Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

February 26, 2021
Project No. 109188001

Mr. Bryce Storm
Santee School District
9880 Riverwalk Drive
Santee, California 92071

Subject: Geotechnical Pavement Evaluation
Pride Academy at Prospect Avenue School Hardcourt Pavement
9303 Prospect Avenue
Santee, California

Dear Mr. Storm:

In accordance with your authorization (P.O. No. 075-8889), we have performed a geotechnical pavement evaluation of the existing hardcourt pavements at the Pride Academy at Prospect Avenue School campus located at 9303 Prospect Avenue in Santee, California (Figure 1). Our evaluation was focused on the asphalt concrete (AC) paved hardcourt play areas located on the north and west sides of the existing grass field on the school campus. For the purpose of this report, these areas have been labeled as the North Hardcourt and West Hardcourt, as shown on Figure 2. The purposes of our services were to measure the existing AC sections, evaluate the subsurface conditions beneath the existing hardcourt play areas, and provide our recommendations for the reconstruction of the hardcourt AC surfacing. Additionally, we understand that the new pavements for the hard court areas are to be designed and constructed to support pedestrian and vehicle traffic. Accordingly, we have included flexible pavement recommendations for the two hardcourt areas.

SCOPE OF SERVICES

Ninyo & Moore's scope of services for this project included the following tasks:

- Reviewing background information including a previous geotechnical report for the school campus that was prepared by our office.
- Performing a site reconnaissance to document the hardcourt pavement conditions and to locate our exploratory borings for clearance by Underground Service Alert (USA) and school personnel. Selected photographs are included in Attachment A.
- Performing a subsurface exploration consisting of manually excavating, logging, and sampling of three exploratory borings. The existing AC was cored prior to excavating the borings. Bulk

samples of the encountered subgrade materials were collected and transported to our in-house laboratory for testing.

- Measuring the existing pavement sections encountered in our borings.
- Evaluating for the presence of paving fabric materials within the existing AC pavement sections at the boring locations.
- Performing geotechnical laboratory testing on representative soil samples to evaluate in-situ moisture content and R-value.
- Compiling and analyzing the data obtained from our background review, subsurface exploration, and laboratory testing.
- Preparing this report providing our findings regarding the subsurface conditions, our laboratory test results, and our recommendations for the reconstruction of the hardcourt play area pavements for supporting pedestrian and vehicular traffic.

SITE DESCRIPTION AND OBSERVATIONS

Our evaluation was focused on the AC paved hardcourt play areas designated the North and West Hardcourts on the school campus (Figure 2). The North Hardcourt (Photographs 1 through 4) is relatively flat with elevations ranging between approximately 350 and 352 feet above mean sea level (MSL) and includes tetherball and foursquare areas. The West Hardcourt (Photographs 4 through 8) is relatively flat with elevations ranging between approximately 356 and 360 feet above MSL and includes basketball courts, tetherball, and foursquare areas.

Based on our discussions with you and the observations during our February 15 and 18, 2021 site visits, the existing AC hardcourt areas have experienced cracking and separation at several locations. Many of those cracks had been previously sealed or repaired and the cracks continue to propagate through the patching.

Our office previously performed a geotechnical evaluation at the school campus for the new library resource center (Ninyo & Moore, 2019). These historic borings are presented on Figure 2 and were used to prepare recommendations for the North Hardcourt. Three additional borings were performed as part of this evaluation to evaluate the West Hardcourt.

FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Our field exploration was conducted on February 18, 2021 and consisted of manually excavating, logging, and sampling of three exploratory borings (B-1 through B-3) within the existing AC paved West Hardcourt. Prior to excavating, the locations were cleared of underground utilities by participating members of USA and the existing AC was cored using an 8-inch diameter core barrel.

The exploratory borings were excavated to depths of up to approximately 4 feet. Bulk soil samples were obtained from the borings. The samples were then transported to our in-house geotechnical laboratory for testing. The approximate locations of the exploratory borings are shown on Figure 2. Table 1 summarizes the encountered hardcourt pavement sections and subgrade materials encountered during our field exploration.

Table 1 – Summary of Encountered Pavement Sections and Subgrade Soils

Boring Location	Boring Depth (feet)	Encountered Asphalt Concrete (AC) Thickness	Encountered Subgrade Soils
B-1	3	6 inches (4-inch top layer over 2-inch bottom layer with a paving fabric in between)	Silty SAND
B-2	4	6 inches (3½-inch top layer over 2½-inch bottom layer with a paving fabric in between)	Poorly Graded SAND (~3" thick) Over Sandy CLAY
B-3	4	7 inches (4-inch top layer over 3-inch bottom layer with a paving fabric in between)	Poorly Graded SAND (~5" thick) Over Sandy CLAY

LABORATORY TESTING

Laboratory testing of the subgrade soils encountered beneath the existing AC hardcourt included an evaluation of the in-situ moisture content in general accordance with ASTM International (ASTM) D 2216 and its R-value in general accordance with California Test (CT) 301. The laboratory tests were performed at our in-house geotechnical laboratory. The testing of the subgrade soils encountered within boring B-3 indicated an in-situ moisture content of 19.7 percent with an R-value of 7.

FINDINGS AND CONCLUSIONS

As noted previously, purposes of our services were to measure the existing AC sections, evaluate the subsurface conditions beneath the existing hardcourt play areas, and provide our recommendations for the reconstruction of the hardcourt AC surfacing. Our evaluation has included a review of geotechnical-related background materials including our previous geotechnical evaluation (Ninyo & Moore, 2019), a site reconnaissance, a subsurface exploration program consisting of three exploratory borings, and geotechnical laboratory testing.

Based on our evaluation, we provide the following conclusions for the project:

- Encountered pavement sections in the West Hardcourt ranged from approximately 6 to 7 inches in thickness. Additionally, a paving fabric was encountered within the AC materials at each of our 3 borings.

- The southwestern corner of the West Hardcourt (near boring B-1) is underlain silty sand, while the northern and eastern portions of the West Hardcourt (near borings B-2 and B-3) is underlain by sandy clay.
- Based on our previous evaluation (Ninyo & Moore, 2019), we anticipate that the North Hardcourt to be underlain by sandy clay.
- The in-situ subgrade soils from boring B-3 indicated an in-situ moisture content of 19.7 percent, which is considered to be above the materials optimum moisture content. The contractor should anticipate performing additional aeration and drying of these materials prior to recompaction.

RECOMMENDATIONS

Due to the variable moisture conditions and types of the subgrade soils beneath the existing AC pavements, along with the presence of paving fabrics and crack sealants, we recommend that the AC hardcourt pavement be reconstructed. The proposed reconstruction should be performed in accordance with the recommendations provided herein and the requirements of the applicable governing agencies. Ninyo & Moore should be contacted for questions regarding the recommendations or guidelines presented herein.

Pre-Construction Conference

We recommend that a pre-construction meeting be held prior to commencement of grading. The owner or his representative, the Project Inspector, the agency representatives, the architect, the civil engineer, Ninyo & Moore, and the contractor should attend to discuss the plans, the project, and the proposed construction schedule.

Excavation Characteristics

The results of our field exploration program indicate that the project site is underlain by fill and weathered granitic rock. Excavation of the fill materials should be feasible with heavy-duty excavation equipment in good working condition. However, due to the potential variability in the thickness of the fill layer and the presence of gravel in the fill, the contractor may encounter difficult conditions when performing excavations. Excavations extending into the granitic rock should anticipate difficult excavation conditions and additional efforts including heavy ripping should be anticipated.

Pavement Reconstruction – West Hardcourt

Based on discussions with the client, we understand that the West Hardcourt pavement is to be designed and constructed to support pedestrian and vehicular traffic. Specifically, the vehicular traffic is anticipated to include maintenance vehicles, delivery trucks, and the occasional piece of

construction equipment. Therefore, we have used a Traffic Index (TI) of 6 for the design and construction of the new West Hardcourt pavement in conjunction with a design R-value of 7, as indicated by the laboratory testing we performed on a sample of the subgrade soils collected from boring B-3. The recommended preliminary pavement section for the new West Hardcourt pavement is as follows:

Table 2 – Recommended Preliminary Flexible Pavement Section – West Hardcourt

Location	Design R-Value	Asphalt Concrete (inches)	Aggregate Base (inches)
West Hardcourt	7	4	12

Aggregate base materials should conform to Caltrans Class 2 aggregate base materials as defined in Section 26 of the Caltrans Standard Specifications (2018b), Greenbook (2018) crushed aggregate base, or Greenbook (2018) crushed miscellaneous base. Aggregate base materials should be moisture conditioned to at or slightly above optimum moisture content and should be placed over prepared subgrade materials. We recommend that the aggregate base materials be compacted to a relative compaction of 95 percent of the modified Proctor density in accordance with ASTM D 1557.

The AC materials should consist of a 3/8-inch gradation in accordance with Class D materials as presented in Section 206-6.5.4 of the Greenbook (2018) with a Performance Grade (PG) 70-10 polymer modified (PM) binder. The AC materials should be placed over the aggregate base materials and be compacted to 95 percent relative compaction as compared to the material's Hveem density.

As part of the reconstruction, we recommend that continuous headers be utilized along the portions of the play area perimeter which are adjacent to the dirt surfacing. Also, the AC surface should be placed in such a manner to provide positive drainage so that surface water is not permitted to pond on the surface and is diverted off of and away from the AC materials.

Additionally, concrete and AC materials generated from the demolition of the existing improvements may be crushed or pulverized and reused as aggregate base materials, provided they are free from painted surfaces and rebar. These materials are considered suitable, provided they are processed and meet the criteria of Caltrans Class 2 aggregate base materials or Greenbook crushed miscellaneous base.

Pavement Reconstruction – North Hardcourt

Based on discussions with the client, we understand that the North Hardcourt pavement is to be designed and constructed to support pedestrian and vehicular traffic. Specifically, the vehicular traffic is anticipated to include maintenance vehicles. Therefore, we have used a Traffic Index (TI) of 5 for the design and construction of the new West Hardcourt pavement in conjunction with a design R-value of 7, as indicated by the laboratory testing presented in the referenced geotechnical report (Ninyo & Moore, 2019). The recommended preliminary pavement section for the new North Hardcourt pavement is as follows:

Table 3 – Recommended Preliminary Flexible Pavement Section – North Hardcourt

Location	Design R-Value	Asphalt Concrete (inches)	Aggregate Base (inches)
North Hardcourt	7	3	10

Aggregate base materials should conform to Caltrans Class 2 aggregate base materials as defined in Section 26 of the Caltrans Standard Specifications (2018b), Greenbook (2018) crushed aggregate base, or Greenbook (2018) crushed miscellaneous base. Aggregate base materials should be moisture conditioned to at or slightly above optimum moisture content and should be placed over prepared subgrade materials. We recommend that the aggregate base materials be compacted to a relative compaction of 95 percent of the modified Proctor density in accordance with ASTM D 1557.

The AC materials should consist of a 3/8-inch gradation in accordance with Class D materials as presented in Section 206-6.5.4 of the Greenbook (2018) with a Performance Grade (PG) 70-10 polymer modified (PM) binder. The AC materials should be placed over the aggregate base materials and be compacted to 95 percent relative compaction as compared to the material's Hveem density.

As part of the reconstruction, we recommend that continuous headers be utilized along the portions of the play area perimeter which are adjacent to the dirt surfacing. Also, the AC surface should be placed in such a manner to provide positive drainage so that surface water is not permitted to pond on the surface and is diverted off of and away from the AC materials.

Additionally, concrete and AC materials generated from the demolition of the existing improvements may be crushed or pulverized and reused as aggregate base materials, provided they are free from painted surfaces and rebar. These materials are considered suitable, provided they are processed

and meet the criteria of Caltrans Class 2 aggregate base materials or Greenbook crushed miscellaneous base.

Site Preparation

For areas to receive new pavements, site preparation activities should begin by clearing and removing existing AC, deleterious materials, including organics (such as roots), and oversize materials. As noted previously, our exploratory borings encountered a layer of paving fabric within the encountered AC surfacing. Underground utilities within the proposed limits of the replacement should be located prior to the commencement of earthwork operations.

Subgrade Preparation – Option 1

We are providing two options for the subgrade preparation associated with the construction of the new hardcourt AC pavements. The subgrade preparation for the new AC pavements may consist of either Option 1 or Option 2.

For Option 1, we recommend that the subgrade soils be overexcavated a depth of 18 inches below the planned finished subgrade elevations. Subsequent to removal, the resulting surface should be scarified to a depth of 6 inches, moisture conditioned to at or slightly above optimum moisture content, and recompacted to a relative compaction of 90 percent as evaluated by ASTM D 1557. Once the resulting removal surface has been recompacted, the overexcavation should be backfilled with aggregate base materials. Aggregate base materials should consist of Caltrans Class 2 aggregate base, Greenbook crushed aggregate base, Greenbook crushed miscellaneous base, or Greenbook (2018) processed miscellaneous base. Aggregate base materials should be moisture conditioned to at or slightly above optimum moisture content and should be placed over prepared subgrade materials. We recommend that the aggregate base materials be compacted to a relative compaction of 95 percent of the modified Proctor density in accordance with ASTM D 1557.

After the subgrade preparation has been performed in accordance with the recommendations provided above for Option 1, the new AC pavement sections, including aggregate base materials, should be constructed in accordance with the previous recommendations of this report.

Subgrade Preparation – Option 2

As noted above, we are providing two options for the subgrade preparation associated with the construction of the new hardcourt AC pavements. The subgrade preparation for the new AC pavements may consist of either Option 1 or Option 2.

For Option 2, we recommend that the upper 8 inches of exposed subgrade soils be scarified, and aerated or dried to a moisture conditioned at or slightly above optimum moisture content. The moisture conditioned subgrade should then be compacted to a relative compaction of 90 percent of the modified Proctor density in accordance with ASTM D 1557. After the subgrade soils have been moisture conditioned and compacted as described above, a layer of geogrid (Tensar TX 130S or equivalent) should be placed on the compacted subgrade soils prior to placement of the aggregate base materials. The geogrid should overlap 3 feet, be placed in a taut condition, and extend laterally a distance of 2 feet beyond the horizontal limits of the new AC pavement sections, where feasible.

After the subgrade preparation and geogrid placement has been performed in accordance with the recommendations provided above for Option 2, the new AC pavement sections, including aggregate base materials, should be constructed in accordance with the previous recommendations of this report.

LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

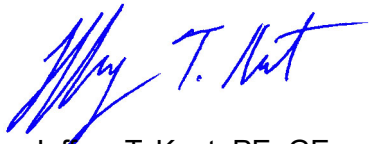
This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

Respectfully submitted,
NINYO & MOORE

Christine M. Kuhns, PE
Project Engineer



Jeffrey T. Kent, PE, GE
Principal Engineer

CMK/JTK/atf

Attachments: References
Figure 1 – Site Location
Figure 2 – Boring Locations
Attachment A – Select Photographs

Distribution: (1) Addressee (via e-mail)

REFERENCES

Building News, 2018, “Greenbook,” Standard Specifications for Public Works Construction: BNI Publications.

California Department of Transportation (Caltrans), 2018a, Highway Design Manual.

California Department of Transportation (Caltrans), 2018b, Standard Specifications.

Google, Inc., 2021, www.googleearth.com.

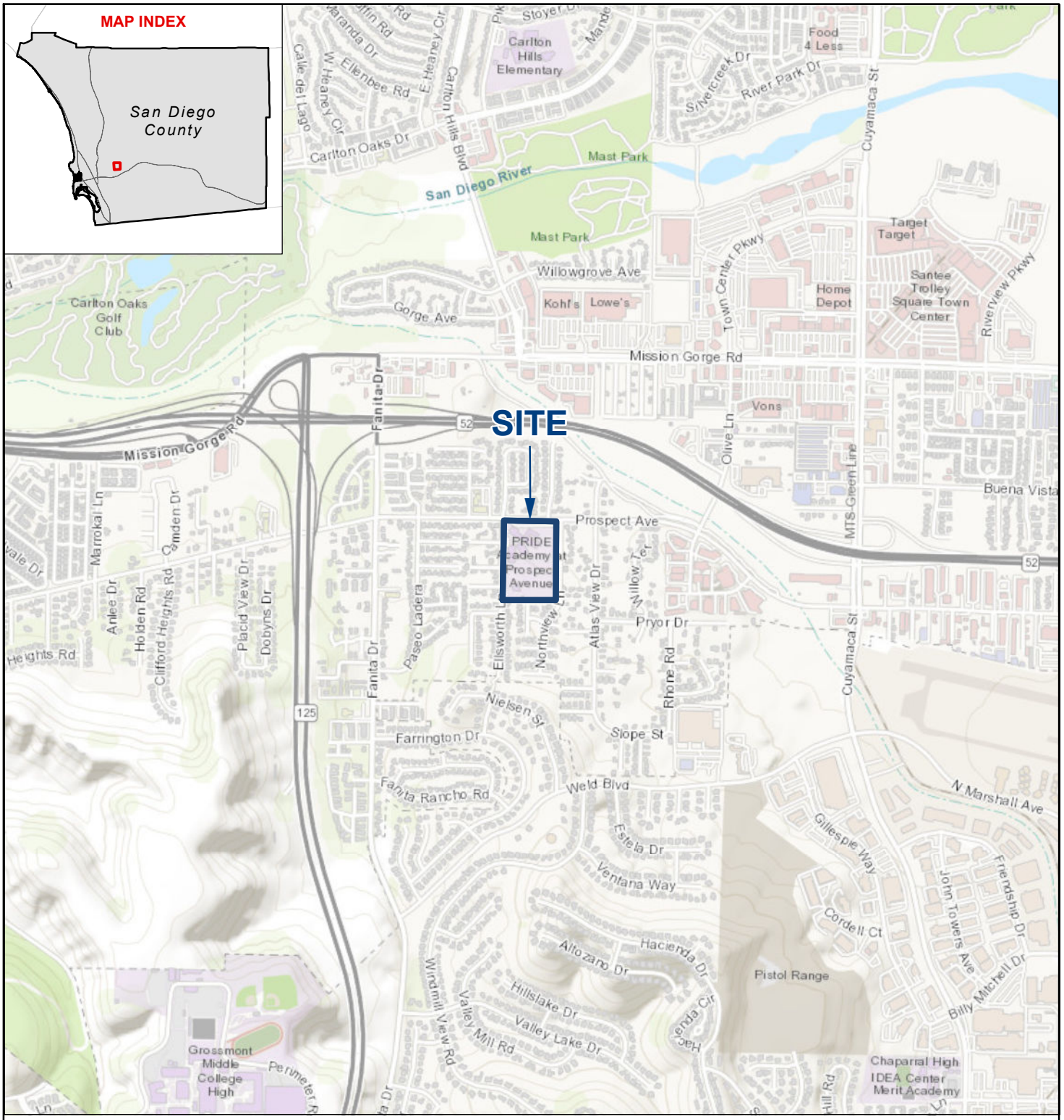
Historic Aerials, 2021, www.historicaerials.com/viewer.

Ninyo & Moore, 2019, Geotechnical Evaluation, Pride Academy at Prospect Avenue School, Library Addition, 9303 Prospect Avenue, Santee, California, Project No. 108775001: dated May 30.

Ninyo & Moore, 2021, Proposal Geotechnical Pavement Evaluation, Hardcourt Pavement, Pride Academy at Prospect Avenue School, Library Addition, 9303 Prospect Avenue, Santee, California,: dated February 21.

ATTACHMENT A

Select Photographs



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: ESRI WORLD TOPO, 2020

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FIGURE 1

SITE LOCATION

PRIDE ACADEMY AT PROSPECT AVENUE SCHOOL HARDCOURT PAVEMENT
9303 PROSPECT AVENUE, SANTEE, CALIFORNIA

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LEGEND

- SITE BOUNDARY
- **B-3** TD=4.0 — BORING TD=TOTAL DEPTH IN FEET
- **NM-2** TD=18.8 — BORING (2019) TD=TOTAL DEPTH IN FEET
- **B-7** TD=8.0 — BORING (2007) TD=TOTAL DEPTH IN FEET

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: GOOGLE EARTH, 2021

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FEET
0 150 300

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FIGURE 2

BORING LOCATIONS

PRIDE ACADEMY AT PROSPECT AVENUE SCHOOL HARDCOURT PAVEMENT
9303 PROSPECT AVENUE, SANTEE, CALIFORNIA

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ATTACHMENT A

Select Photographs

Photograph 1: **North Hardcourt: Overall view of play area looking northeast.**

Photograph 2: **North Hardcourt: View of play area looking east. Open cracks and previously patched cracks.**

Photograph 3: **<u>North Hardcourt:</u> View of play area looking south. Previously patched cracks reopening.**

Photograph 4: **<u>North Hardcourt:</u> View of play area looking west. Previously patched cracks reopening.**

Photograph 5: **<u>West Hardcourt:</u> Overall view of play area looking east. Open cracks and previously patched cracks.**

Photograph 6: **<u>West Hardcourt:</u> View of play area looking north. Open cracks and previously patched cracks.**

Photograph 7: **<u>West Hardcourt:</u> View of play area looking west. Open cracks and previously patched cracks.**

Photograph 8: **<u>West Hardcourt:</u> View of play area looking south. Open cracks and previously patched cracks reopening.**