Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

May 23, 2023

Mr. Roger Leonard
Director of Facilities, Maintenance & Operations
Hawthorne School District
14120 Hawthorne Boulevard
Hawthorne, California 90250

Subject: **GEOTECHNICAL INVESTIGATION REPORT**
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street, Hawthorne, California 90250
Converse Project No. 23-31-119-01

Dear Mr. Leonard:

Enclosed is the Geotechnical Investigation Report prepared by Converse Consultants (Converse) for the Hawthorne School District's New Turf Field and Asphalt Track Resurfacing project within the existing Hawthorne Middle School campus in the city of Hawthorne, Los Angeles County, California.

The purpose of the investigation was to determine the geotechnical site conditions and provide recommendations for the excavation, site preparations, concrete paving, and track resurfacing.

Based on our field exploration, laboratory testing, geologic evaluation, and geotechnical analysis, the site is suitable from a geotechnical standpoint for this project, provided our conclusions and recommendations are implemented during design and construction.

We appreciate the opportunity to be of service to the Hawthorne School District. If you should have any questions, please do not hesitate to contact us at (626) 930-1200.

Sincerely,

CONVERSE CONSULTANTS

Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President/Principal Engineer

PROFESSIONAL CERTIFICATION

This report for the Hawthorne School District's New Turf Field and Asphalt Track Resurfacing project within the existing Hawthorne Middle School campus in Hawthorne, California, has been prepared by the staff of Converse under the professional supervision of the individuals whose seals and signatures appear hereon.

The findings, recommendations, specifications, or professional opinions contained in this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice in this area of Southern California. There is no warranty, either expressed or implied.

In the event that changes to the property occur, or additional, relevant information about the property is brought to our attention, the conclusions contained in this report may not be valid unless these changes and additional relevant information are reviewed, and the recommendations of this report are modified or verified in writing.



Babak Abbasi, PhD, PE
Project Manager



Douglas S. Santo, PG, CEG, CHG
Principal, Chief Engineering Geologist



Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President/Principal Engineer

EXECUTIVE SUMMARY

The following is a summary of our geotechnical investigation, conclusions and recommendations as presented in the body of this report. Please refer to the appropriate sections of the report for complete conclusions and recommendations. In the event of a conflict between this summary and the report, or an omission in the summary, the report shall prevail.

- The proposed project is located at 4366 West 129th Street, Hawthorne Los Angeles County, California 90250. The subject site is relatively flat to gently sloping with surface elevations of approximately 66 feet relative to mean-sea-level (MSL). The site is bounded by West 130th Street to the South, Washington Avenue to the east, and West 129th Street to the north. The site coordinates are: North latitude: 33.9150, West longitude: -118.3502 degrees.

- A total of one (1) exploratory boring (BH-1), two (2) percolation tests, and two (2) corings were advanced within the project site on March 27, 2023. Borings were advanced using a 4-inch diameter hand auger to a depth of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils.

- The project site is not located within a currently designated State of California Earthquake Fault Zone for surface fault rupture. No surface faults are known to project through or towards the site.

- The site is located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Inglewood Quadrangle.

- Groundwater was not encountered during our subsurface exploration to the deepest depth drilled of 11.0 feet below ground surface. Based on review of Historically Highest Groundwater Map, Plate No. 1.2, in the Seismic Hazard Zone report for the Inglewood 7.5-minute Quadrangle (1998), the historically highest groundwater level contours in the vicinity of the site are interpreted to be approximately 45 feet bgs.

- The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth explored of 11.0 feet bgs. The fill soils encountered consist primarily of clayey silts and silty sands. The alluvial soil deposits below the fill consist of clayey silts and silty sands. Sampling blow-counts correlate to loose to moderately dense conditions near surface, and generally become denser with depth.

- In general, the pH value, chloride content, and concentrations of water-soluble sulfates saturated resistivity of the site soils are in the non-corrosive range. The saturated resistivity of the site soils is in the mildly corrosive range to ferrous metals.

- The earth materials at the site should be excavatable with conventional heavy-duty earth moving equipment. Earthwork should be performed with suitable equipment for gravelly materials.

- For non-building structures (e.g., signs, fence walls, short retaining walls, etc.), conventional footings can be used.

Results of our investigation indicate that the site is suitable from a geotechnical standpoint for the proposed development, provided that the recommendations contained in this report are incorporated into the design and construction of the project.

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE AND PROJECT DESCRIPTION 1

3.0 SCOPE OF WORK 1

3.1 Site Reconnaissance 2
3.2 Subsurface Exploration 2
3.3 Laboratory Testing 2
3.4 Engineering Analyses and Report 3

4.0 GEOLOGIC CONDITIONS 3

4.1 Regional Geologic Setting 3
4.2 Subsurface Profile of Project Site 3
4.3 Groundwater 3
4.4 Subsurface Variations 4

5.0 FAULTING AND SEISMIC HAZARDS 4

5.1 Seismic Characteristics of Nearby Faults 4
5.2 Surface Fault Rupture 5
5.3 Liquefaction and Seismically-Induced Settlement 5
5.4 Lateral Spreading 5
5.5 Seismically-Induced Slope Instability 6

6.0 SEISMIC ANALYSIS 6

6.1 CBC Seismic Design Parameters 6

7.0 EARTHWORK RECOMMENDATIONS 6

7.1 General Evaluation 6
7.2 Over-Excavation 7
7.3 Structural Preparation 8
7.4 Engineered Fill 8
7.5 Excavatability 9
7.6 Expansive Soil 9
7.7 Trench Zone Backfill 9
7.8 Shrinkage and Subsidence 10

8.0 DESIGN RECOMMENDATIONS 11

8.1 Shallow Foundations 11
8.2 Cast-In-Drilled-Hole Pile Foundations for Non-building Structures 12
8.3 Slabs-on-Grade 13
8.4 Modulus of Subgrade Reaction 13
8.5 Lateral Earth Pressure 14
8.6 Soil Corrosivity Evaluation 15
8.7 Site Drainage 15
8.8 Flexible Pavement 15
8.9 Rigid Pavement 16

9.0 CONSTRUCTION RECOMMENDATIONS 17

9.1 General 17
9.2 Temporary Excavations 18

9.3 SLOT CUT RECOMMENDATIONS 18
9.4 GEOTECHNICAL SERVICES DURING CONSTRUCTION 19

10.0 CLOSURE 20

11.0 REFERENCES 21

Tables

Page Number
Table No. 1, Existing Pavement Sections 2
Table No. 2, CBC Seismic Design Parameters 6
Table No. 3, Lateral Earth Pressures for Retaining Wall Design 14
Table No. 4, Flexible Pavement Structural Sections 16
Table No. 5, Rigid Pavement Structural Sections 17
Table No. 6, Slope Ratios for Temporary Excavation 18

Figures

Following Page Number
Figure No. 1, Site Location Map 1
Figure No. 2, Approximate Boring Location Map 2

Appendices

Appendix A ..... Field Exploration
Appendix B ..... Laboratory Testing Program
Appendix C ..... Earthwork Specifications
Appendix D ..... Infiltration Testing

1.0 INTRODUCTION

This report contains the findings and recommendations of our geotechnical study performed at the site of the Hawthorne Middle School New Turf Field and Asphalt Track Resurfacing Project located in Los Angeles County, California, as shown on Figure No. 1, *Site Location Map*.

The purpose of the study was to evaluate the subsurface soil conditions and provide geotechnical recommendations and design recommendations for the design and construction of the proposed project, consistent with the 2022 edition of California Building Code (CBC), Title 24, Chapter 16; Earthquake Design, Chapter 18A, Foundation and Retaining Wall; Appendix Chapter 33, Excavation and Grading; Part 1' section 4-317 (e) and CGS Note 48-Checklist for the review of Geologic/Seismic Reports for California Public Schools, Hospitals and Essential Services Buildings for new and existing (retrofit/modernization) buildings.

This report is written for the project described herein and is intended for use solely by the Hawthorne School District, Hawthorne Middle School, and its design team. It should not be used as a bidding document but may be made available to potential contractors for information on factual data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

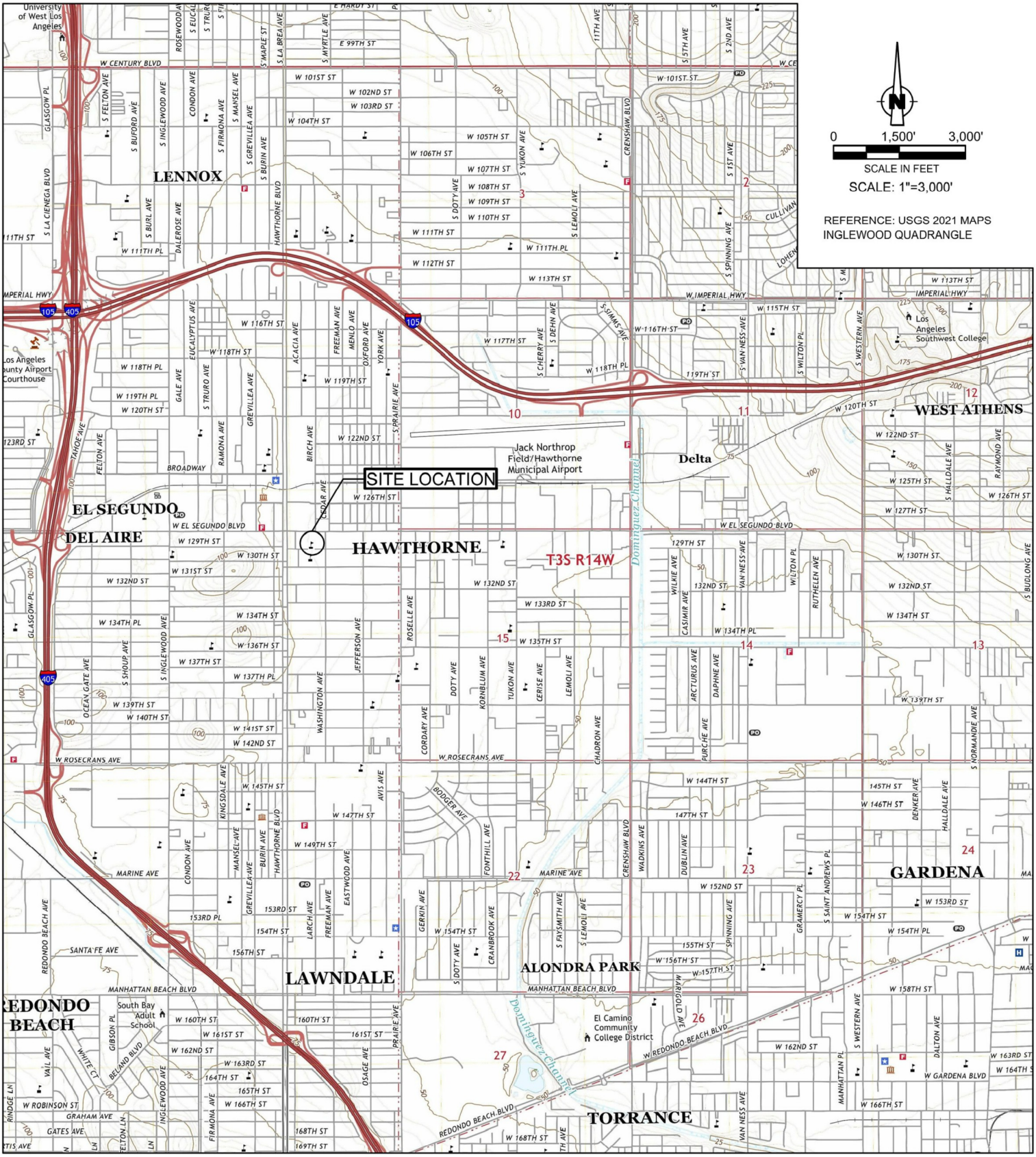
2.0 SITE AND PROJECT DESCRIPTION

The proposed project is located at 4366 West 129th Street, Hawthorne Los Angeles County, California 90250. The subject site is relatively flat to gently sloping with surface elevations of approximately 66 feet relative to mean-sea-level (MSL). The site is bounded by West 130th Street to the South, Washington Ave to the east, and West 129th Street to the north. The site coordinates are: North latitude: 33.9150, West longitude: -118.3502 degrees.

We understand that the proposed project consists of a new turf field for Hawthorne Middle School and will include resurfacing the asphalt track around the field with a synthetic material.

3.0 SCOPE OF WORK

The scope of our work included a site reconnaissance, subsurface exploration with soil sampling, laboratory testing, engineering analyses, and preparation of this report.



SITE LOCATION MAP

New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street
Hawthorne, California 90250

Project No.

23-31-119-01

Figure No.

1

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3.1 Site Reconnaissance

During the site reconnaissance, the surface conditions were noted, and the locations of the borings were determined so that access to all the locations was available for field investigation. The borings were located using existing boundary features as a guide and should be considered accurate only to the degree implied by the method used. Underground Service Alert (USA) of Southern California was notified of our proposed drilling locations at least 48 hours prior to initiation of the subsurface field work.

3.2 Subsurface Exploration

A total of one (1) exploratory borings (BH-1), two (2) percolation test and two (2) coring were advanced within the project sites on March 27, 2023. Borings were advanced using a hand auger with a 4-inch diameter to depth of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils. Table number one summarizes the existing pavement sections at the coring locations.

Table No.1, Existing Pavement Sections

Core	AC Thickness (inches)	Base Thickness (inches)	Subgrade Soil
C-1	4.0	12.0	Silty Sand (SM)
C-2	3.8	10.0	Silty Sand (SM)

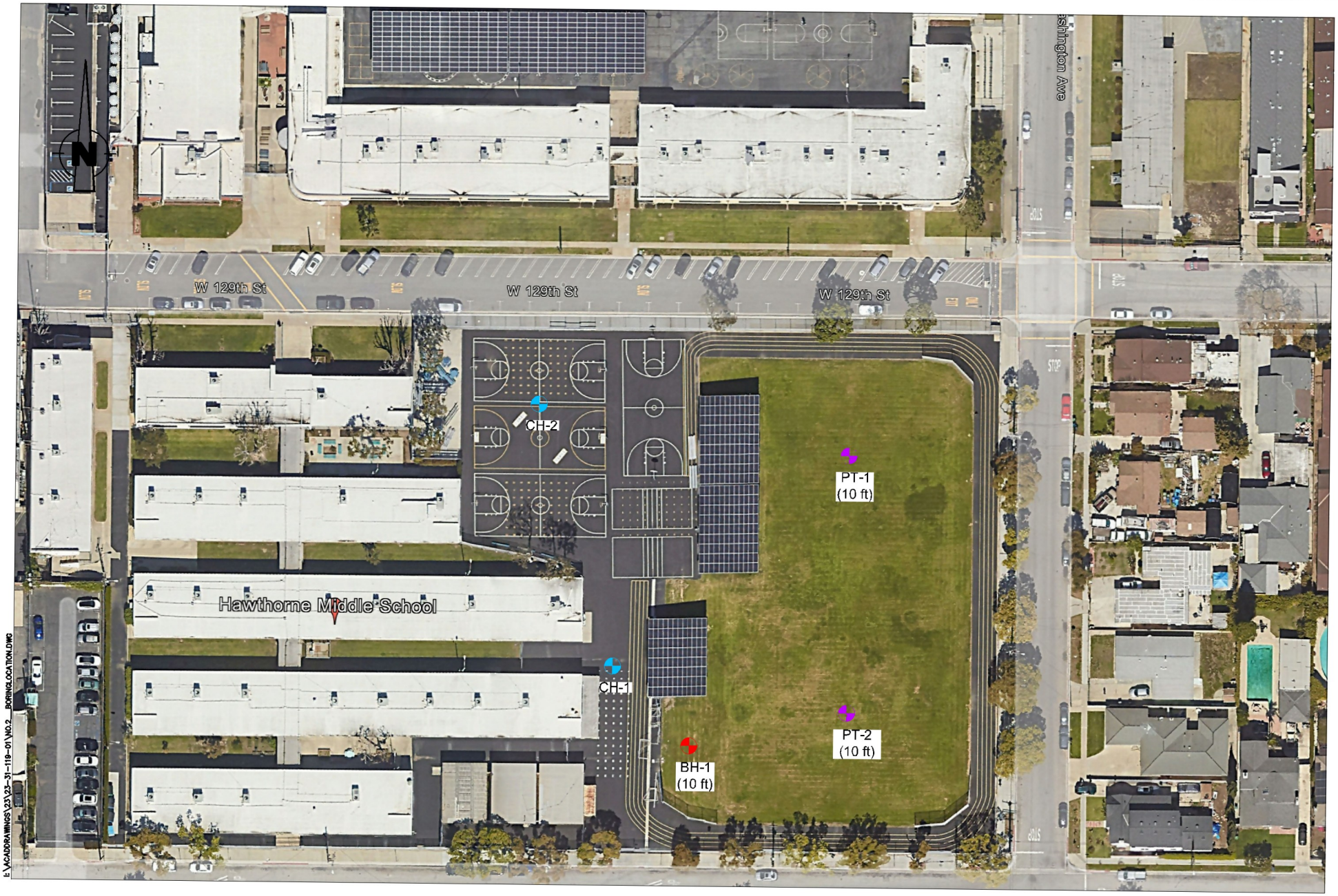
California Modified Sampler ring samples and bulk soil samples were obtained for laboratory testing. Borings were backfilled with soil cuttings, tamped and capped to match surface conditions.

The approximate locations of the exploratory borings are shown in Figure No. 2, *Approximate Boring Location Map*. Detailed descriptions of the field exploration and sampling program are presented in Appendix A, *Field Exploration*.

3.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in classification and to evaluate relevant engineering properties. The tests performed included:

- In Situ Moisture Contents and Dry Densities (ASTM Standard D2216)
- Passing Sieve No. 200 (ASTM D1140)
- Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)



Approximate Boring Locations Map

Legend
- Boring Location
- Coring Location
- Percolation Testing Location

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New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street
Hawthorne, California 90250

Project No.	Figure No.
23-31-119-01	2

- Soil Corrosivity Tests (Caltrans 643, 422, 417, and 532)
- R-value, ASTM D2844 and CTM301

For a description of the laboratory test methods and test results, see Appendix B, *Laboratory Testing Program*. For *in-situ* moisture and density data, see the Logs of Borings in Appendix A, *Field Exploration*.

3.4 Engineering Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated. This report was prepared to provide the findings, conclusions and recommendations developed during our investigation and evaluation.

4.0 GEOLOGIC CONDITIONS

4.1 Regional Geologic Setting

The project site lies within the coastal plain region of Los Angeles County. This area is situated at the junction of the two major convergent fault systems. The first group includes the northwest-trending high angle strike slip faults of the San Andreas system projecting from the northern terminus of the Peninsular Ranges province. Faults in this group include the Palos Verdes, Newport-Inglewood, and Whittier-Elsinore fault zones. The second group includes the east-west trending low angle reverse or reverse-oblique faults bounding the south margin of the Traverse Ranges Province. Faults in this group include the Malibu-Santa Monica, Hollywood, Raymond and Sierra Madre fault zones. The seismic hazard for the coastal plain region is high.

4.2 Subsurface Profile of Project Site

The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth explored of 11.0 feet bgs. The fill soils encountered consists primarily of clayey silts and silty sands. The alluvial soil deposits below the fill consist of clayey silts and silty sands. Sampling blow-counts correlate to loose to moderately dense conditions near surface, and generally become denser with depth.

4.3 Groundwater

Groundwater was not encountered during our subsurface exploration to the deepest depth drilled of 11.0 feet below ground surface. Based on review of Historically Highest Groundwater Map, Plate No. 1.2, in the Seismic Hazard Zone report for the Inglewood 7.5-minute Quadrangle (1998), the historically highest groundwater level contours in the vicinity of the site are interpreted to be approximately 45 feet below ground surface.

The groundwater level beneath the site can vary depending upon the seasonal precipitation and groundwater basin activities including recharge, storage and pumping occurring in the general site vicinity. Zones of perched groundwater may be present within the near-surface deposits due to local conditions, storm water recharge or during rainy seasons.

4.4 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and depositional characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If, during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

A detailed description of the earth materials encountered during our field exploration is presented in Appendix A*, Field Exploration.*

5.0 FAULTING AND SEISMIC HAZARDS

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, liquefaction and seismically induced settlement, lateral spreading, landslides, earthquake induced flooding, tsunamis and seiches, and volcanic eruption hazard. Results of a site-specific evaluation for each type of possible seismic hazards are discussed in the following sections.

5.1 Seismic Characteristics of Nearby Faults

The proposed project site is situated in a seismically active region. As is the case for most areas of Southern California, ground-shaking resulting from earthquakes associated with nearby and more distant faults may occur at the project site. During the life of the project, seismic activity associated with active faults can be expected to generate moderate to strong ground shaking at the site. Review of recent seismological and geophysical publications indicates that the seismic hazard for the project site is high.

The project site is not located within a currently designated State of California Earthquake Fault Zone for surface fault rupture. No surface faults are known to project through or towards the site. The closest known faults to the project site with mapped surface traces are the Newport Inglewood (approximately 2.2 miles or 3.5 kilometers to the northwest)

and the Palos Verdes (approximately 6.2 miles or 10.0 kilometers to the southwest) The Elysian Park (Upper) Fault, Santa Monica Fault, and Hollywood Fault along with other regional faults were included as capable faults modeled for the probabilistic seismic hazard analysis for the site.

5.2 Surface Fault Rupture

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture. The Alquist-Priolo Earthquake Fault Zoning Act requires the California Geological Survey to zone "active faults" within the State of California. An "active fault" has exhibited surface displacement with Holocene time (within the last 11,000 years) hence constituting a potential hazard to structures that may be located across it. Based on a review of existing geologic information, no known active faults project through or toward the site. The potential for surface rupture resulting from the movement of the nearby major faults is considered very low.

5.3 Liquefaction and Seismically-Induced Settlement

Liquefaction is the sudden decrease in strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface.

The site is not located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Inglewood Quadrangle.

5.4 Lateral Spreading

Seismically induced lateral spreading involves primarily lateral movement of earth materials due to ground shaking. It differs from slope failure in that complete ground failure involving large displacement does not occur due to the relatively smaller gradient of the initial ground surface. Lateral spreading is characterized by near-vertical cracks with predominantly horizontal movement of the soil mass involved. The topography at the project site and in the immediate vicinity of the site is relatively flat, with no significant nearby slopes or embankments. Under these circumstances, the potential for lateral spreading at the subject site is considered low.

5.5 Seismically-Induced Slope Instability

Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The project site is relatively flat. In the absence of significant ground slopes, the potential for seismically induced landslides to affect the proposed site is considered to be very low.

6.0 SEISMIC ANALYSIS

6.1 CBC Seismic Design Parameters

General seismic parameters based on the 2022 California Building Code and ASCE 7-16 with Supplement 3 are calculated using the ATC hazard, *Seismic Design by Location* website application and the site coordinates (North latitude: 33.9150, West longitude: -118.3502 degrees). The seismic parameters are presented below.

Table No. 2, CBC Seismic Design Parameters

Seismic Parameter	Value
Site Class	D
Mapped Short Period (0.2-sec) Spectral Response Acceleration, S_S	1.833 g
Mapped 1-second Spectral Response Acceleration, S_1	0.645 g
Site Coefficient, Fa	1.0
Site Coefficient, Fv	1.7
MCE 0.2-sec Period Spectral Response Acceleration, S_{MS}	1.833 g
MCE 1-second Period Spectral Response Acceleration, S_{M1}	1.645 g*
Design Spectral Response Acceleration for Short Period, S_{DS}	1.222 g
Design Spectral Response Acceleration for 1-second Period, S_{D1}	1.097 g*
TL	8
PGA_M	0.871
Seismic Design Category	D

*Per ASCE 7-16 Supplement 3-Section 11.4.8, the S_{M1} and S_{D1} values listed in this table are increased by 50%.

The parameters presented in Table No. 2, *CBC Seismic Design Parameters* are only valid if requirements of ASCE 7-16 Section 11.4.8 are satisfied.

7.0 EARTHWORK RECOMMENDATIONS

7.1 General Evaluation

Based on our field exploration, laboratory testing, and analyses of subsurface conditions at the site, remedial grading will be required to prepare the sites for support of the

proposed structures that are constructed with conventional shallow footings. To reduce differential settlement, variations in the soil type, degree of compaction, and thickness of the compacted fill, the thickness of compacted fill placed underneath the shallow footings should be kept uniform.

Site grading recommendations provided below are based on our experience with similar projects in the area and our evaluation of this investigation. Site preparation for the proposed development will require removal of existing structures, improvements, and other existing underground manmade structures and utilities.

The site soils can be excavated utilizing conventional heavy-duty earth-moving equipment. The excavated site soils, free of vegetation, organics and debris, may be placed as compacted fill in structural areas after proper processing. Rocks larger than 3.0 inches in the largest dimension should not be placed as fill.

On-site fine-grained soils and with an expansion index exceeding 20 should not be re-used for compaction within 2 feet below the proposed shallow foundations and slabs on grade. Soils containing organic materials should not be used as structural fill. The extent of removal should be determined by the geotechnical representative based on soil observation during grading.

7.2 Over-Excavation

Prior to the start of construction, all loose soils, fill and soils disturbed during demolition should be removed to firm acceptable native materials or sedimentary bedrock. In order to provide uniform support for the minor structures on shallow foundations, the minimum depth of over-excavation should be 4 feet below the ground surface, or 2 feet below bottom of proposed shallow foundations or depth of undocumented fill, whichever is deeper. Deeper over-excavation will be needed if soft, yielding soils or earth materials are exposed on the excavation bottoms. Over-excavation should extend at least 4 feet laterally beyond the limits of footings or as limited by the existing structures and improvements to remain in place. Over excavation beneath slabs on grade, pavements and hardscape areas should have a minimum of 2 feet of engineered fill and extend at least 2 feet laterally. Excavation activities should not disturb existing utilities, buildings, sidewalks and remaining structures.

For the synthetic track and field and artificial turf areas, we recommend over-excavation be at least 2 feet below existing grade and 2 feet laterally beyond the foot prints, where space is available. These areas should be backfilled with proper subgrade materials that meet the specifications for Tarkett Sports synthetic turf or project specific requirements.

The excavations adjacent to existing structures can be done using shoring or the “A-B-C” slot cut method. The “A-B-C” slot cuts exposing native sandy soils may be excavated with

maximum 8 feet wide and 8 feet in height sections to prevent the existing utility lines and/or site structures from becoming unstable.

7.3 Structural Preparation

All exposed subgrade soil surface should be observed by a geotechnical engineer or their representative prior to placement of fill, base materials, slabs, and/or foundation. The exposed subgrade should be scarified at least 6 inches, moisture conditioned as needed to near-optimum moisture content, mixed and compacted to 90 percent relative compaction. The upper 12 inches of subgrade below new pavement should be compacted to 95 percent relative compaction.

If loose, yielding soil conditions are encountered at the excavation bottom, the following options can be considered:

a. Over-excavate until a firm bottom is reached.
b. Over-excavate an additional 18 inches deep, and then place at least 18-inch-thick compacted base material (CAB or equivalent) to bridge the soft bottom. Base materials should be compacted to at least 95% relative compaction.
c. Over-excavate an additional 18-inches deep, and then place a layer of geotextile (i.e., Mirafi HP570, or equivalent), then place 18-inch-thick compacted base material (CAB or equivalent) to bridge the soft bottom. Base should be compacted to at least 95% relative compaction. An additional layer of geotextile may be needed on top of the compacted base materials depending on the actual site conditions.

7.4 Engineered Fill

Following observation of the excavation bottom, subgrade soil surfaces should be scarified to a depth of at least 6.0 inches. The scarified soil should be moisture-conditioned to within three percent (3%) of optimum moisture for granular soils and to approximate three percent (3%) above the optimum moisture for fine-grained soils. Scarified soils shall be compacted to a minimum ninety percent (90%) of the laboratory maximum dry density as determined by the ASTM Standard D1557 test method.

Any import fill should be tested and approved by Project Geotechnical Consultant. The import fill should have an expansion potential less than 20. The imported materials should be thoroughly mixed and moisture conditioned within three percent (3%) above the optimum moisture. All fill, if not specified otherwise elsewhere in this report, should be compacted to at least ninety percent (90%) of the laboratory dry density in accordance with the ASTM Standard D1557 test method.

Where the fill is not within the areas specified above or is not to support any structures, excavated site soils, free of deleterious materials and rock particles larger than 3.0 inches in the largest dimension, should be suitable for placement as compacted fill. The site materials should be thoroughly mixed and moisture conditioned to approximately three percent (3%) above the optimum moisture, and then compacted to at least ninety percent (90%) of relative compaction.

7.5 Excavatability

Based on our field exploration, the earth materials at the site may be excavated with conventional heavy-duty earth moving and trenching equipment. The onsite materials may contain demolition debris and gravel and/or cobbles. Earthwork should be performed with suitable equipment and methods for removal of debris from the engineered fill.

7.6 Expansive Soil

During construction, grading will mix and relocate the site soils, and additional fill soils may be added. The expansion potential of the finish-grade soils should be tested at the completion of grading. Shallow foundations should be designed to accommodate the anticipated soil expansion. Any proposed import fill should have an expansion index less than 20 and should be evaluated and approved by Converse prior to import to the site.

7.7 Trench Zone Backfill

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

Trench excavations to receive backfill shall be free of trash, debris, grass, roots or other unsatisfactory materials at the time of backfill placement. Excavated on-site soils free of oversize particles, defined as larger than one (1) inch in maximum dimension in the upper 12 inches of subgrade soils and larger than three (3) inches in the largest dimension in the trench backfill below, and deleterious matter after proper processing may be used to backfill the trench zone. Imported trench backfill, if used, should be approved by the project soils consultant prior to delivery at the site. No more than 30 percent of the backfill volume should be larger than ¾ inch in the largest dimension.

Trench backfill shall be compacted to 90 percent of the laboratory maximum dry density as per ASTM Standard D2922 test method. At least the upper twelve (12) inches of trench underlying pavements should be compacted to at least 95 percent of the laboratory maximum dry density.

Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The

backfill materials shall be brought to within three (3) percent of optimum moisture content and then placed in horizontal layers if the expansion index is less than or equal to 30. Should the expansion index be greater than 30, backfill materials shall be brought to approximately three (3) percent above optimum moisture content. The thickness of uncompacted layers should not exceed eight (8) inches. Each layer shall be evenly spread, moistened, or dried as necessary, and then tamped or rolled until the specified density has been achieved.

The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work. The field density of the compacted soil shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent. Observation and field tests should be performed by geotechnical engineer or their representatives during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained. It should be the responsibility of the contractor to maintain safe conditions during cut and/or fill operations. Trench backfill shall not be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

Imported soils, if any, used as compacted trench backfill should be predominantly granular and meet the following criteria:

- Expansion Index less than 20
- Free of all deleterious materials
- Contain no particles larger than 3 inches in the largest dimension
- Contain less than 30 percent by weight retained on ¾-inch sieve
- Contain at least 15 percent fines (passing #200 sieve)
- Have a Plasticity Index of 10 or less

Any import fill should be tested and approved by the geotechnical representative prior to delivery to the site.

7.8 Shrinkage and Subsidence

Soil shrinkage and/or bulking as a result of remedial grading depends on several factors including the depth of over-excavation, and the grading method and equipment utilized, and average relative compaction. For preliminary estimation, bulking and shrinkage factors for various units of earth material at the site may be taken as presented below:

- The approximate shrinkage factor for the undocumented fill soils is estimated to range from ten (10) to fifteen (15) percent.
- The approximate shrinkage factor for the native alluvial soils is estimated to range from five (5) to ten (10) percent.
- For estimation purposes, ground subsidence may be taken as 0.1 feet as a result of remedial grading.

Although these values are only approximate, they represent our best estimates of the factors to be used to calculate lost volume that may occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field-testing using the actual equipment and grading techniques be conducted.

The various design recommendations provided in this section are based on the assumptions that in preparing the site, the earthwork and site grading recommendations provided in this report will be followed.

8.0 DESIGN RECOMMENDATIONS

Based on the results of our background review, subsurface exploration, laboratory testing, geotechnical analyses, and understanding of the planned site development, it is our opinion that the proposed project is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the project plans, specifications, and are followed during site construction. The proposed structures and site improvements may be supported by shallow continuous or isolated square footings.

8.1 Shallow Foundations

8.1.1 Vertical Capacity

The proposed minor structures, such as trash enclosures and storage buildings, can be supported by conventional shallow footings. We recommend continuous and square footings be founded at least 18 inches below lowest adjacent final grade entirely into compacted fill or into native soil. A minimum footing width of 24 inches is recommended for square footings and 18 inches for continuous footings. The allowable bearing value for footings with above minimum sizes founded on compacted fill and competent native soils may be designed for a net bearing pressure of 2,000 pounds per square foot (psf) for dead-plus-live-loads. The net allowable bearing pressure can be increased by 250 psf for each additional foot of excavation depth and by 250 psf for each additional foot of excavation width up to a maximum value of 3,000 psf.

The net allowable bearing values indicated above are for the dead loads and frequently applied live loads and are obtained by applying a factor of safety of 3.0 to the net ultimate bearing capacity.

8.1.2 Lateral Capacity

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.3 may be assumed with normal dead load forces. An allowable passive earth pressure of 200 psf per foot of depth up to a maximum of 1,500 psf may be used for footings poured against properly compacted fill. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

8.1.3 Static Settlement

The static settlement of structures supported on continuous and/or spread footings founded on compacted fill and native soil will depend on the actual footing dimensions and the imposed vertical loads. Based on the maximum allowable net bearing pressures presented above, static settlement is anticipated to be less than 1.0 inch. Differential settlement is expected to be up to one-half of the total settlement over a 30-foot span.

8.1.4 Dynamic Increases

Bearing values indicated above are for total dead load and frequently applied live loads. The above vertical bearing may be increased by 33% for short durations of loading which will include the effect of wind or seismic forces. The allowable passive pressure may be increased by 33% for lateral loading due to wind or seismic forces.

8.2 Cast-In-Drilled-Hole Pile Foundations for Non-building Structures

The planned non-building structures (e.g., lighting for parking lot, walkway, and court, fence walls, signs, etc.) may be supported on a Cast-In-Drilled-Hole (CIDH) pile foundation provided the following recommendations are incorporated into design and construction.

8.2.1 Vertical Capacity

CIDH piles should be at least 18-inches in diameter and can be designed for an allowable skin friction of 150 psf against the perimeter of pile. The diameter and length of CIDH pile shall be determined by the structural engineer based on design loads. The uplift capacities can be taken as one-half of compressive capacities for pile design.

8.2.2 Lateral Capacity

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.30 may be assumed with

normal dead load forces. An allowable passive earth pressure of 200 psf per foot of depth up to a maximum of 1,500 psf may be used for foundations poured against compacted fill. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

For ground surface restrained by concrete slab, the passive resistance may be calculated from the ground surface. For unrestrained ground condition, the passive resistance of the upper one (1) foot of earth material should be neglected in design.

8.2.3 Settlement

Based on the maximum allowable net vertical capacity presented above, static settlement is anticipated to be less than 0.5 inch.

8.3 Slabs-on-Grade

Slabs-on-grade should have a minimum thickness of five (5) inches nominal for support of normal ground-floor live loads. Minimum reinforcement for slabs-on-grade should be No. 4 reinforcing bars, spaced at 18 inches on-center each way. The thickness and reinforcement of more heavily loaded slabs will be dependent upon the anticipated loads and should be designed by a structural engineer. A static modulus of subgrade reaction equal to 125 pounds per square inch per inch may be used in structural design of concrete slabs-on-grade.

It is critical that the exposed subgrade soils should not be allowed to desiccate prior to the slab pour. Care should be taken during concrete placement to avoid slab curling. Slabs should be designed and constructed as promulgated by the ACI and Portland Cement Association (PCA). Prior to the slab pour, all utility trenches should be properly backfilled and compacted.

In areas where a moisture-sensitive floor covering (such as vinyl tile or carpet) is used, a minimum 10-mil-thick moisture retarder/barrier between the bottom of slab and subgrade that meets the performance criteria of ASTM E1745 Class A material. Retarder/barrier sheets should be overlapped a minimum of six inches and should be taped or otherwise sealed per the product specifications.

8.4 Modulus of Subgrade Reaction

For the subject project, design of the structures supported on compacted fill subgrade prepared in accordance with the recommendations provided in this report may be based on a soil modulus of subgrade reaction of (k_s) of 100 pounds per square inch per inch.

8.5 Lateral Earth Pressure

Although not anticipated, the following provisional design values may be used for any utility vaults and/or walls below grade that are less than 8 feet high.

The earth pressure behind any buried wall depends primarily on the allowable wall movement, type of soil behind the wall, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following earth pressures are recommended for vertical walls with no hydrostatic pressure.

Table No. 3, Lateral Earth Pressures for Retaining Wall Design

Backfill Slope (H:V)	Cantilever Wall Equivalent Fluid Pressure (pcf)	Restrained Wall (psf)
Level	40 (triangular pressure distribution)	55 (triangular pressure distribution)

The recommended lateral pressures assume that the walls are fully back-drained to prevent build-up of hydrostatic pressure. Adequate drainage could be provided by means of permeable drainage materials wrapped in filter fabric installed behind the walls. The drainage system should consist of perforated pipe surrounded by a minimum one (1) square feet per lineal feet of free draining, uniformly graded, 3/4-inch washed, crushed aggregate, and wrapped in filter fabric such as Mirafi 140N or equivalent. The filter fabric should overlap approximately 12 inches or more at the joints. The subdrain pipe should consist of perforated, four-inch diameter, rigid ABS (SDR-35) or Schedule 40 PVC Pipe, or equivalent, with perforations placed down. Alternatively, a prefabricated drainage composite system such as the Miradrain G100N or equivalent can be used. The subdrain should be connected to solid pipe outlets, with a maximum outlet spacing of 100 feet. Waterproofing membranes should be added to the subterranean wall levels for moisture sensitive areas to mitigate moisture migration through the walls.

In addition, walls with inclined backfill should be designed for an additional equivalent fluid pressure of one (1) pound per cubic foot for every two (2) degrees of slope inclination. Walls subjected to surcharge loads located within a distance equal to the height of the wall should be designed for an additional uniform lateral pressure equal to one-third or one-half the anticipated surcharge load for unrestrained or restrained walls, respectively. These values are applicable for backfill placed between the wall stem and an imaginary plane rising 45 degrees from below the edge (heel) of the wall footings.

Retaining walls taller than 6 feet should be designed to resist additional earth pressure caused by seismic ground shaking based on CBC latest edition. A seismic earth pressure of 24H (psf), based on an inverted triangular distribution, can be used for design of wall.

8.6 Soil Corrosivity Evaluation

Based on our review of soil corrosivity test results (see Appendix B), the soluble sulfate concentration, pH, and chloride content are not in the corrosive range to concrete in accordance with the Caltrans Corrosive Guidelines (2012). The minimum saturated resistivity is in the mildly corrosive range to ferrous metal. Mitigation measures to protect concrete in contact with the soils are not anticipated.

A corrosion engineer may be consulted for appropriate mitigation procedures and construction design, if needed. General considerations for corrosion mitigation measures may include the following:

- Steel and wire concrete reinforcement should have at least three inches of concrete cover where cast against soil, unformed.

- Below-grade ferrous metals should be given a high-quality protective coating, such as 18-mil plastic tape, extruded polyethylene, coal-tar enamel, or Portland cement mortar.

- Below-grade metals should be electrically insulated (isolated) from above-grade metals by means of dielectric fittings in ferrous utilities and/or exposed metal structures breaking grade.

8.7 Site Drainage

Adequate positive drainage should be provided away from the structures to prevent ponding and to reduce percolation of water into structural backfill. We recommend that the landscape area immediately adjacent to the foundation shall be designed sloped away from the building with a minimum 5% slope gradient for at least 10 feet measured perpendicular to the face of the wall. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2% away from the building per 2022 CBC.

Planters and landscaped areas adjacent to the building perimeter should be designed to minimize water infiltration into the subgrade soils. Gutters and downspouts should be installed on the roof, and runoff should be directed to the storm drain through non-erosive devices. Lower-level walkways and open patio areas may require special drainage provisions and sump pumps to provide suitable drainage.

8.8 Flexible Pavement

The flexible pavement structural section design recommendations were performed in accordance with the method contained in the *CALTRANS Highway Design Manual*, Chapter 630, without the factor of safety. No specific traffic study was performed to

determine the Traffic Index (TI) for the proposed project; therefore, a wide range of TI values were evaluated.

Due to various earth materials encountered at the site, flexible pavement structural section recommendations are prepared for both subgrade soils. We recommend that the project structural engineer consider the traffic loading conditions at various locations and select the appropriate pavement sections from the following table:

Table No. 4, Flexible Pavement Structural Sections

Design R-value	Design TI	Asphalt Concrete (AC) Over Aggregate Base (AB) Structural Sections		Full AC Structural Section
		AC (inches)	AB (inches)	AC (inches)
3	4	**3.0**	**6.0**	**5.0**
	5	**4.0**	**8.0**	**6.5**
	6	**5.0**	**10.0**	**8.0**
	7	**6.0**	**12.0**	**9.5**
	8	**7.0**	**14.0**	**11.0**
	9	**8.0**	**16.0**	**12.5**

Base material shall conform to requirements for Aggregate Base (AB) or equivalent and should be placed in accordance with the requirements of the Standard Specifications for Public Works Construction (SSPWC, latest Edition). Asphaltic materials should conform to Section 203-1, "Paving Asphalt," of the Standard Specifications for Public Works Construction (SSPWC, latest Edition) and should be placed in accordance with Section 302-5, "Asphalt Concrete Pavement," of the SSPWC, 2012 edition.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

8.9 Rigid Pavement

Rigid pavement design recommendations were provided in accordance with the Portland Cement Association's (PCA) Southwest Region Publication P-14, Portland Cement Concrete Pavement (PCCP) for Light, Medium and Heavy Traffic Rigid Pavement. We recommend that the project structural engineer consider the loading conditions at various locations and select the appropriate pavement sections from the following table:

Table No. 5, Rigid Pavement Structural Sections

Design R-Value	Design Traffic Index (TI)	PCCP Pavement Section (inches)
3	5.0	8.5
	6.0	8.5
	7.0	9.0
	8.0	9.5
	9.0	10.0

The above pavement section is based on a minimum 28-day Modulus of Rupture (M-R) of 550 psi and a compressive strength of 3,750 psi. The third point method of testing beams should be used to evaluate modulus of rupture. The concrete mix design should contain a minimum cement content of 5.5 sacks per cubic yard. Recommended maximum and minimum values of slump for pavement concrete are 3.0 inches to 1.0 inch, respectively.

Transverse contraction joints should not be spaced more than 10 feet and should be cut to a depth of 1/4 the thickness of the slab. Longitudinal joints should not be spaced more than 12 feet apart. A longitudinal joint is not necessary in the pavement adjacent to the curb and gutter section.

Prior to placement of concrete, at least the upper 12.0 inches of subgrade soils below rigid pavement sections should be compacted to at least ninety-five percent (95%) relative compaction as defined by the ASTM D 1557 standard test method.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into pavement base and/or subgrade.

9.0 CONSTRUCTION RECOMMENDATIONS

9.1 General

Site soils should be excavatable using conventional heavy-duty excavating equipment. Temporary sloped excavation is feasible if performed in accordance with the slope ratios provided in Section 9.2, *Temporary Excavations*. Existing utilities should be accurately located and either protected or removed as required. For steeper temporary construction slopes or deeper excavations, shoring should be provided by the contractor as necessary, to protect the workers in the excavation.

9.2 Temporary Excavations

Based on the materials encountered in the exploratory borings, sloped temporary excavations may be constructed according to the slope ratios presented in Table No. 6, *Slope Ratios for Temporary Excavation*. Any loose utility trench backfill or other fill encountered in excavations will be less stable than the native soils. Temporary cuts encountering loose fill or loose dry sand should be constructed at a flatter gradient than presented in the following table:

Table No. 6, Slope Ratios for Temporary Excavation

Maximum Depth of Cut (feet)	Maximum Slope Ratio* (horizontal: vertical)
0 – 4	Vertical
4 – 8	1: 1
8+	1.5: 1

*Slope ratio assumed to be uniform from top to toe of slope.

Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction equipment, should not be placed within five (5) feet of the unsupported excavation edge. The above maximum slopes are based on a maximum height of six (6) feet of stockpiled soils placed at least five (5) feet from the excavation edge.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

If the excavation occurs near existing structures, special construction considerations would be required during excavation to protect these existing structures during construction. The proposed excavation should not cause loss of bearing and/or lateral supports of the existing structures.

9.3 Slot Cut Recommendations

Temporary excavations during possible improvements should not extend below a 1:1 horizontal:vertical (H:V) plane extending beyond and down from the bottom of the existing

utility lines or structures. The remedial grading excavations should not cause loss of bearing and/or lateral support for adjacent utilities or structures.

If remedial grading excavations extend below a 1:1 horizontal:vertical (H:V) plane extending beyond and down from the bottom of adjacent off-site utility lines or structure foundations, shoring or slot cutting shall be employed. "A-B-C" slot cuts exposing native sandy soils may be excavated with maximum 8 feet wide and 8 feet depth sections to prevent the existing utility lines or off-site structures from becoming unstable. Backfill should be accomplished in the shortest period of time possible and in alternating sections.

The ABC slot cutting method for retaining walls could be a possible option as an alternative to shoring for excavation less than 8 feet or with cohesive soils. In general, for structures it is not recommended for slot cutting if the height of excavation exceeds more than 8 feet or into sandy soils and with surcharging load.

9.4 Geotechnical Services During Construction

This report has been prepared to aid in the foundation plans and specifications, and to assist the architect, civil and structural engineers in the design of the proposed structures. It is recommended that this office be provided an opportunity to review final design drawings and specifications to verify that the recommendations of this report have been properly implemented.

Footing excavations should be observed by geotechnical engineer or their representative prior to placement of steel and concrete so that footings are founded on satisfactory materials and excavations are free of loose and disturbed materials. Trench backfill should be placed and compacted with observation and field density testing provided by this office.

During construction, the geotechnical engineer and/or their authorized representatives should be present at the site to provide a source of advice to the client regarding the geotechnical aspects of the project and to observe and test the earthwork performed. Their presence should not be construed as an acceptance of responsibility for the performance of the completed work, since it is the sole responsibility of the contractor performing the work to ensure that it complies with all applicable plans, specifications, ordinances, etc. This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations and cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the Owner if he considers any recommended actions presented herein to be unsafe.

10.0 CLOSURE

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice. We make no other warranty, either expressed or implied. Our conclusions and recommendations are based on the results of the field and laboratory investigations, combined with an interpolation and extrapolation of soil conditions between and beyond boring locations. If conditions encountered during construction appear to be different from those shown by the borings, this office should be notified.

Design recommendations given in this report are based on the assumption that the earthwork and site grading recommendations contained in this report are implemented. Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the final site grading and actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.

11.0 REFERENCES

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Appendix A

Field Exploration

APPENDIX A: FIELD EXPLORATION

Field exploration included a site reconnaissance and subsurface exploration program consisting of drilling soil borings. During the site reconnaissance, the surface conditions were noted, and the approximate locations of the borings were marked using existing boundary and other features as a guide and should be considered accurate only to the degree implied by the method used.

Exploratory Borings

A total of one (1) exploratory boring (BH-1), two (2) percolation test and two (2) coring were advanced within the project sites on March 27, 2023. The excavations were advanced using a two-man hand auger crew to the depths ranging of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse geologist/engineer and sampled at regular intervals and at changes in subsurface soils.

California Modified Sampler (Ring samples) and bulk soil samples were obtained for laboratory testing the bore holes were backfilled and compacted with soil cuttings following the auguring and coring observations were patched with asphalt where necessary to match existing conditions.

The approximate locations of the exploratory borings are shown in Figure No. 2, *Approximate Boring Locations Map*. Boring logs for the most recent field exploration are presented in Appendix A, *Field Exploration*.

Ring samples of the subsurface materials were obtained at frequent intervals in the exploratory borings using a drive sampler (2.4-inches inside diameter and 3.0-inches outside diameter) lined with sample rings. The steel ring sampler was driven into the bottom of the borehole with successive drops of 45 lbs at 2 feet height. Samples are retained in brass rings (2.4-inches inside diameter and 1.0-inch in height). The central portion of the sample was retained and carefully sealed in waterproof plastic containers for shipment to the Converse laboratory. Below counts for each sample interval are presented on the logs of borings. Bulk samples of typical soil types were also obtained.

It should be noted that the exact depths at which material changes occur cannot always be established accurately. Changes in material conditions that occur between driven samples are indicated in the logs at the top of the next drive sample. For a key to soil symbols and terminology used in the boring logs, refer to Drawing No. A-1, *Unified Soil Classification and Key to Boring Log Symbols*. For the logs of the borings, see Drawing Nos. A-2 through A-4, *Logs of Borings*.

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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		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
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

FIELD AND LABORATORY TESTS

C	Consolidation (ASTM D 2435)
CL	Collapse Potential (ASTM D 4546)
CP	Compaction Curve (ASTM D 1557)
CR	Corrosion, Sulfates, Chlorides (CTM 643-99; 417; 422)
CU	Consolidated Undrained Triaxial (ASTM D 4767)
DS	Direct Shear (ASTM D 3080)
EI	Expansion Index (ASTM D 4829)
M	Moisture Content (ASTM D 2216)
OC	Organic Content (ASTM D 2974)
P	Permeablility (ASTM D 2434)
PA	Particle Size Analysis (ASTM D 6913 [2002])
PI	Liquid Limit, Plastic Limit, Plasticity Index (ASTM D 4318)
PL	Point Load Index (ASTM D 5731)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301)
SE	Sand Equivalent (ASTM D 2419)
SG	Specific Gravity (ASTM D 854)
SW	Swell Potential (ASTM D 4546)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166)
	Unconfined Compression - Rock (ASTM D 7012)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850)
UW	Unit Weight (ASTM D 2937)
WA	Passing No. 200 Sieve (ASTM D1140)

BORING LOG SYMBOLS

SAMPLE TYPE

- STANDARD PENETRATION TEST — Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method
- DRIVE SAMPLE — 2.42" I.D. sampler (CMS).
- DRIVE SAMPLE — No recovery
- BULK SAMPLE
- GROUNDWATER WHILE DRILLING
- GROUNDWATER AFTER DRILLING

DRILLING METHOD SYMBOLS

Auger Drilling | Mud Rotary Drilling | Dynamic Cone or Hand Driven | Diamond Core

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Converse Consultants

Project ID: 138-01.GPJ; Template: LOG

Project Name
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street Hawthorne, California 90250

Project No.
23-31-119-01

Drawing No.
A-1a

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	SPT Blow Counts	Pocket Penetrometer (tsf)	CA Sampler	Torvane (tsf)	Field Approximation
Very Soft	<0.25	< 2	<0.25	<3	<0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	2 - 4	0.25 - 0.50	3 - 6	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	5 - 8	0.50 - 1.0	7 - 12	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	9 - 15	1.0 - 2.0	13 - 25	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	16 - 30	2.0 - 4.0	26 - 50	1.0 - 2.0	Readily indented by thumbnail
Hard	>4.0	>30	>4.0	>50	>2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N_{60} Value (blows / foot)	CA Sampler
Very Loose	<4	<5
Loose	4- 10	5 - 12
Medium Dense	11 - 30	13 - 35
Dense	31 - 50	36 - 60
Very Dense	>50	>60

MOISTURE

Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OF PROPORTION OF SOILS

Descriptor	Criteria
Trace (fine)/ Scattered (coarse)	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

Descriptor		Size
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION/ Induration

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

NOTE: This legend sheet provides descriptions and associated criteria for required soil description components only. Refer to Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), Section 2, for tables of additional soil description components and discussion of soil description and identification.

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Log of Boring No. PT-01

Dates Drilled: 3/27/2023 Logged by: Musfiqur Ali Checked By: Babak Abbasi

Equipment: 4" HAND AUGER Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/12"	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		GRASS 2", PATCHY DARK SOIL **FILL (Af)** **CLAYEY SILT (ML):** Low Plasticitywith some fine-grained sand, some silt, brown.						CP
5		**ALLUVIUM (Qal)** **CLAYEY SILT (ML):** Low plasticity, with some fine-grained sand, brown/gray.			25	20	106.7	WA (fc=69.4%)
10		**SILTY SAND (SM):** fine grained sand, loose, dry, dark brown/gray.			35	13	103.4	
		End of boring at 11 feet below ground surface. No ground water encountered. Borehole used for percolation testing. Borehole was backfilled with soil cuttings on 3/27/3023.						

Converse Consultants

Project Name
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street Hawthorne, California 90250

Project No. **23-31-119-01**

Drawing No. **A-2**

Log of Boring No. PT-02

Dates Drilled: 3/27/2023 Logged by: Musfiqur Ali Checked By: Babak Abbasi

Equipment: 4" HAND AUGER Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/12"	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		GRASS 2", PATCHY DARK SOIL						R
		FILL (Af) **CLAYEY SILT (ML):** Low Plasticity, with some fine-grained sand, some silt, brown.						
5		**ALLUVIUM (Qal)** **CLAYEY SILT (ML):** Low plasticity, with some fine-grained sand, brown/gray.			20	19	103.5	
10		**SILTY SAND (SM):** fine grained, moderately indurated, grayish brown.			25	23	112.1	WA (fc=24.1%)
		End of boring at 11 feet below ground surface. No ground water encountered. Borehole used for percolation testing. Borehole was backfilled with soil cuttings on 3/27/3023.						

Converse Consultants

Project Name
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street Hawthorne, California 90250

Project No. **23-31-119-01**

Drawing No. **A-3**

Log of Boring No. BH-03

Dates Drilled: 3/27/2023 Logged by: Musfiqur Ali Checked By: Babak Abbasi

Equipment: 4" HAND AUGER Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/12"	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		2" INCH GRASS, PATCHY DARK SOIL **FILL (Af):** **SILTY SAND (SM):** fine-grained, some silt, brown.						CR
5		**ALLUVIUM (Qal):** **SILTY SAND (SM):** fine grained sand, trace silt, moist to wet, reddish-brown.			30	17	120.8	
10					35	15	105.7	
		End of boring at 11 feet below ground surface. No ground water encountered. Borehole was backfilled with soil cuttings on 3/27/3023.						

Converse Consultants

Project Name
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street Hawthorne, California 90250

Project No. **23-31-119-01**

Drawing No. **A-4**

Appendix B

Laboratory Testing Program

APPENDIX B: LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their relevant physical characteristics and engineering properties. The amount and selection of tests were based on the geotechnical requirements of the project. Test results are presented herein and on the Logs of Borings in Appendix A, *Field Exploration*. The following is a summary of the laboratory tests conducted for this project.

In-situ Moisture Content and Dry Density

Results of moisture content and dry density tests performed on relatively undisturbed ring samples in accordance with ASTM standards D2216 and D7263 were used to aid in the classification of the soils and to provide quantitative measure of the *in situ* dry density. Data obtained from this test provides qualitative information on strength and compressibility characteristics of site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

Soil Corrosivity

One (1) representative soil sample was tested to determine minimum electrical resistivity, pH, and chemical content, including chloride concentrations, and soluble sulfate. The purpose of the testing was to determine the corrosion potential of site soils when placed in contact with common construction materials. The testing was performed by AP Engineering in Pomona, California. The test result received from AP Engineering is included in the following table:

Table No. B-1, Summary of Corrosivity Test Result

Boring No.	Sample Depth (feet)	pH (Caltrans 643)	Soluble Chlorides (Caltrans 422) ppm	Soluble Sulfate (Caltrans 417) (%)	Saturated Resistivity (Caltrans 643) Ohm-cm
BH-3	1-5	7.15	130	0.011	10,200

Percent Finer Than Sieve No. 200

The percent finer than Sieve No. 200 test was performed on three (3) selected soil samples to aid in the classification of the on-site soils and to estimate other engineering parameters. Testing was performed in general accordance with the ASTM Standard D1140 test method. The test results are presented in the boring logs.

Table No. B-2, Summary of Percent Passing Sieve #200 Test Results

Boring No.	Depth (feet)	Soil Classification	Percent Passing Sieve No. 200
PT-1	5.0-5.5	Clayey Silt (ML)	69.4
PT-2	10.0-10.5	Silty Sand (SM)	24.1

R-Value

One (1) representative bulk soil sample was tested for resistance value (R-Value) in accordance with ASTM D2844 Standard. This test is designed to provide a relative measure of soil strength for use in pavement design. The test result is shown in the following table:

Table No. B-3, R-Value Test Result

Boring No.	Depth (feet)	Soil Classification	Measured R-Value
PT-2	0.2-5	Clayey Silt (ML)	3

Maximum Dry Density Test

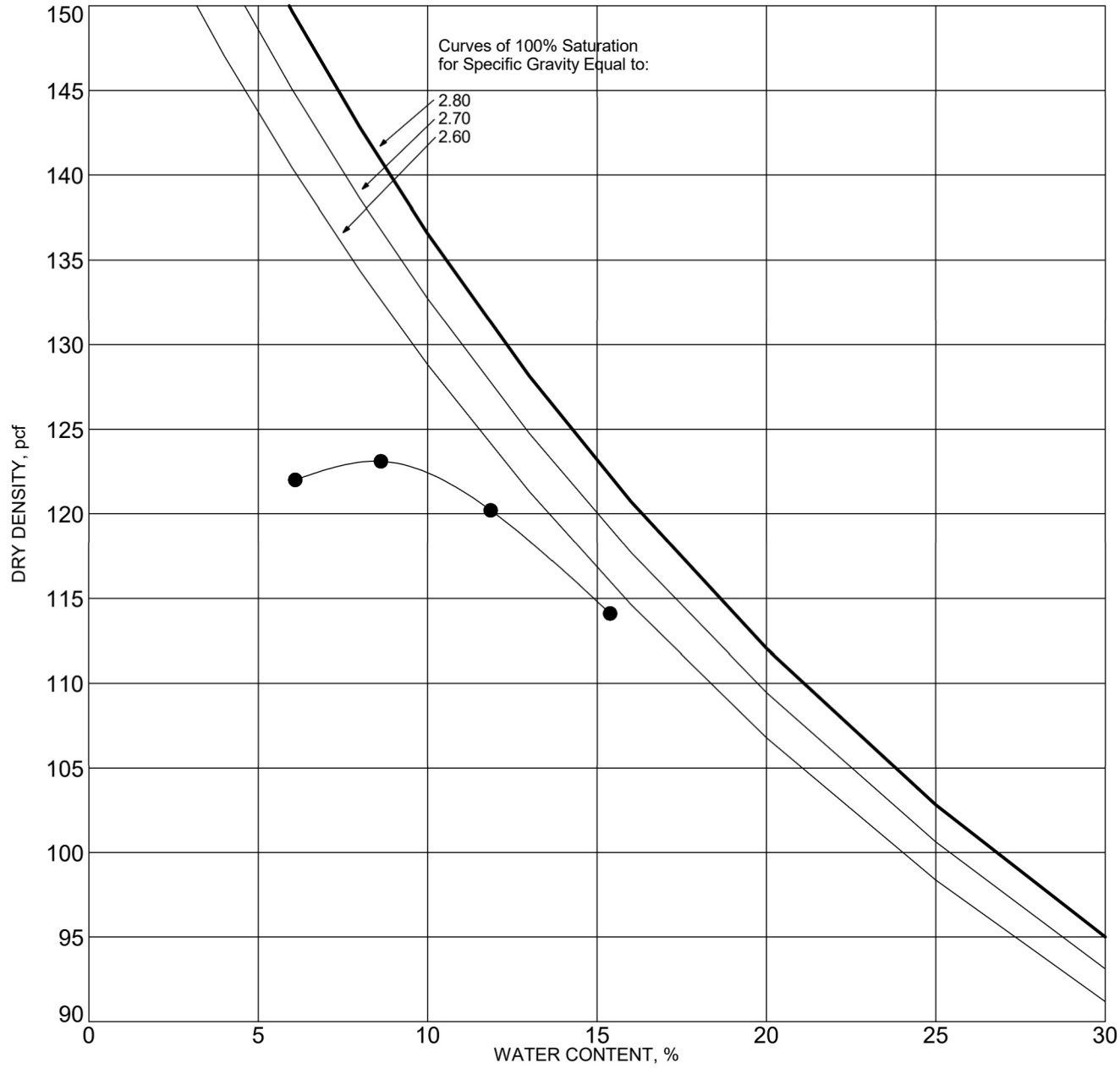
One (1) laboratory maximum dry density moisture content relationship test was performed on a representative bulk sample of the upper 5 feet of soil material. The testing was conducted in accordance with ASTM Standard D1557 laboratory procedure. The test result is presented on Drawing No. B-4, *Summary of Moisture-Density Relationship Result*.

Table No. B-4, Summary of Moisture-Density Relationship Result

Boring No.	Depth (feet)	Soil Description	Optimum Moisture (%)	Maximum Density (lb/cft)
PT-1	0.2-5	Clayey Silt (ML)	9.0	123.5

Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period of time.



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	PT-01	0.2-5.0	Clayey Silt (ML)	D1557-Method B	9.0	123.5

MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

Project Name
New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street Hawthorne, California 90250

Project No.
23-31-119-01

Drawing No.
B-1

Appendix C

Earthwork Specifications

APPENDIX C: EARTHWORK SPECIFICATIONS

Scope of Work

The work includes all labor, supplies and construction equipment required to construct the structures in a good, workmanlike manner, herein specified. The major items of work covered in this section include the following.

- Site Inspection
- Authority of Geotechnical Engineer
- Site Clearing
- Excavations
- Preparation of Fill Areas
- Placement and Compaction of Fill
- Observation and Testing

Site Inspection

- The Contractor shall carefully examine the site and make all inspections necessary, to determine the full extent of the work required to make the completed work conform to the drawings and specifications. The Contractor shall satisfy himself as to the nature and location of the work, ground surface and the characteristics of equipment and facilities needed prior to and during prosecution of the work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the drawings, or between the drawings and specifications, must be brought to the Owner's attention to clarify the exact nature of the work to be performed.

- This *Geotechnical Investigations Report* by Converse Consultants may be used as a reference to the surface and subsurface conditions on this project. The information presented in this report is intended for use in design and is subject to confirmation of the conditions encountered during construction. The exploration logs and related information depict subsurface conditions only at the time and location designated on the boring logs. Subsurface conditions at other locations may differ from conditions encountered at the exploration locations. In addition, the passage of time may result in a change in subsurface conditions at the exploration locations. Any review of this information shall not relieve the Contractor from performing such independent investigation and evaluation to satisfy himself as to the nature of the surface and subsurface conditions to be encountered and the procedures to be used in performing his work.

Site Clearing

- Clearing and grubbing shall consist of the removal from project areas to be graded of all existing structures, pavement, utilities, and vegetation.

- Organic and inorganic materials resulting from the clearing and grubbing operations shall be hauled away from the areas to be graded.

Excavations

- Based on observations made during our field explorations, the surficial soils can be excavated with conventional earthwork equipment.

Preparation of Fill Areas

- All organic material, organic soils, incompetent alluvium, undocumented fill soils and debris should be removed from the proposed building areas.

- All loose, soft or disturbed earth materials should be removed from the bottom of excavations before placing structural fill. The actual depth of removal should be determined based on observations made during grading.

- The subgrade in all areas to receive fill shall be scarified to a minimum depth of 6 inches, the soil moisture adjusted within 3 percent of the optimum moisture for granular soils and at above approximately 3 percent of the optimum moisture for fine-grained soils, then compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. Scarification may be terminated on moderately hard to hard, cemented earth materials with the approval of the Geotechnical Engineer.

- Compacted fill may be placed on native soils that have been properly scarified and recompacted as discussed above.

- All areas to receive compacted fill will be observed and approved by the Geotechnical Engineer before the placement of fill.

Placement and Compaction of Fill

- Compacted fill placed for the support of footings, slabs-on-grade, exterior concrete flatwork, and driveways will be considered structural fill. Structural fill may consist of approved on-site soils or imported fill that meets the criteria indicated below.

- Native sediments and fill prepared for subgrades below planned infiltration chambers may require specialized preparation and limited compaction so as to not to significantly reduce the permeability and infiltration characteristics of the underlying sediments. Infiltration chamber structures shall be backfilled and constructed in accordance with the manufacturer's recommendations and specifications.

- Fill consisting of selected on-site earth materials or imported soils approved by the Geotechnical Engineer shall be placed in layers on approved earth materials. Soils used as compacted structural fill shall have the following characteristics:

    - All fill soil particles shall not exceed 3 inches in nominal size and shall be free of organic matter and miscellaneous inorganic debris and inert rubble.
    - Imported fill materials shall have an Expansion Index (EI) less than 20. All imported fill should be compacted to at least 90 percent of the laboratory maximum dry density (ASTM Standard D1557) at about 3 percent above optimum moisture for fine grained soils, and within 3 percent of optimum for granular soils.

- Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer.

- All fill placed at the site shall be compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. The on-site soils shall be moisture conditioned within 3 percent of the optimum moisture for granular soils and at above approximately 3 percent of the optimum moisture for fine-grained soils. At least the upper 12 inches of subgrade soils underneath the concrete apron, pavement and parking areas should be compacted to a minimum of 95 percent relative compaction.

- Fill exceeding 5 feet in height shall not be placed on native slopes that are steeper than 5:1 horizontal:vertical (H:V). Where native slopes are steeper than 5:1 H:V, and the height of the fill is greater than 5 feet, the fill shall be benched into competent materials. The height and width of the benches shall be at least 2 feet.

- Representative samples of materials being used as compacted fill will be analyzed in the laboratory by the Geotechnical Engineer to obtain information on their physical properties. Maximum laboratory density of each soil type used in the compacted fill will be determined by the ASTM Standard D1557 compaction method.

- Fill materials shall not be placed, spread or compacted during unfavorable weather conditions. When site grading is interrupted by heavy rain, filling operations shall not resume until the Geotechnical Engineer approves the moisture and density conditions of the previously placed fill.

- It shall be the Grading Contractor's obligation to take all measures deemed necessary during grading to provide erosion control devices in order to protect slope areas and adjacent properties from storm damage and flood hazard originating on this project. It shall be the contractor's responsibility to maintain slopes in their as-graded form until all slopes are in satisfactory compliance with job specifications, all berms have been properly constructed, and all associated drainage devices meet the requirements of the Civil Engineer.

Trench Backfill

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

- Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials at the time of backfill placement.

- Trench backfill shall be compacted to a minimum relative compaction of 90 percent as per ASTM Standard D1557 test method.

- Rocks larger than one inch should not be placed within 12 inches of the top of the pipeline or within the upper 12 inches of pavement or structure subgrade. No more than 30 percent of the backfill volume shall be larger than 3/4-inch in largest dimension diameter, and rocks shall be well mixed with finer soil.

- The pipe design engineer should select bedding material for the pipe. Bedding materials generally should have a Sand Equivalent (SE) greater than or equal to 30, as determined by the ASTM Standard D2419 test method.

- Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The backfill materials shall be brought to within 3 percent of optimum moisture content for granular soils and fine-grained soils, then placed in horizontal layers. The thickness of uncompacted layers should not exceed 8 inches. Each layer shall be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.

- The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work.

- The field density of the compacted soil shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent.

- Observation and field tests should be performed by Converse during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained.

- It should be the responsibility of the Contractor to maintain safe conditions during cut and/or fill operations.

- Trench backfill shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

Observation and Testing

- During the progress of grading, the Geotechnical Engineer will provide observation of the fill placement operations.

- Field density tests will be made during grading to provide an opinion on the degree of compaction being obtained by the contractor. Where compaction of less than specified herein is indicated, additional compactive effort with adjustment of the moisture content shall be made as necessary, until the required degree of compaction is obtained.

A sufficient number of field density tests will be performed to provide an opinion to the degree of compaction achieved. In general, density tests will be performed on each one-foot lift of fill, but not less than one for each 500 cubic yards of fill placed.

Appendix D

Infiltration Testing

APPENDIX D: INFILTRATION TESTING

Infiltration testing was performed utilizing exploratory borings PT-1 and PT-2 on March 27, 2023. The continuous pre-soak falling-head test method for water Infiltration testing was utilized to evaluate soil infiltration rates of the native soils encountered below the ground surface at the respective boring locations in accordance with Los Angeles County Public Works administrative manual Guidelines for investigation and reporting low impact development stormwater infiltration (2021).

The borings were cased using a two-inch diameter perforated casing. Water was added to the bore hole until the water level was as near the ground surface as could be achieved and allowed to pre-soak for at least 1 hour if the water did not drain entirely within 30 minutes. After pre-soaking, water was added to the bore hole until the water level was as near the target depth of the project 10 feet below ground surface level. The water level was measured to the nearest 1/8-inch. There were at least eight (8) readings that were taken or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate is when the highest and lowest readings are within 10 percent of each other from three consecutive readings. Reduction factors RF (Based on the GS200.1 procedures), RF_t=1, RF_v=1 and RF_s=1 was used to calculate design infiltration rates. Design Infiltration rate was calculated as the average of the last three readings. Percolation test results can vary depending on location, depth, soil type and variability of the underlying alluvial sediments. The results of the infiltration tests are tabulated in the tables below:

Table No. D-1, Soil Boring Infiltration Test Results

Boring No.	Depth of Test (feet)	Topsoil Types (USCS)	Ground Water Encountered (feet)	Design Percolation Rate (inches/hour)
PT-1	0-10	Clayey Silt and Silty Sand (SM)	N/E	1.07
PT-2	0-10	Clayey Silt and Silty Sand (SM)	N/E	0.81

*Percolation rate was obtained from a 4-inch diameter bore hole to a depth which shows in the next column (Depth of Test). The percolation rate may change with different well dimensions. The adjustment to the provided percolation rate to a well with different dimensions should be determined by the well designer.

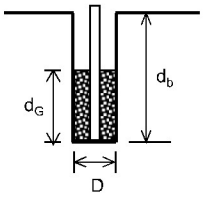
In accordance with County of Los Angeles requirements, the minimum percolation rate for design of infiltration system for storm water management is 0.30 inch per hour. Percolation rates of PT-1 and Pt-2 meet the minimum percolation rate. The project Civil Engineer should review the raw data of percolation test presented herein to determine specific soil layers and percolation rates for design of the proposed infiltration system. Such systems should be constructed a minimum distance of 10 feet laterally from any existing or future planned building or subsurface structure so as not to disturb or undermine foundations. The proposed infiltration system should be constructed 10 feet

above seasonal ground water table. The percolation rates were determined in general accordance with Los Angeles County guidelines. The detailed percolation test results are shown on the following data sheets.

Percolation Testing

Job Name: New Turf Field and Asphalt Track Resurfacing
Job No.: 23-31-119-01
Location: Hawthorne Middle School
Test Date: March 27, 2023

Test Boring No. **PT-01**
Depth of Boring (d_b): 10.0 feet
Diameter of Boring (D): 0.33 feet
Diameter of Casing (d_c): 0.25 feet
Percolation Test Zone: 0 to 10 feet bgs
Test Performer: MA



Time of Testing			Water Level Measurement		Water Level Calculations				Infiltration Rate Calculations			
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate	Infiltration Rate by Porchet Method*
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$P_t = \Delta d / \Delta T$	R_f	$k = P_t / R_f$	$I = \Delta d D / [2\Delta T(D/2+2L_{ave})R_f]$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)	(inch/hr)
Percolation Test												
0:00	0:10	0.17	0.00	7.50	10.00	2.50	7.50	6.25	539.63	3.0	179.88	2.37
0:10	0:20	0.17	0.00	4.50	10.00	5.50	4.50	7.75	323.78	3.0	107.93	1.15
0:20	0:30	0.17	0.00	4.00	10.00	6.00	4.00	8.00	287.80	3.0	95.93	0.99
0:30	0:40	0.17	0.00	4.25	10.00	5.75	4.25	7.88	305.79	3.0	101.93	1.07
0:40	0:50	0.17	0.00	3.85	10.00	6.15	3.85	8.08	277.01	3.0	92.34	0.94

Reference: Adminstrative Manual - County of Los Angeles Public Works Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, dated 6/30/21
* Inverse Borehole Method

Reduction Factors:
RF_t (small diameter boring) = 1
RF_v (site variability) = 1
RF_s (siltation, plugging) = 1

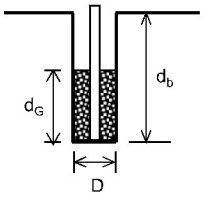
Total Reduction Factor (RF) = RFt +RFv +RFs 3

Design Infiltration Rate = 1.07 inch/hr
Note: Design Infiltration Rate = Average of last three adjusted precolation rate readings

Percolation Testing

Job Name: New Turf Field and Asphalt Track Resurfacing
Job No.: 23-31-119-01
Location: Hawthorne Middle School
Test Date: March 27, 2023

Test Boring No. **PT-02**
Depth of Boring (d_b): 10.0 feet
Diameter of Boring (D): 0.33 feet
Diameter of Casing (d_c): 0.25 feet
Percolation Test Zone: 0 to 10 feet bgs
Test Performer: MA



Time of Testing			Water Level Measurement		Water Level Calculations				Infiltration Rate Calculations			
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate	Infiltration Rate by Porchet Method*
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$P_t = \Delta d / \Delta T$	R_f	$k = P_t / R_f$	$I = \Delta d D / [2\Delta T(D/2+2L_{ave})R_f]$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)	(inch/hr)
Percolation Test												
0:00	0:10	0.17	0.00	4.30	10.00	5.70	4.30	7.85	309.39	3.0	103.13	1.08
0:10	0:20	0.17	0.00	3.40	10.00	6.60	3.40	8.30	244.63	3.0	81.54	0.81
0:20	0:30	0.17	0.00	3.50	10.00	6.50	3.50	8.25	251.83	3.0	83.94	0.84
0:30	0:40	0.17	0.00	3.30	10.00	6.70	3.30	8.35	237.44	3.0	79.15	0.78

Reference: Adminstrative Manual - County of Los Angeles Public Works Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, dated 6/30/21

* Inverse Borehole Method

Reduction Factors:

RF_t (small diameter boring) = 1
RF_v (site variability) = 1
RF_s (siltation, plugging) = 1

Total Reduction Factor (RF) = RFt +RFv +RFs 3

Design Infiltration Rate = 0.81 inch/hr

Note: Design Infiltration Rate = Average of last three adjusted precolation rate readings

Aneska Kekula <ikekula@hawthorne.k12.ca.us>

Sign-In-Sheet BID NO C26-27-2 HMS Synthetic Field Turf Replacement

1 message

Maria Soriano <msoriano@hawthorne.k12.ca.us> Fri, Oct 2, 2026 at 11:53 AM
To: estimateingestimating@afesports.com, r.belleci@tencategrass.com, contact@ramsaconst.com, bids@avsarcd.com, info@mcmconstructors.com, lawrence.hamocon@thekyagroup.com, jbaiz@lcof.net, bids@laeng.net, xiaoxue@verdedesigninc.com
Cc: Ines Kekula <ikekula@hawthorne.k12.ca.us>, Juanita Navas <jnavas@hawthorne.k12.ca.us>, Marisela Vasquez <mvasquez@hawthorne.k12.ca.us>, Jazmin Anzaldo <janzaldo@hawthorne.k12.ca.us>, chrisg@verdedesigninc.com, devin@verdedesigninc.com

Good Afternoon Everyone,

Thank you for attending yesterday's Pre-Bidders Conference and Job-Walk for BID NO C26-27-2 HMS Synthetic Field Turf Replacement. Please find attached the sign in sheet listing all attendees.

As discussed during the pre-bidders conference I have also attached the Geotechnical Report for your reference.

Have a great weekend.

Thank you,

Maria Soriano
Purchasing Assistant
Business Services | Hawthorne School District
The Hawthorne Way: Every student, every day

P: Office: 310-263-3982 | District Office 310-676-2276
E: msoriano@hawthorne.k12.ca.us
W: www.hawthorne.k12.ca.us
A: 13021 S. Yukon Ave. , Hawthorn
District Office: 14120 Hawthorne Blvd., Hawthorne, CA 90250

For inquiries related to invoices, please contact our Accounts Payable Department at ap@hawthorne.k12.ca.us.

2 attachments

Sign-In-Sheet BID NO C26-27-2 HMS Synthetic Field Turf Replacement.pdf
1207K

Geotechnical Report.pdf
5160K