	Reading (in.)	
0.1	-0.009	
0.25	-0.0091	
0.5	-0.0091	
1	-0.0091	
2	-0.0091	
4	-0.009	
8	-0.0089	
15	-0.0088	
30	-0.0084	
60	-0.0075	
120	-0.0059	
180	-0.0045	
240	-0.0033	
300	-0.002	
360	-0.0008	
1440	0.0384	
2880	0.0601	
4320	0.1287	
8640	0.1448	
10080	0.1536	
11520	0.1541	*
12960	0.1541	*
14400	0.1541	*
18720	0.2166	*
21600	0.2428	*
24480	0.2745	*
28800	0.2747	*
34560	0.2748	*
38880	0.2748	*
43200	0.2749	*
48960	0.2749	*
51840	0.2749	*



*Dial indicator maxed out at approximately t=11520 minutes. Dial indicator reset at approximately t=18720 minutes and zeroed to allow for additional measurements. Data lost during resetting of dial indictor was approximated using fixed datum at base of container housing sample. Movement approximated = 0.0625 inches.



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Eugene	(541) 345-0289
Geotechnical	(503) 601-8250
Salem	(503) 589-1252
Tigard	(503) 684-3460

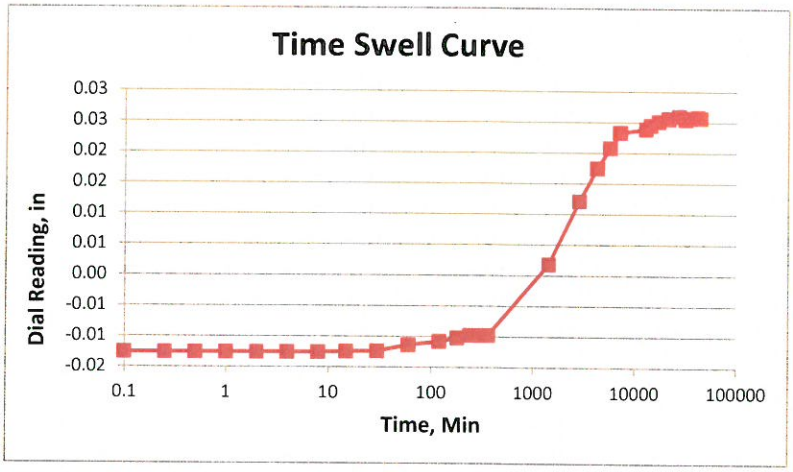
Figure B3

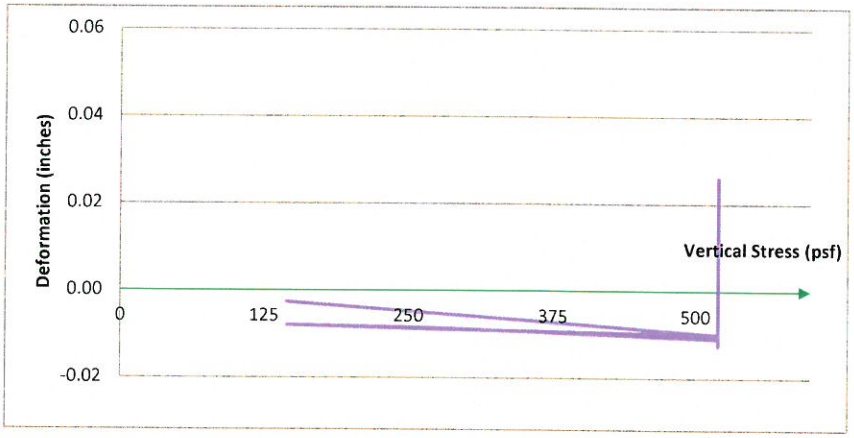
ASTM D4546, Method "B": One Dimensional Swell Test of Soil

Project:	Mountainside High School Softball Field
Project Number:	G1905187
Boring:	B-3
Sample ID:	SH1
Sample Depth:	4.5'
Soil Type:	Bentonite fill

Initial Specimen Height, h:	0.992	in.
Vertical Stress Value	520	psf
Height after Dry Loading, h1:	0.9796	in.
Final Specimen Height, h2:	1.0179	in.
Initial Moisture Content:	110	%
Final Moisture Content:	122	%
Swell strain, ε_s	4	%

Following Specimen Inundation	
Time Elapsed (min.)	Reading (in.)
0.1	-0.0126
0.25	-0.0126
0.5	-0.0126
1	-0.0126
2	-0.0126
4	-0.0126
8	-0.0126
15	-0.0125
30	-0.0124
60	-0.0114
120	-0.0108
180	-0.0102
240	-0.0098
1440	0.0018
2880	0.0121
4320	0.0175
5760	0.0208
7200	0.0233
12960	0.0239
14400	0.0245
17280	0.0251
21600	0.0256
27360	0.026
31680	0.0255
36000	0.0257
41760	0.0258
44640	0.0257





SUBMITTAL TRANSMITTAL RECORD

South Cooper Mountain High School

Hoffman Construction Co.
Lic. # 28417
South Cooper Mountain High School
12500 SW 175th Ave.
Beaverton, OR 97007

Submittal No.: 612-116623-0
Description: Scoreboard Footing Resubmittal
For: [☑] Review [☐] Information [☐] Coordination
Specification Reference: 116623
Bid Package: BP3B
Supplier/Subcontractor: Security Signs
Address:
Phone: Contact:

HCC Job # 5169515

Routing	# Copies	Attention	Date Sent	Date Received	Date Due
Boora Architects	1	Jim Harold	12/1/2016		12/15/16
BSD	1	Leslie Imes			
BSD	1	Patrick O'Harrow			
Washington County	1	Christopher Harrell			

Submittal #	Description	Action	Comments
612-116623-0	Scoreboard Footing Resubmittal (Changing to round footings in lieu of square footings)	Review	

R = Reproducible P = Print B = Brochure

HCC Comments:

HOFFMAN CONSTRUCTION COMPANY
This submittal has been reviewed for general conformance with the contract documents. Contractor's review does not relieve the Vendor/Subcontractor of responsibility for compliance with all requirements of the contract, including completeness and accuracy of this submittal.

12/01/2016 — Date
612-116623-0 — Submittal #
wolerye — Reviewed By

DESIGN OPERATIONS:

THIS DOCUMENT HAS BEEN REVIEWED FOR GENERAL COMPATIBILITY WITH DESIGN CONCEPT AND THE FOLLOWING IS NOTED:

- [X] NO EXCEPTIONS TAKEN
- [ ] REVISE AS NOTED
- [ ] REVISE AND RESUBMIT
- [ ] REJECTED

kpff

JDE — By
12/05/2016 — Date

MILLER
CONSULTING
ENGINEERS

STRUCTURAL CALCULATIONS

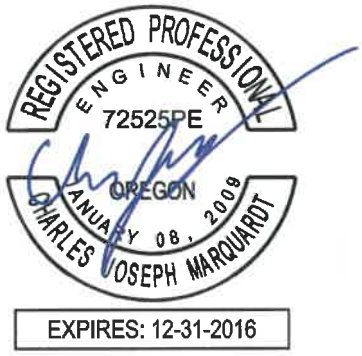
South Cooper Mountain High School Scoreboard
Beaverton, Oregon
Security Signs

September 19, 2016
Project No. 161192

1 12-01-16

8 pages

Principal Checked: _____



*** LIMITATIONS ***

Miller Consulting Engineers, Inc. was retained in a limited capacity for this project. This design is based upon information provided by the client, who is solely responsible for accuracy of same. No responsibility and or liability is assumed by or is to be assigned to the engineer for items beyond that shown on these sheets.

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BASEBALL SCOREBOARD SUPPORT POLE

Steel Column/Beam Design - AISC 13th Addition

Shape: W **Shape Capacity = 0.68 < 1.0**

Size: 10X39

	ASD	
Weight =	39	plf
Pr =	1.63	k, axial compression load
Mr_x =	73.46	ft-k, strong axis moment
Mr_y =	0.00	ft-k, weak axis moment
Vr_y =	0.00	k, strong axis shear
Vr_x =	0.00	k, weak axis shear
K_x =	2.10	*(Table C-C2.2, pg 16.1-240)*
K_y =	2.10	*(Table C-C2.2, pg 16.1-240)*
Lb_x =	10.00	ft
Lb_y =	10.00	ft
KL/r x =	59.02	
KL/r y =	127.27	
E =	29000	ksi
Fy =	50	ksi
d =	9.92	in
Ag =	11.50	in^2
tf =	0.53	in
bf =	7.99	in
tw =	0.315	in
hw =	7.88	in
Z_x =	46.8	in^3
Z_y =	17.2	in^3
S_x =	42.1	in^3
S_y =	11.3	in^3
I_x =	209	in^4
I_y =	45	in^4
r_x =	4.27	in
r_y =	1.98	in
J =	0.976	in^4
Cw =	992	in^6

Section is Compact in the flange for flexure

Section is Compact in the flange for compression

Section is Compact in the web for flexure

Section is Compact in the web for compression

Axial Capacity, Chapter E

Aeff =	11.50	in^2
Q =	1.00	
Qs =	1.00	*(Section E7, pg 16.1-40)*
Qa =	1.00	*(Section E7, pg 16.1-42)*
Fe_x =	82.2	ksi, *(Section E3 pg 16.1-33)*
Fe_y =	17.7	ksi, *(Section E3 pg 16.1-33)*
Fcr_x =	38.8	ksi, *(Section E3 pg 16.1-33)*
Fcr_y =	15.5	ksi, *(Section E3 pg 16.1-33)*
Pn_x =	446	k, *(Section E3 pg 16.1-33)*
Pn_y =	178	k, *(Section E3 pg 16.1-33)*

Moment Capacity, Chapter F

Cb =	1	
Mn_x =	182.4	*ft-k, (section F2 pg. 16.1-47)*
Mn_y =	71.7	*ft-k, (section F6 pg. 16.1-54)*

Shear Capacity: Chapter G

kv_x =	5	*(Section G2, pg 16.1-65)*
kv_x =	1.2	*(Section G7, pg 16.1-68)*
Cv_x =	1.00	*(Section G2, pg 16.1-65)*
Cv_y =	1.00	*(Section G2, pg 16.1-65)*
Aw_x =	3.12	in^2, *(Section G5, pg 16.1-68)*
Aw_y =	8.47	in^2, *(Section G5, pg 16.1-68)*
Vn_x =	93.7	*k, (Section G2, pg 16.1-65)*
Vn_y =	254.1	*k, (Section G2, pg 16.1-65)*

Allowable Capacities: Rn / Ω (ASD); Rn * Φ (LRFD)

(ASD)	Pc, k	Mc, ft-k	Vc, k
x-axis	**106.7**	**109.2**	**62.5**
y-axis		**42.9**	**169.4**

Interaction Equations:

Pr/Pc = 0.02 < 0.2, Equation H1-1b controls

0.68 < 1.0 OK

Equation H1-1b, AISC 13 ed., pg 16.1-70

Use W 10X39

MILLER CONSULTING ENGINEERS

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Portland, OR 97219

Phone 503.246.1250
Fax 503.246.1395
www.miller-se.com

Project Name South Cooper Mountain High School Scoreboard Project # 161192

Location Beaverton, Oregon

Client Security Signs

By EWA Ck'd CJM Date 9/19/16

COOPER MTN. HIGH SCHOOL SOFTBALL SCOREBOARD

Scope of work is for the design of the sign poles and the foundation.
See pages 7 and 8 for structural notes.

LOADING:

WIND: ASCE7-10 | 120 | MPH, EXP | B |
(3 second gust)

MAXIMUM HEIGHT, h = 22.50 ft
Gust Factor, G = 0.85

K1 =	0.00	*(ASCE 7-10 Figure 26.8-1)*
K2 =	1.00	*(ASCE 7-10 Figure 26.8-1)*
K3 =	1.00	*(ASCE 7-10 Figure 26.8-1)*
Kzt =	1.00	*(ASCE Eqn. 26.8-1)*
Kd =	0.85	*(ASCE 7-10 Table 26.6-1)*
Cf =	1.69	*(ASCE 7-10 Figure 29.4-1)*
s =	12.50	ft
B =	20.00	ft
0.2B =	4.00	ft
x =	13.00	ft (c-c dist. btwn. poles)
F1 =	81%	of load to single pole due to 20% wind offset

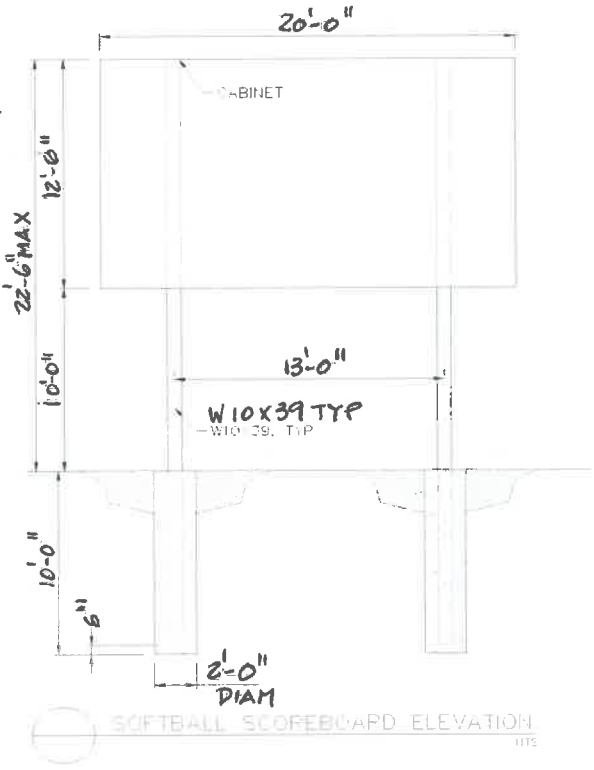
s/h = 0.56
B/s = 1.60

F = qz*G*Cf*0.6: (allowable)

Kz	qz		F(psf)	h
0.57	17.86	=	15.4	0 - 15 ft
0.62	19.43	=	16.8	15 - 20 ft
0.64	20.05	=	17.3	20 - 23 ft

FORCES:

Width	Height to bottom (ft)	Height to top (ft)	Area (sq. ft.)	Wind load (psf)	Force (lbs)	Height to center (ft)	Moment (ft-lb)
20.00	20.00	22.50	50.00	17.3	865	21.25	18381
20.00	15.00	20.00	100.00	16.8	1677	17.50	29348
20.00	10.00	15.00	100.00	15.4	1541	12.50	19263
2.00	0.00	10.00	20.00	15.4	308	5.00	1540
	0.00	0.00	0.00	0.0	0	0.00	0
				Σ =	4391	Σ =	68532



SIGN POLE: (Double Pole)

Try a W 10x39 Sign Pole

Z = 46.80 in^3
M = 55511 ft-lb = 68532*0.81

Use W 10X39
See next page for calculation

FOUNDATION CHECK:

Mnet =	55.451	k-ft	Applied moment from sign minus $M_{res.}$
P =	3.557	k	Applied lateral force
$h_{(effective)}$ =	15.59	ft	distance from ground surface to P
q =	400	psf/ft	allowable soil-brg, q=2(200)=400 *

Footing shape: Circular

b =	2	ft	diameter
L =	2	ft	diameter
b =	2.00	ft	diameter
$d_{(estimated)}$ =	10.00	ft	ESTIMATED embedment, ft 10.00 for pressure

Unconstrained Condition

S_1 =	1333	psf	q*d_est / 3
A =	3.12	ft	2.34*P*1000/(S_1*b)
d =	9.01	ft	A/2*(1+(1+4.36*h/A)^.5)

9.01 < 10' OK

volume of concrete =	1.2	yd
footing wt =	4.7	k
sign wt =	1.12	k
Total wt (DL) =	5.83	k
eccentricity of load to reaction (e) =	0.01	ft =0.06/5.83
maximum resistive moment available based on soil bearing, $M_{res.}$ =	0.06	ft-k

Use 2' - 0" diameter x 10' - 0" deep
2500 psi concrete footing at each pole

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Project Name South Cooper Mountain High School Scoreboard Project # 161192

Location Beaverton, Oregon

Client Security Signs

By EWA Ck'd _____ Date 9/19/16