The following clarifications are provided based on questions received or changes in District requirements and must be added/considered when completing your submittal: Acknowledgement of receipt of this ADDENDUM is required in the proposal’s cover letter of introduction. Please clearly note the addendum date and number.

ITEM:

A. CHANGES TO PROJECT MANUAL

NONE

B. CHANGES TO DRAWINGS

ITEM 1: Replace the bid drawing set in its entirety with the attached set of plans.

C. GEOTECHNICAL ENGINEERING REPORT

ITEM 1: Terracon Geotechnical Report
NOTES:
1. PAVEMENT SECTIONS IS BASED ON A TI OF 4 AND A "R" VALUE OF 5.
   ADJUST DIMENSIONS PER FIELD CONDITIONS AS RECOMMENDED BY THE
   GEOTECHNICAL ENGINEER.
2. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION.
3. PAVEMENT SECTION IS FOR EVA ONLY.

AC FIRE LANE PAVEMENT SECTION
3" A.C.
9" CLASS II A.B. COMPACTED TO 95% R.C.
SCARIFY AND RECOMPACT 6" OF SUBGRADE TO 92% R.C.
OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.

AB FIRE LANE PAVEMENT SECTION
12" CLASS II A.B. COMPACTED TO 95% R.C.
SCARIFY AND RECOMPACT 6" OF SUBGRADE TO 92% R.C.
OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.

CURB RAMP DETAIL 3
6" HIGH CURB
7.5% GRAVEL CONC.
1.0% CONC.
1.5% GRAVEL CONC.
0" HIGH CURB
GRVEL CONC.
3'X8' TRUNCATED DOMES
LOCAL FIRE AUTHORITY REVIEW

To facilitate the Division of the State Architect's (DSA) approval of the Fire Life Safety portion of a project, DSA requires Local Fire Authority (LFA) review of certain elements as identified in this form. Use of this form is mandatory for projects that add square footage to a structure or if any item on this form is relevant to the project. For additional information, see DSA 810 Instructions and Form Notes (10-25).

PROJECT INFORMATION

Project Name/Number:

LOCAL FIRE AUTHORITY (LFA)

LFA Agency Name:

LFA Agency Telephone:

Fax:

Email:

submitButton.html

I have reviewed and reviewed the applicable form for this project as listed below:

Note: Only sign this form when it is signed under the signature.

LFA Reviewer's Signature:

Date:

Review Key:

"R": Revisions needed in the library
"D": Discretionary revisions
"A": Additional information needed

D: Additional information needed

DESCRIPTION

Table showing various elements and their review status.

signature of school district official

Check the following boxes to indicate the accuracy of these elements:

Yes

No

1. Check if the project meets the applicable code requirements.

2. Check if the project meets the applicable code requirements.

3. Check if the project meets the applicable code requirements.

4. Check if the project meets the applicable code requirements.

5. Check if the project meets the applicable code requirements.

6. Check if the project meets the applicable code requirements.

COMMENTS

Any additional comments.

SEE DSA AND ARCHITECTURAL SHEETS A1.2 THRU A1.7 FOR EXTENT AND SCOPE OF GRADING AND PAVING.

SITE PLAN

FIRE TRUCK ACCESS

The designation of the fire lanes shall be indicated per the California Vehicle Code Section 22600.12 by outlining or painting the lanes in red and in contrasting color, marking the lanes with the word "FIRE" lane, which are clearly visible from a vehicle. Marked fire lanes shall be a minimum of 20'-0" wide.

LEGEND

--- FIRE TRUCK ACCESS (FIRE LANE)

--- FIRE HYDRANT

CR 2012.12

1 SITE PLAN

1000

1000

LICENACEE OF STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CALIFORNIA

ARCHITECT

MADI ARCHITECTURE PLANNING

1111 BELMONT STREET

SIERRA VISTA SUITE 200

SOLANO COMMUNITY COLLEGE DISTRICT

ARCHITECT

MADI ARCHITECTURE PLANNING

1111 BELMONT STREET

SIERRA VISTA SUITE 200

SOLANO COMMUNITY COLLEGE DISTRICT

ENGINEER

SOLANO COMMUNITY COLLEGE DISTRICT

CONSULTANT

SOLANO COMMUNITY COLLEGE DISTRICT
ENLARGED SITE PLAN

LEGEND

1. HARDSCAPE HARD WOOD GATE
2. 12" X 12" BRIEFS TO GATE
3. 12" X 12" BRIEFS TO MAIN ENTRANCE GATE
4. 12" X 12" BRIEFS TO 12" HIGH SAND GATE
5. 12" X 12" BRIEFS TO 12" HIGH SAND GATE
6. 12" X 12" BRIEFS TO 12" HIGH SAND GATE
7. 12" X 12" BRIEFS TO 12" HIGH SAND GATE
8. 12" X 12" BRIEFS TO 12" HIGH SAND GATE

ADDITIONAL LEGEND

1. FUTURE TOILET BUILDING
2. FUTURE BUILDING TO MAIN ENTRANCE GATE

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SOLANO COMMUNITY COLLEGE DISTRICT

LOUISE WILBOURN

MADIAN ARCHITECTS + PLANNERS

PROJECT:

YARBROUGH HORTICULTURE & PLANT SCIENCE INSTITUTE

ENLARGED SITE PLAN

A1.4
GENERAL NOTES:

EXISTING CONDITIONS:

POWER AND SIGNAL SYSTEMS DURING CONSTRUCTION:

ELECTRICAL COMPONENT ANCHORAGE NOTE:

ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE:

TERMINAL CABINET SCHEDULE:

NOTES:

ELECTRICAL SYMBOLS LIST:

LOUISE WILBOURN HORTICULTURE & PLANT SCIENCE INSTITUTE PHASE II: MODULAR BUILDINGS

ELECTRICAL SYMBOL LIST & NOTES

sheet number

E0.1
EXAMPLE FORM DSA 103

NOTE: THE EXAMPLE FORM DSA 103 SHOWN ON THIS PAGE IS FOR ILLUSTRATION PURPOSES ONLY TO ASSIST IN THE COMPLETION OF FUTURE PROJECTS SPECIFIED FORM DSA 103 FORM DSA 103 IS TO BE COMPLETED FOR EACH APPLICATION THAT THIS PC IS BEING INCORPORATED INTO AND THE EXAMPLE FORM DSA 103 IS TO BE CROSS-REF ACROSS DRAWINGS.

For more information on the 2010 edition of the California Building Code (CBC) where otherwise noted.

GENERAL NOTES

1. SPECIFICATIONS DESCRIPTION OF SPECIFICATIONS: THE ALL APPLICABLE SPECIFICATIONS CITE THE CBC. WHERE THE CBC IS NOT APPLICABLE, THE SPECIFICATIONS ARE TO BE CONSULTED FOR ALL REQUIREMENTS.

2. BILAYERED CONCRETEpatient: patient is not the design professional, professional responsibility charged. Unless otherwise noted.

3. FOR THE SPECIFIC PROJECT, RODGE HYDRAW IN THIS IS THE DESIGN PROFESSIONAL, PROFESSIONAL RESPONSIBILITY CHARGED. UNLESS OTHERWISE NOTED.

4. FOR THE SPECIFIC PROJECT, RODGE HYDRAW IS NOT THE DESIGN PROFESSIONAL, IN WHICH CASE, PROFESSIONAL RESPONSIBILITY CHARGED. UNLESS OTHERWISE NOTED.

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December 22, 2015

Solano Community College District
360 Campus Lane, suite 203
Fairfield, CA 94534

Attn: Mr. John Pranys, Sr. Project Engineer
P: (707) 863-7869
C: (916) 208-2197
E: john.pranys@solano.edu

Re: Geotechnical Engineering Report
Proposed Horticulture Expansion
Solano Community College District, Fairfield Campus
4000 Suisun Valley Road
Fairfield, California
Terracon Project No. NB155061

Dear Mr. Pranys:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering report for the above referenced project. This study was performed in general accordance with our proposal dated October 5, 2015 with proposal number PNB150339. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of the proposed expansion.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
TERRACON CONSULTANTS, INC.
Gerry Lenehan, PE
Professional Engineer 73459
Project Manager

Enclosures
cc: 1 – Client (PDF)
   1 – File
# TABLE OF CONTENTS

**EXECUTIVE SUMMARY** ............................................................................................................. i  
1.0  **INTRODUCTION** ............................................................................................................. 1  
2.0  **PROJECT INFORMATION** ............................................................................................. 1  
   2.1  Project Description ....................................................................................................... 1  
   2.2  Site Location and Description ................................................................................... 2  
3.0  **SUBSURFACE CONDITIONS** ........................................................................................ 3  
   3.1  Geology ............................................................................................................... 3  
   3.2  Typical Subsurface Profile ....................................................................................... 3  
   3.3  Groundwater ........................................................................................................... 4  
   3.4  Seismic Considerations ........................................................................................... 4  
   3.5  Liquefaction ............................................................................................................. 5  
4.0  **RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION** .............................. 6  
   4.1  Geotechnical Considerations ............................................................................... 6  
   4.1.1  Expansion Potential of Subgrade Soils ............................................................. 6  
   4.2  Earthwork ............................................................................................................. 6  
   4.2.1  Site Preparation ........................................................................................ 7  
   4.2.2  Subgrade Preparation .............................................................................. 7  
   4.2.3  Engineered Fill Material Requirements ..................................................... 7  
   4.2.4  Compaction Requirements ....................................................................... 8  
   4.2.5  Grading and Drainage ............................................................................ 9  
   4.2.6  Earthwork Construction Considerations ................................................... 9  
   4.3  Foundations ....................................................................................................... 10  
   4.3.1  Foundation Design Recommendations ................................................... 10  
   4.3.2  Foundation Construction Considerations ................................................ 11  
   4.4  Floor Slab .......................................................................................................... 12  
   4.4.1  Design Recommendations ................................................................ 12  
   4.4.2  Floor Slab Construction Considerations .................................................. 12  
   4.5  Lateral Earth Pressures ..................................................................................... 13  
   4.6  Pavements ....................................................................................................... 13  
   4.6.1  Subgrade Preparation .......................................................................... 13  
   4.6.2  Design Considerations .......................................................................... 14  
   4.6.3  Minimum Pavement Thickness ................................................................. 14  
   4.6.4  Pavement Drainage .............................................................................. 15  
   4.6.5  Pavement Maintenance ........................................................................ 16  
5.0  **GENERAL COMMENTS** ............................................................................................... 16
APPENDIX A – FIELD EXPLORATION
   Exhibit A-1    Site Location Plan
   Exhibit A-2    Boring Location Diagram
   Exhibit A-3    Field Exploration Description
   Exhibits A-4 to A-6  Boring Logs

APPENDIX B – LABORATORY TESTING
   Exhibit B-1    Laboratory Test Description
   Exhibit B-2    Atterberg Limits Results
   Exhibit B-2 to B-3  Grain Size Distribution

APPENDIX C – SUPPORTING DOCUMENTS
   Exhibit C-1    General Notes
   Exhibit C-2    Unified Soil Classifications
EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the proposed horticulture expansion at the existing Solano Community College located at 4000 Suisun Valley Road in Fairfield, California. Three (3) borings were drilled to depths of 11½ to 51½ feet below ground surface (bgs) within the footprint of the proposed buildings. The geotechnical considerations identified included the following:

- **Site Soils:** The subsurface soils were generally consistent between borings. The subsurface soils generally consisted of lean clay to sandy lean clay to the maximum depth explored of 51½ feet bgs. Groundwater was encountered at an initial depth of 20 feet bgs and was measured at approximately 16 feet bgs immediately after our exploration was completed.

- **Foundations:** The proposed buildings may be supported by spread footings extending to a depth of at least 24 inches below the lowest adjacent finished soil grade bearing on native soil. The near surface clay soils are not suitable for reuse as engineered fill for this project.

- **Seismic Considerations:** The 2013 California Building Code (CBC) Seismic Site Classification for this site is D.

- **Earthwork:** Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that Terracon be retained to monitor this portion of the work.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.
1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed Horticulture Expansion to the existing Solano Community College located at 4000 Suisun Valley Road in Fairfield, California. The Site Location Map (Exhibit A-1) is included in Appendix A of this report. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- seismic considerations
- foundation design and construction
- earthwork
- floor slab design and construction
- exterior concrete sidewalks
- retaining walls

Our geotechnical engineering scope of work for this project included the advancement of three (3) borings to a maximum depth of 51½ feet below ground surface (bgs) within the footprint of the proposed buildings.

Logs of borings along with a Boring Location Diagram (Exhibit A-2) are included in Appendix A of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in Appendix B of this report. Descriptions of the field exploration and laboratory testing are included in their respective appendices.

2.0 PROJECT INFORMATION

2.1 Project Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site layout</td>
<td>See Appendix A, Exhibit A-1 and A-2: Site Diagram and Boring Location Diagram.</td>
</tr>
<tr>
<td>Structures</td>
<td>The proposed construction will consist of a total of three (3) pre-fabricated buildings, Earthwork and grading will be required at all three locations. The three buildings will include a storage facility (1600 ft²), greenhouse (700 ft²), and a farmer’s stand (1225 ft²).</td>
</tr>
</tbody>
</table>
Geotechnical Engineering Report
Proposed Horticulture Expansion ■ Fairfield, California
December 22, 2015 ■ Terracon Project No. NB155061

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Construction will consist of pre-fabricated wood frame buildings founded on a spread footing foundation system with concrete slab on grade floors, with associated asphalt-paved roads and concrete walkways.</td>
</tr>
</tbody>
</table>
| Maximum loads | ■ Maximum Column Loads: 20-30 kips (assumed)  
■ Maximum Wall Loads: less than 2 kips/ft. (assumed)  
■ Maximum Floor Loads: less than 100 psf (assumed) |
| Grading       | Based upon site topography, cuts and fills on the order of approximately two (2) foot are anticipated to provide a level building pad.              |

2.2 Site Location and Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>4000 Suisun Road, Fairfield, California.</td>
</tr>
<tr>
<td>Existing site features</td>
<td>The site is located at the northeastern edge of the Solano Community College campus. The immediate site around the proposed building consists of asphalt paved roadways and parking with structures associated with the campus to the south.</td>
</tr>
</tbody>
</table>
| Surrounding developments | The general location of this site is in Fairfield which is highly developed.  
North: Solano College Road followed by agricultural land.  
West: Asphalt-paved parking lot developed by solar car port canopies.  
South: Solano Community College Campus.  
East: Solano College Road followed by undeveloped land. |
| Current ground cover | The site is covered with grass.                                                                                                                                                                           |
| Existing topography | Site topography is relatively flat with changes in elevation on the order of 1 feet across the site.                                                                                                      |
| Seismic Hazards     | Based on our review of the State of California Seismic Hazard Zone Maps, the site is not shown to be within an Alquist-Priolo special studies zone for earthquake faults.  
Upon our review of the Association of Bay Area Governments earthquake liquefaction susceptibility maps, the project site si mapped in a ‘moderate’ area of susceptibility. A liquefaction analysis has been performed as per the 2013 California Building Code. |
3.0 SUBSURFACE CONDITIONS

3.1 Geology

The project area is situated within the Coast Range geomorphic province of California. The native soils underlying the site are considered to consist of undifferentiated alluvial deposits (Q_a) as described on the Geologic Map of the area.¹ According to the map, the sediments are late Quaternary in age (2.6 million years ago and present) and consist of pebble gravel, sand, and clay of valley areas. The surficial mapped geology is consistent with the materials encountered throughout the boring depths.

3.2 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soils types; in-situ, the transition between materials may be gradual. Details for the borings can be found on the attached boring logs.

The site conditions generally encountered are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Approximate Depth to Bottom of Stratum</th>
<th>Material Encountered</th>
<th>Consistency/Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum 1</td>
<td>50½ feet bgs (Maximum Depth of Exploration)</td>
<td>Lean Clay to Sandy Lean Clay</td>
<td>soft to very stiff</td>
</tr>
</tbody>
</table>

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B. The upper soils encountered at the site generally consisted of lean clay to sandy lean clay. The lean clays exhibited medium to high plasticity, and were found to have the following characteristics:

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Depth (feet)</th>
<th>Liquid Limit (%)</th>
<th>Plastic Limit (%)</th>
<th>Plasticity Index</th>
<th>&lt; No. 200 Sieve (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boring B-1</td>
<td>5 to 6½</td>
<td>37</td>
<td>20</td>
<td>17</td>
<td>78</td>
</tr>
<tr>
<td>Boring B-3</td>
<td>10 to 11½</td>
<td>38</td>
<td>22</td>
<td>16</td>
<td>90</td>
</tr>
<tr>
<td>Boring B-3</td>
<td>1 to 2½</td>
<td>39</td>
<td>19</td>
<td>20</td>
<td>72</td>
</tr>
</tbody>
</table>

3.3 Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was observed in the boring B-2 while drilling at a depth of approximately 20 feet and at the completion of drilling at a depth of approximately 16 feet. Groundwater was not encountered in borings B-1 or B-3 during our exploration.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs.

3.4 Seismic Considerations

The site is located in Northern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. The table below indicates the distance of the fault zones and the associated maximum credible earthquake that can be produced by nearby seismic events, as calculated using the USGS Earthquake Hazard Program 2008 interactive deaggregations.

<table>
<thead>
<tr>
<th>Fault Name</th>
<th>Approximate Distance to Site</th>
<th>Maximum Considered Earthquake (MCE) Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. San Andreas; SAO+SAN+SAP+SAS</td>
<td>134.3 km</td>
<td>8.03</td>
</tr>
<tr>
<td>Great Valley 7 Char</td>
<td>66.7 km</td>
<td>6.80</td>
</tr>
<tr>
<td>Hunting Creek-Berryessa Char</td>
<td>97.1 km</td>
<td>7.05</td>
</tr>
</tbody>
</table>

Based on nearby faults within the proximity of the site, the Maximum Considered Earthquake (MCE) peak ground acceleration at the subject site for a 2% Probability of Exceedance in 50 years is expected to be about 0.782g per the ASCE 7-10 standard with March 2013 errata. The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.2

The following table provides the seismic design criteria in accordance with the 2013 California Building Code at the approximate center of the site, obtained from the USGS Earthquake Hazards website (http://geohazards.usgs.gov/designmaps/us/application.php):

---

3.5 Liquefaction

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The CGS has designated certain areas within California Bay Area as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. The project site is not located within a liquefaction hazard zone as mapped or evaluated by the CGS. However, the Association of Bay Area Governments Resilience Program (ABAG) liquefaction susceptibility map based on United States Geological Survey (USGS) was reviewed and indicated the site has a moderate liquefaction susceptibility.

The consequences of one-dimensional settlement may be largely mitigated by the presence of the thick non-liquefied layer above the potentially liquefiable soils (Ishihara 1985, Naesgaard et al. 1998, Bouckoalas and Dakoulas 2007). It is our opinion that the presence of stiff lean clay and sandy lean clay soils (non-liquefiable layer) found beneath the existing ground surface may act as a bridging layer that redistributes stresses and therefore results in more uniform ground surface settlement if there is a deeper liquefiable soil beneath the 51½ foot depth of our borings. Based on our experience in this area of Fairfield and the soil conditions found at this site, we have concluded that liquefaction is not a potential hazard at this site.
4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Based on the results of the subsurface exploration, laboratory testing, and our analysis, it is our opinion that the proposed buildings may be supported on spread foundations that bear on firm undisturbed native clay soils. Geotechnical considerations for this project include:

- Expansion potential of subgrade soils

4.1.1 Expansion Potential of Subgrade Soils

Moderately expansive clay soils are present at this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion on buildings supported on the expansive clay soil. However, even if these procedures are followed, some movement and at least minor cracking in the structure should be anticipated. The severity of cracking and other cosmetic damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and cosmetic distress may not be feasible, but it may be possible to further reduce the risk of movement if more expensive measures are used during construction.

Spread footing foundations should bear at least 24 inches into the native clay soils. Floor slabs and exterior flatwork should bear on at least 18 inches of engineered fill consisting of low volume change material. The onsite native clay soils materials are not suitable for use as engineered fill for this project.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in Appendices A and B), engineering analyses, and our current understanding of the proposed project.

4.2 Earthwork

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented are for the design and construction of earth supported elements including foundations and concrete slabs on grade and are contingent upon following the recommendations outlined in this section. All grading for the structure should incorporate the limits of the proposed structure plus a lateral distance of at least five feet beyond the outside perimeter (the building pad).

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation,
foundation bearing soils, and other geotechnical conditions exposed during the construction of the project. Such evaluation is considered an extension of this study.

4.2.1 Site Preparation

Strip and remove any existing structures, foundations, slabs, trees, and other deleterious materials within the footprint of the proposed construction. Exposed native soils should be free of mounds and depressions which could prevent uniform compaction. Near surface clay soils are not suitable for use as engineered fill for this project.

4.2.2 Subgrade Preparation

Floor slabs and exterior flatwork should be supported on a minimum of 18 inches of engineered fill. The moisture content and compaction of subgrade soils should be maintained until foundation and slab construction. The minimum lateral extent of engineered fill should be at least 5 feet wider than the foundation perimeter. The on-site clay soils are not suitable for use as engineered fill.

During grading operations, exposed soils should be proof rolled and approved by the Engineer prior to the placement of engineered fill. Any soft spots, where the Contractor may have difficulty in obtaining the desired compaction, shall be removed and replaced with compacted engineered fill as described in this report.

4.2.3 Engineered Fill Material Requirements

All engineered fill materials from any source should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Native clay soils are expansive and not suitable to be used as engineered fill. Import materials for use as engineered fill should be pre-approved by our representative during construction.

Import soils for use as compacted engineered fill material within the proposed building areas should conform to low volume change materials as indicated as follows:
Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches loose thickness.

### 4.2.4 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

<table>
<thead>
<tr>
<th>Material Type and Location</th>
<th>Per the Modified Proctor Test (ASTM D 1557)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum Compaction Requirement (%)</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
</tr>
<tr>
<td>Approved import engineered fill soils:</td>
<td></td>
</tr>
<tr>
<td>Beneath foundations:</td>
<td>90</td>
</tr>
<tr>
<td>Beneath slabs:</td>
<td>90</td>
</tr>
<tr>
<td>Beneath exterior sidewalks:</td>
<td>90</td>
</tr>
<tr>
<td>Utility trenches (structural areas):</td>
<td>90</td>
</tr>
<tr>
<td>On site Soils:</td>
<td></td>
</tr>
<tr>
<td>Bottom of excavation receiving fill:</td>
<td>90</td>
</tr>
<tr>
<td>Miscellaneous backfill:</td>
<td>90</td>
</tr>
<tr>
<td>Utility trenches (Landscape areas):</td>
<td>90</td>
</tr>
<tr>
<td>Beneath asphalt pavements:</td>
<td>95</td>
</tr>
<tr>
<td>Beneath concrete pavements:</td>
<td>95</td>
</tr>
<tr>
<td>Aggregate base (beneath pavements):</td>
<td>95</td>
</tr>
</tbody>
</table>
4.2.5 Grading and Drainage

All final grades must provide effective drainage away from the buildings during and after construction. Water permitted to pond next to the building can result in greater soil movements than those discussed in this report. These greater movements can result in unacceptable differential movements, cracks, and leaks. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

Exposed ground should be sloped at least 2 percent away from the building extending a minimum of 5 feet beyond the perimeter of the building. After building construction and landscaping, we recommend the Civil Engineer/Surveyor verify final grades to document that effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary, as part of the structure maintenance program.

Planters located within 10 feet of the structure should be self-contained to prevent water accessing the building and pavement subgrade soils. Locate sprinkler mains and spray heads a minimum of 5 feet away from the building lines. Collect roof runoff in drains or gutters. Discharge roof drains and downspouts onto pavements which slope away from the building or extend down spouts a minimum of 10 feet away from the structure.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems should not be installed within 5 feet of foundation walls. Landscaped irrigation adjacent to the foundation systems should be minimized or eliminated.

4.2.6 Earthwork Construction Considerations

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. The workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying. If the construction schedule does not allow for scarifying and drying by aeration in place, the contractor may utilize dry crushed rock materials to stabilize wet subgrade materials. If soil stabilization is needed, Terracon should be consulted to evaluate the situation as needed.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and re-compacted.
The contractor is responsible for designing and constructing stable, temporary excavations (including utility trenches) as required to maintain stability of both the excavation sides and bottom. Excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations to the completed subgrade.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

4.3 Foundations

In our opinion, the proposed building can be supported by a shallow, spread footing foundation system bearing on native soils with footings extending a minimum of 24 inches below lowest adjacent grade. Design recommendations for shallow foundations for the proposed structure are presented in the following paragraphs.

4.3.1 Foundation Design Recommendations

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Type</td>
<td>Conventional Shallow Spread Footings</td>
</tr>
<tr>
<td>Bearing Material</td>
<td>Native undisturbed soil</td>
</tr>
<tr>
<td>Allowable Bearing Pressure</td>
<td>2,200 psf</td>
</tr>
<tr>
<td>Minimum Plan View Dimensions</td>
<td>Walls: 12 inches; Columns: 24 inches</td>
</tr>
<tr>
<td>Minimum Embedment Below Finished Grade</td>
<td>24 inches</td>
</tr>
<tr>
<td>Total Estimated Settlement</td>
<td>1-inch</td>
</tr>
<tr>
<td>Lateral Resistance</td>
<td>Passive: 300 pcf</td>
</tr>
<tr>
<td></td>
<td>Coefficient of Friction: 0.30</td>
</tr>
<tr>
<td>Estimated Differential Settlement</td>
<td>½ inch over 40 feet</td>
</tr>
</tbody>
</table>
4.3.2 Foundation Construction Considerations

Finished grade is defined as the lowest adjacent grade within five feet of the foundations. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include transient conditions, such as wind or seismic. The weight of the foundation concrete below grade may be neglected in dead load computations. Passive and friction may be combined to resist lateral loads provided the passive resistance is reduced by half.

Total and differential settlements should not exceed predicted values, provided that:

- Foundations are constructed as recommended, and
- Essentially no changes occur in water contents of foundation soils.

Additional foundation movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage should be provided in the final design and during construction.

Footings and foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement.

Foundation excavations and bearing soils should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, then supplemental recommendations will be required.

The base of all foundation excavations should be free of water, loose soil, and gravel prior to placing concrete. Concrete should be placed soon after excavating and placement of engineered fill to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed, or saturated, the affected soil should be removed prior to placing concrete. In addition, as previously described, unsuitable soils should be completely removed from any proposed construction areas prior to construction. We recommend that Terracon be retained to observe and test the soil foundation bearing materials exposed in the over excavation.
4.4 Floor Slab

4.4.1 Design Recommendations

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floor slab support</strong></td>
<td>At least 18 inches of engineered fill consisting of low volume change material.</td>
</tr>
<tr>
<td><strong>Modulus of subgrade reaction</strong></td>
<td>150 pounds per square inch per inch (psi/in) (^2) (\text{The modulus was obtained based on our experience with similar subgrade conditions.}) (^2)</td>
</tr>
<tr>
<td><strong>Aggregate base course/capillary break</strong></td>
<td>4-inches of crushed, washed (\frac{3}{4})-inch gravel; or, 6-inches of compacted Aggregate Base (Caltrans Class 2)</td>
</tr>
</tbody>
</table>

1. Upon completion of grading operations in the building area, the recommended subgrade moisture content and density should be maintained to construction of the building floor slabs.
2. This value is for a small load area (1 sq. ft. or less) such as for forklift wheel loads or point loads and should be adjusted for large loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

In areas of exposed concrete, control joints should be saw-cut into the slab after concrete placement in accordance with ACI Design Manual, Section 302.1R-37 8.3.12 (tooled control joints are not recommended). To control the width of cracking (should it occur), continuous slab reinforcement should be considered in exposed concrete slabs.

4.4.2 Floor Slab Construction Considerations

Interior trench backfill placed beneath slabs should be compacted in accordance with recommendations outlined in the Earthwork section of this report. Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of base rock and concrete and corrective action will be required.

We recommend the area underlying the floor slab be rough graded and then thoroughly proof-rolled with a loaded tandem axel dump truck prior to final grading and placement of base rock. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill.
All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of the base rock and concrete.

4.5 Lateral Earth Pressures

For on-site native soils and fill materials, or imported engineered fill materials above any free water surface, recommended equivalent fluid pressures for foundation elements are:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Onsite Soils</th>
<th>Engineered Fill Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Case (psf/ft)</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Passive Case (psf/ft)</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>At-Rest Case (psf/ft)</td>
<td>65</td>
<td>55</td>
</tr>
<tr>
<td>Coefficient of Friction</td>
<td>0.30</td>
<td>0.40</td>
</tr>
</tbody>
</table>

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. These values assume a level backfill. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation and retaining walls should be compacted to densities recommended in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.

4.6 Pavements

4.6.1 Subgrade Preparation

On most project sites, the site grading is accomplished relatively early in the construction phase. Fills are placed and compacted in a uniform manner. However, as construction proceeds, excavations are made into these areas, rainfall and surface water saturates some areas, heavy traffic from concrete trucks and other delivery vehicles disturbs the subgrade and many surface irregularities are filled in with loose soils to improve trafficability temporarily. As a result, the pavement subgrades, initially prepared early in the project, should be carefully evaluated as the time for pavement construction approaches.

We recommend the moisture content and density of the top 10 inches of the subgrade be evaluated and the pavement subgrades be proof rolled within two days prior to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be moisture conditioned and recompacted. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the materials with properly compacted fills.
After proof rolling and repairing deep subgrade deficiencies, the entire subgrade should be scarified and developed as recommended in Section 4.2 of the Earthwork section this report to provide a uniform subgrade for pavement construction. Areas that appear severely desiccated following site stripping may require further undercutting and moisture conditioning. If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by qualified personnel immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

4.6.2 Design Considerations
Traffic patterns and anticipated loading conditions were not available at the time that this report was prepared. However, we anticipate that traffic loads will be produced primarily by automobile traffic and occasional delivery and trash removal trucks. The thickness of pavements subjected to heavy truck traffic should be determined using expected traffic volumes, vehicle types, and vehicle loads and should be in accordance with local, city or county ordinances.

Two soil samples were obtained from the near surface soils on the site. Due to similarities in soil type, only one of the two samples was subjected to an R-value test in our laboratory. The approximate locations of the samples are shown on Exhibit A-2 in Appendix A. From the results of the R-value test, an R-value of 5 was obtained.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to parking lots and drives should slope down from pavement edges at a minimum 2%;
- The subgrade and the pavement surface should have a minimum 1/4 inch per foot slope to promote proper surface drainage;
- Install pavement drainage surrounding areas anticipated for frequent wetting (e.g., garden centers, wash racks);
- Install joint sealant and seal cracks immediately;
- Seal all landscaped areas in, or adjacent to pavements to reduce moisture migration to subgrade soils;
- Place compacted, low permeability backfill against the exterior side of curb and gutter; and,
- Place curb, gutter and/or sidewalk directly on subgrade soils rather than on unbound granular base course materials.

4.6.3 Minimum Pavement Thickness
Assuming the pavement subgrades will be prepared as recommended within this report, the following pavement sections should be considered minimums for this project for the traffic indices assumed in the table below. As more specific traffic information becomes available, we should be contacted to reevaluate the pavement calculations.
### Typical Pavement Section (inches)

<table>
<thead>
<tr>
<th>Traffic Area</th>
<th>Alternative</th>
<th>Asphalt Concrete (AC) Surface Course</th>
<th>Portland Cement Concrete (PCC)</th>
<th>Aggregate Base (AB) Course</th>
<th>Total Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car Parking Assumed Traffic Index (TI) = 4.0</td>
<td>PCC</td>
<td>--</td>
<td>5.0</td>
<td>4.0</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td>2.5</td>
<td>--</td>
<td>7.5</td>
<td>10.0</td>
</tr>
<tr>
<td>Auto Drive Areas Assumed Traffic Index (TI) = 5.0</td>
<td>PCC</td>
<td>--</td>
<td>6.0</td>
<td>4.0</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td>3.5</td>
<td>--</td>
<td>8.5</td>
<td>11.0</td>
</tr>
<tr>
<td>Trucks/Heavy Traffic Assumed Traffic Index (TI) = 6.0</td>
<td>PCC</td>
<td>--</td>
<td>6.0</td>
<td>4.0</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td>4.5</td>
<td>--</td>
<td>10.5</td>
<td>15.0</td>
</tr>
</tbody>
</table>

1. 4,000 psi at 28 days, 4-inch maximum slump and 5 to 7 percent air entrained, 6-sack min. mix.

PCC pavements are recommended for trash container pads and in any other areas subjected to heavy wheel loads and/or turning traffic.

These pavement sections are considered minimal sections based upon the expected traffic and the existing subgrade conditions. However, they are expected to function with periodic maintenance and overlays if good drainage is provided and maintained. Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

Subgrade soils beneath all pavements should be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. All materials should meet the Caltrans Standard Specifications for Highway Construction. Aggregate base materials should meet the gradation and quality requirements of Class 2 Aggregate Base in Caltrans Standard Specifications, latest edition, Sections 25 through 29.

All concrete for rigid pavements should have a minimum flexural strength of 600 psi, and be placed with a maximum slump of four inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

### 4.6.4 Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subgrade.
4.6.5 Pavement Maintenance
The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the first priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.
THIS DIAGRAM IS FOR GENERAL LOCATION ONLY AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

BORING LOCATION DIAGRAM
SOLANOCCDHORTICULTUREEXPANSION
4000 SUISUN VALLEY ROAD
FAIRFIELD, CA

LEGEND
APPROXIMATE BORING LOCATION

Project Mgr: GL
Design By: EMD
Checked By: NN
Approved By: GL

Project No: NB155501
Scale: AS SHOWN

50 GOLDENLAND CT, SUITE 116
SACRAMENTO, CA 95834
Ph: (916) 528-4600
Fax: (916) 528-4667

B1
B2
B3

3 (N) BUILDING LOCATIONS

CONSULTING ENGINEERS AND SCIENTISTS
EXHIBIT A-2
Field Exploration Description

Our field exploration for this project included performing three (3) test borings to approximate a maximum depth of 50 feet bgs on December 7, 2015. The approximate exploration locations are shown on the Boring Location Diagram, Exhibit A-2. Exploration locations were located in the field by measuring from the existing site features shown on an aerial photo. The exploration locations should only be considered accurate to the degree implied by the means and methods used to define them.

The test borings were advanced with a truck-mounted CME-75 drill rig which utilized 8-inch diameter hollow-stem auger. A continuous log of each boring was recorded during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving either split-spoon samplers. These logs include visual classifications of the materials encountered during drilling as well as the field engineer’s interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples. Groundwater conditions were evaluated in each boring at the time of drilling and upon completion of the field exploration. Groundwater was measured immediately after drilling at a depth of 16 feet in one boring.

Samples of the soils encountered in the borings were obtained using the split barrel sampling procedures described below. The samples were stored in moisture tight containers and transported to our laboratory for further visual classification and testing.

Penetration resistance measurements were obtained by driving the split-spoon and a 2.5-inch outside diameter Modified California sampler into the subsurface materials with a 140-pound hammer falling 30 inches. This test is referred to as the standard penetration test (SPT) and displayed on the logs as an “N” value when the standard 2-inch outer diameter sampler is used. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the borings logs attached to this report includes soil descriptions, consistency evaluations, borings depths, sampling intervals, relative density and groundwater conditions. The borings were backfilled with soil cuttings and cold patched with asphalt upon completion.
Lean Clay with Sand (CL), fine grained, medium plasticity, dark brown to brown, very stiff

Low to medium plasticity, light brown to orange

8.0

Lean Clay (CL), silty with fine sand, fine grained, medium plasticity, brown to orange, stiff

Boring Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
Fairfield, CA

LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

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CLIENT: Solano Community College District
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Groundwater not encountered

Notes:
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Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

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Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

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ABANDONMENT METHOD:
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WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

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WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

PROJECT: Solano CCD Horticulture Expansion

SITE: 4000 Suisun Valley Road
Fairfield, CA

CLIENT: Solano Community College District
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LOCATION
See Exhibit A-2
Latitude: 38.2384°  Longitude: -122.1184°

ADVANCEMENT METHOD:
8" Hollow Stem Auger

ABANDONMENT METHOD:
Borings backfilled with neat cement grout upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Notes:
See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.
LEAN CLAY (CL), silty, fine grained, low to medium plasticity, dark brown to brown, very stiff

SANDY SILTY CLAY (CL-ML), fine grained, low to medium plasticity, light brown, very stiff

LEAN CLAY WITH SAND (CL), fine grained, medium to high plasticity, light brown to gray, medium stiff

SANDY LEAN CLAY (CL), fine grained, medium to high plasticity, brown to gray, soft

WATER LEVEL OBSERVATIONS

<table>
<thead>
<tr>
<th>WATER LEVEL OBSERVATIONS</th>
<th>FIELD TEST RESULTS</th>
<th>LABORATORY</th>
<th>WATER CONTENT (%)</th>
<th>DRY UNIT WEIGHT (pcf)</th>
<th>ATTERBERG LIMITS</th>
<th>LL-PL-PI</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>5-13-17</td>
<td>4.25 (HP)</td>
<td>12</td>
<td>98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>5-12-15</td>
<td>4.25 (HP)</td>
<td>13</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>2-2-3</td>
<td>1.25 (HP)</td>
<td>27</td>
<td>86</td>
<td>38-22-16</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>1-6-8</td>
<td>2.25 (HP)</td>
<td>25</td>
<td>98</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>18.0</td>
<td>1-1-3</td>
<td>1.0 (HP)</td>
<td>23</td>
<td>109</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.0</td>
<td>2-8-9</td>
<td>4.0 (HP)</td>
<td>27</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PROJECT:** Solano CCD Horticulture Expansion  
**SITE:** 4000 Suisun Valley Road  
**CLIENT:** Solano Community College District  
**LOCATION:** See Exhibit A-2  
Latitude: 38.2382°  
Longitude: -122.1184°

### Depth (FL)  
<table>
<thead>
<tr>
<th>Depth (FL)</th>
<th>Water Level Observations</th>
<th>Field Test Results</th>
<th>Laboratory Test Results</th>
<th>Water Content (%)</th>
<th>Dry Unit Weight (pcf)</th>
<th>Atterberg Limits</th>
<th>Percent Finer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>4.00</td>
<td>N=20</td>
<td>4.0 (HP)</td>
<td>21</td>
<td>109</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>4.50</td>
<td>N=25</td>
<td>4.5 (HP)</td>
<td>22</td>
<td>109</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>5.00</td>
<td>N=23</td>
<td>4.5 (HP)</td>
<td>24</td>
<td>94</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>4.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEAN CLAY (CL),** trace sand, fine grained, medium plasticity, brown, very stiff, with black specs  

with fine sand, gray mottling

**SANDY LEAN CLAY (CL),** fine grained, stiff, orange mottling

**LEAN CLAY WITH SAND (CL),** fine grained, medium plasticity, light brown, very stiff, gray mottling

**Boring Terminated at 51.5 Feet**

Stratification lines are approximate. In-situ, the transition may be gradual.  

Hammer Type: Automatic SPT Hammer

### WATER LEVEL OBSERVATIONS

- **While drilling**  
- **At completion of drilling**

### Advancement Method:
8" Hollow Stem Auger

### Abandonment Method:
Borings backfilled with neat cement grout upon completion.

### Notes:

- See Exhibit A-3 for description of field procedures.  
- See Appendix B for description of laboratory procedures and additional data (if any).  
- See Appendix C for explanation of symbols and abbreviations.

---

**Boring Started:** 12/7/2015  
**Boring Completed:** 12/7/2015  
**Drill Rig:** CME-75  
**Driller:** Terracon  
**Project No.:** NB155061  
**Exhibit:** A-5

---

**Graphic Log:**

While drilling  
At completion of drilling
**BORING LOG NO. B3**

**PROJECT:** Solano CCD Horticulture Expansion

**SITE:** 4000 Suisun Valley Road
Fairfield, CA

**CLIENT:** Solano Community College District
Fairfield, CA

---

**LOCATION**
See Exhibit A-2
Latitude: 38.2381°  Longitude: -122.1183°

---

**DEPTH**

<table>
<thead>
<tr>
<th>DEPTH (Ft.)</th>
<th>WATER LEVEL OBSERVATIONS SAMPLE TYPE</th>
<th>FIELD TEST RESULTS</th>
<th>LABORATORY TESTS (TSF)</th>
<th>WATER CONTENT (%)</th>
<th>DRY UNIT WEIGHT (pcf)</th>
<th>ATTERBERG LIMITS</th>
<th>LL-PL-PI</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.25</td>
<td>(HP)</td>
<td>4.25 (HP)</td>
<td>13</td>
<td>92</td>
<td>39-19-20</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>(HP)</td>
<td>4.5 (HP)</td>
<td>15</td>
<td>101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>(HP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.25</td>
<td>(HP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**LEAN CLAY WITH SAND (CL),** fine to medium, medium plasticity, brown, stiff

fine grained, low plasticity, light brown to orange, very stiff

---

**SANDY LEAN CLAY (CL),** fine grained, medium to high plasticity, gray to brown with orange, medium stiff

---

**LEAN CLAY WITH SAND (CL),** fine grained, medium to high plasticity, stiff

---

**Boring Terminated at 16.5 Feet**

---

Stratification lines are approximate. In-situ, the transition may be gradual.

---

**Advancement Method:**
8" Hollow Stem Auger

**Abandonment Method:**
Borings backfilled with neat cement grout upon completion.

**Notes:**

---

**WATER LEVEL OBSERVATIONS**

Groundwater not encountered

---

**Boring**

Boring Started: 12/7/2015  
Boring Completed: 12/7/2015

---

**Drl Rig:** CME-75  
Driller: R. Anderson

---

**Project No.:** NB155061  
Exhibit: A-6
Laboratory Testing
Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented on the logs of the borings or in the body of the report. The laboratory test results were used for the geotechnical engineering analyses, and the development of engineering, earthwork, and construction recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local, or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- In-situ Water Content
- Unit Weight
- Grain Size Analysis
- Atterberg Limits
<table>
<thead>
<tr>
<th>Boring ID</th>
<th>Depth</th>
<th>LL</th>
<th>PL</th>
<th>PI</th>
<th>Fines</th>
<th>USCS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>5 - 6.5</td>
<td>37</td>
<td>20</td>
<td>17</td>
<td>78</td>
<td>CL</td>
<td>LEAN CLAY with SAND</td>
</tr>
<tr>
<td>B2</td>
<td>10 - 11.5</td>
<td>38</td>
<td>22</td>
<td>16</td>
<td>90</td>
<td>CL</td>
<td>LEAN CLAY</td>
</tr>
<tr>
<td>B3</td>
<td>1 - 2.5</td>
<td>39</td>
<td>19</td>
<td>20</td>
<td>72</td>
<td>CL</td>
<td>LEAN CLAY with SAND</td>
</tr>
</tbody>
</table>
## GENERAL NOTES

### DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger</td>
<td>Rock Core</td>
</tr>
<tr>
<td>Shelby Tube</td>
<td>Macro Core</td>
</tr>
<tr>
<td>Split Spoon</td>
<td>Modified California Ring Sampler</td>
</tr>
<tr>
<td>Grab Sample</td>
<td>No Recovery</td>
</tr>
<tr>
<td>Modified Dames &amp; Moore Ring Sampler</td>
<td></td>
</tr>
</tbody>
</table>

#### WATER LEVEL

- Water initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

#### FIELD TESTS

- (HP) Hand Penetrometer
- (T) Torvane
- (b/f) Standard Penetration Test (blows per foot)
- N N value
- (P/D) Photo-ionization Detector
- (OVA) Organic Vapor Analyzer
- (WOH) Weight of Hammer

## DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a No. 200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a No. 200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

## LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

### RELATIVE DENSITY OF COARSE-GRAINED SOILS

(50% or more retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.

<table>
<thead>
<tr>
<th>Strength Terms</th>
<th>Standard Penetration or Ring Sampler Blows/Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Loose</td>
<td>4 - 9</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>10 - 29</td>
</tr>
<tr>
<td>Dense</td>
<td>30 - 50</td>
</tr>
<tr>
<td>Very Dense</td>
<td>&gt; 50</td>
</tr>
</tbody>
</table>

### CONSISTENCY OF FINE-GRAINED SOILS

(50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance.

<table>
<thead>
<tr>
<th>Consistency Term (Consistency)</th>
<th>Unconfined Compressive Strength, Qu, psf</th>
<th>Standard Penetration or N-Value Blows/Ft.</th>
<th>Ring Sampler Blows/Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Soft</td>
<td>less than 500</td>
<td>0 - 1</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>Soft</td>
<td>500 to 1,000</td>
<td>2 - 4</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Medium-Stiff</td>
<td>1,000 to 2,000</td>
<td>4 - 8</td>
<td>5 - 9</td>
</tr>
<tr>
<td>Stiff</td>
<td>2,000 to 4,000</td>
<td>8 - 15</td>
<td>10 - 18</td>
</tr>
<tr>
<td>Very Stiff</td>
<td>4,000 to 8,000</td>
<td>15 - 30</td>
<td>19 - 42</td>
</tr>
<tr>
<td>Hard</td>
<td>&gt; 8,000</td>
<td>&gt; 30</td>
<td>&gt; 42</td>
</tr>
</tbody>
</table>

## RELATIVE PROPORTIONS OF SAND AND GRAVEL

<table>
<thead>
<tr>
<th>Descriptive Term(s) of other constituents</th>
<th>Percent of Dry Weight</th>
<th>Major Component of Sample</th>
<th>Particle Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 15</td>
<td>Boulders</td>
<td>Over 12 in. (300 mm)</td>
</tr>
<tr>
<td>With</td>
<td>15 - 29</td>
<td>Cobble</td>
<td>12 in. to 3 in. (300mm to 75mm)</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 30</td>
<td>Gravel</td>
<td>3 in. to #4 sieve (75mm to 4.75 mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sand</td>
<td>#4 to #200 sieve (4.75mm to 0.075mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silt or Clay</td>
<td>Passing #200 sieve (0.075mm)</td>
</tr>
</tbody>
</table>

## GRAIN SIZE TERMINOLOGY

<table>
<thead>
<tr>
<th>Term</th>
<th>Plasticity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-plastic</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>1 - 10</td>
</tr>
<tr>
<td>Medium</td>
<td>11 - 30</td>
</tr>
<tr>
<td>High</td>
<td>&gt; 30</td>
</tr>
</tbody>
</table>

## RELATIVE PROPORTIONS OF FINES

<table>
<thead>
<tr>
<th>Descriptive Term(s) of other constituents</th>
<th>Percent of Dry Weight</th>
<th>Term</th>
<th>Plasticity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 5</td>
<td>Non-plastic</td>
<td>0</td>
</tr>
<tr>
<td>With</td>
<td>5 - 12</td>
<td>Low</td>
<td>1 - 10</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 12</td>
<td>Medium</td>
<td>11 - 30</td>
</tr>
</tbody>
</table>

## PLASTICITY DESCRIPTION

Exhibit C-1
<table>
<thead>
<tr>
<th>Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests</th>
<th>Soil Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gravels:</strong> More than 50% of coarse fraction retained on No. 4 sieve</td>
<td><strong>Clean Gravels:</strong> Less than 5% fines</td>
</tr>
<tr>
<td></td>
<td>Cu ≥ 4 and 1 ≤ Cc ≤ 3</td>
</tr>
<tr>
<td></td>
<td>Cu &lt; 4 and/or 1 &gt; Cc &gt; 3</td>
</tr>
<tr>
<td></td>
<td>Fines classify as ML or MH</td>
</tr>
<tr>
<td></td>
<td>Fines classify as CL or CH</td>
</tr>
<tr>
<td></td>
<td>Cu ≥ 6 and 1 ≤ Cc ≤ 3</td>
</tr>
<tr>
<td></td>
<td>Cu &lt; 6 and/or 1 &gt; Cc &gt; 3</td>
</tr>
<tr>
<td></td>
<td>Fines classify as ML or MH</td>
</tr>
<tr>
<td></td>
<td>Fines classify as CL or CH</td>
</tr>
<tr>
<td>Sands: 50% or more of coarse fraction passes No. 4 sieve</td>
<td><strong>Clean Sands:</strong> Less than 5% fines</td>
</tr>
<tr>
<td></td>
<td>Cu ≥ 4 and 1 ≤ Cc ≤ 3</td>
</tr>
<tr>
<td></td>
<td>Cu &lt; 4 and/or 1 &gt; Cc &gt; 3</td>
</tr>
<tr>
<td></td>
<td>Fines classify as ML or MH</td>
</tr>
<tr>
<td></td>
<td>Fines classify as CL or CH</td>
</tr>
<tr>
<td><strong>Inorganic:</strong> PI &gt; 7 and plots on or above “A” line</td>
<td>CL Lean clay</td>
</tr>
<tr>
<td></td>
<td>PI &lt; 4 or plots below “A” line</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - oven dried</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - not dried &lt; 0.75</td>
</tr>
<tr>
<td><strong>Organic:</strong> Liquid limit - oven dried</td>
<td>CH Fat clay</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - not dried &lt; 0.75</td>
</tr>
<tr>
<td><strong>Inorganic:</strong> PI plots on or above “A” line</td>
<td>MH Elastic silt</td>
</tr>
<tr>
<td></td>
<td>PI plots on or above “A” line</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - oven dried</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - not dried &lt; 0.75</td>
</tr>
<tr>
<td><strong>Organic:</strong> Liquid limit - oven dried</td>
<td>OH Organic silt</td>
</tr>
<tr>
<td></td>
<td>Liquid limit - not dried &lt; 0.75</td>
</tr>
</tbody>
</table>

**Fine-Grained Soils:** 50% or more passes the No. 200 sieve

| Silts and Clays: Liquid limit less than 50 | Inorganic: PI plots on or above “A” line | CH Fat clay |
| | PI plots on or above “A” line | CH Fat clay |

| Silts and Clays: Liquid limit 50 or more | Organic: Liquid limit - oven dried | MH Elastic silt |
| | Liquid limit - not dried | OL Organic clay |

**Highly organic soils:** Primarily organic matter, dark in color, and organic odor

| PT Peat |

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A Based on the material passing the 3-inch (75-mm) sieve
B If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.
C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
E \( C_u = \frac{D_{60}^2}{D_{10} \times D_{60}} \)
F If soil contains ≥ 15% sand, add “with sand” to group name.
G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.