VALLEY CENTER FIRE PROTECTION DISTRICT
REQUEST FOR PROPOSALS FOR DESIGN-BUILD SERVICES
FIRE STATION PROJECTS

December 2, 2021

Valley Center Fire Protection District (VCFPD), is soliciting proposals from three pre-qualified Design-Build Entities (D-BEs) to design and construct a temporary fire station and fire station improvement projects to serve the community of Valley Center. The temporary fire station site is located northwest of the intersection of Cole Grade Road and Cole Grade Lane. The fire station improvement projects are located at VCFPD Station Nos. 1 and 2.

This RFP is the second step in the two-step Design-Build process set forth in the design-build provisions of the Public Contract Code. Proposals shall be accepted from the following three Design-Build Entities who were pre-qualified by the VCFPD in step one of the process, Request for Statements of Qualifications (RFSQ):

- EC Constructors, Inc./JKA Architecture
- Erickson-Hall/PBK-WLC Architects
- I.E. Pacific, Inc./Tectonics A-E

Proposals for the VCFPD Fire Station Projects must be received on or before 2:00 p.m. on January 10, 2022, at the following address:

Joe Napier, Fire Chief
Valley Center Fire Protection District
28234 Lilac Road
Valley Center, CA 92082

One hard copy original, four (4) hard copies, and one electronic copy of the proposal shall be received by the Fire Chief's office, within said time limit, in a sealed envelope identified on the outside with the Offeror's Business Name, RFP for the Valley Center Fire Protection District Fire Station Projects and the Due Date. As the selection of the D-BE will be based on VCFPD's determination of "Best Value", there will be no public opening of proposals.

Written questions regarding this RFP must be received no later than December 15, 2021. Questions may then be responded to by written amendment to this document. **Oral statements or instructions shall not constitute an amendment to the RFP.** All questions shall be in writing and shall be directed to:

Robin Biglione via email at: robinraeputnam@gmail.com. All questions and answers shall be distributed to all proposers.

Sincerely,

Joe Napier, Fire Chief

REQUEST FOR PROPOSAL
DESIGN/BUILD SERVICES

1.0 INTRODUCTION

1.1 VCFPD, is issuing this Request for Proposal to solicit proposals from Design-Build Entities (D-BEs) to provide pre-construction, design, value engineering, constructability review, construction management, construction and operations, and startup and commissioning services for a new temporary fire station to be located northwest of the intersection of Cole Grade Road and Cole Grade Lane in the community of Valley Center and for fire station improvements at VCFPD Station Nos. 1 and 2.

This Request for Proposal (RFP) is the second step in the two-step Design-Build process set forth in the design-build provisions of the Public Contract Code. Proposals shall only be accepted from the three Design-Build Entities (D-BEs) who were pre-qualified by the VCFPD in step one of the process, Request for Statements of Qualifications (RFSQ).

The D-BE is to provide a Design-Build Team (DBT) that shall consist of the D-BE and all relevant Architects/Engineers/Designers. All DBT members shall be licensed/registered with the State of California under their respective professions. The VCFPD discourages identifying subcontractors in the proposal. The VCFPD would like to be involved in decisions regarding subcontractor selection to promote competition and to ensure best value selections.

This RFP describes all the elements of the projects, the required scope of services, the DB-E selection process, and minimum information that must be included in the proposal. Failure to submit information in accordance with the RFP's requirements and procedures may be a cause for disqualification.

1.2 Award will be based on best value, not on lowest responsible bidder.

2.0 BACKGROUND

The VCFPD obtained County approval of a Lot Line Adjustment to establish a 10-acre parcel for acquisition by the VCFPD. The VCFPD now owns the approximately 10-acre parcel shown in Attachment 1 and plans to construct a permanent fire station on the site in the future. The portion of the 10-acre site planned for the temporary fire station is located on the most northerly portion of the property to allow the temporary station to remain operational while the permanent facility is under construction. Attachment 2 is the conceptual Site Plan for Temporary Fire Station No. 3.

As part of the Lot Line Adjustment planning process, County Planning & Development Services determined that a Site Plan Exemption would be appropriate for the Temporary Fire Station No. 3 project, so the temporary fire station project has been referred to County Building for further processing. In discussions with the County, it appears that a

Plot Plan will be required to be processed, which will include review by the Valley Center Planning Group.

Aside from the Plot Plan process, is appears that the processing will include standard County commercial building plan and large grading plan submittal requirements. Attachment 3 includes the County's applicable building and grading submittal handouts. For purposes of the scope of work, DBs should assume that the County will require a hydrology study and SWMP to accompany the grading plan submittal and that a NOI and SWPPP will be required to meet stormwater compliance requirements. In addition, DB-Es should assume landscape and irrigation plans will be required for the slopes created following grading for the temporary fire station. The DB-E will be responsible for working with the County to determine the specific submittal requirements.

3.0 DESCRIPTION OF WORK

The Project includes design and construction of Temporary Fire Station No. 3 as conceptually shown on Attachment 2 and described in Attachment 4. Attachment 5 includes a preliminary geotechnical study prepared for the entire 10-acre Fire Station No. 3 site. The D-BE's work on Temporary Fire Station No. 3 will begin with a though review of the conceptual Site Plan. The D-BE will work with the VCFPD to make revisions to that Site Plan prior to proceeding with preparation of construction plans and required studies for review and approval by the County. The Temporary Fire Station No. 3 project will require architectural, structural, mechanical, plumbing, electrical engineering, on-site wastewater treatment design and landscape and irrigation design.

The Temporary Fire Station No. 3 project includes relocation of the temporary fire station facilities from a temporary fire station site located at 2604 Overlook Point Drive, Escondido, CA, 92029, and extending permanent water and electrical utilities from Cole Grade Road to the project site. The D-BE will be responsible for coordinating with Valley Center Municipal Water District and San Diego Gas & Electric and preparing the necessary plans for utility extension. The budget for Temporary Fire Station No. 3 is $1 million.

In addition, the project includes approximately $500,000 in improvements to Fire Stations No. 1 and 2, with approximately one-half of the $500,000 budget to be allocated to each station. The selected DB-E will work with VCFPD to accomplish as many of the projects from each station's priority list as possible. Attachment 6 includes priority lists for the stations.

The Project will include all design, engineering, permits, grading, construction, material, labor, special observation, inspection, testing, and verification. D-BE will be responsible for obtaining all required permits, including federal, state, and local governance as well as coordination with all utilities and other regulatory agencies, start up and commissioning required for occupancy and operations. The VCFPD will pay the actual cost of all permits and fees, including County and agency plan check and inspection fees.

4.0 DESIGN BUILD SERVICES

The services sought by this RFP include all services necessary to design and construct the Project. The design and construction must comply with the requirements of all applicable Federal, State, County, and local agencies having jurisdiction over the Project. The D-BE shall work to obtain approvals in increments that will facilitate the schedule. The completed Project is to be a fully functioning temporary fire station and fully functioning fire station improvements as described in this RFP.

4.1 The Scope of Work includes, but is not limited to, the following services during design, approvals, construction, and closeout:

1. Architectural and engineering design services, including structural, civil, stormwater, on-site wastewater, mechanical, electrical, plumbing, landscape, fire sprinkler, and fire alarm systems.
2. Geotechnical Engineering, testing, investigation, and observation.
3. Material testing and special inspection services.
4. Survey, layout, and staking.
5. Submittals and approvals from all agencies having jurisdiction,
6. Project engineering and project management.
7. Supervision, safety program, quality assurance/quality control, and site security.
8. Abatement, demolition (if required), material recycling/diversion program, and removal.
9. Construction, materials, equipment, labor and supplies.
10. Site clearing, soil import/export, on-site grading, and off-site grading as required. Construction and coordination with utilities regarding communication loops and connections, for complete and operating systems.
11. Startup of systems and equipment and commissioning.
12. Coordination and scheduling of work.
13. Insurance and bonding.
14. Temporary facilities and services required for construction of the Project including, but not limited to: temporary office facilities, signage, fencing for site control, etc.
15. Design and installation of communications, alerting, and alarm, including both backbone and secondary distribution to equipment. The D-BE will coordinate with the VCFPD's IT Manager who will specify, purchase and install computer systems in coordination with the D-B. The trailers to be relocated to the site include sprinklers and smoke detectors. These systems will have to be connected to electrical and water facilities and

wired to a local alarm bell. The D-BE will be responsible for designing the alerting system and providing the alerting system equipment for the Temporary Fire Station. The alerting system used by VCFPD is US Digital Designs Phoenix G2.

16. Meetings, reporting, and documentation including preparation and proper submittal of certified payroll.

17. Coordination, scheduling and conducting of progress meetings with VCFPD representatives and the Architect as required and directed by the VCFPD.

18. Compliance of the design and construction with all applicable codes, ordinances, regulations, and requirements of agencies having jurisdiction over the Project.

4.2 The selected D-BE shall be responsible for completion of the design and construction of the Project in accordance with:

1. The RFP.
2. The Contract.
3. The D-BE's Proposal.
4. The approved design and construction documents.
5. The required agency approvals.
6. The agreed Project Schedule.
7. The Guaranteed Maximum Price (GMP). Please note that this project will use the "Progressive" design-build delivery method. The project will be delivered in two distinct phases, pre-construction and construction. The GMP and schedule will be established after the project has been sufficiently designed, working in collaboration with the VCFPD, to meet the project's goals. The VCFPD shall maintain control over design definition. The contract will be established on a cost plus fee basis, with a Guaranteed Maximum Price. The contract will require full transparency into the D-BE's cost, including an ability to be involved in subcontractor procurement and best value selection of subcontractors. The contract will be structured so that all savings are returned to the VCFPD.

5.0 PUBLIC CONTRACT CODE COMPLIANCE REQUIREMENTS

5.1 The undertaking and accomplishment of this Project is required by State law to comply with the requirements of Public Contract Code Section 22160, et seq. Nothing in this RFP is intended nor should be interpreted as contravening the provisions of that Code as it relates to design build and best value.

5.2 The undertaking and accomplishment of this project is required by State law to comply

with the requirements of Labor Code Sections 1770, et seq. Nothing in this RFP is intended nor should it be interpreted as contravening the provisions of that code.

5.3 The D-BE shall be fully knowledgeable of and shall comply with the provisions of Public Contract Code Section 1770, et seq., including the general prevailing wage rates and reporting requirements. Further, the D-BE shall be fully knowledgeable and comply with the provisions of Public Contract Code Section 22160, et seq. which include provisions related to the design-build delivery method.

6.0 RFP SUBMITTAL REQUIREMENTS

6.1 **General RFP Requirements**:
All D-BEs are required to follow the format specified below. The content of the proposal must be clear, concise, and complete. Each section of the proposal shall be presented according to the outline shown below to aid in expedient information retrieval.

One (1) original and four (4) copies and one electronic copy of the sealed proposal shall be delivered no later than 2:00 P.M. on Monday, January 10, 2022, to:

Joe Napier, Fire Chief
Valley Center Fire Protection District
28234 Lilac Road
Valley Center, CA 92082

Please note that faxed copies will not be accepted. Also note that incomplete proposals, incorrect information, or late submittals may be cause for immediate disqualification. The VCFPD reserves the right to amend the RFP prior to the date that proposals are due. Amendments to the RFP shall be emailed to all potential D-BEs. The VCFPD reserves the right to extend the date by which the proposals are due.

6.1.1 The proposal should be concise, well organized and demonstrate the D-BE's qualifications and experience applicable to the Project. The proposal shall be inclusive of resumes, graphics, forms, pictures, photographs, dividers, front and back cover, cover letter, etc.

6.2 **Contents**
Sealed proposals submitted in response to this RFP shall be in the following order and shall include:

6.2.1 General Information:
1. Executive Summary.
2. Provide a narrative (maximum 4 pages) that highlights D-BE's approach to this project and D-BE's commitment to meet or exceed the VCFPD's objectives and ensure a successful project built on time and within budget.

3. Describe how the Design-Build team will participate together in design review, constructability review, estimating, value engineering, scheduling and phasing, and construction methods.
4. Identify each DBT member. Provide a description of any design-build fire station projects that the team has completed together and provide contact information for references for those projects.
5. Legal name and address.
6. Name, title, address and telephone number of person(s) to be assigned to Project.
7. Name, title, address and telephone number of person to contact concerning the proposal.

6.2.2 Lifecycle Cost Analysis

Provide a narrative and spreadsheet including a 15 year lifecycle cost analysis for Temporary Fire Station No.3, which should include, but not be limited to energy consumption costs, operation and maintenance costs, life expectancy, replacement costs, and total cost of ownership over fifteen (15) years.

6.2.3 Project Schedule

Provide a schedule that that includes major tasks from Notice of Award to Final Completion. Also, confirm that DBT can meet the VCFPD's Final Completion date of October 27, 2022.

6.2.4 Preliminary Costs

Complete Preliminary Cost Worksheet in format detailed in Attachment 7. The Preliminary Cost Worksheet requests costs for design and pre-construction. The DB-E's fee percentage for construction and costs for General Conditions/General Requirements are also requested. In addition, percentages for payment and performance bonds, liability insurance and builder's risk insurance are requested.

6.2.5 Project Organization and Key Personnel

1. Describe proposed Project organization and provide an organizational chart, including identification and responsibilities of key personnel.
2. Describe the D-BE's staffing plan during preconstruction and construction. Identify which staff members will be on-site. Provide the percentage of each staff member's time that will be devoted to the project during both design and construction. Indicate the role and responsibilities of the D-BE and all subconsultants. Indicate how local firms are being utilized to ensure a strong understanding of local laws, ordinances, regulations, policies, requirements, permitting, etc. Indicate extent of commitment of key personnel for duration of Project (through building occupation) and furnish resumes of key personnel.

3. If a trade contractor is listed in the RFP for preconstruction services, provide all qualifications as well as a narrative describing their added value in the preconstruction process.
4. The VCFPD's evaluation of D-BE will consider its entire team; therefore, no changes in team composition will be allowed without prior written approval of the VCFPD. The VCFPD reserves the right to review and approve subconsultants not listed in the proposal. Describe DBT's capacity to perform the work within the time limitations, considering DBT's current and planned workload and DBT's workforce.

6.2.6 Exceptions to this RFP and Contract Form

The D-BE shall certify that it takes no exceptions to this RFP or the anticipated use of AIA Owner-Design-Builder Agreement A141-2014. If the D-BE does take exception(s) to any portion of the RFP or the use of AIA Owner-Design-Builder Agreement A141-2014, the specific portion of the RFP or Agreement to which exception is taken shall be identified and explained.

6.2.7 Addenda to this RFP

DB-E shall confirm in its proposal the receipt of all addenda issued to this RFP. D-BE is not required to include copies of the actual addenda in its proposal.

6.2.8 Additional Information

This section shall contain all the other pertinent information that is required to be submitted with the proposal in the following order:

1. Confirmation that DBT can meet the insurance requirements specified in this RFP.
2. Indicate whether D-BE proposes to self-perform construction work and, if so, what trades. The VCFPD discourages identifying work to be self-performed in the proposal. The VCFPD would like to be involved in decisions regarding subcontractor selection and work to be self-performed to promote competition and to ensure best value selections.
3. Provide the following information:
    a) List of fire station and other municipal design-build projects completed in the last year.
    b) Provide references for the work of the D-BE on the projects listed in a).

7.0 PROPOSAL EVALUATION CRITERIA

7.1 Selection of the DB will be based on best value, not on lowest responsible bidder. Proposals shall be evaluated and ranked based on best value as determined by the following factors and relative weights of importance:

1. 15% - Overall experience and technical competence of the teams(s) (including principal firms and sub-consultants) and demonstrated specific experience and technical competence on projects with similar design, coordination and construction complexity. Experience as a team is an important consideration in this factor.

2. 10% - Appropriateness of Staffing Levels as indicated on the DB Cost for Preconstruction Services and General Conditions/General Requirements breakdowns required as attachments to the Preliminary Cost Worksheet (Attachment 7).

3. 15% - The experience of key DB-E and Architect personnel working on fire station and other municipal projects together. Projects with a design-build delivery method will be evaluated most positively.

4. 10% - Rates and Fees including Preconstruction Costs, D-BE Fees, General Conditions/General Requirements, payment and performance bond rates, and insurance rates.

5. 5% - Life cycle costs over 15 years for Temporary Fire Station No. 3.

6. 20% - Project approach, including proposed methods and overall strategic plan to accomplish the work in a timely and competent manner, including Preliminary Schedule. Demonstration of understanding of the role of teamwork for a successful Progressive Design-Build project.

7. 10% - Combination of the following factors:
   a. Conformance to the specified RFP requirements and format.
   b. Organization, presentation, and content of the submittal.
   c. Knowledge and understanding of the State and local environment and a local presence for interfacing with the VCFPD.

8. 15% - Proposal Interview – Optional at Discretion of VCFPD

7.2 The VCFPD reserves the right to discuss and negotiate scope, costs, and schedule as needed starting with the top rated D-BE, followed by next highest rated, and so forth. At any time prior to the VCFPD executing a Design-Build contract with the selected firm, if that D-BE cannot meet any of the RFP conditions, the VCFPD has the option of opening negotiations with the next highest rated D-BE.

7.3 The VCFPD may conduct interviews as part of the evaluation process. If the VCFPD does conduct interviews, information provided during the interviews will be taken into consideration when evaluating the stated criteria. The VCFPD will not reimburse the D-BE for the costs associated with the interview process. Interviews will be held at a time and place specified by the VCFPD. The DBTs key project team members will be invited to attend the interview. At the interview, the DBTs should be prepared to discuss their specific experience

providing services similar to those described in the RFP, project approach, estimated work effort, available resources, and other pertinent things that distinguish your team from others.

7.4 The VCFPD reserves the right to make such additional investigations as it deems necessary to establish the competence and financial stability of any D-BE submitting a proposal.

7.5 The VCFPD may take previous experiences with the proposer into consideration when evaluating qualifications and experience.

8.0 INSURANCE REQUIREMENTS

8.1 The D-BE shall procure and maintain for the duration of the contract, insurance against claims for injuries to persons or damages to property, which may arise from or in connection with the performance of the work hereunder by the DBT, his/her agents, representatives, employees or sub-consultants. All sub-contractors and sub-consultants shall be required to comply with the applicable insurance provisions. The maintenance of proper coverage is a material element of the Design-Build Contract and that failure to maintain or renew coverage or to provide evidence of renewal may be treated by the VCFPD as a material breach of contract.

8.2 **Minimum Insurance Requirements**

See Attachment 8 for insurance requirements. Before an exposure to loss may occur, the D-BE shall file with the VCFPD certificates of insurance and **additional insured endorsements on forms specified by the VCFPD, providing** evidence of the required insurance. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the VCFPD.

9.0 PROPRIETARY INFORMATION

9.1 All response documents become the property of VCFPD and subject to Public Records Act requirements of California Government Code section 6250, et seq. D-BE is encouraged to mark any documents "CONFIDENTIAL" that they deem to be confidential before submission to VCFPD. Information provided will be kept confidential to the extent permitted by law. The proprietary or confidential data shall be readily separable from the Proposal in order to facilitate eventual public inspection of the non-confidential portion of the Proposal.

VCFPD assumes no responsibility for disclosure or use of unmarked data for any purpose.

10.0 PROPOSAL SCHEDULE

10.1 The solicitation receipt and evaluation of proposals and the selection of the D-BE will conform to the following schedule (Note: Dates are subject to change):

- Distribution of RFP – December 2, 2021
- Deadline for Questions on RFP – December 15, 2021
- Submittal of Proposals Deadline – January 10, 2022, by 2:00 p.m.
- Interviews with Selected Respondents – January 2022
- Approval of Design/Build Contract(s) –February 17, 2022
- Final Completion Date – October 27, 2022

11.0 CONTRACT TERMS AND CONDITIONS

11.1 Selection is dependent upon the negotiation of a mutually acceptable contract with the successful D-BE.

11.2 Each submittal shall be valid for not less than one hundred and twenty (120) calendar days from the date of receipt.

11.3 All insurance shall be provided at the sole cost and expense of the D-BE selected, and shall be reimbursable in accordance with contract terms, unless the requirement is modified or waived by the VCFPD. The VCFPD reserves the right to modify the insurance limits or to substitute project insurance during contract negotiations.

11.4 The selected D-BE will enter into a contract in substantially the same form as AIA A141-2014 Owner-Design-Builder Agreement.

11.5 The VCFPD is under no obligation to award a contract under this RFP, and reserves the right to terminate the RFP process at any time, reject any or all Proposals received and/or to withdraw from discussions with all or any of the D-BEs who have responded.

11.6 The VCFPD in its sole discretion, reserves the right to terminate the RFP process and re-advertise with either the identical or revised terms, if it is deemed by the VCFPD in its sole discretion to be in the best interest of the VCFPD to do so.

11.7 In the event of rejection of any or all responses, or the termination of the RFP process, the VCFPD shall not be liable for any loss, damage, cost or expense incurred or suffered by any offeror as a result of said rejection or cancellation.

11.8 D-BEs warrant and covenant that no official or employee of the VCFPD, nor any business entity in which an official or employee of the VCFPD has an interest, has been employed or retained to solicit or aid in the RFP process nor have any such persons divulged any information to a D-BE not made available to all D-BEs. Further no official or employee of the VCFPD, nor any business entity in which an official or employee of the VCFPD has an interest, shall have any interest in any contract awarded to a D-BE.

12.0 QUESTIONS

All contacts from a D-BE related to this RFP or its Proposal must be directed by email to the VCFPD's construction manager at the email address below. D-BEs should not attempt to contact other VCFPD personnel.

Robin Biglione
Biglione Construction Management, Inc.
Email: robinraeputnam@gmail.com

ATTACHMENTS:

1. **Site Location Map**
2. **Site Plan for Temporary Fire Station No. 3**
3. **County of San Diego Building and Grading Handouts**
4. **Temporary Fire Station No. 3 Scope of Work**
5. **Preliminary Geotechnical Study for Temporary Fire Station No. 3 Site**
6. **Improvement Priority Lists for Station No. 1 and 2**
7. **Preliminary Cost Worksheet**
8. **Insurance Requirements**

Note: The plans and reports provided in the Attachments are for reference only. The D-BE is responsible for verifying all information provided.

NOVA

Attachment 1
Site Location Map

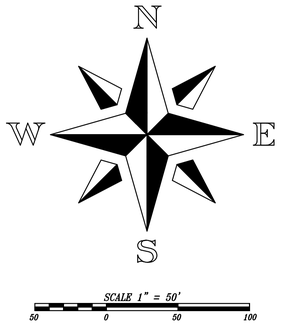
Cole Grade Road and Cole Grade Lane
Valley Center, California

North

ATTACHMENT 2
SITE PLAN FOR TEMPORARY
FIRE STATION NO. 3

LEGAL DESCRIPTION:

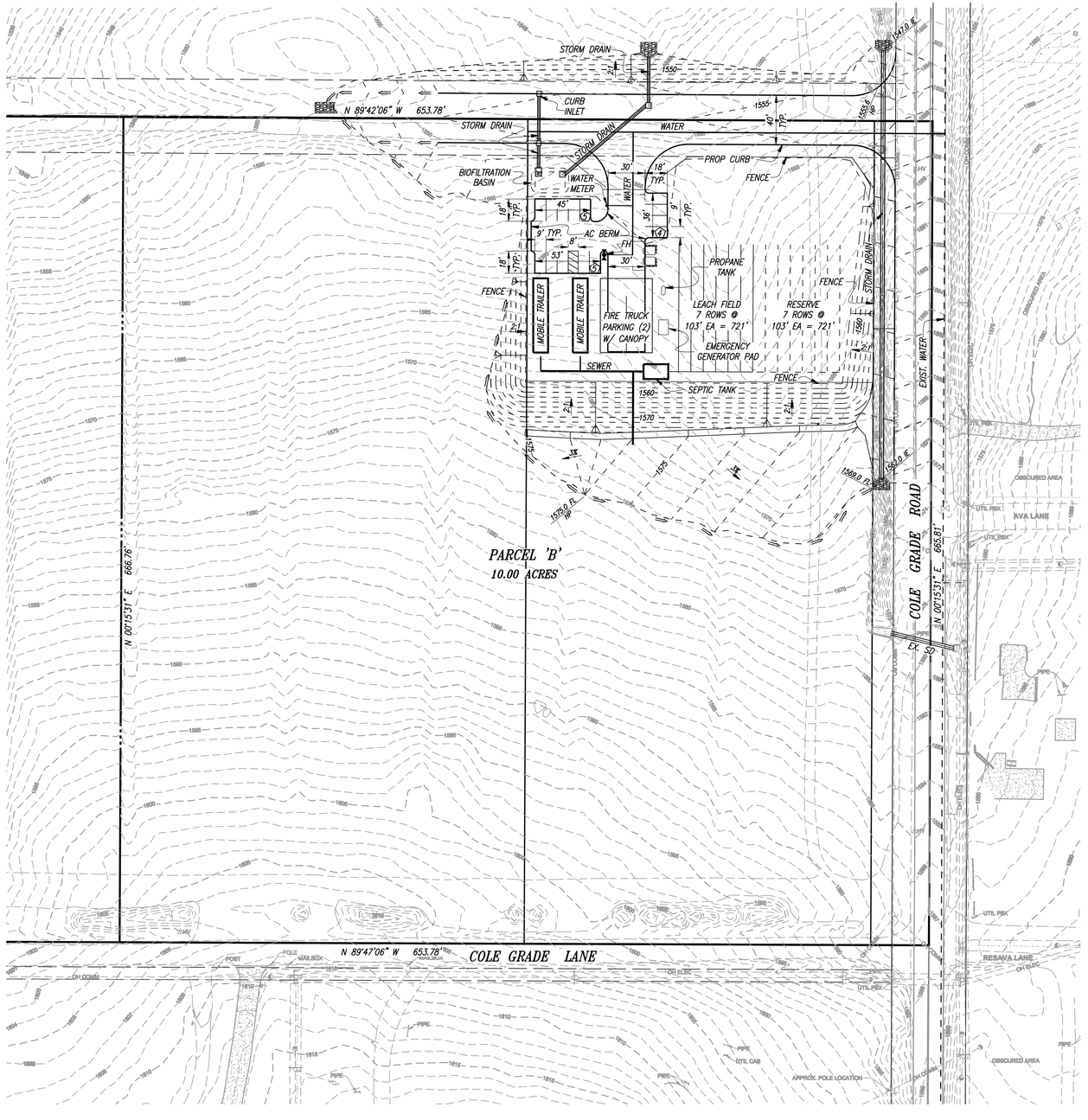
PARCEL B OF CERTIFICATE OF COMPLIANCE B/C-20-0079 DESCRIBED AS THE EAST 10.00 ACRES OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 31, TOWNSHIP 10 SOUTH, RANGE 1 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. WHERE THE WEST LINE OF SAID EAST 10.00 ACRES IS PARALLEL WITH THE EAST LINE OF THE SOUTHWEST QUARTER OF SECTION 31.



EARTHWORK QUANTITIES

CUT:	9,035 C.Y.
FILL:	9,035 C.Y.
IMPORT:	0 C.Y.

EARTHWORK QUANTITIES SHOWN ARE APPROXIMATE AND ARE SUBJECT TO REVISIONS DURING FINAL DESIGN. ADJUSTMENTS HAVE NOT BEEN MADE FOR REMEDIAL GRADING.



PREPARED IN THE OFFICE OF:

BUCCOLA ENGINEERING, inc 760/721-2000

3142 Vista Way, Suite 301, Oceanside, CA 92056

DATE PREPARED: Nov. 15, 2021

PREPARED FOR
JOE NAPIER, FIRE CHIEF
VALLEY CENTER FIRE PROTECTION DISTRICT
28234 LILAC ROAD
VALLEY CENTER, CA. 92082
TELE: (760) 751-7600

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Attachment 3
County of San Diego
Building and Grading Handouts

New Commercial Shell Structure Plan Submittal:

Form Name	Date MM/YY	Number
Commercial Building Permit Application *(Interactive)*	3/20	**PDS #293**
Stormwater Intake Form *(Interactive)*	02/19	**INTAKE FORM**
Standard Project Stormwater Quality Management Plan	09/20	**STANDARD SWQMP**
Best Management Practices for Stormwater *(file size 22MB)*	04/10	**PDS #143**
Best Management Practices for Stormwater Design Manual	09/20	**BMP DESIGN MANUAL**
BMP Installation Verification Form for Priority Development Projects	09/20	**BMP VERIFY**
Category I Structural BMP Maintenance Notification Agreement	10/19	**BMP MAINTENANCE**
Customer Acknowledgment of Liabilities & Risks	05/20	**PDS #001**
Optional Pre-Intake Assistance Conference	07/20	**PDS #001b**
Guards and Handrails	09/12	**PDS #075**
Plot Plan Minimum Requirements	05/17	**PDS #090**
Valuation Multiplier	06/17	**PDS #169**
Sample Presentation for Stormwater BMPs	09/12	**PDS #272**
Green Building Incentive Program	09/12	**PDS #273**
Checklist for Commercial Buildings	07/18	**PDS #492**
Building Permit Fee Schedule	07/21	**PDS #613**
Hazardous Materials Questionnaire	-	**DEH:HM-9171**
Wildland Urban Interface Code Requirements	01/20	**PDS #664**
Fire Clearing FAQ Sheet	05/17	**PDS #800**
State Disability Access Notice for Commercial Building Applicants	07/19	**Access Notice**

County of San Diego, Planning & Development Services

PRE-SCREENING CHECKLIST

LAND DEVELOPMENT DIVISION

GRADING AND IMPROVEMENT PLAN PRE-SCREENING CHECKLIST

Grading and Improvement plans are subject to pre-screening by Planning & Development Services (PDS) Land Development Division prior to initial submittal. Plans must meet the following format requirements at a minimum. If plans do not meet any of the following, the submittal is subject to rejection. The pre-screened submittal will be returned within twenty (10) business days.

Applications and plans shall be submitted to the Land Development Counter at: 5510 Overland Ave Suite 110 San Diego, CA 92123.

Private:		County:
☐	Grading plans placed on 24" x 36"sheets with 1" border on all edges	☐
☐	North arrow and scale on all sheets	☐
☐	Vicinity map (distance shown to nearest street intersection, page, and section of Thomas Guide)	☐
☐	Permittee's name, address and telephone number	☐
☐	Owner's name, address and telephone number (if same as Permittee, indicate on plan)	☐
☐	Civil Engineer's name, address, telephone number, signature in title block, and stamp	☐
☐	Short legal description	☐
☐	Assessor's Parcel Number	☐
☐	Site address	☐
☐	Bench mark: show location on plan and describe in space provided (if datum is assumed, so note)	☐
☐	L, CG, TM, or TPM-Number in the block	☐
☐	California Coordinate in title block	☐
☐	Purpose of grading shown in the title block	☐
☐	Show special use permit, rezone, TM, or TPM number, and dates of their approval next to title block where applicable	☐
☐	Required General Notes	☐
☐	Key map for projects covering several sheets	☐
☐	Show existing contours (max. 5') to cover at least 50' beyond the property line or sufficient for showing drainage basin	☐
☐	Best Management Practices Items proposed during construction and Post construction	☐
☐	Drainage study	☐
☐	Plans are related to a project with a previously approved discretionary permit (include a copy of the conditionally approved plot plan with the adopted Resolutions or Final Notice of Approval)	☐
☐	Structural calculation for proposed designed retaining wall, if required	☐
☐	Project Schedule	☐
☐	Review Initial Deposit and Cost Estimate (if recommended by County Staff)	☐
☐	Complete Application (County staff confirmed complete submittal)	☐

If any of the following boxes are checked, an extra set of the project plan set with supporting documentation, studies, and/or other information will be sent to the respective specialist.

PDS Environmental: All discretionary projects/applications require PDS Environmental review. (Except for Agricultural Grading plans and Grading plans for restoration which will be reviewed by PDS Project Planning)

Project has previous Discretionary approval:

☐ If Yes, please provide project name and permit number(s): _____

_____

☐ If No, (PDS Environmental will determine environmental status upon initial review)

Project received a Site Plan Waiver? ☐ Yes ☐ No

If Yes. please provide Site Plan Record ID#:_____

Planning & Development Services (PDS):

☐ Project is for agricultural grading
☐ Grading Plans required as restoration for grading violation as determined by the PDS Code Compliance Division or the DPW Watercourse Enforcement Division.
☐ Project proposes grading into an open space easement

DPW Private Development Construction Inspection (PDCI):

☐ Project proposes grading under an L-Grading Permit Application
☐ Project is the result of a Watercourse Violation under the County Grading Ordinance

DPW Capital Improvement Program (CIP):

☐ Project is located within, along, or adjacent to a listed Public Road on the current County five (5) year CIP Plan
☐ Sidewalk and pedestrian ramp improvements deviate from ADA requirements
☐ Project proposes public pathways

DPW Flood Control:

- ☐ Project is subject with National Flood Insurance Program (NFIP)
- ☐ Project is subject with County Flood Protection Ordinance, Resource Protection ordinance
- ☐ Project subject to County Flood Plain mapping
- ☐ Project impacts or required to construct master planned drainage facility
- ☐ Project is subject with County Hydrology Manual, Drainage Design Manual for major drainage course or master facility
- ☐ Easement dedication to San Diego County Flood Control District (SDCFCD)

DPW Field Operations:

- ☐ Project will violate the County 3-year Pavement Cut Policy
- ☐ Project will make improvements to existing or future publicly maintained road for the purpose of acceptance into the County Maintained road system
- ☐ Project connects or intersects a private road to a County publicly maintained road
- ☐ Project proposes modifications or eliminates pedestrian access to curb ramps or sidewalks
- ☐ Project proposes raised medians (landscaped and/or hardscaped) within a County maintained road
- ☐ Project proposes landscaping within or along a County maintained road
- ☐ Project proposes connection to an existing or proposed County drainage system
- ☐ Project proposes improvement or installation of drainage facilities to be County maintained
- ☐ Project proposes improvements that do not meet minimum County Drainage Standards within the County maintained road system
- ☐ Project proposes permanent stormwater BMPs to be publicly maintained by the County of San Diego
- ☐ Project proposes a publicly maintained detention or retention basin and/or those which will drain directly into a County maintained drainage system or roadway
- ☐ Project proposes a Regional Standard Drawing D-25, Curb Outlet, or RSD D-27, sidewalk under drain within the County maintained road system (note: copy of the drainage study required to verify runoff will be contained within the gutter).

DPW Materials Lab:

- ☐ Project proposes paving under the Private or Public Road Standards, conditions of approval, or permit requirements
- ☐ Project has Geotechnical/Geology issues (seismic, slope stability, potential rock fall, etc.) including specialized retaining or slope stability structures
- ☐ Project requires "Geologic Hazard" memo
- ☐ Project proposes designs employing non-standard methods and materials

Note: If a geotechnical report is available, for the project, a copy of the report should be routed with the plans. A copy of conditions of approval or permit requirements must be provided with plans.

DPW Special Districts:

- ☐ Project is in a Permanent Road Division, ***PRD Number*** _____
- ☐ Project proposes improvements that will connect or intersect a PRD road.
  PRD Number _____

DPW Traffic Engineering:

- ☐ Striping and pavement markings
- ☐ Traffic signs
- ☐ Traffic signals and flashers
- ☐ Guardrail installations
- ☐ Traffic Control Plans
- ☐ Traffic calming

DPW Wastewater Engineering:

- ☐ Project is located in a County Sanitation District

Department of Environmental Health (DEH):

- ☐ Project site has existing water wells on the property
- ☐ Water wells are shown on the grading plan
- ☐ Water wells located within the area of proposed grading
- ☐ Water wells located on adjacent property near proposed grading
- ☐ Project site has existing monitoring wells on the property
- ☐ Properties adjacent to the project are currently using, or will use on-site sewage disposal systems
- ☐ 5:1 grading setbacks are shown from the top of cut to primary and/or reserve area disposal fields to adjacent properties that have or are approved for onsite sewage disposal systems
- ☐ Grading plan shows existing or proposed on-site sewage disposal system for project site
- ☐ Proposed earthen fill located over or near components of on-site sewage disposal systems

Department of Parks and Recreation:

- ☐ Project is located adjacent to existing or proposed County park or preserve
- ☐ Project is conditioned to construct a public or private park
- ☐ Project is conditioned to construct public or private trails and/or pathways
- ☐ Project proposes an LLD/CFD which requires operations and/or management by DPR

Note: A copy of conditions of approval or permit requirements must be provided with plans under Park and Recreation review.

( ) - Items to be re-checked

PDS20 _ _ - LDGR _ _ - _ _ _ _ _

Grading Plan Check List

10/2014 PDS LD
By: _____

A. GENERAL FORMAT

1. Grading plans to be placed on 24'' X36''sheets with a 1'' border on all edges. (Note that std. Mylar of first sheet is available for reproduction)
2. Show North arrow and scale on all sheets.
3. Vicinity map (show distance to nearest street intersection, page and section of Thomas Brothers).
4. Permittee's name, address and telephone number.
5. Owner's name, address and telephone number (if same as permittee, indicate on plan).
6. Civil engineer's name, address, telephone number, signature in title block.
7. Short legal description.
8. Site address.
9. Bench mark: show location on plan and describe in space provided (if datum is assumed, so note).
10. L-number in the block.
11. California coordinate in title block.
12. Purpose of grading shown in the title block.
13. Show special use permit, rezone, TM, or TPM number, and dates of their approval next to title block where applicable.
14. Required General Notes (see page 3, 4).
15. Key map for projects covering several sheets.
16. NOI# - if disturbed area > 1 acre.

B. GRADING TECHNICAL INSTRUCTION

1. Show proper set back from property line (STD Drawings DS-11).
2. Identify property and easement lines.
3. Show amounts of excavation, fill & waste/import (cubic yards).
4. Show cut and fill ratios on the plans, if other than standards.
5. Show existing contours (max. 5'), to cover at least 50' beyond property line or sufficient for showing drainage basin.
6. Show final grades by contours, and /or spot elevations.
7. Show location of cut and placement of fill ("Daylight" and limit lines).
8. Show typical lot drainage (see note 16 below).
9. Show typical of berm or swale at top of fill (see note 16 below).
10. Show typical of brow ditch (see note 16 below).
11. Show percent of grade of streets and driveways, length of vertical curve, B.V. C., & E.V. C.
12. Horizontal and vertical sight distance; cross-check improvement plans.
13. Conditions of resolution of approval of M.U.P., Rezone, Tentative Map, TPM, etc., fulfilled. (If applicable).
14. Grading plan compared with grading shown on T.M. (New E. I. R. or Resolution change possible). (If applicable).
15. Grading plan compared with improvement plans prior to signature. (If applicable).

( ) - Items to be re-checked

____ 16. Details may be omitted if the following statement is placed on plans: "All grading details will be in accordance with the San Diego County Standard Drawings DS-8, DS-10, DS-11, D75."

____ 17. If grading encroaches on adjacent property, submit letter of permission (see H.5) and place appropriate note at location of encroachment including date of letter.

____ 18. Submit estimate

____ (1) Plans>5,000 cy include all items to be constructed per the Grading permit

____ (2) Plans<5,000 cy include those items requiring structure inspection such as drainage, retaining walls, irrigation systems, etc.

C. DRAINAGE

____ 1. If diversion or concentration of existing drainage courses occurs, a signed waiver and release from the affected downstream owners must be submitted. Attach standard form to plans for execution.

____ 2. Indicate on the plans waiver and release for discharge of drainage onto adjacent property and date waiver signed.

____ 3. Drainage Map of all drainage areas affecting site. (200 scale county topo plus any other updated topo prepared by engineer / surveyor)

____ 4. Hydrology and hydraulic calculations required.

____ 5. Check for non-erosive velocities at point of discharge, or adequate energy dissipater.

____ 6. Check for point of adequate discharge downstream (provide photos and calcs.).

____ 7. Show direction of street drainage and percent of slope plans. Give elevations at intersections and where required for clarity.

____ 8. Show size, length, gauge and profile of pipes, where drainage is to be installed with the grading plan. Show elevations and grades. Include details of all structures or give standard drawing number.

____ 9. Show width of all drainage easements. Show recording documentation and date of all off-site drainage easements.

10. Check for existing or proposed levee or dam.

11. DPW Flood Control Section review required for any of the following:

a. Drainage system or facility proposed for Flood Control ownership/maintenance (e.g. detention basins and/or pipes/culverts greater than 42" in diameter outside the public road right-of-way)

b. Proposed work or encroachment within an existing Flood Control District (FCD) Easement.

c. FEMA and/or County-mapped Floodway/Floodplain on project site.

D. LANDSCAPE AND IRRIGATION

____ 1. Show LD number on title sheet, Check with Dave Kahler on status. (Landscaping and irrigation plans required on slopes > 3 feet high and < 15' high)

E. RETAINING WALLS

____ 1. One of the following:

____ (1) Not a part of this plan (Building Inspection Permit) but show temporary slopes (same ratios as above).

____ (2) County standard drawing number.

____ (3) Designed wall- show details on plan-submit calculations and soil report for data backup.

( ) - Items to be re-checked

____ 2. Show elevations at top and bottom of wall (B.W.=T.F. top of footing) .
____ 3. Profile is required for keystone retaining wall with special inspection notes.

F. REFERRAL TO ENVIRONMENTAL REVIEW BOARD (PDS Environmental)
____ 1. CEQA Compliance

G. SWMP
____ 1. Start from INTAKE Form.
____ 2. Show Construction BMPs on Erosion Control plans.
____ 3. Show Permanent TCBMPs on separate sheets.
____ 4. Input RECORD data to Excel: "Z:\PCCommon\LAND DEVELOPMENT TEAMS\PL-JURMP Annual Report FY 13-14 Susan.xlsx"
** Create new "LDSWTR" Account on ACCELA (on hold till further notice.)

H. MISCELLANEOUS ITEMS AFFECTING THE GRADING PLAN
____ 1. Legal lot—proof that site is a legal lot (always applicable).
____ 2. San Diego Coastal Commission permit: ____Required ___Not Required
____ 3. a.) If more than 500 C.Y. are to be removed from the site, see borrow pit permit, Ordinance 3792, amending Section 34 of the Zoning Ordinance.
b.) Q>1,000 CY add import/export note.
c.) When Q>10,000 CY or plan changes, it should bring to PM for public review notification requirement decision)
____ 4. If project is on land zoned for multi-residential development, commercial, industrial, manufacturing, or other more intensive use, the grading plan will have to be compared with the street improvements required by the Centerline Ordinance if any.
____ 5. Submit notification mailing package if major grading permit is not related to any other discretionary permit per Grading Ordinance Section 87.208
____ 6. Public Notification is required for all Major Grading (See Sec. 87.208)

IN-HOUSE REQUIREMENTS (NOT REQUIRED TO BE CHECKED BY ENGINEER OF WORK)
____ 1. Check for illegal grading.
____ 2. Required account balance, agreements have been submitted and/ or paid.
____ 3. Health Department clearance obtained (DEH DPW).
____ 4. Easement documents recorded and /or shown on record map.
____ 5. Other resources' review.

ATTACHMENT 4

Temporary Fire Station No. 3 Scope of Work

Valley Center Fire Protection District is planning a temporary fire station west of Cole Grade Road and north of Cole Grade Lane in the northwest corner of the property identified as Parcel B of Lot Line Adjustment No. B/C-20-0079. The proposed site plan is shown in more detail on the exhibit titled Site Plan for Valley Center Fire Station Phase 1. The temporary facilities will be located at least 150 feet west of the ultimate right-of-way for Cole Grade Road and will be enclosed with chain link fencing, with slats to minimize the visibility of the temporary station. Access is proposed via a gravel driveway located near the northerly property line.

The temporary fire station is proposed to include two 864 square foot modular buildings, which are 15 feet tall; a metal carport for one Type 1 Fire Engine, which is 19 feet tall; and, two small storage sheds. The site is proposed to include 14 parking spaces.

Site improvements, including parking, the areas surrounding the modular buildings, carport, storage sheds and utilities, are proposed to be gravel. Pavement is only proposed in areas necessary to facilitate accessibility. Storm drain facilities and a biofiltration basin are also proposed.

Three to five crew members will be on-site per shift. Similar to a permanent station, these crew members will eat, sleep and perform administrative functions related to emergency calls at the temporary station. Limited public access is anticipated for the site. Only handouts with educational material and public postings are anticipated. All other administrative functions will be referred to Fire Station 1.

The site will be served by electrical facilities, water from Valley Center Municipal Water District and an on-site septic system. A propane tank and emergency generator will also be located on the site.

Project Components:

Site grading for temporary site
Move and set two trailers with ramps and a canopy for engines from Rancho Santa Fe Harmony Grove site
Emergency Generator, including automatic transfer switch
Propane tank pad and bollards
Propane piping and connections to trailers

Coordinate and provide electrical service to the site and site electrical to generator/ATS, gate and trailers
Water connections from facility in Cole Grade Road to site and connections to trailers
Stormwater basin and drainage facility to discharge under access road to property to the north, including headwall for drainage discharge into existing drainage ditch
Septic System for trailers, including tank and leach field
Cable TV and Data Connections from existing infrastructure to site and connections to trailers
Alerting system (US Digital Designs Phoenix G2) connections to trailers and equipment
Covered trash enclosure, if required by the County
AC paving
DG for access road and majority of site (if allowed by County)
Concrete where necessary for handicap access
Handicap parking with signage
Handicap restroom (outside of trailers), if required by the County
Any other required accessibility improvements
Striping
Fencing with slats to screen the temporary station
Motorized access gate that operates with both keypad and remote

Report
Geotechnical Investigation

Proposed Fire Station #3
Cole Grade Road, Valley Center, California

Valley Center Fire Protection District
28234 Lilac Road
Valley Center, CA 92082

NOVA Project 2020074
August 20, 2020

NOVA

4373 Viewridge Avenue, Suite B
San Diego, California 92123
858.292.7575

944 Calle Amanecer, Suite F
San Clemente, CA 92673
949.388.7710

www.usa-nova.com

Valley Center Fire Protection District
28234 Lilac Road
Valley Center, CA 92082

August 20, 2020
NOVA Project 2020074

Attention: Joe Napier, Fire Chief

Subject: Report
Geotechnical Investigation
Proposed Fire Station #3
Cole Grade Road, Valley Center, California 92082

Dear Mr. Napier:

NOVA Services, Inc. (NOVA) is pleased to forward herewith the above-referenced report. Work-related to this report was completed by NOVA for Valley Center Fire Protection District (VCFPD) in accordance with the scope of work identified in NOVA's revised proposal dated October 25, 2019, as authorized by you on April 29, 2020.

NOVA appreciates the opportunity to be of service to VCFPD on this most interesting project. Should you have any questions regarding this report or other matters, please contact the undersigned at 858.292.7575.

Sincerely,
NOVA Services, Inc.

Wail Mokhtar
Senior Project Manager

Melissa Stayner PG, CEG
Senior Engineering Geologist

CERTIFIED ENGINEERING GEOLOGIST
MELISSA STAYNER
2707
STATE OF CALIFORNIA

John F. O'Brien, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
JOHN F. O'BRIEN
651
EXPIRES 3-31-2021
GEOTECHNICAL
STATE OF CALIFORNIA

Hillary A. Price
Senior Staff Geologist

Report
Geotechnical Investigation

Proposed Fire Station #3
Cole Grade Road, Valley Center, California 92082

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1.0 INTRODUCTION

1.1 Terms of Reference

1.1.1 General

This report provides recommendations for the design of foundations and pavements for the construction of a new fire station on the eastern 4.75 acres of a 9.75-acre parcel with APN 133-220-38-00. This geotechnical investigation only addresses the eastern half of the parcel (hereinafter, 'the site'). This new fire station is known to NOVA as 'Fire Station #3'.

Work-related to this report was completed by NOVA Services, Inc. (NOVA) for Valley Center Fire Protection District (VCFPD) in accordance with the scope of work identified in NOVA's October 25, 2019 revised proposal, as authorized by VCFPD on April 29, 2020.

Figure 1-1 depicts the vicinity of the new fire station.

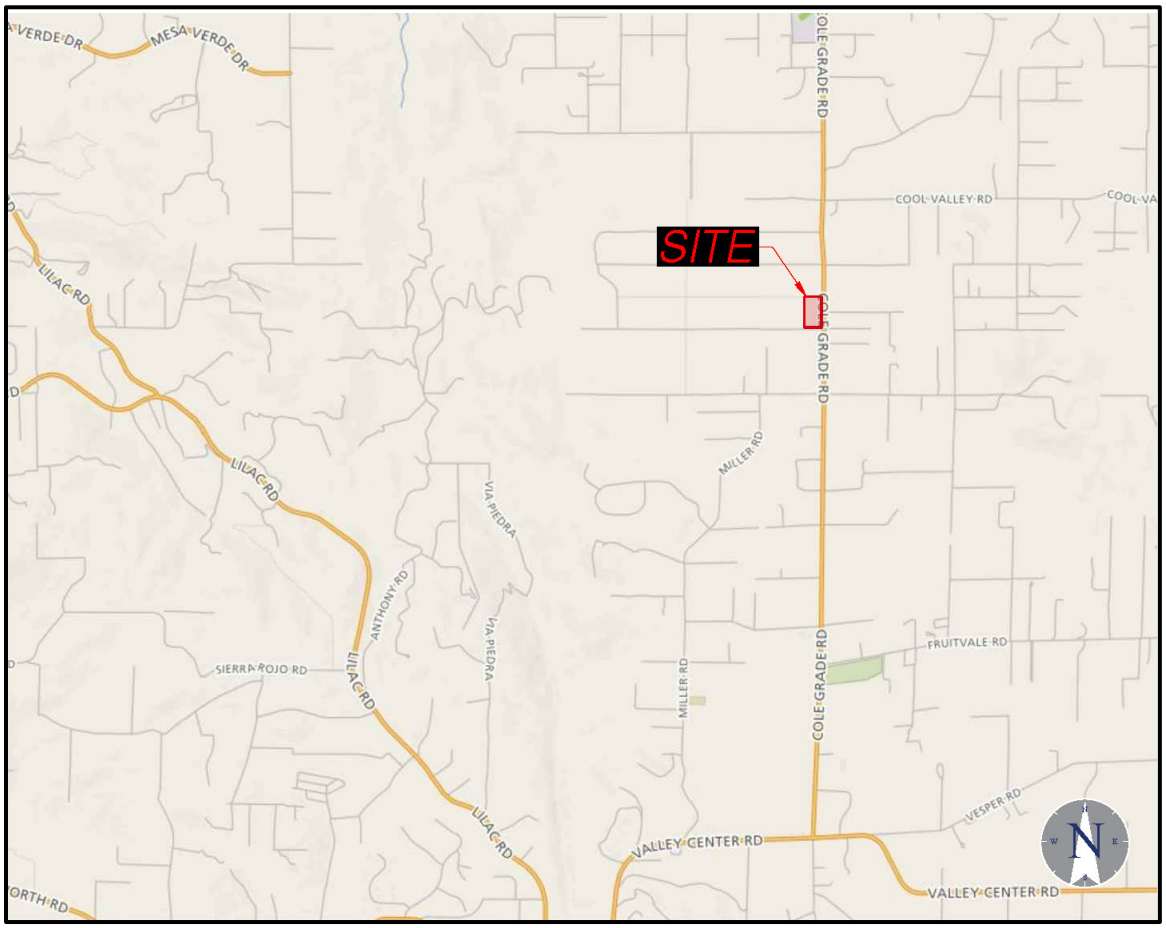

Figure 1-1. Vicinity Map

1.1.2 Related Reporting

Associated with this same authorization, NOVA has completed field testing and developed design-basis percolation rates for use in design of an on-site wastewater treatment system (OWTS). The findings of that work will be provided under separate cover.

1.2 Objectives, Scope, and Limitations of This Work

1.2.1 Objectives

The objectives of the work reported herein are twofold, as described below.

1. Objective 1, Geotechnical. Characterize the occurrence of subsurface soil and formational rock in a manner sufficient to provide recommendations for geotechnical-related site development.
2. Objective 2, Stormwater. Assess soil percolation rates in a manner sufficient to provide guidance for design of permanent stormwater infiltration Best Management Practices ('stormwater BMPs').

1.2.2 Scope

In order to accomplish the above objectives, NOVA undertook the task-based scope of work described below.

1. Task 1, Background Review. NOVA reviewed readily available background data regarding the site area, including geotechnical reports, topographic maps, geologic data, fault maps, and reports. Conceptual planning was reviewed. No architectural or structural information was available.

2. Task 2, Subsurface Exploration. A NOVA geologist directed a subsurface exploration comprised of the subtasks listed below.

    - *Subtask 2-1, Reconnaissance.* Prior to undertaking any exploratory work, NOVA conducted a site reconnaissance, including layout of borings and percolation test wells. Underground Service Alert and a private utility location contractor was notified for underground utility mark-out services.

    - *Subtask 2-2, Coordination*. A specialty subcontractor was retained to conduct engineering borings. NOVA coordinated with you regarding access for fieldwork.

    - *Subtask 2-3, Engineering Borings*. The geologist logged and sampled six (6) engineering borings.

    - *Subtask 2-4, Percolation Testing*. NOVA constructed and tested two (2) percolation wells at a proposed stormwater BMP. Percolation testing was performed in accordance with the San Diego County requirements.

    - *Subtask 2-5, Closure*. On completion, each boring and percolation test well was backfilled.

3. Task 3, Laboratory Testing. Laboratory testing was undertaken to address soil index characteristics. Chemical testing addresses the potential that soils may be corrosive to embedded concrete or metals.

4. Task 4, Engineering Evaluations. The findings of Tasks 1-3 were utilized to support evaluations directed toward recommendations for geotechnical-related development, including foundations, earthwork, pavements, and design for stormwater infiltration.

5. Task 5, Reporting. Submittal of this report completes NOVA's scope of work for this geotechnical investigation. The report provides a record of all work and geotechnical-related recommendations for foundations, earthwork, and stormwater.

1.2.3 Limitations

The recommendations for design and construction included in this report are not final. These recommendations are developed by NOVA using judgment and opinion and based on the information available at the time of the report. NOVA can finalize its recommendations only by observing actual subsurface conditions revealed during construction. NOVA cannot assume responsibility or liability for the report's recommendations if NOVA does not perform construction observation.

This report does not address any environmental assessment or investigation for the presence or absence of hazardous, toxic or regulated materials in the soil, groundwater, or surface water within or beyond the site.

1.3 Understood Use of This Report

Assessment of the subsurface in geological and geotechnical engineering is characterized by uncertainty. Opinions relating to environmental, geologic, and geotechnical conditions are based on limited data, such that actual conditions may vary from those encountered at the times and locations where the data are obtained, despite the use of due professional care.

The judgments provided in this report are based upon NOVA's understanding of the planned construction, its experience with similar work, and its judgments regarding subsurface conditions indicated by the methods of subsurface exploration described in the report.

Conditions exposed by construction may vary from those disclosed by the borings. NOVA should be retained for design review and for surveillance to observe subsurface conditions revealed during construction. NOVA cannot assume responsibility for the recommendations of this report if NOVA does not perform construction observation. Section 9 of this report addresses this consideration in more detail.

This report addresses geotechnical considerations only. The report does not provide any environmental assessment or investigation of the presence or absence of hazardous or toxic materials in the soil, soil gas, groundwater, or surface water within or beyond the site. Appendix A to this report provides important additional guidance regarding the use and limitations of this report. This information should be reviewed by all users of the report.

1.4 Report Organization

The remainder of this report is organized as abstracted below.

- Section 2 reviews available project information.
- Section 3 describes subsurface exploration.
- Section 4 describes the surface and subsurface conditions.
- Section 5 reviews geologic, soil, and siting-related hazards common to this area of San Diego, considering each for its potential to affect the planned fire station.
- Section 6 provides recommendations for earthwork and foundation design.
- Section 7 provides recommendations for design of stormwater infiltration BMPs.
- Section 8 provides recommendations for development of pavements.
- Section 9 addresses design review and geotechnical observation/testing during construction.
- Section 10 provides a list of the principal references utilized in the development of the report.

Figures and tables that directly support discussion in the text are embedded therein. Larger-scale plots of the subsurface exploration and subsurface profiles are provided as Plates immediately following the text of the report.

The report is supported by three appendices.

- Appendix A provides guidance regarding the use and limitations of this report.
- Appendix B presents logs of the engineering and percolation test borings.
- Appendix C provides records of laboratory testing.

2.0 PROJECT INFORMATION

2.1 Site Description

2.1.1 Location

VCFPD plans to construct a new fire station on the eastern half (4.75 acres) of an approximately 10-acre parcel with APN 133-220-38-00 (hereinafter, 'the site').

The site is located on the western side of Cole Grade Road, in Valley Center. The site is bounded on the north and the west by agricultural land, to the east by Cole Grade Road, and to the south by Cole Grade Lane. Figure 2-1 depicts the location and limits of the site on a recent aerial view.

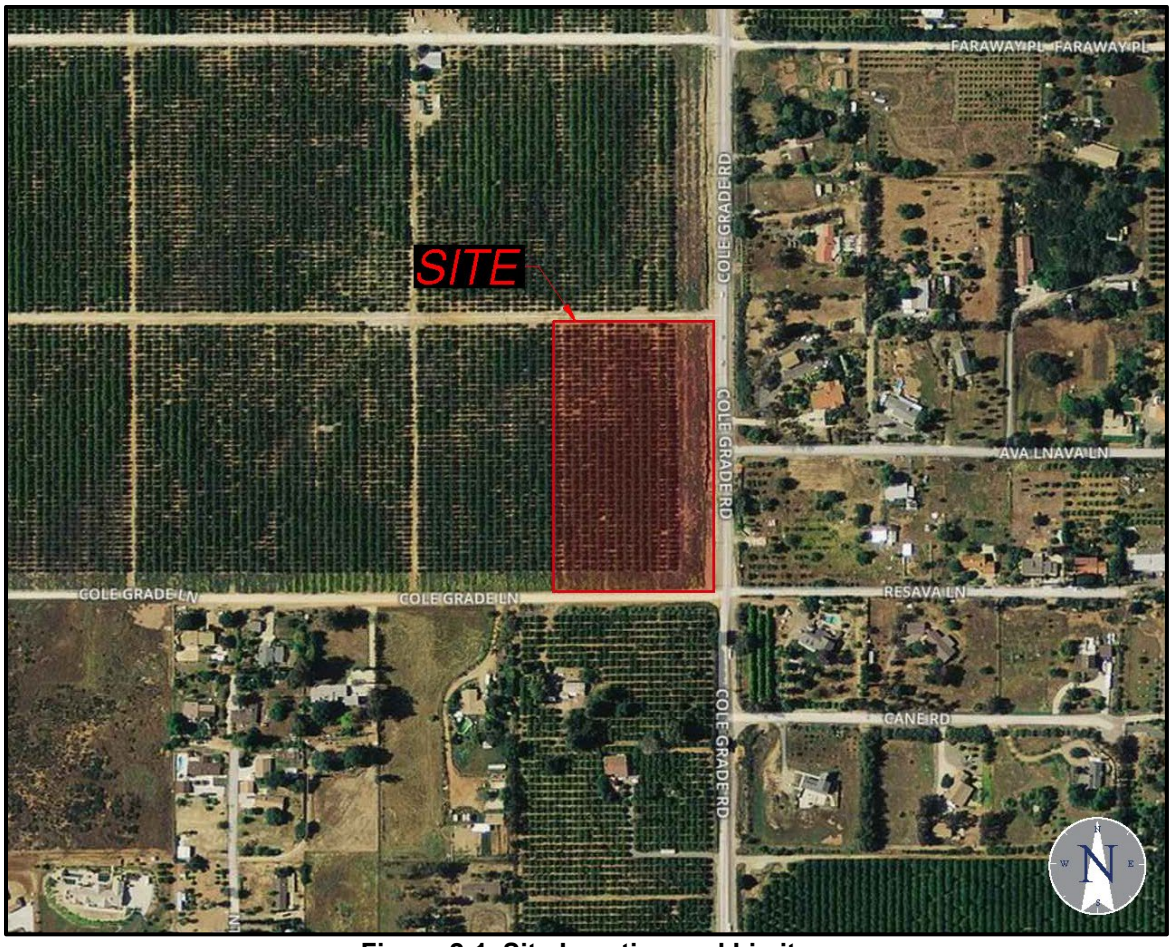

Figure 2-1. Site Location and Limits

2.1.2 Current Site Use

The approximately 330-foot x 670-foot site of the future firehouse and associated improvements is currently vacant, open land with a bare soil surface and scattered shrubs and grasses.

The site slopes gradually down to the northwest and northeast. On-site elevations range from +1,603 feet mean sea level (msl) at the southwest corner, to +1,550 feet msl at the northwest corner. This elevation differential occurs over a distance of about 670 feet, a surface gradient of about 8%.

2.1.3 Historic Site Use

Review of aerial photography, which started as early as 1939, indicates the site was unused until the 1960's, when an orchard was developed on the site. The subject site was cultivated as a citrus orchard until approximately 2016.

Figure 2-2 provides an aerial photograph depicting the site area in 1946. This photograph depicts the presence of a north-northwest trending drainage feature that was filled by the 1960's.

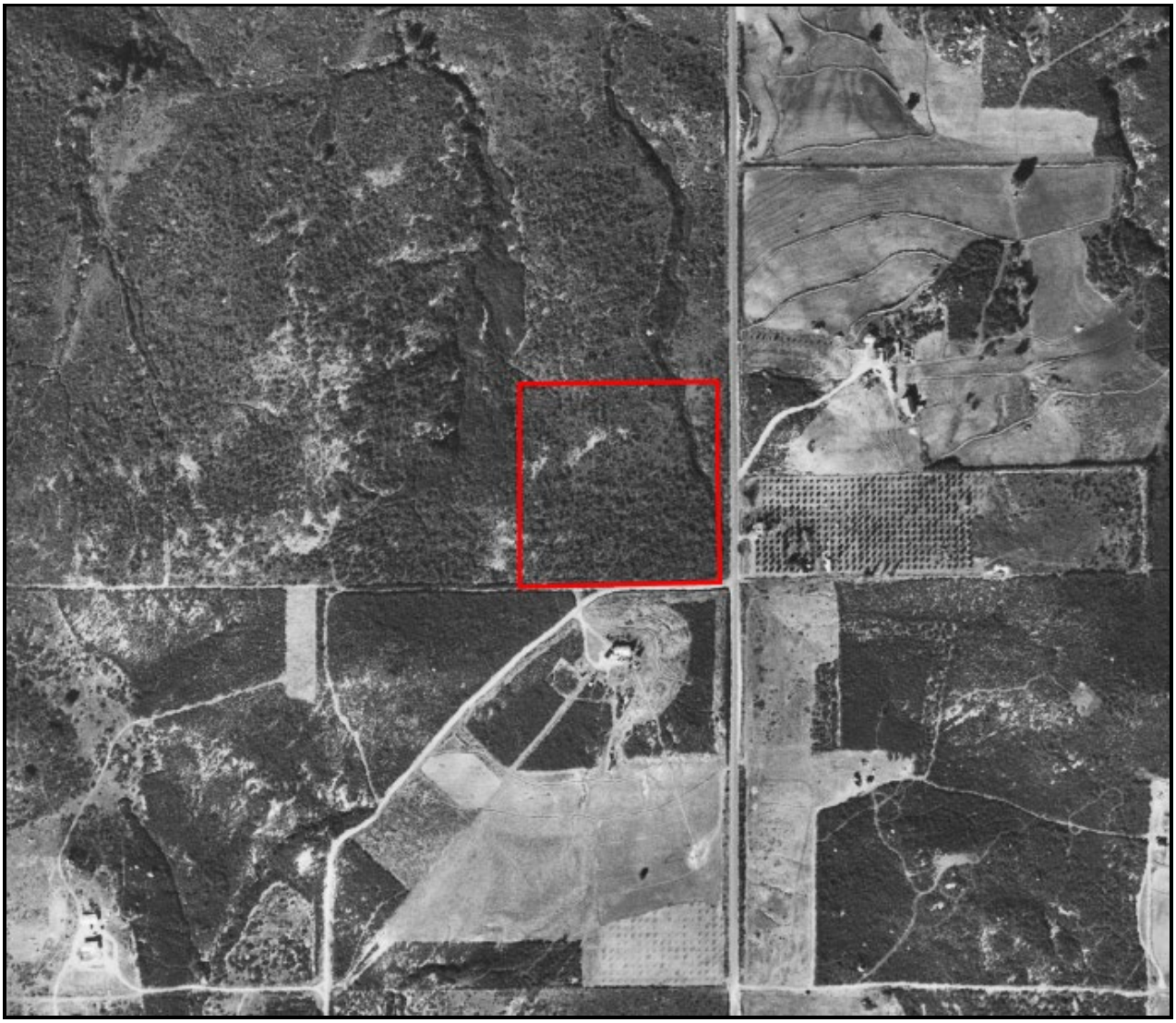

Figure 2-2. 1946 Aerial View of the 10-Acre Parcel

2.2 Planned Fire Station

2.2.1 General

Planning and design is still preliminary. NOVA's understanding of the current planning for Fire Station #3 is based upon review *VCFPD - Fire Station #3, Preliminary Site Plan* (Buccola Engineering, Inc., undated, hereinafter 'Buccola 2020'). Figure 2-3 reproduces Buccola 2020, depicting the layout of structures and infrastructure planned for the new fire station.

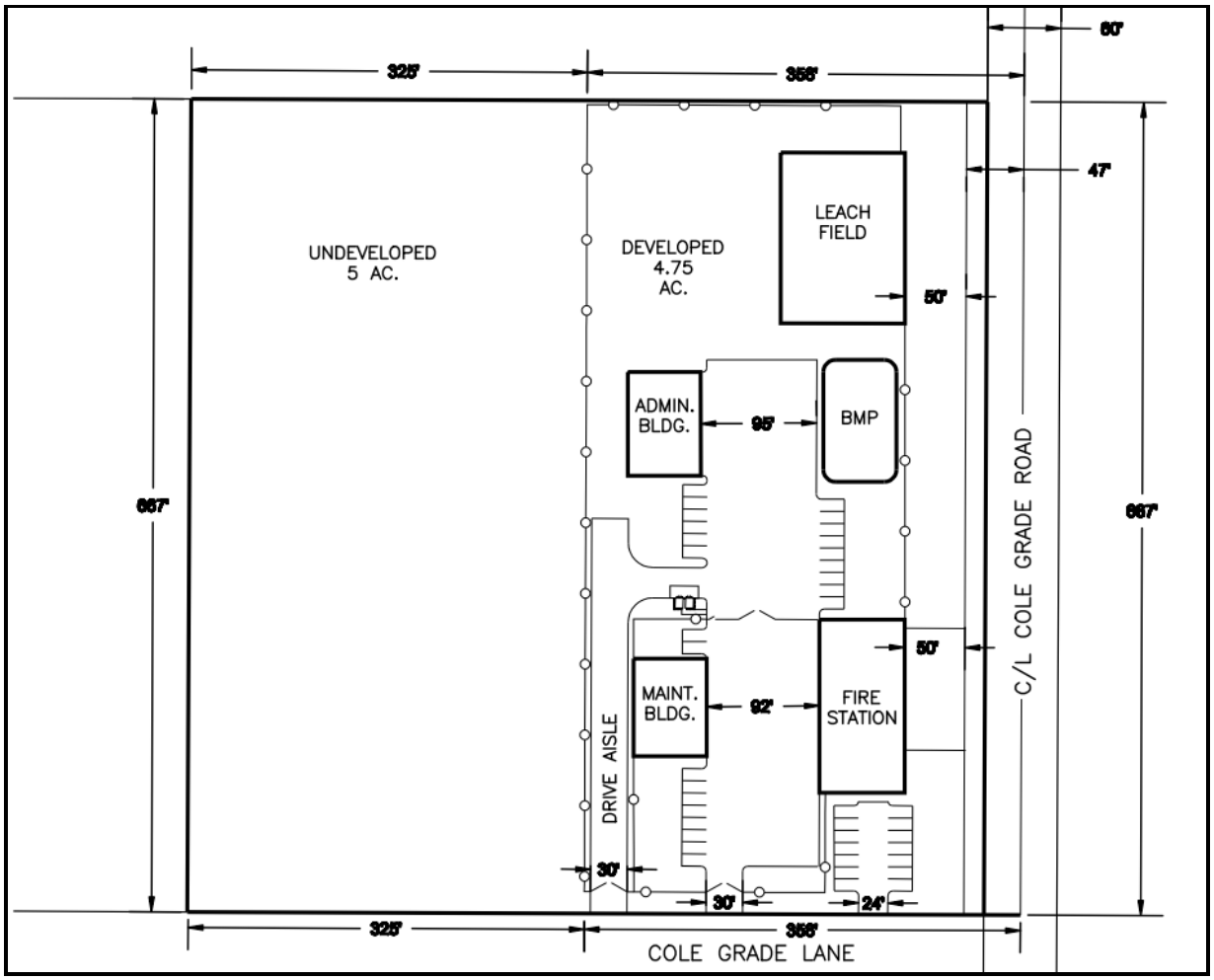

Figure 2-3. Preliminary Site Plan
(source: Buccola 2020)

As may be seen by review of Figure 2-3, the planned development will include three principal structures: a 10,000 square foot (SF) fire station, a 5,000 SF maintenance building, and a 5,000 SF administration building. These structures will be set around parking and driveway access. Stormwater management and an on-site waste treatment system (OWTS) will be developed on the northern portion of the 4.75-acre site.

2.2.2 Structures

The three structures planned for Fire Station #3 maybe one or two levels. No below-grade construction is planned.

The fire station will enclose 10,000 SF, the administration building and the maintenance building will each enclose about 5,000 SF. The planned structures will each include relatively light loads to foundations. However, the interior floor slab for both the fire station and the maintenance building will be required to support fire trucks. Some of the buildings may require retaining walls to adapt the structures to grades at the site.

2.2.3 Floors, Pavements, and Parking

Design of pavements outside the fire station and floors within the fire stations will be controlled by the need to support the fire trucks. Though the design basis vehicle is not known, NOVA expects that the typical vehicle could weigh up to 80,000 pounds and apply H-20 axle loads to floors and pavements. The typical firefighting vehicle will be about 33 feet long.

The garage area within the fire station and the maintenance building may each require an interior trench drain connected to an oil-water separator.

2.2.4 Potential for Earthwork

No below-grade construction is anticipated beyond that required for utilities. NOVA expects that design will adapt the new structure to existing site grades. Based upon review of the planning described in Buccola 2020, it is expected that significant earthwork operations will be required to achieve pad grades. The site will be developed with cuts and fills that may be up to 15 feet.

Based on conversations with our client, it is NOVA's understanding that cut slopes may be constructed in the southwest corner of the site surrounding the entrance drive.

2.2.5 Stormwater BMPs

Planning for permanent stormwater BMPs is indicated on Figure 2-3. Permanent stormwater BMPs will be located in a Drainage Management Area (DMA) encompassing about 6,000 SF, sited north of the fire station.

2.2.6 OWTS

Design for the OWTS is only conceptual at this point. As is noted in Section 1, recommendations for development an OWTS will be provided under separate cover.

2.2.7 Miscellaneous

It is expected that the new fire station will include a variety of miscellaneous structures, such as signage, equipment pads, traffic bollards, and a flag pole.

3.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

3.1 General

The subsurface exploration was completed on July 1-2, 2020. A NOVA geologist directed excavation, *in situ* testing, and sampling of a series of six (6) engineering borings across the site. Two (2) percolation tests were completed in the vicinity planned for the stormwater BMP.

Figure 3-1 depicts the locations of the separate elements of the subsurface exploration. Plate 1, provided immediately following the text of this report, depicts this information in larger scale. Appendix B presents the boring logs.

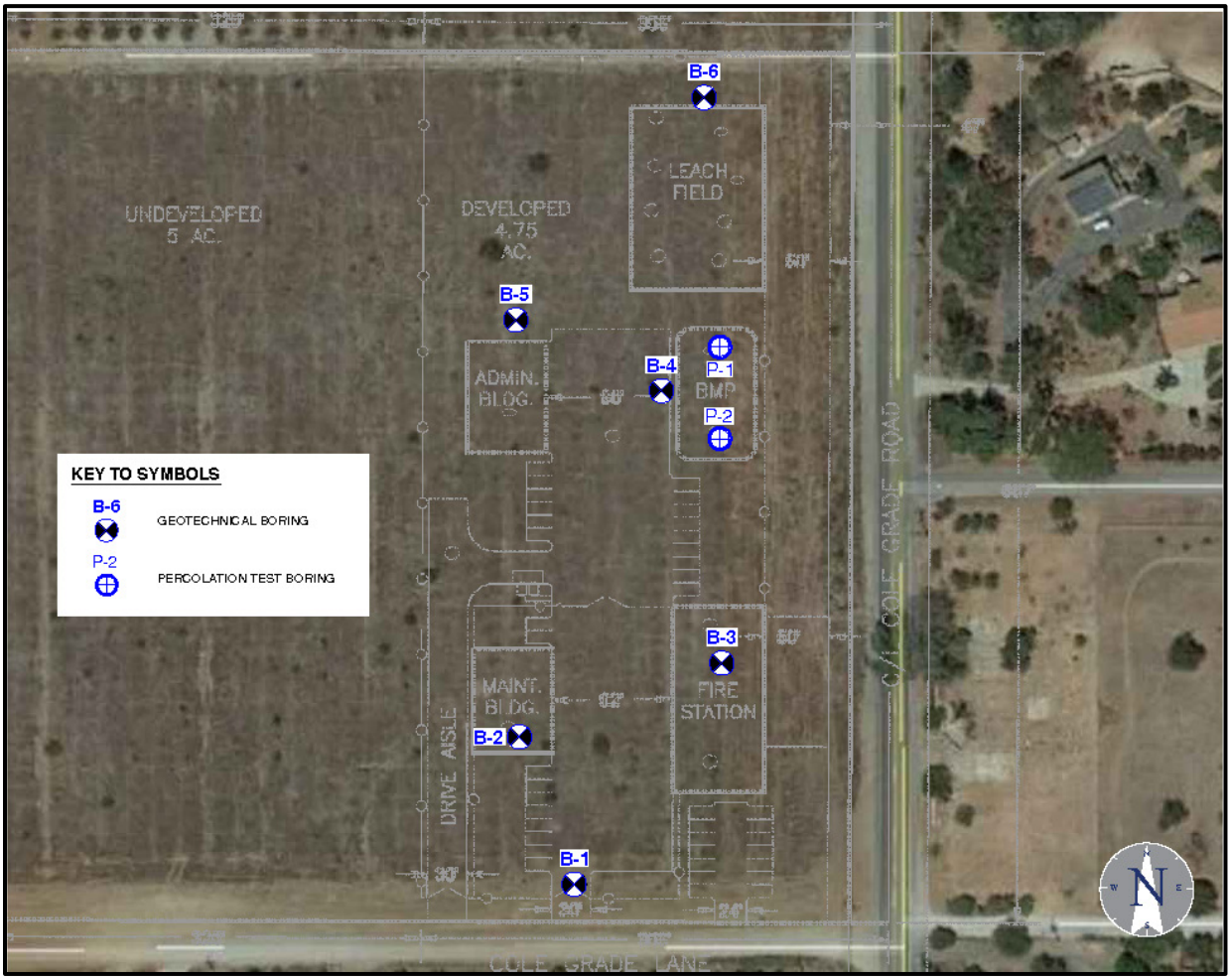

Figure 3-1. Locations of the Borings and Percolation Testing

3.2 Engineering Borings

3.2.1 Excavation

The geologist directed drilling and sampling of six (6) engineering borings ('B-1' through 'B 6') to depths between 10.5 feet and 16.5 feet below ground surface (bgs) on July 1, 2020. Samples recovered from the borings were delivered to NOVA's materials laboratory for review and analysis. The engineering borings were advanced by a truck-mounted drilling rig utilizing hollow-stem auger drilling techniques. Prior to beginning fieldwork, boring locations were determined by a geologist based on the proposed building configuration.

Table 3-1 provides an abstract of the engineering borings.

Table 3-1. Abstract of the Engineering Borings by NOVA

Boring Reference	Approx. Ground Surface Elev. (feet, msl)[1]	Total Depth Below Ground Surface (feet)	Elevation at Completion (feet, msl) [1]	Approx. Depth to Formation (feet) [2]	Approx. Depth to Groundwater (feet)
B-1	+1600.0	15.5	+1584.5	1.5	Not encountered
B-2	+1595.0	10.5	+1584.5	0.5	Not encountered
B-3	+1584.0	15.5	+1568.5	5.0	Not encountered
B-4	+1568.0	16.0	+1552.0	2.0	Not encountered
B-5	+1570.0	15.5	+1554.5	4.0	Not encountered
B-6	+1553.0	16.5	+1536.5	3.5	Not encountered

Notes: 1. Elevations are approximate and should be reviewed
2. The referenced geologic unit is Cretaceous-aged Cole Grade Tonalite (Kcg)

Figure 3-2 (following page) depicts drilling operations.

3.2.2 Logging and Sampling

The geologist directed sampling and maintained a log of the soils that were encountered. Both disturbed and relatively undisturbed samples were recovered from the borings. Samples were delivered to NOVA's materials laboratory for analysis. Sampling of and *in situ* testing are described below.

1. The Modified California sampler ('ring sampler', after ASTM D 3550) was driven using a 140-pound hammer falling for 30 inches with a total penetration of 18 inches, recording blow counts for each 6 inches of penetration.

2. The Standard Penetration Test sampler ('SPT', after ASTM D 1586) was driven in the same manner as the ring sampler, recording blow counts in the same fashion. SPT blow counts for the final 12 inches of penetration comprise the SPT 'N' value, an index of soil strength and compressibility.

3. Bulk samples representative of the subsurface materials encountered during the investigation were collected for testing.

Soil samples recovered from the engineering borings were transferred to NOVA's geotechnical laboratory where a geotechnical engineer reviewed the soil samples and the field logs.

Figure 3-2. Drilling Operations, B-2, July 1, 2020

3.2.3 Closure

On completion, the borings were backfilled with cuttings. The area was cleaned and left as close to the original condition as practical.

3.3 Percolation Testing

3.3.1 General

NOVA directed the advancement and construction of two (2) percolation test wells following the recommendations for percolation testing presented in the County of San Diego County BMP Design Manual, January 2019 edition, and the County of San Diego Department of Health Services guidelines. The percolation test locations are shown on Figure 3-1.

3.3.2 Drilling

The borings for the wells were each drilled with an 8-inch hollow-stem auger to depths of 5 feet below ground surface (bgs). Field measurements were taken to confirm that the borings were

excavated to approximately 8 inches in diameter. The borings were logged by a NOVA geologist, who observed and recorded exposed soil cuttings and the boring conditions.

3.3.3 Conversion to Percolation Well

Once the borings were drilled to the desired depths, the borings were converted to percolation test wells by placing an approximately 2-inch layer of ¾-inch gravel on the bottom, then extending 3-inch diameter schedule 40 perforated PVC pipe to the ground surface. The ¾-inch gravel was used to partially fill the annular space around the perforated pipe below the existing finish grade to minimize the potential of soil caving.

3.3.4 Percolation Testing

The percolation test wells were pre-soaked by filling the holes with water to the ground surface level and testing commenced within a 26-hour window.

On the day of testing, two 25-minute trials were conducted in each well. In the test wells the pre-soak water did not percolate at least 6 inches into the soil unit within 25 minutes.

Based on the results of the trials, water levels were recorded every 30 minutes for six hours. At the beginning of each test interval, the water level was raised to approximately the same level as the previous tests, in order to maintain a near-constant head during all test periods.

Table 3-2 abstracts the percolation test conditions and related percolation rates.

Table 3-2. Abstract of the Percolation Testing

Test Well Reference	Approx. Elevation (feet, msl) [1]	Total Depth (feet)	Approx. Percolation Test Elevation (feet, msl) [1]	Percolation Rate (min/in)[2]	Subsurface Unit Tested[3]	Infiltration Rate (in/hr)[2]	Infiltration Rate (in/hr, FS=2)[4]
P-1	+1563	5	+1560	10	Kcg	0.39	0.20
P-2	+1568	5	+1563	1.81	Kcg	3.37	1.69

Note 1: Elevations are approximate and should be reviewed.
Note 2: Percolation rate is not infiltration rate. Infiltration rates are discussed in detail in Section 7.
Note 3: The referenced geologic subsurface unit tested is Tonalite of Cole Grade (Kcg).
Note 4: 'FS' indicates 'Factor of Safety'. Discussed further in Section 7.

Figure 3-3 (following page) depicts percolation testing at well P-2.

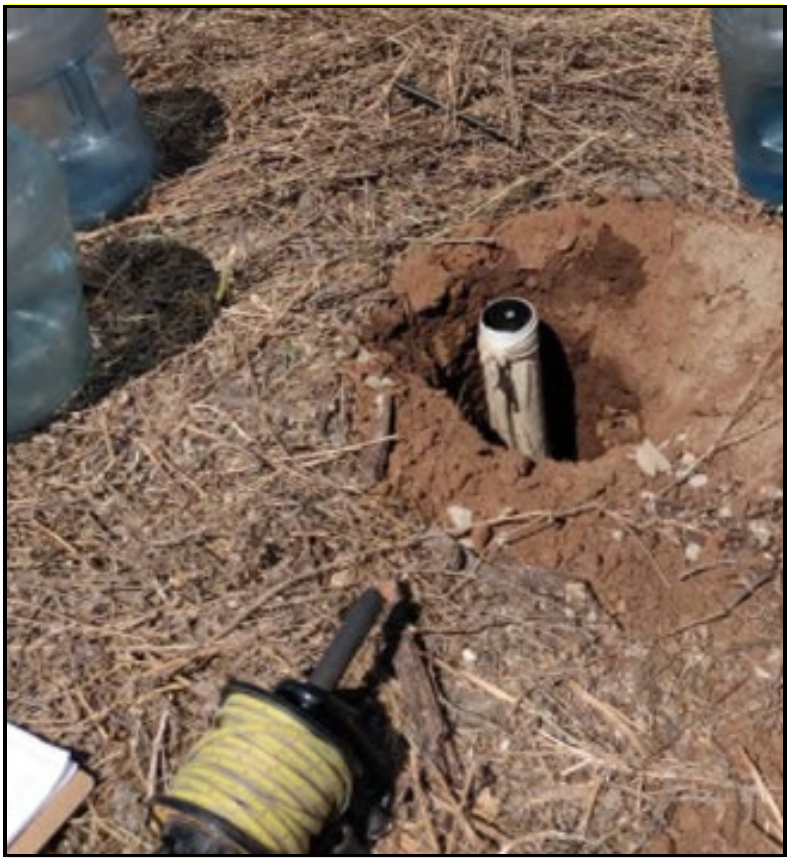

Figure 3-3. Percolation Testing at Well P-2, July 2, 2020

3.4 Laboratory Testing

3.4.1 General

Soil samples recovered from the engineering borings were transferred to NOVA's geotechnical laboratory where a geotechnical engineer reviewed the soil samples and the field logs. Representative soil samples were selected and tested in NOVA's materials laboratory to check visual classifications and to determine pertinent engineering properties. The laboratory program included visual classifications of all soil samples as well as index and expansivity testing in general accordance with ASTM standards.

Records of the geotechnical laboratory testing are provided in Appendix C.

3.4.2 R-Value

As used for this report, the purpose of this test is to determine the suitability of prospective subgrade soils for use in the pavement sections. Of particular concern in development of Fire Station #3 will be the high axle loads applied to pavements by the firefighting vehicles.

Developed and used by Caltrans for flexible pavement design, R-Value replaces the California Bearing Ratio (CBR) test. Samples used to determine R-value are prepared at a moisture and density condition representative of the expected *in situ* condition of a compacted subgrade (often, conditions of saturation and lower relative compaction).

The R-value is calculated from the ratio of the applied vertical pressure to the developed lateral pressure, essentially a measure of the material's resistance to plastic flow. Figure 3-4 depicts lateral flow in soil rutted by tires of a test soil section.

Figure 3-4. Tire Rutting of a Test Subgrade with Low R-Value

The R-value thus reflects the ability of a soil to resist lateral spreading due to an applied vertical load (such as the tire loads depicted above). A range of values are established from 0 to 100, where 0 is the resistance of water and 100 is the resistance of steel. Typical R-values based on NOVA's local experience are presented below.

Table 3-3. Typical R-Values for Soils in the San Diego Area

Soil Type	Typical R-Values
Plastic clays/silty clays	5 – 15
Clayey silts	12 - 25
Silty sands	15 - 55
Sands	50 - 75
Sandy gravels	> 60
Crushed rock	> 70

A sample representative of the subgrade soils in the planned paved areas was selected for R-Value testing after ASTM D2844, indicating R = 17, characteristic of R-values for sands with silt.

3.4.3 Compaction

A single composite sample of the sandy fraction of near-surface soil was tested to determine the moisture-density characteristics during compaction after ASTM D1557 (the 'modified Proctor'). Table 3-4 summarizes the results of this testing.

Table 3-4. Abstract of the Compaction Testing, ASTM D1557

Location	Depth (feet)	Soil Description	Maximum Dry Density (lb/ft^3)	Optimum Moisture Content (%)
B-2	0-4	Orange brown clayey sand	133.5	9.8

3.4.4 Expansion Potential and Plasticity

The field visual classification of the soils by the geologist and reviewed in the laboratory by the geotechnical engineer indicates that the near-surface soils are characteristically sandy with varying amounts of silt. As such, these soils would be expected to be of low plasticity and low expansion potential.

The foregoing judgments were checked by testing of a single representative sample of the near-surface alluvium after ASTM D4829 to determine Expansion Index. This testing showed the soil to have 'Low' expansion potential (EI = 40) after ASTM D4829.

3.4.5 In-Place Soil Density

The dry unit weight and moisture content of representative, relatively undisturbed samples were determined as a basis for comparison with the optimum density and moisture. Table 3-5 depicts these results.

Table 3-5. Moisture Content and Dry Unit Weight, ASTM D2937

Boring	Depth (feet)	Soil Description	Moisture Content	Dry Unit Weight (pcf)
B-2	2.5	Orange-brown clayey sand	12.2	124.4
B-3	6	Orange-brown silty sand	10.6	119.3

3.4.6 Gradation

Table 3-5 summarizes the results of gradation testing of soils recovered from the borings.

Table 3-6. Abstract of the Soil Gradation Testing, ASTM D6913

Location	Depth (feet)	Percent Finer Than the U.S. No. 200 Sieve (0.074 mm)	Soil Classification
B-1	1	30	SM
B-2	1	33	SC
B-2	6	21	SM
B-4	2.5	35	SM
B-4	5	27	SM
B-4	8	23	SM
B-6	2	59	CL
B-6	3.5	27	SM
B-6	5.5	9	SP-SM

3.4.7 Corrosion Potential

Resistivity, sulfate content, and chloride contents were determined to estimate the potential of on-site soils to be corrosive to unprotected, embedded metals or to attack embedded concrete. The testing indicated a slightly basic pH and low levels of soluble sulfates and chlorides. Section 6 discusses the indications of the chemical testing.

4.0 SITE CONDITIONS

4.1 Geologic Setting

4.1.1 Regional

The project area is located in the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990). The province varies in width from approximately 30 to 100 miles. In general, the province consists of rugged mountains underlain mostly by Jurassic metavolcanic and metasedimentary rocks, intruded by Cretaceous igneous rocks of the southern California batholith.

The site is in the Foothills Physiographic Province of San Diego County. Geologic units include granitic rocks such as gabbro, granodiorite, and tonalite; and hard metasedimentary and metavolcanics rock. Alluvial soils in this area are generally derived of the granitic rocks, and can occur in basins, drainages, and alluvial fans.

4.1.2 Site Specific

The site is generally underlain by a layer of alluvium overlying Cretaceous-age Tonalite of Cole Grade (Kcg), a granitic-type bedrock.

In its unweathered state, tonalite provides excellent, high-capacity foundation support. However, unweathered tonalite may have the strength of low-grade concrete and present excavation difficulties. The upper portion of the tonalite at this site is variably weathered (sometimes called ‘decomposed’). Weathered tonalite will still provide excellent foundation conditions and often can be favorable for infiltration and percolation.

Figure 4-1 (following page) reproduces geologic mapping of the site area.

There are no known, mapped active faults underlying the site. The nearest mapped fault zone is the Elsinore Fault Zone, with the nearest active fault located in the Temecula Section, about 5.5 miles north of the site.

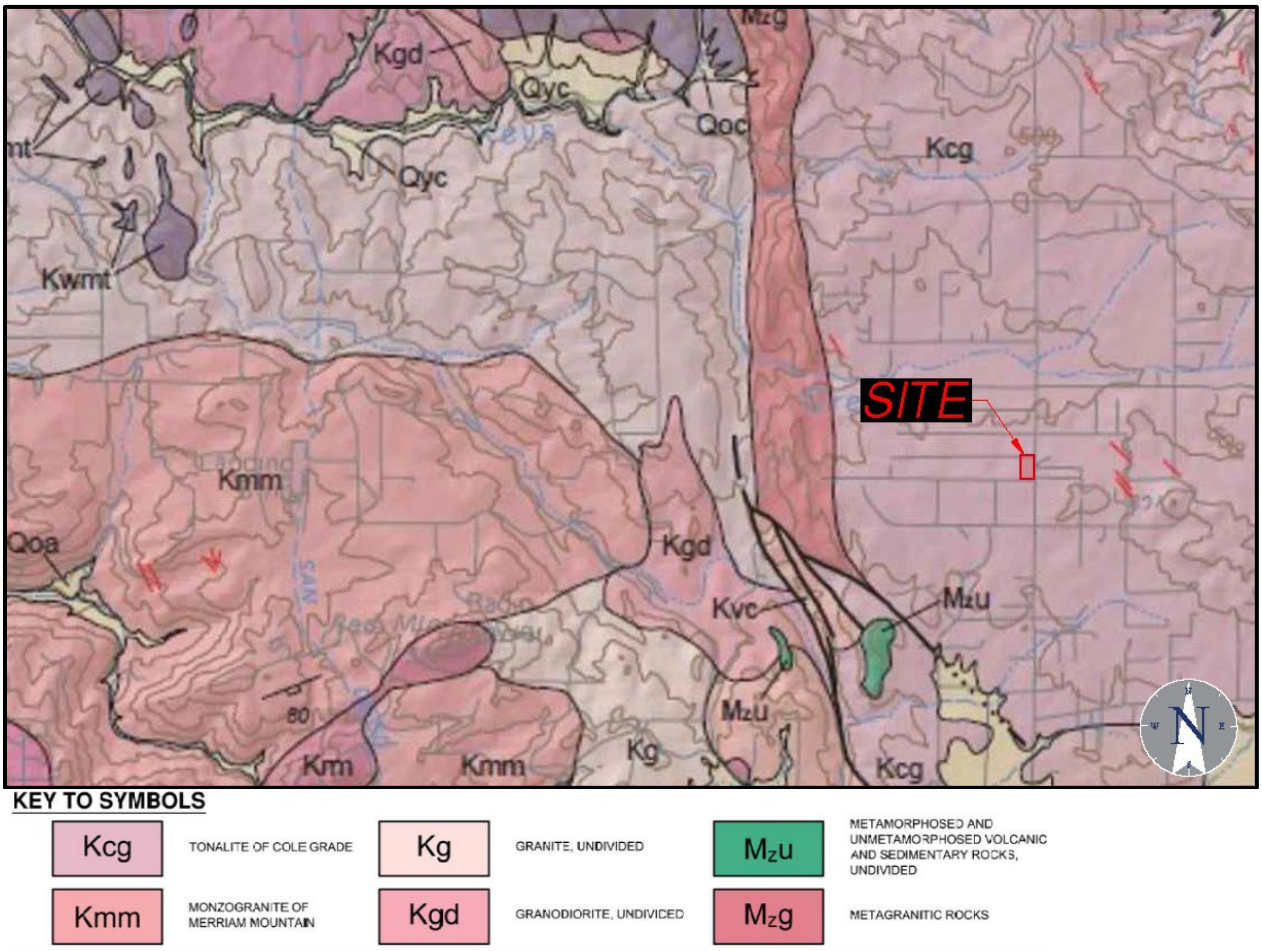

Figure 4-1. Geologic Mapping of the Site Vicinity

4.2 Surface, Subsurface, and Groundwater

4.2.1 Surface

The site is characterized by gently rolling topography. Surface drainage is generally from south to north. The site slopes gradually down to the northwest and northeast. On-site elevations range from +1,603 feet mean sea level (msl) at the southwest corner, to +1,550 feet msl at the northwest corner. This elevation differential occurs over a distance of about 670 feet, a surface gradient of about 8%.

Cole Grade Road, which borders the site to the east, is elevated almost 10 feet relative to the site levels in the northeast corner of the site, but is 2 feet lower than the site in the southeast corner.

Figure 4-2 (following page) depicts surface conditions at the site. As may be seen by review of this figure, the site is covered by a dense cover of native grasses, weeds, and brush.

(a) Looking south along east boundary

(b) Looking south from north property line

Figure 4-2. Surface Conditions

4.2.2 Subsurface

The sequence of soils and rock encountered by the borings may be generalized to occur as described below.

1. Unit 1, Alluvium (Qal). The site is covered by a veneer of alluvium. As encountered in the explorations, this material ranges from 0 to 5 feet in thickness but maybe thicker in other areas of the site. The alluvial soils encountered is comprised of medium dense clayey sand, but is subject to wide variation in quality and consistency. Figure 4-3 depicts the soil from this unit.

Figure 4-3. Unit 1 Alluvium

2. Unit 2, Weathered Tonalite of Cole Grade (Kcg). Beneath the alluviual soils, the site is underlain by granitics of this Cretaceous-aged unit. The upper several feet are characteristically weathered and decomposed to a medium to coarse, orange to gray sand with silt. A one-foot clay layer of weathered tonalite was encountered within boring

B-6. As characterized by Standard Penetration Test blowcounts ('N', after ASTM D 1586), the weathered tonalite is of dense to very dense consistency, with N > 50. Rock floaters may be encountered during earthwork operations.

Figure 4-4 and Figure 4-5 depict variations in the degree of weathering of this unit.

Figure 4-4. Unit 2 Weathered Tonalite

Figure 4-5. Unit 2 Weathered Tonalite

4.2.3 Groundwater

No groundwater was encountered in the borings. Information provided on the Water Well Drillers Report for a groundwater well installed in 1986 at a property located approximately 2,000 feet west of Cole Grade Road on Cole Grade Lane (approximately 1,300 feet west of the site) indicates groundwater first occurs in fractured bedrock at a depth of approximately 30 feet below ground surface (bgs).

Infiltrating storm water from prolonged wet periods can 'perch' atop localized zones of lower permeability soil that exist above the static groundwater level. Localized perched groundwater conditions may also develop post-construction, once landscape irrigation commences.

No perched groundwater was observed in the work by NOVA.

4.2.4 Surface Water

No surface water was evident within the limits of the planned fire station at the time of NOVA's subsurface exploration. NOVA did not observe any visual evidence of seeps, springs, erosion, staining, discoloration, etc. that would indicate recent problems with surface water.

The closest surface water is Keys Creek, located approximately a half-mile north of the site.

4.3 Subsurface Profile

As is tabulated in Section 3 and discussed previously in this section, beneath a veneer of alluvium, the site is underlain by weathered granitics. Figure 4-6 and Figure 4-7 provide two south to north subsurface profiles beneath the planned structures. Locations of cross-section

lines are located on Plate 1 following the text of the report, and cross-section figures are provides in larger scale as Plate 2.

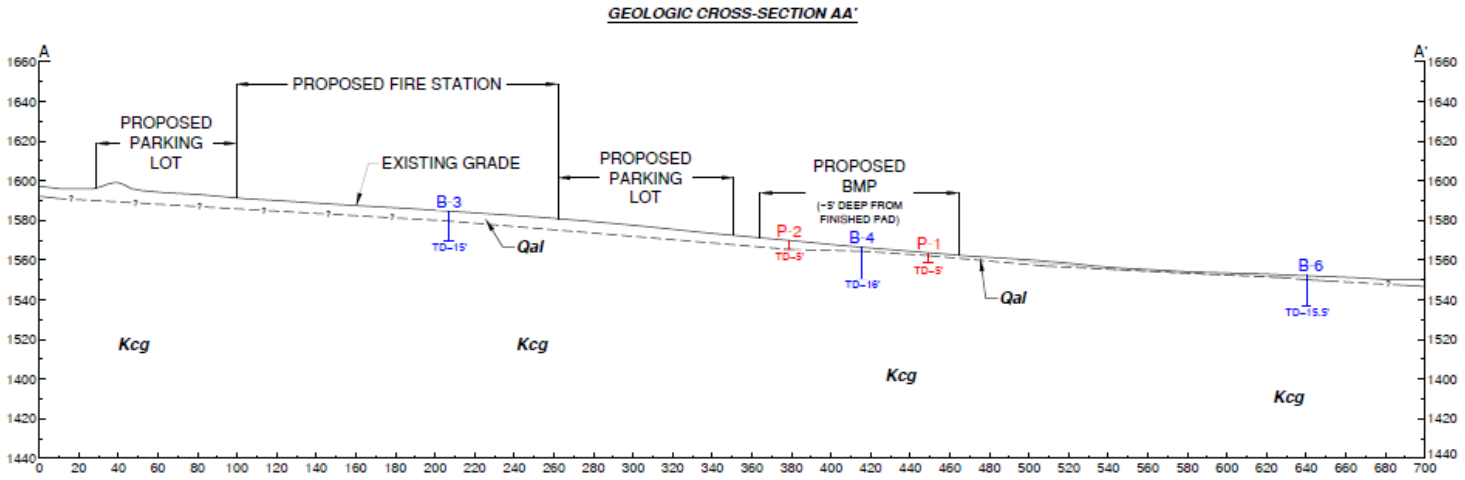

Figure 4-6. South to North Profile Beneath the Planned Fire Station
(Qal indicates alluvium; Kcg indicates granitic tonalite)

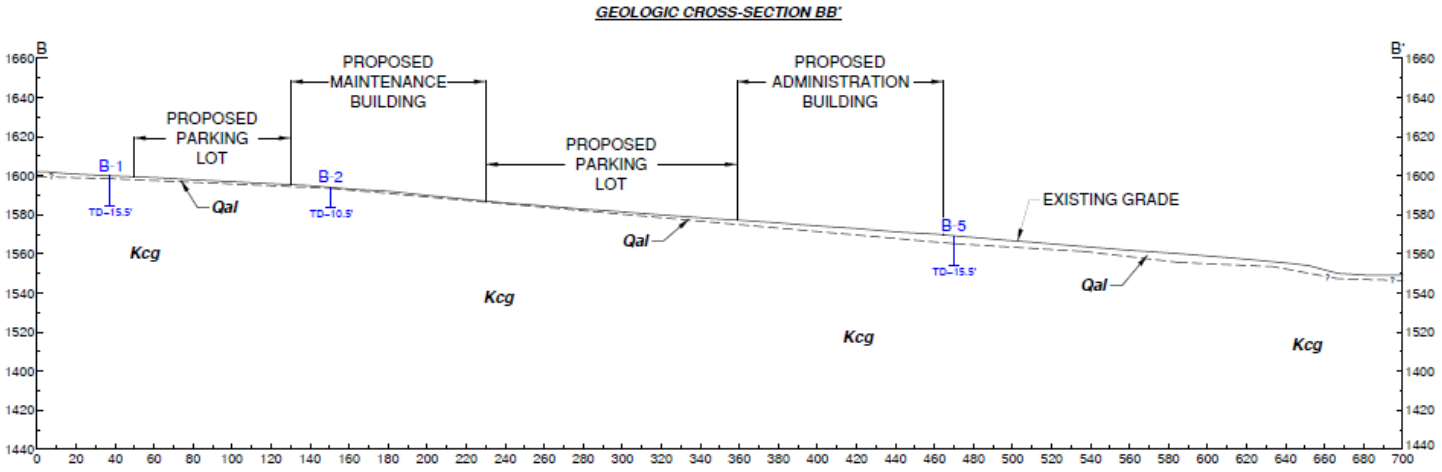

Figure 4-7. South to North Profile Beneath the Planned Maintenance and Admin Buildings
(Qal indicates alluvium; Kcg indicates granitic tonalite)

As is discussed in Section 2, site design is not complete. However, based upon review of Figure 4-6 and Figure 4-7 it is likely that the structures will largely be founded in the Unit 2 tonalite. Some low retaining walls may be employed to adapt development to the site.

5.0 REVIEW OF GEOLOGIC, SOIL, AND SITING HAZARDS

5.1 Overview

This section provides a review of geologic, soil, and siting-related hazards common to this region of California, considering each for its potential to affect the planned development. The primary hazard identified by this review is the risk for moderate-to-severe ground shaking in response to a large-magnitude earthquake during the lifetime of the planned development, a circumstance is common to all civil works in this area of California.

While strong ground motion could affect the site there is no risk of liquefaction or related seismic phenomena.

The following subsections describe NOVA's review of soil and geologic hazards.

5.2 Geologic Hazards

5.2.1 Strong Ground Motion

The seismicity of the site was evaluated utilizing a web-based analytical tool provided by The American Society of Civil Engineers (ASCE). This evaluation shows the site may be subjected to a Magnitude 7.7 seismic event, with a corresponding risk-based Peak Ground Acceleration (PGA_M) of PGA_M ~ 0.63 g.

5.2.2 Fault Rupture

No evidence of faulting was observed during NOVA's geologic reconnaissance of the site. The site does not lie within a state-designated active Earthquake Fault Zone (Alquist-Priolo Zone).

The nearest mapped major fault zone is the Elsinore fault zone, with the closest active fault (Holocene- active) located about 5.5 miles north within the Temecula Section, and nearest potentially active faults (late Quaternary) of the Julian Section located 5.0 miles northeast from the site. Figure 5-1 (following page) reproduces published mapping of active faulting in the site vicinity.

Because of the lack of known active faults on the site, the potential for surface rupture at the site is considered low. Shallow ground rupture due to shaking from distant seismic events is not considered a significant hazard, although it is a possibility at any site.

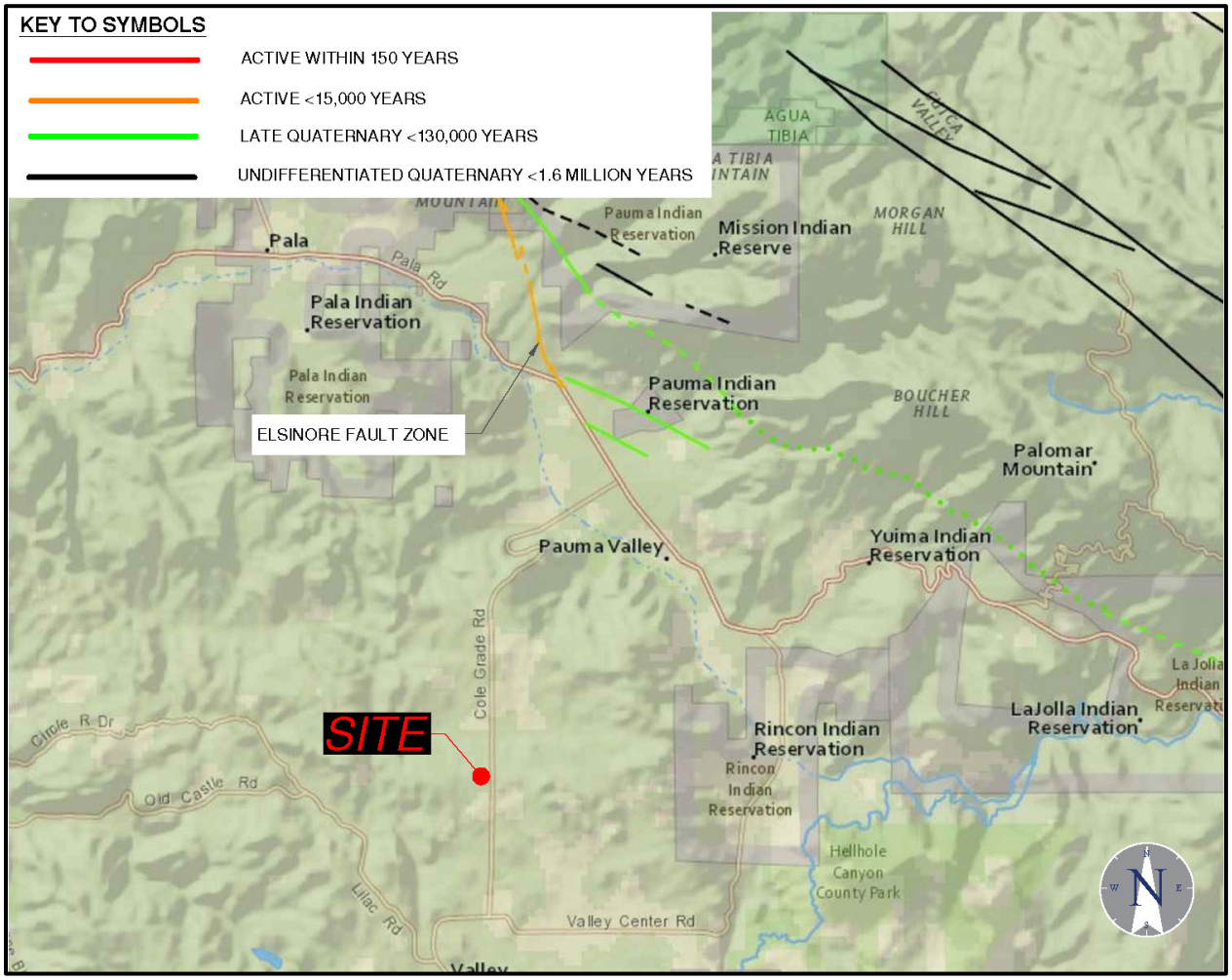

Figure 5-1. Active Faulting in the Site Vicinity

5.2.3 Landslide

As used herein, 'landslide' describes downslope displacement of a mass of rock, soil, and/or debris by sliding, flowing, or falling. Such mass earth movements are greater than about 10 feet thick and larger than 300 feet across. Landslides typically include cohesive block glides and disrupted slumps that are formed by translation or rotation of the slope materials along one or more slip/failure surfaces. These mass displacements can also include more narrowly confined modes of mass wasting such as rock topples, 'mud flows' and 'debris flows'.

The causes of classic landslides start with a preexisting condition - characteristically, a plane of weak soil or rock - inherent within the rock or soil mass. Thereafter, movement may be precipitated by earthquakes, wet weather, and changes to the structure or loading conditions on a slope (e.g., by erosion, cutting, filling, release of water from broken pipes, etc.).

Associated with this assessment, NOVA completed a review of published information regarding historical landslides and the risk of landsliding in the site vicinity. That review indicates no mapped historic landslides in the immediate site area.

In consideration of the gently sloping topography at and around the site, review of published information, and geologic reconnaissance of the site area, NOVA considers the landslide hazard at the site to be 'negligible' for the site and the area immediately surrounding it.

5.3 Soil Hazards

5.3.1 Embankment Stability

As used herein, 'embankment stability' is intended to mean the safety of localized natural or man-made embankments against failure. Unlike landslides described above, embankment stability can include smaller scale slope failures such as erosion-related washouts and more subtle, less evident processes such as soil creep.

At the time of this report, grading plans are not available. It is NOVA's understanding that there may be cut slopes designed as part of the future construction. The dense to very dense nature of the tonalite bedrock is expected to provide sound cut slopes. Any loose alluvium in the cut slope should be removed and replaced with engineered fill, per recommendations in Section 6. Embankment stability is not considered a hazard to development.

5.3.2 Seismic

Liquefaction

'Liquefaction' refers to the loss of soil strength during a seismic event. The phenomenon is observed in areas that include geologically 'younger' soils (i.e., soils of Holocene age), shallow water table (less than about 60 feet depth), and cohesionless (i.e., sandy and silty) soils of looser consistency. The seismic ground motions increase soil water pressures, decreasing grain-to-grain contact among the soil particles, which causes the soils to lose strength.

The subsurface exploration did not encounter saturated soils. The Unit 2 tonalite is known to extend to great depth at this site. This Cretaceous-aged rock is not at risk for liquefaction (or related 'lateral spreading).

Seismically Induced Settlement

Apart from liquefaction, a strong seismic event can induce settlement within loose to moderately dense, unsaturated granular soils. Unit 2 tonalite is sufficiently dense that seismic settlement will not occur. Unit 1 alluvium will be improved by remedial grading to be a soil of very dense consistency.

5.3.3 Expansive Soil

Expansive soils are characterized by their ability to undergo significant volume changes (shrinking or swelling) due to variations in moisture content, the magnitude of which is related to both clay content and plasticity index. These volume changes can be damaging to structures. Nationally, the annual value of real estate damage caused by expansive soils is exceeded only by that caused by termites.

As is discussed in Section 3, the soils have been characterized by testing to determine Expansion Index ('EI' after ASTM D 4829). Originally developed in Orange County in the 1960s, EI is a basic soil index property, comparable to indices such as the Atterberg limits of soils.

EI is adopted by the 2019 California Building Code ('CBC', Section 1803.5.3) for characterization of expansive soils. Testing of the Unit 1 alluvium, as well as visual inspection of samples recovered by NOVA, indicates that this soil has 'Low' expansion potential.

5.3.4 Hydro-Collapsible Soils

Hydro-collapsible soils are common in the arid climates of the western United States in specific depositional environments - principally, in areas of young alluvial fans, debris flow sediments, and loess (wind-blown sediment) deposits. These soils are characterized by low *in situ* density, low moisture contents, and relatively high unwetted strength.

The Unit 1 alluvium will be improved by remedial grading and will not be collapsible. The consistency, geomorphogeny, and geologic age of the Unit 2 tonalite is such that these soils are at risk for hydro-collapse.

5.3.5 Alluvial Soils

Alluviual soils should be considered at risk for wide variations in quality and consistency. This unit in its natural state has the potential to affect structures and infrastructure, unless mitigated per recommendations in Section 6.

5.3.6 Corrosivity

Chemical testing of the near-surface soils indicates the soils contain low concentrations of soluble sulfates and chlorides, but may be considered 'severely corrosive" to buried metal based on resistivity testing. Section 6 addresses this consideration in more detail.

5.4 Siting Hazards

5.4.1 Effect on Adjacent Properties

The proposed project will not affect the structural integrity of adjacent properties or existing public improvements and street right-of-ways located adjacent to the site if the recommendations of this report are incorporated into project design.

5.4.2 Inundation

Flood
The site is located within an area designated by FEMA as "Zone X," an area of minimal flood hazard Figure 5-2 (following page) reproduces flood mapping by FEMA of the site area.

Surface Water Structures
The site is not located near any surface water bodies (e.g., lakes, reservoirs, canals, etc.) whose failure would have the potential to inundate the site.

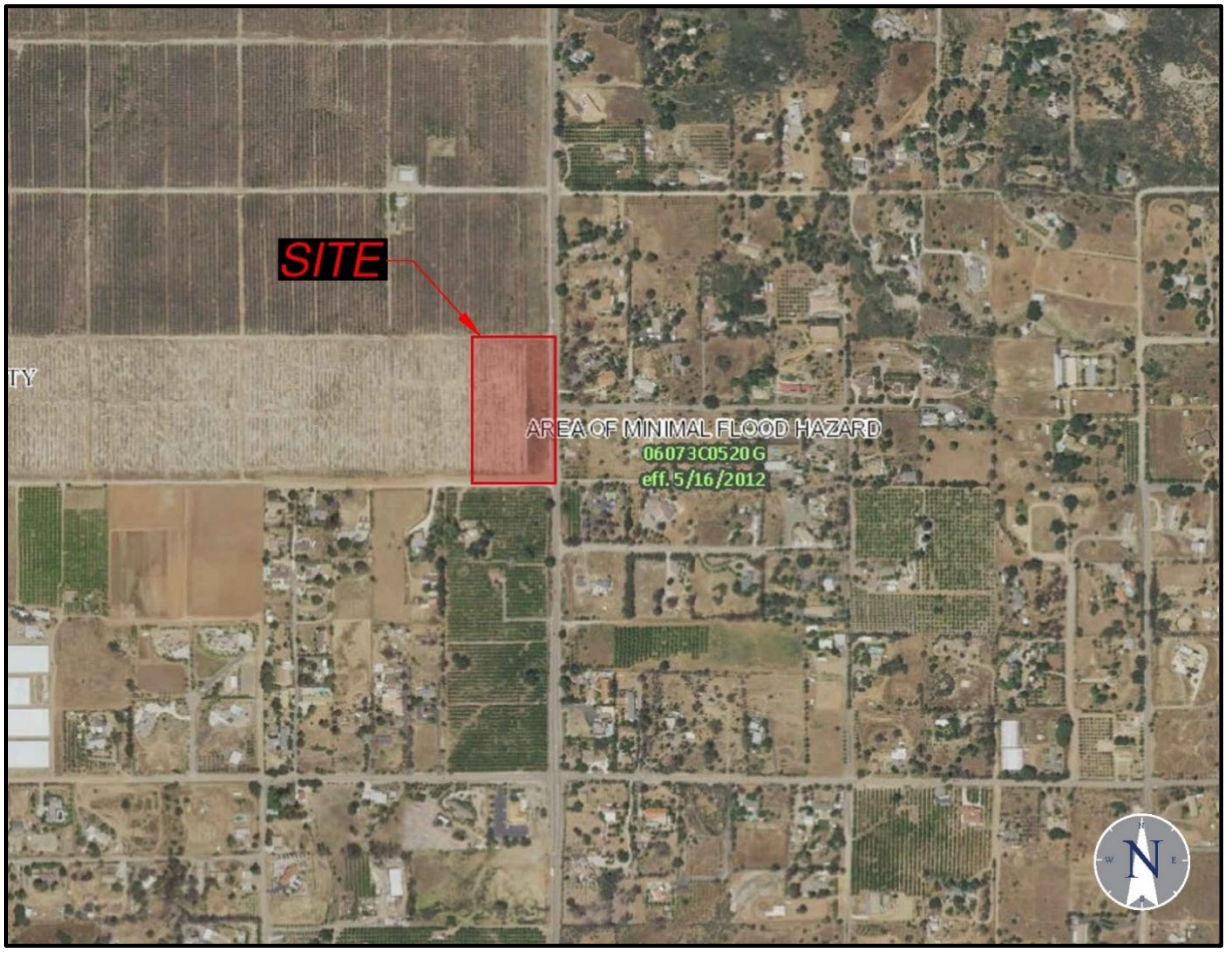

Figure 5-2. Flood Mapping of the Site Area
(source: FEMA 2019, found at https://msc.fema.gov/portal/)

Tsunami and Seiche

Tsunami describes a series of fast-moving, long-period ocean waves caused by earthquakes or volcanic eruptions. The distance of the site from the ocean precludes this threat.

Seiches are standing waves that develop in an enclosed or partially enclosed body of water such as lakes or reservoirs. Harbors or inlets can also develop seiches. The site is not located near a body of water that could generate a seiche.

6.0 EARTHWORK AND FOUNDATIONS

6.1 Overview

6.1.1 Review of Site Hazards

Section 5 provides review of geologic, soil, and siting-related hazards that may affect the planned development. The primary hazard identified by that review is that the site is at risk for moderate-to-severe ground shaking in response to large-magnitude earthquakes during the lifetime of the planned development. This circumstance is common to all civil works in this area of California.

While strong ground motion could affect the site, there is no risk of liquefaction or related seismic phenomena. Section 6.2 provides seismic design parameters.

6.1.2 Site Suitability

The site is suitable for development of the planned structures on shallow foundations provided the geotechnical recommendations described herein are followed. Founded as such, the project will not affect the structural integrity of adjacent properties or existing public improvements and street right-of-ways located adjacent to the site.

6.1.3 Review and Surveillance

The subsections following provide geotechnical recommendations for the planned development as it is now understood. It is intended that these recommendations provide sufficient geotechnical information to develop the project in general accordance with 2019 California Building Code (CBC) requirements.

NOVA should be given the opportunity to review the grading plan, foundation plan, and geotechnical-related specifications as they become available to confirm that the recommendations presented in this report have been incorporated into the plans prepared for the project.

All earthwork related to site and foundation preparation should be completed under the observation of NOVA.

6.2 Seismic Design Parameters

6.2.1 Site Class

The Site Class was determined using site-specific boring data and geologic knowledge. Based on this information, the site is classified as Site Class C per ASCE 7-16, Table 20.3-1. The planned fire station is considered Risk Category IV.

6.2.2 Seismic Design Parameters

Table 6-1 provides seismic design parameters for the site in accordance with 2019 CBC and mapped spectral acceleration parameters.

Table 6-1. Seismic Design Parameters, ASCE 7-16

Parameter	Value
Site Soil Class	C
Site Latitude (decimal degrees)	33.260506
Site Longitude (decimal degrees)	-117.024095
Site Coefficient, F_a	1.2
Site Coefficient, F_v	1.5
Mapped Short Period Spectral Acceleration, S_S	1.19
Mapped One-Second Period Spectral Acceleration, S_1	0.429
Short Period Spectral Acceleration Adjusted For Site Class, S_{MS}	1.428
One-Second Period Spectral Acceleration Adjusted For Site Class, S_{M1}	0.643
Design Short Period Spectral Acceleration, S_{DS}	0.952
Design One-Second Period Spectral Acceleration, S_{D1}	0.429

Source: *SEAOC and OSHPD Seismic Design Maps* www.seismicmaps.org

6.3 Corrosivity and Sulfates

6.3.1 General

Electrical resistivity, chloride content, and pH level are all indicators of the soil's tendency to corrode ferrous metals. Levels of water-soluble sulfates are correlated with the potential for sulfate attack to embedded concrete. Chemical testing for these parameters was performed on a representative sample of the near-surface soils. These results are tabulated in Table 6-2.

Table 6-2. Summary of Corrosivity Testing of the Near Surface Soil

Sample Ref		pH	Resistivity (Ω-cm)	Sulfates		Chlorides	
Boring	Depth (feet)			ppm	%	ppm	%
B-2	0-4	7.8	1200	66	0.007	230	0.023

6.3.2 Metals

Caltrans considers a soil to be corrosive if one or more of the following conditions exist for representative soil and/or water samples taken at the site:

- chloride concentration is 500 parts per million (ppm) or greater,
- sulfate concentration is 2,000 ppm (0.2%) or greater, or
- the pH is 5.5 or less.

Based on the Caltrans criteria, the on-site soils would not be considered 'corrosive' to buried metals.

In addition to the above parameters, the risk of soil corrosivity buried metals may considered by determination of electrical resistivity (ρ). Soil resistivity may be used to express the corrosivity of soil only in unsaturated soils. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of DC electrical current from the metal into the soil. As the resistivity of the soil decreases, the corrosivity generally increases. A common qualitative correlation (cited in Romanoff 1989, NACE 2007) between soil resistivity and corrosivity to ferrous metals is tabulated below.

Table 6-3. Soil Resistivity and Corrosion Potential

Minimum Soil Resistivity (Ω-cm)	**Qualitative Corrosion Potential**
0 to 2,000	Severe
2,000 to 10,000	Moderate
10,000 to 30,000	Mild
Over 30,000	Not Likely

Despite the relatively benign environment for corrosivity indicated by pH and water-soluble chlorides, the resistivity testing suggests that design should consider that the soils may be Severely Corrosive to embedded ferrous metals. Ferrous metals include steel and pig iron (with a carbon content of a few percent) and alloys of iron with other metals (such as stainless steel).

Typical recommendations for mitigation of such corrosion potential in embedded ferrous metals include:

- a high-quality protective coating such as an 18-mil plastic tape, extruded polyethylene, coal tar enamel, or Portland cement mortar;
- electrical isolation from above grade ferrous metals and other dissimilar metals by means of dielectric fittings in utilities and exposed metal structures breaking grade; and
- steel and wire reinforcement within concrete having contact with the site soils should have at least 2 inches of concrete cover.

If extremely sensitive ferrous metals are expected to be placed in contact with the site soils, it may be desirable to consult a corrosion specialist regarding choosing the construction materials and/or protection design for the objects of concern.

6.3.3 Sulfates

As shown in Table 6-2, the soil sample indicated water-soluble sulfate (SO_4) content of 66 parts per million ('ppm,' 0.007% by weight). With SO_4 < 0.10 percent by weight, the American Concrete Institute (ACI) 318-08 considers a soil to have no potential (S0) for sulfate attack. Table 6-4 (following page) reproduces the Exposure Categories considered by ACI.

6.3.4 Limitations

Testing to determine several chemical parameters that indicate a potential for soils to be corrosive to construction materials are traditionally completed by the Geotechnical Engineer, comparing testing results with a variety of indices regarding corrosion potential. Like most geotechnical consultants, NOVA does not practice in the field of corrosion protection, since this is not specifically a geotechnical issue. Should you require more information, a specialty corrosion consultant should be retained to address these issues.

Table 6-4. Exposure Categories and Requirements for Water-Soluble Sulfates

Exposure Category	Class	Water-Soluble Sulfate (SO_4) In Soil	Cement Type (ASTM C150)	Max Water-Cement Ratio	Min. f'_c (psi)
Not Applicable	S0	$SO_4 < 0.10$	-	-	-
Moderate	S1	$0.10 \leq SO_4 < 0.20$	II	0.50	4,000
Severe	S2	$0.20 \leq SO_4 \leq 2.00$	V	0.45	4,500
Very severe	S3	$SO_4 > 2.0$	V + pozzolan	0.45	4,500

Adapted from: ACI 318-08, Building Code Requirements for Structural Concrete

6.4 Earthwork

6.4.1 General

As is noted in Section 2, no detailed structural or civil-related design information is available at this time. However, based upon the known condition of the site and the design concept that is currently considered, NOVA expects that earthwork will be limited to preparation of building pads, grading for roads and parking lots, and excavations for foundations and utilities.

Earthwork should be performed in accordance with Section 300 of the most recent approved edition of the "*Standard Specifications for Public Works Construction*" and "*Regional Supplement Amendments*."

6.4.2 Site Preparation

Prior to the start of earthwork, the site should be cleared of vegetation, including the root zone. The deleterious materials should be disposed of in approved off-site locations.

At the outset of site work, the Contractor should establish Construction BMPs to prevent erosion of graded/excavated areas until such time as permanent drainage and erosion control measures have been installed. Any existing utilities which are to be abandoned should either be (i) excavated and the trenches backfilled, or (ii) the lines completely filled with sand-cement slurry.

6.4.3 Select Fill

Material Requirements

Any fill used to support structures should be 'select.' Select Fill should be a mineral soil free of organics and any regulated constituents with the characteristics listed below:

- free of organics, with at least 40% by weight finer than ¼ inches in size;
- maximum particle size of 4 inches;
- classified as GM, GW, SW or SM after ASTM D 2488; and,
- expansion index (EI) less than 40 (i.e., EI < 40, after ASTM D 4829).

Much of the Unit 1 alluvium will conform to the above criteria. In certain cases mixing of the Unit 1 and Unit 2 soils may be required to meet the above criteria. The upper portions of the Unit 2 weathered tonalite should also conform to the above criteria.

Compaction Requirements
All fill should be compacted to a minimum of 90% relative compaction after ASTM D1557 (the 'modified Proctor') following moisture conditioning to 2% above the optimum moisture content.
The cohesionless (i.e., sandy and gravelly) Select Fill must be densified by vibratory means, using compaction equipment intended for the densification of cohesionless soils. The equipment must be in good working order.

Fill should be placed in loose lifts no thicker than the ability of the compaction equipment to thoroughly densify the lift. For most self-propelled construction equipment, this will limit loose lifts to on the order of 8 inches or less. Lift thickness for hand-operated equipment (tampers, walk-behind compactors, etc.) will be limited to on the order of 4 inches or less.

6.4.4 Excavation Characteristics

The Unit 1 alluvium will be readily excavated by earthwork equipment usual for construction of this nature.

Engineering borings excavated by means of hollow stem auger drilling were able to be extended to depths of 16 feet below surrounding ground, penetrating at least 10 feet of the Unit 2 weathered tonalite. SPT blow counts ('N', blows per foot) in this interval were commonly N > 50. The weathered tonalite encountered over this interval was characteristically a coarse-grained sand with varying amounts of silt.

NOVA expects that the Unit 2 weathered tonalite should be able to be excavated by medium to heavy earthmoving equipment, including larger dozers and appropriately equipped backhoes. Despite this expectation, the prospective contractor should recognize that this unit commonly includes near-surface zones of sound rock known as 'core stones' or 'floaters' that may require ripping, breaking, or other special means to loosen the material prior to handling, though none of these were encountered during the investigation.

6.4.5 Remedial Grading at Structures

General
The Unit 1 alluvium is unsuitable for support of structures. Foundation preparation for floor slabs and foundations should provide for complete removal of the Unit 1 alluvium to the level of the Unit 2 weathered tonalite, extending this excavation to at least 5 feet outside the building limits. The resultant excavation should be backfilled to finish pad grades with Select Fill meets the criteria of Section 6.4.3.

The project GEOR should approve the bottom of removals. Soils loosened by excavation should be redensified to a minimum of 90% relative compaction after ASTM D 1557.

Transition Conditions
A "transition condition" occurs when a portion of the structure is bearing on new engineered fill and a portion of the structure is bearing on the Unit 2 weathered tonalite.

If a transition condition occurs within the limits of a structure, the Unit 2 tonalite should be over excavated to a depth of 2 feet below the bottom of footings and floor slab, to ensure the structure is bearing entirely on at least 2 feet of compacted fill.

These over excavations should extend 5 feet beyond the building footprint. Removal bottoms should be observed and documented by the GEOR.

6.4.6 Maintenance of Moisture in Soils During Construction

The subgrade moisture condition of the building pad and foundation soils must be maintained at least 2% above optimum moisture content up to the time of concrete placement.

6.4.7 Trenching and Backfilling for Utilities

Excavation for utility trenches must be performed in conformance with OSHA regulations contained in 29 CFR Part 1926.

Utility trench excavations have the potential to degrade the properties of the adjacent soils. Utility trench walls that are allowed to move laterally will reduce the bearing capacity and increase settlement of adjacent footings and overlying slabs.

Backfill for utility trenches is as important as the original subgrade preparation or engineered fill placed to support either a foundation or slab. Backfill for utility trenches must be placed to meet the project specifications for the engineered fill of this project. Unless otherwise specified, the backfill for the utility trenches should be placed in 4-inch to 6-inch loose lifts and compacted to a minimum of 90% relative compaction after ASTM D 1557 (the ‘modified Proctor’) at soil moisture at least +2% of the optimum moisture content. Up to 4 inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to 90% relative compaction with respect to the Modified Proctor.

6.4.8 Slope Construction

Adaptation of the planned fire station to the sloping site may include engineered fills.

Select Fill (Section 6.4.3) should be used in the construction of engineered fill slopes. Cut and fill slopes should be constructed at an inclination of 2:1 (horizontal:vertical) or flatter. Keyways should be constructed at the toe of all fill slopes taller than four feet.

Where the slope of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Geotechnical Engineer of Record (GEOR), the original ground should be benched in accordance with the Figure 6-1.

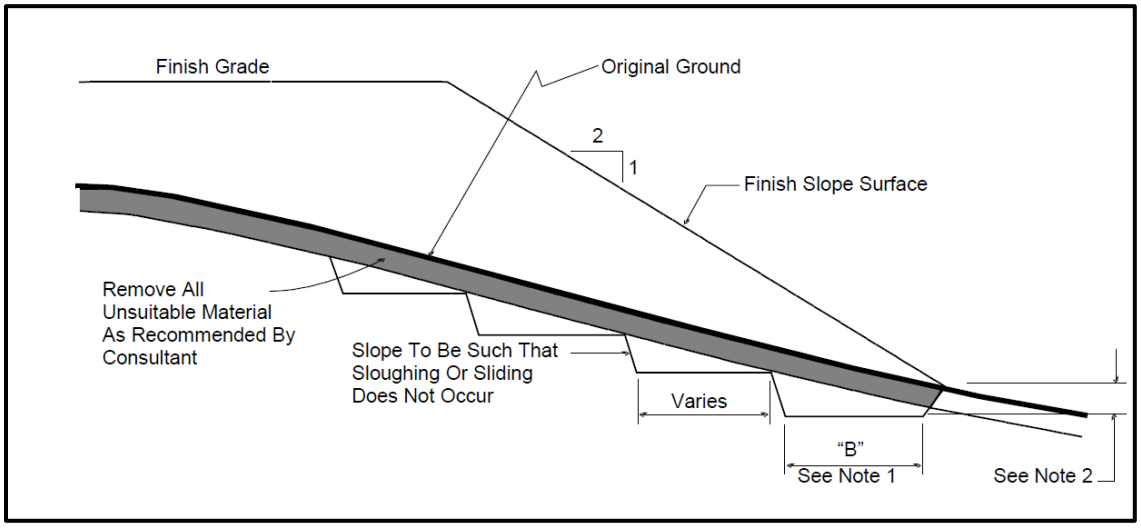

Figure 6-1. Benching Detail

Notes:
(1) Key width "B" should be a minimum of 5 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense Tonalite material (Unit 2). The bottom of the key, the depth and configuration of the key may be modified as approved by the GEOR.

6.4.9 Flatwork

Prior to casting exterior flatwork, the upper 12 inches of subgrade soils should be removed and replaced with compacted fill that meets the requirments of Select Fill. The exposed bottom of removals should be scarified, moisture conditioned, and compacted to a minimum of 90% relative compaction after ASTM D 1557 (the 'modified Proctor').

Exterior concrete slabs for pedestrian traffic or landscape should be at least 4 inches thick. Weakened plane joints should be located at intervals of about 6 feet. Control of the water/cement ratio can limit shrinkage cracking due to excess water or poor concrete finishing or curing. Exterior slabs may be reinforced with No. 3 bars on 18-inches centers, each way.

6.5 Shallow Foundations

6.5.1 General

Structures can be supported on shallow foundations embedded in either compacted Select Fill or the Unit 2 weathered tonalite. The following subsections provide recommendations for shallow foundations. It is recommended that all foundation elements, including any grade beams, be reinforced top and bottom. The actual reinforcement should be designed by the Structural Engineer.

6.5.2 Shallow Foundations Supported on Compacted Fill

Minimum Dimensions

Continuous footings should be at least 18 inches wide and have a minimum embedment of 18 inches below lowest adjacent finish grade. Isolated square or rectangular footings should be a minimum of 24 inches wide, embedded at least 18 inches below surrounding finish grade.

Allowable Contact Stress

Continuous and isolated footings constructed as described in the preceding sections and supported on compacted fill may be designed using an allowable (net) contact stress of 3,000 pounds per square foot (psf). An allowable increase of 500 psf for each additional 12 inches in depth may be utilized, if desired.

In no case should the maximum allowable contact stress should be greater than 3,500 psf. The maximum bearing value applies to combined dead and sustained live loads (DL + LL). The allowable bearing pressure may be increased by one-third when considering transient live loads, including seismic and wind forces.

Lateral Resistance

Resistance to lateral loads will be provided by a combination of (i) friction between the soils and foundation interface; and, (ii) passive pressure acting against the vertical portion of the footings. Passive pressure may be calculated at 350 psf per foot of depth. A frictional coefficient of 0.35 may be used. No reduction is necessary when combining frictional and passive resistance.

Settlement

Structure supported on shallow foundations as recommended above will settle on the order of 0.5 inch or less, with about 70% of this settlement occurring during the construction period. Angular distortion due to differential settlement of adjacent, unevenly loaded footings should be less than 1 inch in 40 feet (i.e., Δ/L less than 1:480).

6.5.3 Shallow Foundations Supported on Unit 2 Tonalite Bedrock

The Unit 2 tonalite bedrock will provide high-capacity foundation support for shallow foundations. NOVA recommends use of conventional foundations, consisting of isolated and continuous footings, as described below.

Isolated Foundations

Isolated foundations for interior columns may be designed for an allowable contact stress of 6,500 psf for dead and commonly applied live loads (DL+LL). These foundation units should have a minimum width of 24 inches, extended through any fill and embedded a minimum of 12 inches into sound Unit 2 tonalite bedrock. This bearing value may be increased by one-third for transient loads such as wind and seismic.

Continuous Foundations

Continuous foundations may be designed for an allowable contact stress of 4,000 psf for dead and commonly applied live loads (DL+LL). These footings must be a minimum of 18 inches in width and embedded a minimum of 12 inches into the Unit 2 tonalite bedrock.

This bearing value may be increased by one-third for transient loads such as wind and seismic.

Resistance to Lateral Loads
Lateral loads to shallow foundations cast 'neat' against Unit 2 tonalite bedrock may be resisted by passive earth pressure against the face of the footing, calculated as a fluid density of 300 psf per foot of depth, neglecting the upper 1 foot of soil below surrounding grade in this calculation. Additionally, a coefficient of friction of 0.35 between soil and the concrete base of the footing may be used with dead loads.

Settlement
Structure supported on shallow foundations as recommended above will settle on the order of 0.5 inch or less, with about 70% of this settlement occurring during the construction period. Angular distortion due to differential settlement of adjacent, unevenly loaded footings should be less than 1 inch in 40 feet (i.e., Δ/L less than 1:480).

6.5.4 General Slab Design

Ground supported slabs for the adminstrative building should be designed by the Structural Engineer using a modulus of subgrade reaction (k) of 180 pounds per cubic inch (i.e., k = 180 pci). NOVA recommends the slab be a minimum 5 inches thick, reinforced by at least #3 bars placed at 16 inches on center each way within the middle third of the slabs by supporting the steel on chairs or concrete blocks ("dobies").

Minor cracking of concrete after curing due to drying and shrinkage is normal. Cracking is aggravated by a variety of factors, including high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due during curing. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking.

To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or 'weakened plane' joints at frequent intervals. Joints should be laid out to form approximately square panels and never exceeding a length to width ratio of 1.5 to 1. Proper joint spacing and depth are essential to effective control of random cracking. Joints are commonly spaced at distances equal to 24 to 30 times the slab thickness. Joint spacing that is greater than 15 feet should include the use of load transfer devices (dowels or diamond plates). Contraction/ control joints should be established to a depth of ¼ the slab thickness as depicted in Figure 6-2 (following page).

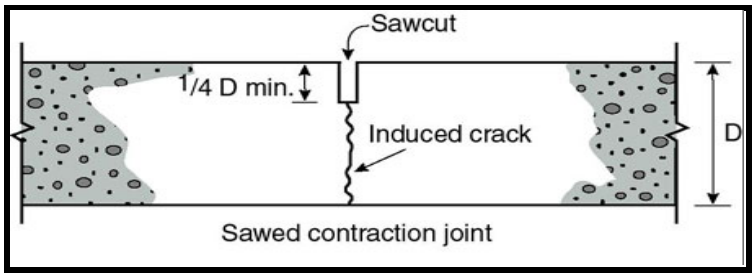

Figure 6-2. Sawed Contraction Joint

A ground supported slab may be developed with a thickened edge to support wall loads. A thickened edge extending to a minimum of 12 inches below surrounding ground and bearing at 3,500 psf. Figure 6-3 depicts these foundations conceptually.

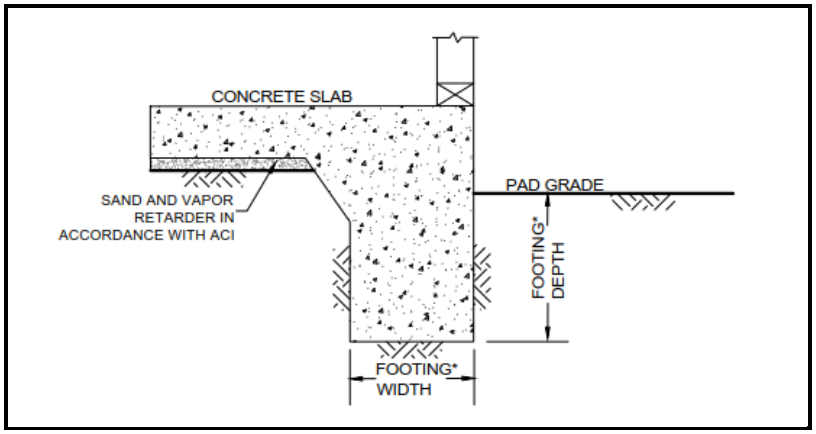

Figure 6-3. Ground Supported Slab with Thickened Edge

6.5.5 Slab Design to Support Fire Trucks

Ground supported slabs within both the fire station and the maintenance building that will be used for longer-term or repeated parking of firetrucks should be designed using k = 180 pci.

These slabs be a minimum 6 inches thick, reinforced by at least #3 bars placed at 16 inches on center each way within the middle third of the slabs. The modulus of rupture (MR) of concrete used for these slabs should be a minimum of 650 psi.

6.6 Underslab Vapor Retarder

6.6.1 General

Soil moisture vapor that penetrates ground-supported concrete slabs can result in damage to moisture-sensitive floors, some floor sealers, or sensitive equipment in direct contact with the floor. It is not the responsibility of the geotechnical consultant to provide recommendations for vapor retarders to address this concern. This responsibility usually falls to the Architect. Decisions regarding the appropriate vapor retarder are principally driven by the nature of the building space above the slab, floor coverings, anticipated penetrations, concerns for mold or soil gas and a variety of other environmental, aesthetic, and materials factors known only to the Architect.

A variety of specialty polyethylene (polyolefin)-based vapor retarding products are available to retard moisture transmission into and through concrete slabs. This remainder of this section provides an overview of design and installation guidance, and considers the use of vapor retarders in the building construction in the San Diego area.

6.6.2 Guidance Documentation

Detail to support selection of vapor retarders and to address the issue of moisture transmission into and through concrete slabs is provided in a variety of publications by the American Society for Testing and Materials (ASTM) and the American Concrete Institute (ACI). A partial listing of those publications is provided below.

- ASTM E1745-97 (2009). *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*
- ASTM E154-88 (2005). *Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover*
- ASTM E96-95 (2005). *Standard Test Methods for Water Vapor Transmission of Materials*
- ASTM E1643-98 (2009). *Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*
- ACI 302.2R-06. *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials*

6.6.3 Design

Vapor retarders employed for ground supported slabs in the San Diego are commonly specified as minimum 10 mil polyolefin plastic that conforms to the requirements of ASTM E1745 as a Class A vapor retarder (i.e., a maximum vapor permeance of 0.1 perms, minimum 45 lb/in tensile strength and 2,200 grams puncture resistance). Among the commercial products that meet this requirement are the series of Yellow Guard® vapor retarders vended by Poly-America, L.P.; the Perminator® products by W. R. Meadows; and, Stego®Wrap products by Stego Industries, LLC.

The person responsible for design of the vapor barrier should consult with product vendors to ensure selection of the vapor retarder that best meets the project requirements. For example, concrete slabs with particularly sensitive floor coverings may require lower permeance or other performance-related factors than are specified by the ASTM E1745 class rating.

6.6.4 Installation

The performance of vapor retarders is particularly sensitive to the quality of installation. Installation should be performed in accordance with the vendor's recommendations under full-time surveillance.

6.7 Control of Moisture Around Foundations

6.7.1 General

Design for the structure should include care to control accumulations of moisture around and below foundations. Such design will require coordination among the Design Team.

6.7.2 Erosion and Moisture Control During Construction

Surface water should be controlled during construction, via berms, gravel/sandbags, silt fences, straw wattles, siltation basins, positive surface grades, or other methods to avoid damage to the finish work or adjoining properties. The Contractor should take measures to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed. After grading, all excavated surfaces should exhibit positive drainage and eliminate areas where water might pond.

6.7.3 Design

Design for the areas around foundations should be undertaken with a view to the maintenance of an environment that encourages constant moisture conditions in the foundation soils following construction. Drainage should be designed to limit the potential for infiltration and/or releases of moisture beneath structures. In particular, rainfall to roofs should be collected in gutters and discharged in a controlled manner away from foundations.

Proper surface drainage will be required to minimize the potential of water seeking the level of the bearing soils under foundations and pavements. In areas where sidewalks or paving do not immediately adjoin a structure, protective slopes should be provided with a minimum grade (away from the structure) of approximately 3% for at least 5 feet from perimeter walls. A minimum gradient of 1% is recommended in hardscape areas. Drainage should be directed to approved drainage facilities.

6.7.4 Utilities

Design for Differential Movement
Underground piping within or near structures should be designed with flexible couplings to accommodate both ground and slab movement so that minor deviations in alignment do not result in breakage or distress. Utility knockouts should be oversized to accommodate the potential for differential movement between foundations and the surrounding soil.

Backfill Above Utilities.
Excavations for utility lines, which extend under or near structural areas should be properly backfilled and compacted. Utilities should be bedded and backfilled with approved granular soil to a depth of at least 1-foot over the pipe. This backfill should be uniformly watered and compacted to a firm condition for pipe support. Backfill above the pipe zone should meet the requirements for Select Fill, placed to at least 90% relative compaction at 2% above optimum.

6.8 Retaining Walls

6.8.1 Wall Loads

As of the time of this report, it is not known if the site will be designed with retaining walls. However, as design progresses, walls may be developed; for example, retaining walls for buildings and/or perimeter site walls. Static lateral earth pressures are provided for these walls on Table 6-5 (following page) as equivalent fluid weights, in psf/foot of wall height or pounds per cubic foot (pcf).

6.8.2 Retaining Wall Foundations

Retaining wall may be supported on continuous foundations designed as described in Section 6.5. Wall foundations are not permitted to have transition conditions as described in Section 6.4.5. If transition conditions exist, the tonalite bedrock should be over excavated a minimum of 2 feet below footing depth such that the walls are entirely bearing on engineered fill. Transition condition recommendations found in Section 6.4.5 should be followed.

Table 6-5. Lateral Earth Pressures to Retaining Walls

Loading Condition	Equivalent Fluid Density (pcf) for Approved 'Native' Backfill Notes [Notes A, B,C]	
	Level Backfill	2:1 Backfill Sloping Upwards
Active (wall movement allowed)	35	50
"At Rest" (no wall movement)	55	80
'Passive" (wall movement toward the soils)	350	350

Note A: 'approved' means Select Fill with EI < 20 after ASTM D4829 and approved by the Geotechnical Engineer.
Note B: assumes level backfill and appropriate wall drainage.
Note C: The values on Table 6-5 do not contain a factor of safety (F).

If footings or other surcharge loads are located a short distance outside the wall, these influences should be added to the lateral stress considered in the design of the wall. Surcharge loading should consider wall loads that may develop from adjacent roads and sidewalks. To account for such potential loads, a surcharge pressure of 75 psf can be applied uniformly over the wall to a depth of about 12 feet.

6.8.3 Seismic Increment

Non-Yielding Walls
Lateral seismic thrust acting on non-yielding below-grade walls can be estimated by the dynamic (seismic) thrust, ΔP_E. Dynamic thrust is approximated as:

$\Delta P_E = k_h H^2 \gamma$ where,

k_h , pseudostatic horizontal earthquake coefficient, equal to $S_{DS}/2.5$
H is the height of the wall in feet from the footing to the point of fixity
γ is the unit weight of the backfill material (about 125 pcf)

The resultant dynamic thrust acts at a distance of 0.6H above the base of the wall.

Cantilevered Walls
Walls less than 6 feet in height need not include a seismic load. Cantilevered walls taller than 6 feet should consider an incremental lateral seismic thrust, ΔP_E, expressed as:

$\Delta P_E = 0.4\ k_h H^2 \gamma$ where,

ΔP_E is the incremental seismic thrust
k_h is the pseudostatic horizontal earthquake coefficient, is equal to $S_{DS}/2.5$
H is the height of the wall in feet from the footing
γ is the unit weight of the backfill material (about 125 pcf)

The resultant dynamic thrust acts at a distance of 0.3H above the base of the wall.

6.8.4 Foundation Uplift

A soil unit weight of 125 pcf may be assumed for calculating the weight of soil over the wall footing.

6.8.5 Resistance to Lateral Loads

Lateral loads to wall foundations will be resisted by a combination of frictional and passive resistance as described in Section 6.5.

6.8.6 Wall Drainage

The recommended equivalent fluid pressures provided in the preceding subsection assume that constantly functioning drainage systems are installed between walls and soil backfill to prevent the uncontrolled buildup of hydrostatic pressures and lateral stresses in excess of those stated.

Design for wall drainage may include the use of pre-engineered wall drainage panels or a properly compacted granular free-draining backfill material (EI < 40).

The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. Figure 6-4 provides a conceptual design for wall drainage. Numerous alternatives are available for collection of water behind retaining walls. The intent of Figure 6-4 is to depict the concepts described in the preceding paragraph.

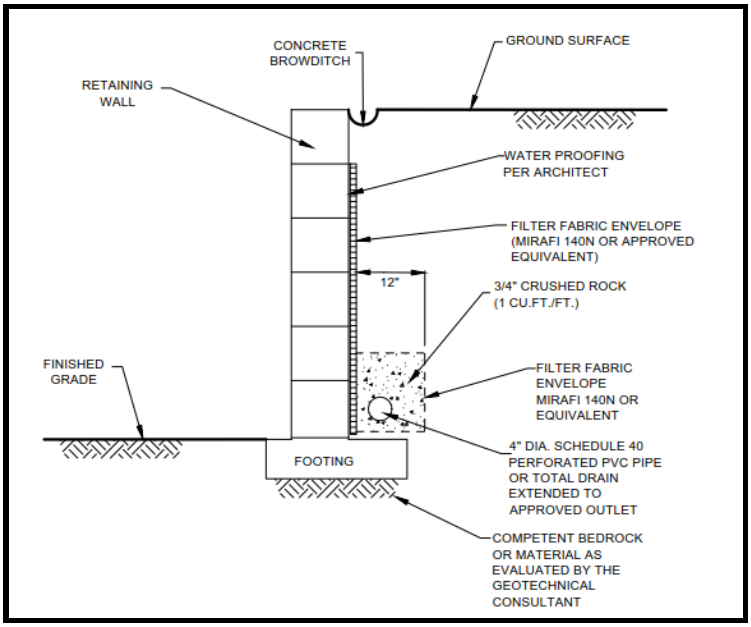

Figure 6-4. Conceptual Design for Wall Drainage

6.9 Temporary Slopes

Temporary slopes may be required for excavations during grading. All temporary excavations should comply with local safety ordinances. The safety of all excavations is solely the responsibility of the Contractor and should be evaluated during construction as the excavation progresses.

Based on the data interpreted from the borings, the design of temporary slopes may assume California Occupational Safety and Health Administration (Cal/OSHA) Soil Type B for planning purposes. Temporary slopes may be excavated no steeper than 1:1 (horizontal:vertical).

7.0 STORMWATER INFILTRATION

7.1 Overview

One permanent stormwater biofiltration basin, encompassing about 6,000 SF, is proposed north of the fire station. As the project plans are conceptual, stormwater best management practice (BMP) design and depths are not identified. NOVA assumes that any such stormwater structures would be developed utilizing an underdrain, and is unrestricted by the elements listed in Table D.1-1 (presented below) of the County of San Diego BMP Design Manual, January 2019 edition (hereafter, 'the BMP Manual').

7.2 Public Health and Safety Considerations

It is NOVA's judgment that the site is not restricted by elements that may pose a significant risk to human health and safety which cannot be reasonably resolved through site design changes. As such, infiltration may be feasible. Figure 7-1 outlines the consideration for geotechnical analysis of infiltration restrictions for the proposed BMP.

Table D.1-1: Considerations for Geotechnical Analysis of Infiltration Restrictions

Restriction Element		Is Element Applicable? (Yes/No)
Mandatory Considerations	BMP is within 100' of Contaminated Soils	No
	BMP is within 100' of Industrial Activities Lacking Source Control	No
	BMP is within 100' of Well/Groundwater Basin	No
	BMP is within 50' of Septic Tanks/Leach Fields	No*
	BMP is within 10' of Structures/Tanks/Walls	No
	BMP is within 10' of Sewer Utilities	No
	BMP is within 10' of Groundwater Table	No
	BMP is within Hydric Soils	No
	BMP is within Highly Liquefiable Soils and has Connectivity to Structures	No
	BMP is within 1.5 Times the Height of Adjacent Steep Slopes (≥25%)	No
	County Staff has Assigned "Restricted" Infiltration Category	No
Optional Considerations	BMP is within Predominantly Type D Soil	No
	BMP is within 10' of Property Line	No
	BMP is within Fill Depths of ≥5' (Existing or Proposed)	No
	BMP is within 10' of Underground Utilities	No
	BMP is within 250' of Ephemeral Stream	**
	Other (Provide detailed geotechnical support)	No
Result	Based on examination of the best available information, I have <u>not identified any restrictions</u> above.	☒ Unrestricted
	Based on examination of the best available information, I have <u>identified one or more restrictions</u> above.	☐ Restricted

Table D.1-1 is divided into Mandatory Considerations and Optional Considerations. Mandatory

*: Design should confirm that the planned BMP is not within 50' of the proposed Leech Field
**: To be reviewed by the SWQMP Preparer

Figure 7-1. Infiltration Restriction Considerations

7.3 Borehole Percolation Testing

On July 1, 2020, NOVA directed the excavation and construction of two (2) percolation test borings ('P-1' and 'P-2') and one (1) engineering boring ('B-4') within the proposed BMP footprint, following the recommendations for borehole percolation testing presented in the BMP Manual. The percolation test borings were drilled to approximately 5 feet bgs, a typical depth for BMP designs, into the underlying tonalite bedrock. The engineering boring was drilled to approximately 16.5 feet bgs to evaluate the soil strata below the bottom of the proposed BMP.

7.4 Infiltration Rate

The percolation rate of a soil profile is not the same as its infiltration rate ('I'). Therefore, the field percolation rate was converted to an estimated infiltration rate utilizing the Porchet Method in accordance with guidance contained in the BMP Manual. Table 7-1 provides a summary of the infiltration rates determined by the percolation testing.

Table 7-1. Infiltration Rates Determined by Percolation Testing

Test Well Reference	Approximate Elevation (feet, msl) [1]	Total Depth (feet)	Approximate Percolation Test Elevation (feet, msl) [1]	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)[2] FS = 2
P-1	+1565.0	5.0	+1560.0	0.39	0.20
P-2	+1568.0	5.0	+1563.0	3.37	1.69

Note 1: Elevations are approximate and should be reviewed
Note 2: 'F' indicates 'Factor of Safety'

As may be seen by review of Table 7-1, a factor of safety (F) has been applied to the infiltration rate (I) determined by the percolation testing. This factor of safety, at least FS = 2 in local practice, considers the nature and variability of subsurface materials, as well as the natural tendency of infiltration structures to become less efficient with time. A default factor of safety of 2 is applied for BMPs utilizing an underdrain.

The calculated infiltration rates at locations P-1 and P-2 after applying FS = 2 are 0.20 and 1.69 inches per hour, respectively. It is the judgment of NOVA that the lower infiltration rate (P-1 = 0.20 inches per hour) should be utilized for design calculations. In addition, the site is classified by NRCS Soil Survey maps as soil type 'C'. The default infiltration rate for soil type 'C' is 0.10 inches per hour. As such, the infiltration rate at P-2 is anomalously high for the bedrock conditions at the site, and should not be considered for design purposes.

7.5 Recommendation for Infiltration

In consideration of the foregoing, it is NOVA's judgment that the site is not restricted by elements that may pose a significant risk to human health and safety which cannot be reasonably resolved through site design changes. Design for the proposed BMP may utilize an infiltration rate of 0.20 inches per hour.

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8.0 PAVEMENT DESIGN

8.1 General

The structural design of pavement sections depends primarily on anticipated traffic conditions, subgrade soils, and construction materials. For the purposes of the preliminary evaluation provided in this section, NOVA has assumed a Traffic Index (TI) of 7.0. These traffic indices should be confirmed by the project civil engineer prior to final design.

8.2 Design for Drainage and Maintenance

8.2.1 Drainage

Control of surface drainage is important to the design and construction of pavements. Standing water that develops either on the pavement surface or within the base course can soften the subgrade and create other problems related to the deterioration of the pavement. Good drainage should minimize the risk of the subgrade materials becoming saturated and weakened over a long period of time.

The following recommendations should be considered to limit the amount of excess moisture, which can reach the subgrade soils:

- maintain surface gradients at a minimum 2% grade away from the pavements;
- compact utility trenches for landscaped areas to the same criteria as the pavement subgrade;
- seal all landscaped areas in or adjacent to pavements to minimize or prevent moisture migration to subgrade soils;
- planters should not be located next to pavements (otherwise, subdrains should be used to drain the planter to appropriate outlets);
- place compacted backfill against the exterior side of curb and gutter; and,
- concrete curbs bordering landscaped areas should have a deepened edge to provide a cutoff for moisture flow beneath pavements (generally, the edge of the curb can be extended an additional twelve inches below the base of the curb).

8.2.2 Maintenance

Preventative maintenance should be planned and provided for in the ownership of all pavements. Preventative maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

8.3 Subgrade Preparation

8.3.1 Subgrade Preparation

Grading for paved areas should consist of removing and replacing the upper 2 feet below the finished subgrade level. The bottom of removals should be scarified 6-inches, moisture conditioned to at least 2% above the optimum moisture content, then densified/compacted to a minimum 90% relative compaction after ASTM D 1557 (the 'modified Proctor'). Thereafter, the removed soils should be replaced as engineered fill moisture conditioned to at least 2% above the optimum moisture content, then densified/compacted to a minimum 95% relative compaction after ASTM D 1557 (the 'modified Proctor').

8.3.1 Proof Rolling

After the completion of subgrade preparation, areas to receive pavements should be proof-rolled. A loaded dump truck or similar should be used to aid in identifying localized soft or unsuitable material.

Any soft or unsuitable materials encountered during this proof-rolling should be removed, replaced with an approved backfill, and compacted.

8.3.2 Timely Pavement Construction

Construction should be managed such that preparation of the subgrade immediately precedes placement of the base course. Proper drainage of the paved areas should be provided to reduce moisture infiltration to the subgrade.

8.3.3 Surveillance

The preparation of roadway and parking area subgrades should be observed on a full-time basis by a representative of NOVA to confirm that any unsuitable materials have been removed and that the subgrade is suitable for support of the proposed driveways and parking areas after ASTM D1557.

8.4 Flexible Pavements

The structural design of flexible pavement depends primarily on anticipated traffic conditions, subgrade soils, and construction materials. Table 8-1 provides preliminary flexible pavement sections using an assumed R-value of 17. The final pavement sections should be determined after performing R-Value testing of the prepared subgrade soils.

Table 8-1. Preliminary Recommendations for Flexible Pavements

Area	Estimated Subgrade R-Value	Traffic Index	Asphalt Thickness (in)	Base Course Thickness (in)
Parking Areas/ Driveways/Roadways	17	7.0	4.0	13.0

The above sections assume properly prepared subgrade consisting of at least 12 inches of subgrade compacted to a minimum of 95% relative compaction. The aggregate base, Caltrans Class II aggregate base or similar, should also be placed at a minimum 95% relative

compaction. Construction materials (asphalt and aggregate base) should conform to the current Standard Specifications for Public Works Construction (Green Book).

Note that the recommended pavement sections are for planning purposes only. Additional R-value testing should be performed on actual soils at the design subgrade levels to confirm the pavement design.

8.5 Rigid Pavements for Fire Response Vehicles

8.5.1 Design Loading

No information is known regarding the design basis fire response vehicles that will be kept at Fire Station #3. For the purposes of this report, NOVA assumes that the vehicles would apply American Association of State Highway Transportation Officials (AASHTO) H-20 loads to pavements. H-20 loads provide for truck axle loading of 32,000 lbs, or wheel loading of 16,000 lbs.

8.5.2 Pavement Section

The rigid pavement section for driveways used by the fire response vehicles should consist of 7 inches of concrete over a 6-inch base course. The aggregate base materials should be placed at a minimum 95% relative compaction over a 12-inch thick section of subgrade prepared as described in Section 8.3.

Of particular consequence to pavement performance in the recommended section design analyses is consideration of the edge loading condition of the pavement. The critical load condition on a concrete pavement is at an unsupported edge. The recommended pavement section assumes full edge support by means of either a tied concrete shoulder or a widened lane. A widened lane would consist of a lane edge stripe that is placed a minimum of 1-foot from the pavement edge.

8.5.3 Concrete Properties

The concrete should be obtained from a mix design that conforms with the minimum properties shown on Table 8-2.

Table 8-2. Recommendations for Concrete Pavements

Property	Recommended Requirement
Compressive Strength @ 28 days	3,250 psi minimum
Strength Requirements	ASTM C94
Minimum Cement Content	5.5 sacks/cu. yd.
Cement Type	Type III Portland
Concrete Aggregate	ASTM C33
Aggregate Size	1-inch maximum
Maximum Water Content	0.5 lb/lb of cement
Maximum Allowable Slump	4 inches

8.5.1 Jointing

Longitudinal and transverse joints should be provided in concrete pavements for expansion/ contraction and isolation spaced at a maximum of 12 feet on center. Sawed joints should be cut within 24 hours of concrete placement, and should be a minimum of 25% of slab thickness plus ¼-inch. All joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer. No doweling is necessary.

9.0 CONSTRUCTION REVIEW, OBSERVATION AND TESTING

9.1 Overview

As is discussed in Section 1, the recommendations contained in this report are based upon a limited number of borings and an assumption of general continuity of subsurface conditions between borings.

The recommendations provided in both NOVA's proposal for this work and this report assume that NOVA will be retained to provide consultation and review during the design phase, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

9.2 Design Phase Review

The recommendations of this report are based upon NOVA's current understanding and assumptions regarding planning for project development.

As is provided for in its proposal for this work, NOVA should review the final design. Such review is important for both (i) conformance with the recommendations provided herein, and (ii) consistency with NOVA's understanding of the planned development.

9.3 Construction Observation and Testing

9.3.1 General

Special inspections should be provided per Section 1705 of the California Building Code. The soils special inspector should be a representative of NOVA as the Geotechnical Engineer-of-Record (GEOR).

NOVA should be retained to provide construction-related services abstracted below.

- Surveillance during site preparation, grading, and foundation excavation.
- Inspection of the ground improvement described in Section 6.
- Soil special inspection during grading.

A program of quality control should be developed prior to the beginning of earthwork. It is the responsibility of the Owner, the Contractor and/or the Construction Manager to determine any additional inspection items required by the Architect/Engineer or the governing jurisdiction.

9.3.2 Continuous Soils Special Inspection

The earthwork operations listed below should be the object of continuous soils special inspection.

- Site grading, including scarification and engineered fill placement.
- Ground preparation as described in Section 6.

- Pavement subgrade preparation and base course compaction.

9.3.3 Periodic Soils Special Inspection

The earthwork operations listed below should be the object of periodic soils special inspection, subject to approval by the Building Official.

- Site preparation and removal of existing development features.
- Placement and compaction of utility trench backfill.
- Observation of foundation excavations.

9.3.4 Testing During Inspections

A preconstruction conference among representatives of the Owner, Contractor and/or Construction Manager, and Geotechnical Engineer is recommended to discuss the planned construction procedures and quality control requirements.

The locations and frequencies of compaction test should be determined by the geotechnical engineer at the time of construction. Test locations and frequencies may be subject to modification by the geotechnical engineer based upon soil and moisture conditions encountered, the size and type of compaction equipment used by the Contractor, the general trend of compaction test results, and other factors.

Of particular concern to NOVA during earthwork operations will be good practices in moisture conditioning, loose soil placement, and soil compaction. In particular, NOVA will be vigilant with regard to the use of compaction equipment appropriate to the full lift thickness of the type of soil being compacted. Reliance on construction traffic (for example, loaders or dump trucks) to achieve compaction will not be approved.

10.0 REFERENCES

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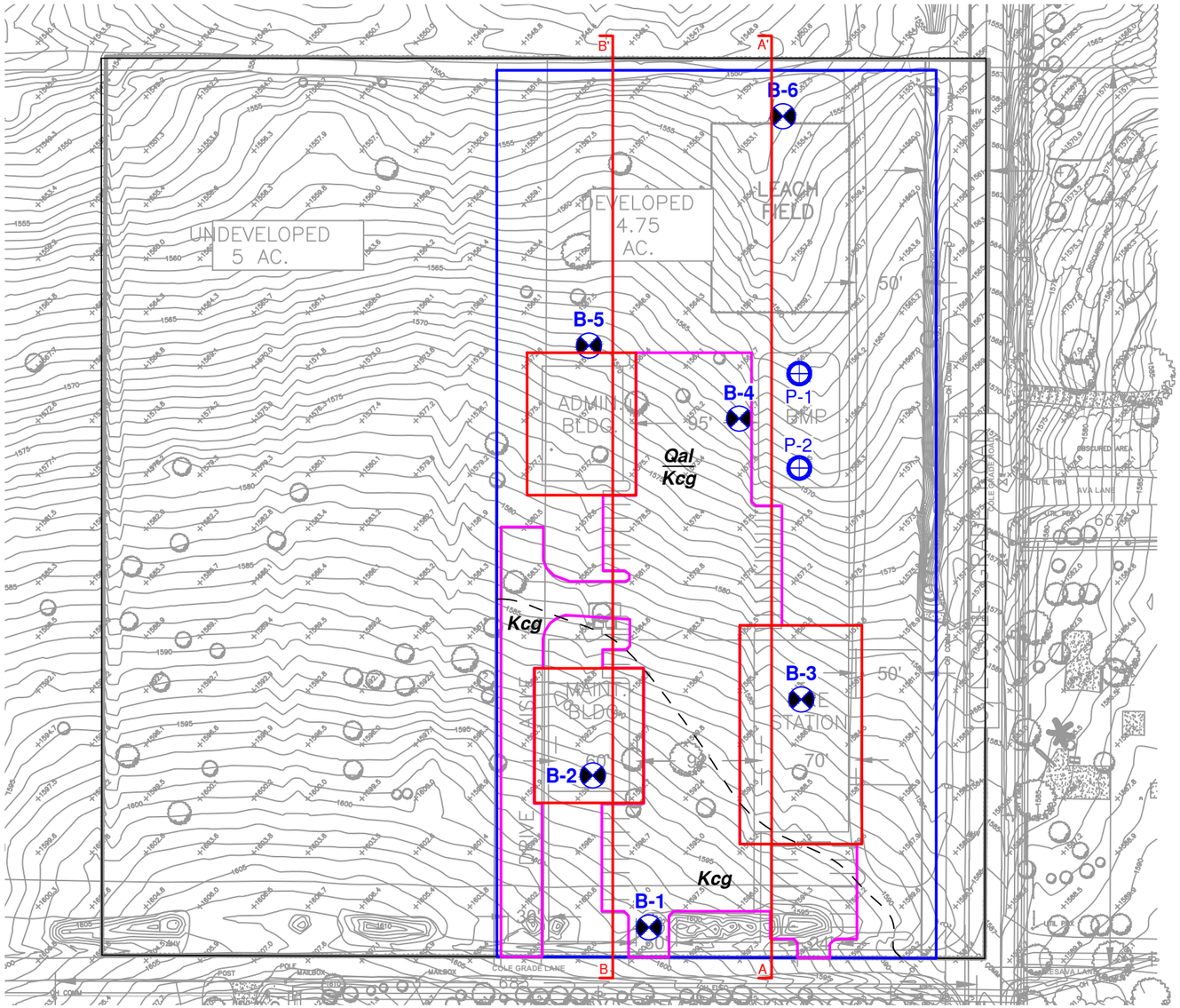
PLATE
SUBSURFACE EXPLORATION MAP



KEY TO SYMBOLS

Qal	ALLUVIUM		GEOLOGIC CONTACT
Kcg	COLE GRADE TONALITE		LIMITS OF SITE
B-6	GEOTECHNICAL BORING		LIMITS OF REMEDIAL REMOVAL FOR BUILDING
P-2	PERCOLATION TEST BORING		LIMITS OF REMEDIAL REMOVALS FOR DRIVEWAY/ PARKING LOT
		B B'	GEOLOGIC CROSS-SECTION

0 100' 200'

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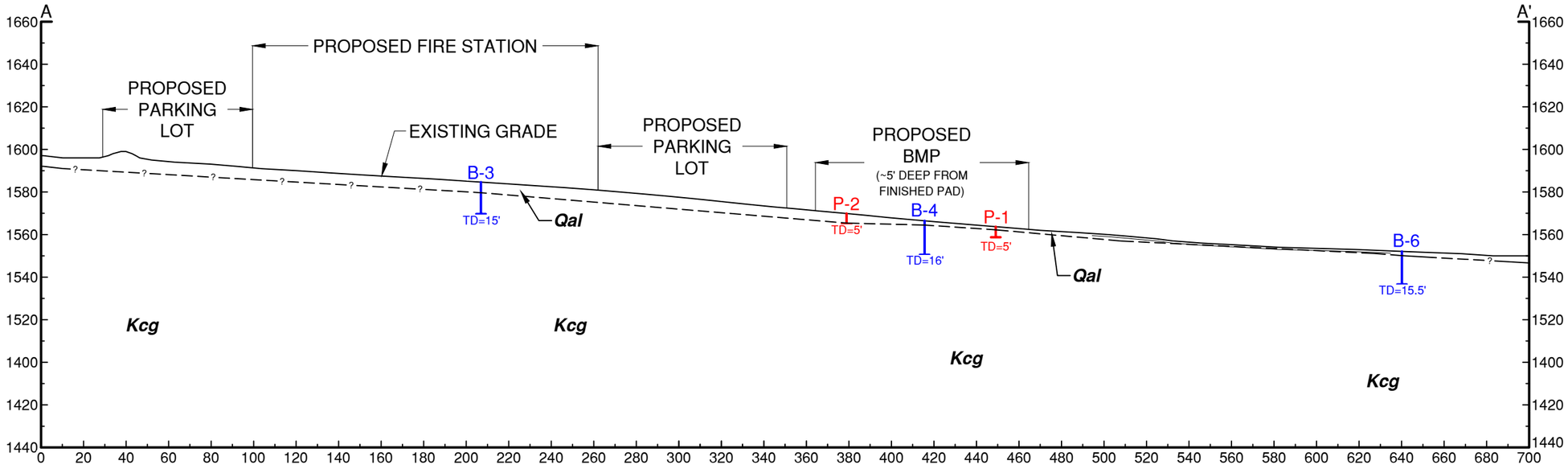
PROJECT NO.:	2020074
DATE:	AUG 2020
DRAWN BY:	DTJ
REVIEWED BY:	WM
SCALE:	1"=100'
DRAWING TITLE:	

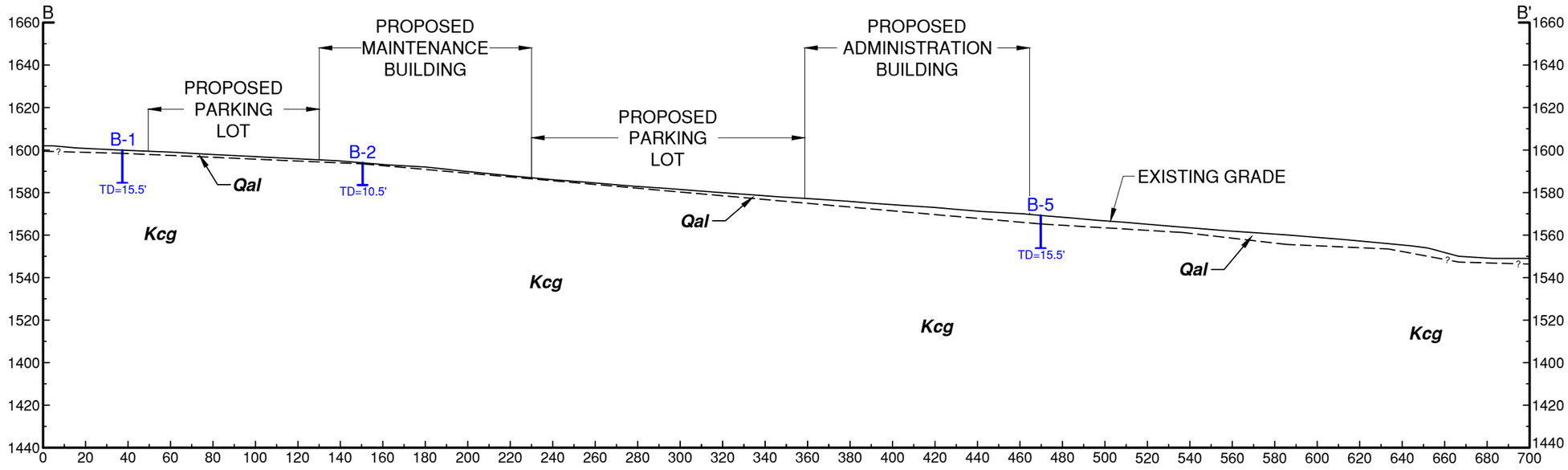
SUBSURFACE
INVESTIGATION MAP

PLATE NO. 1 OF 2

GEOLOGIC CROSS-SECTION AA'



GEOLOGIC CROSS-SECTION BB'



KEY TO SYMBOLS

Qal	ALLUVIUM
Kcg	COLE GRADE TONALITE
B-6	GEOTECHNICAL BORING
P-2	PERCOLATION TEST BORING
	GEOLOGIC CONTACT
	EXISTING GRADE

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GEOLOGIC
CROSS-SECTION

PLATE NO. 2 OF 2

APPENDIX A
USE OF THE GEOTECHNICAL REPORT

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

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APPENDIX B
LOGS OF BORINGS

BORING LOG B-1

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1600 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0		☒	▨	SC	38	**ALLUVIUM (Qal):** *CLAYEY SAND; ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA	
				SM	30	**TONALITE (Kcg):** *SILTY SAND; ORANGE BROWN WITH BLACK MICAS, MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED*		*HIGHLY WEATHERED*
5			⊘		44	*LIGHT GRAYISH BROWN WITH BLACK MICAS, DAMP TO MOIST, DENSE*		*LESS WEATHERED*
10			⊘		50/5	*VERY DENSE*		
15			⊘		50/1			
						BORING TERMINATED AT 15.5 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.		
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
▨	CAL. MOD. SAMPLE (ASTM D3550)	– – –	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.1

LOGGED BY:	GAN	DATE:	AUG 2020
REVIEWED BY:	MS	PROJECT NO.:	2020074

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BORING LOG B-2

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1595 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC	26	**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA	*12.2% 124.4pcf*
				SC	41	**TONALITE (Kcg):** *CLAYEY SAND; ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	CR MD RV CN	*HIGHLY WEATHERED*
5				SM	50/5	*SILTY SAND; LIGHT GRAYISH BROWN, DRY TO DAMP, DENSE, FINE TO COARSE GRAINED* *DAMP TO MOIST, VERY DENSE*	SA	*LESS WEATHERED*
10					50/3	*BORING TERMINATED AT 10.5 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.*		
15								
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
■	CAL. MOD. SAMPLE (ASTM D3550)	— — —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.2

LOGGED BY:	GAN	DATE:	AUG 2020
REVIEWED BY:	MS	PROJECT NO.:	2020074

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BORING LOG B-3

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1584 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC	31	**ALLUVIUM (Qal):** *CLAYEY SAND; ORANGE BROWN, DAMP TO MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	EI	*40 LOW*
					29			
5				SM	62	**TONALITE (Kcg):** *SILTY SAND; ORANGE BROWN, DAMP, VERY DENSE, FINE TO COARSE GRAINED*		*10.6% 119.3pcf HIGHLY WEATHERED*
						LIGHT GRAYISH BROWN, DAMP, VERY DENSE, FINE TO COARSE GRAINED		*LESS WEATHERED*
10					82	*GRAYISH BROWN*		
15					50/1			
						BORING TERMINATED AT 15 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.		
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊠	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
■	CAL. MOD. SAMPLE (ASTM D3550)	— – —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.3

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REVIEWED BY:	MS	PROJECT NO.:	2020074

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BORING LOG B-4

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1568 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0	SC	18	**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN TO ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA	
	SM	57	**TONALITE (Kcg):** *SILTY SAND; LIGHT GRAYISH BROWN, DRY TO DAMP, VERY DENSE, FINE TO COARSE GRAINED*		*HIGHLY WEATHERED*
		50/5			
5		50/1	*GRAYISH BROWN, DRY*	SA	*LESS WEATHERED*
		50/2			
		50/2		SA	
10		50/3			
15		50/2			
			BORING TERMINATED AT 16 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.		
20					
25					
30					

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
■	CAL. MOD. SAMPLE (ASTM D3550)	– – –	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.4

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REVIEWED BY:	MS	PROJECT NO.:	2020074

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BORING LOG B-5

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1570 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC		**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN TO ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*		
5			☒	SM	50/2	**TONALITE (Kcg):** *SILTY SAND; LIGHT GRAYISH BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO COARSE GRAINED* *GRAYISH BROWN, VERY DENSE*		*HIGHLY WEATHERED* *LESS WEATHERED*
10			☒		50/3			
15			☒		50/2			
						BORING TERMINATED AT 15.5 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.		
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
☒	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
■	CAL. MOD. SAMPLE (ASTM D3550)	— – —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.5

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BORING LOG B-6

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1553 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC	25	**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN TO ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA	
				CL	70	**TONALITE (Kcg):** *SANDY CLAY; ORANGE BROWN TO DARK GRAYISH BROWN, MOIST, HARD*	SA	*HIGHLY WEATHERED*
				SC		*CLAYEY SAND; LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE TO COARSE GRAINED*		*LESS WEATHERED*
5				SP-SM	50/1	*POORLY-GRADED SAND-SILTY SAND; GRAYISH BROWN, DAMP TO MOIST, VERY DENSE, FINE TO COARSE GRAINED*	SA	
				SM	50/4	*SILTY SAND; GRAYISH BROWN, DAMP TO MOIST, VERY DENSE, FINE TO COARSE GRAINED*		
10								
15					50/2			
						BORING TERMINATED AT 15.5 FT. NO GROUNDWATER ENCOUNTERED. NO CAVING.		
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
▒	CAL. MOD. SAMPLE (ASTM D3550)	— — —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.6

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PERCOLATION BORING LOG P-1

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1563 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC		**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN TO ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*		
				SM		**TONALITE (Kcg):** *SILTY SAND; LIGHT GRAYISH BROWN, DRY TO DAMP, VERY DENSE, FINE TO COARSE GRAINED*		*HIGHLY WEATHERED*
5						*GRAYISH BROWN, DRY*		*LESS WEATHERED*
						BORING TERMINATED AT 5 FT AND CONVERTED TO A PERCOLATION WELL.		
10								
15								
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
■	CAL. MOD. SAMPLE (ASTM D3550)	— – —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

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APPENDIX B.7

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PERCOLATION BORING LOG P-2

DATE EXCAVATED: JULY 1, 2020 **EQUIPMENT:** CME 95

EXCAVATION DESCRIPTION: 8-INCH DIAMETER AUGER BORING **GPS COORD.:** N/A

GROUNDWATER DEPTH: GROUNDWATER NOT ENCOUNTERED **ELEVATION:** ± 1568 FT MSL

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

DEPTH (FT)	GRAPHIC LOG	BULK SAMPLE	CAL/SPT SAMPLE	SOIL CLASS. (USCS)	BLOWS PER 12-INCHES	SOIL DESCRIPTION (SUMMARY OF SUBSURFACE CONDITIONS; USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LABORATORY	REMARKS
0				SC		**ALLUVIUM (Qal):** *CLAYEY SAND; BROWN TO ORANGE BROWN, DRY TO DAMP, MEDIUM DENSE, FINE TO MEDIUM GRAINED*		
5				SM		**TONALITE (Kcg):** *SILTY SAND; LIGHT GRAYISH BROWN, DRY TO DAMP, VERY DENSE, FINE TO COARSE GRAINED*		*HIGHLY WEATHERED*
						BORING TERMINATED AT 5 FT AND CONVERTED TO A PERCOLATION WELL.		
10								
15								
20								
25								
30								

KEY TO SYMBOLS

▼/▽	GROUNDWATER / STABILIZED	#	ERRONEOUS BLOWCOUNT
☒	BULK SAMPLE	*	NO SAMPLE RECOVERY
⊘	SPT SAMPLE (ASTM D1586)	———	GEOLOGIC CONTACT
▒	CAL. MOD. SAMPLE (ASTM D3550)	— – —	SOIL TYPE CHANGE

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

APPENDIX B.8

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APPENDIX C
RECORDS OF LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

- **CLASSIFICATION:** *Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soils Classification System and are presented on the exploration logs in Appendix B.*

- **MAXIMUM DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557 METHOD A,B,C):** *The maximum dry density and optimum moisture content of typical soils were determined in the laboratory in accordance with ASTM Standard Test D1557, Method A, Method B, Method C.*

- **DENSITY OF SOIL IN PLACE (ASTM D2937):** *In-place moisture contents and dry densities were determined for representative soil samples. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry unit weight is determined in pounds per cubic foot, and the in-place moisture content is determined as a percentage of the soil's dry weight. The results are summarized in the exploration logs presented in Appendix B.*

- **EXPANSION INDEX (ASTM D4829):** *The expansion index of selected materials was evaluated in general accordance with ASTM D4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours.*

- **CORROSIVITY TEST (CAL. TEST METHOD 417, 422, 643):** *Soil PH, and minimum resistivity tests were performed on a representative soil sample in general accordance with test method CT 643. The sulfate and chloride content of the selected sample were evaluated in general accordance with CT 417 and CT 422, respectively.*

- **R-VALUE (ASTM D2844):** *The resistance Value, or R-Value, for near-surface site soils were evaluated in general accordance with California Test (CT) 301 and ASTM D2844. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results.*

- **GRADATION ANALYSIS (ASTM C 136 and/or ASTM D422):** *Tests were performed on selected representative soil samples in general accordance with ASTM D422. The grain size distributions of selected samples were determined in accordance with ASTM C 136 and/or ASTM D422. The results of the tests are summarized on Appendix C.3 through Appendix C.11.*

- **CONSOLIDATION PROPERTIES (ASTM D2435):** *Tests were performed on selected relatively undisturbed soil samples in general accordance with ASTM D2435. The samples were inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the tests are summarized on Appendix C.12.*

Maximum Dry Density and Optimum Moisture Content (ASTM D1557)

Sample Location	Sample Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-2	0 - 4	Orange Brown Clayey Sand	133.5	9.8

Density of Soil in Place (ASTM D2937)

Sample Location	Sample Depth (ft)	Soil Description	Moisture (%)	Dry Density (pcf)
B-2	1.5 - 3	Orange Brown Clayey Sand	12.2	124.4
B-3	5 - 6.5	Orange Brown Silty Sand	10.6	119.3

Expansion Index (ASTM D4829)

Sample Location	Sample Depth (ft)	Expansion Index	Expansion Potential
B-3	0 - 5	40	Low

Resistance Value (Cal. Test Method 301 & ASTM D2844)

Sample Location	Sample Depth (ft)	Soil Description	R-Value
B-2	0 - 4	Orange Brown Silty Sand	17

Corrosivity (Cal. Test Method 417,422,643)

Sample Location	Sample Depth (ft)	pH	Resistivity (Ohm-cm)	Sulfate Content (ppm)	Sulfate Content (%)	Chloride Content (ppm)	Chloride Content (%)
B-2	0 - 4	7.8	1200	66.0	0.007	230	0.023

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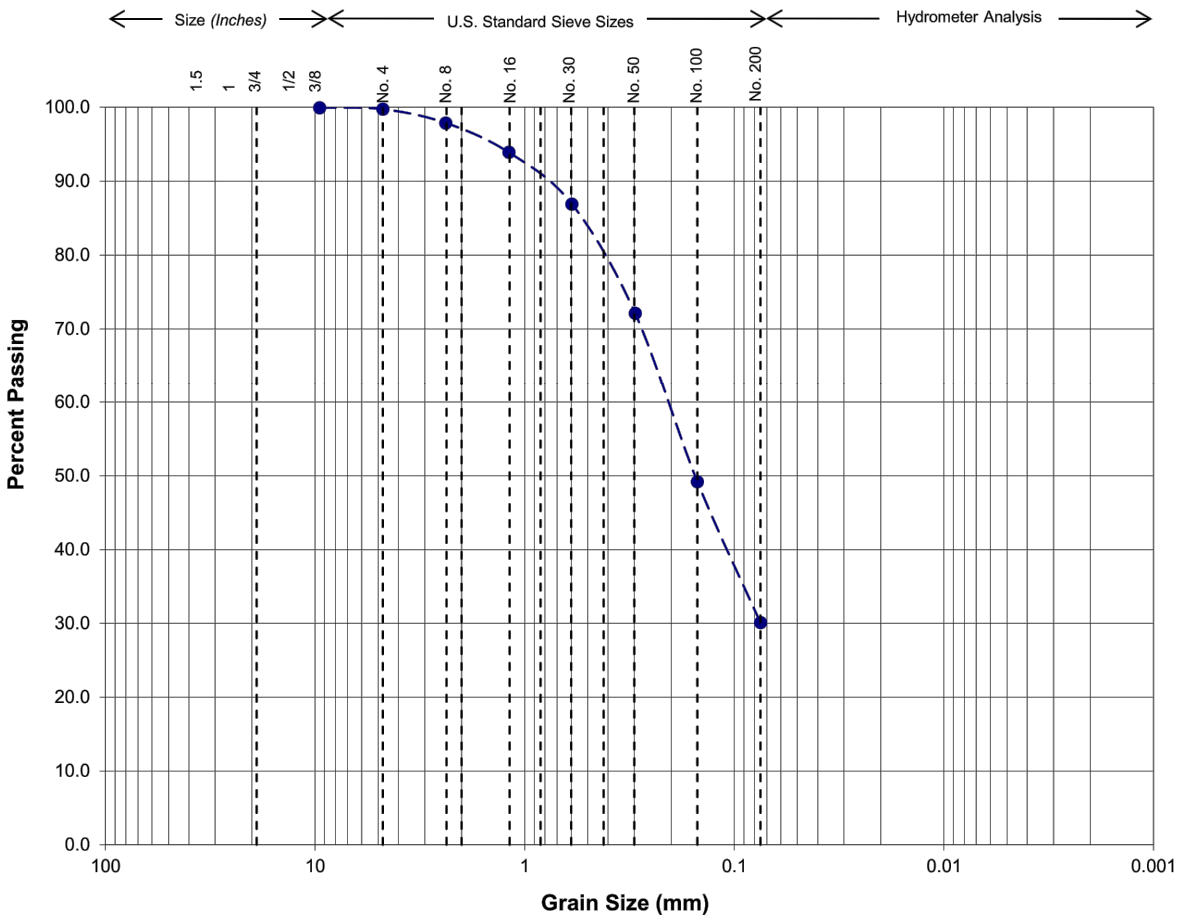
LAB TEST RESULTS

COLE GRADE ROAD FIRE STATION
VALLEY CENTER, CALIFORNIA



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-1

Depth (ft): 1 - 1.5

USCS Soil Type: SC

Passing No. 200 (%): 30

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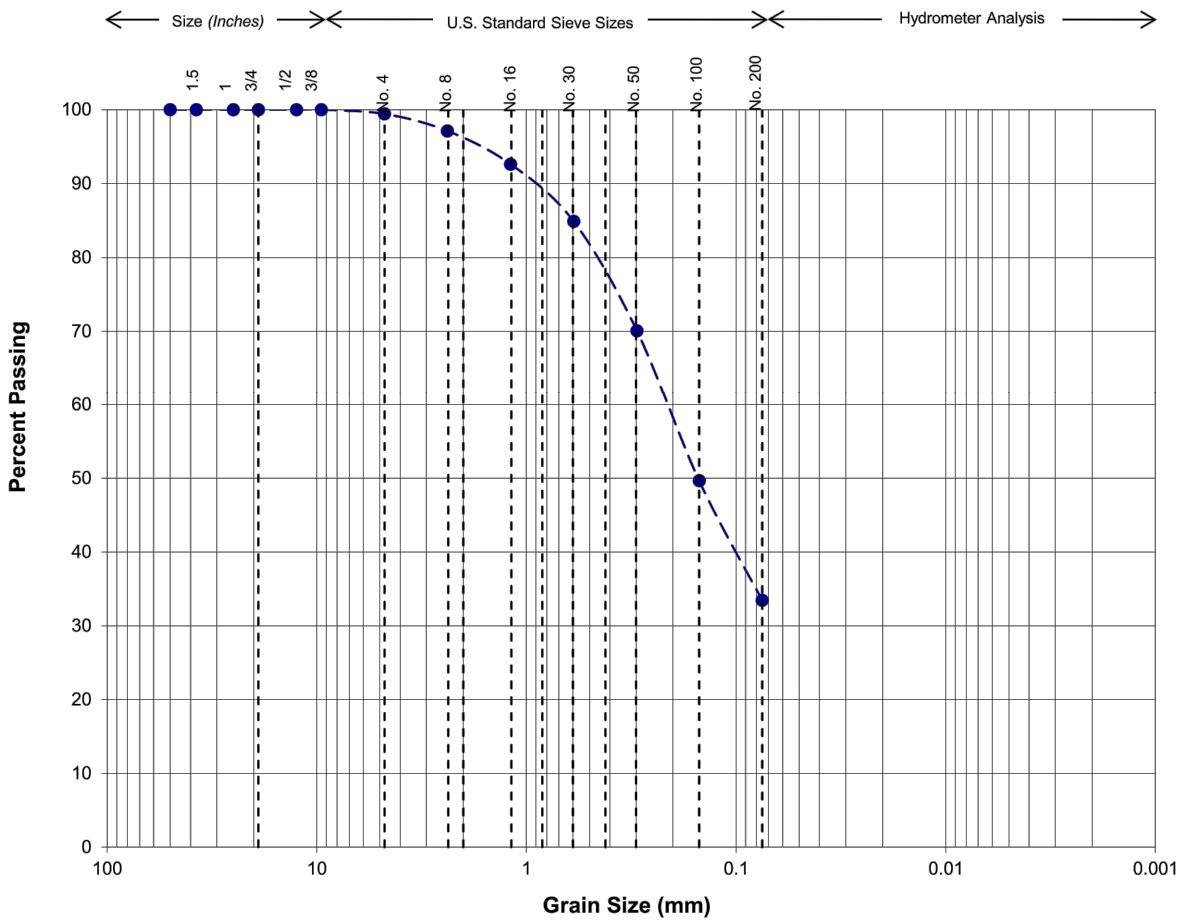
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.3



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-2

Depth (ft): 0 - 1.5

USCS Soil Type: SC

Passing No. 200 (%): 33

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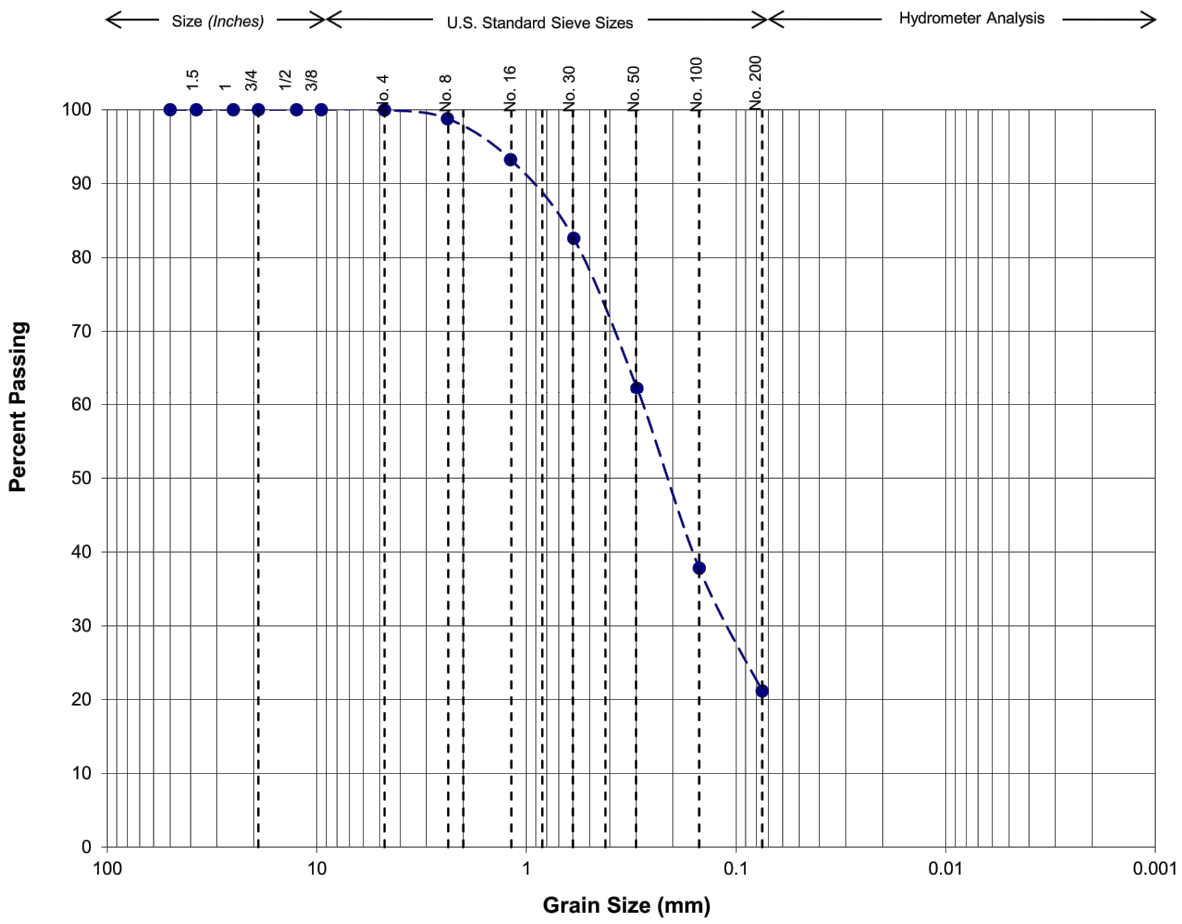
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.4



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-2

Depth (ft): 5 - 6.5

USCS Soil Type: SM

Passing No. 200 (%): 21

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GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

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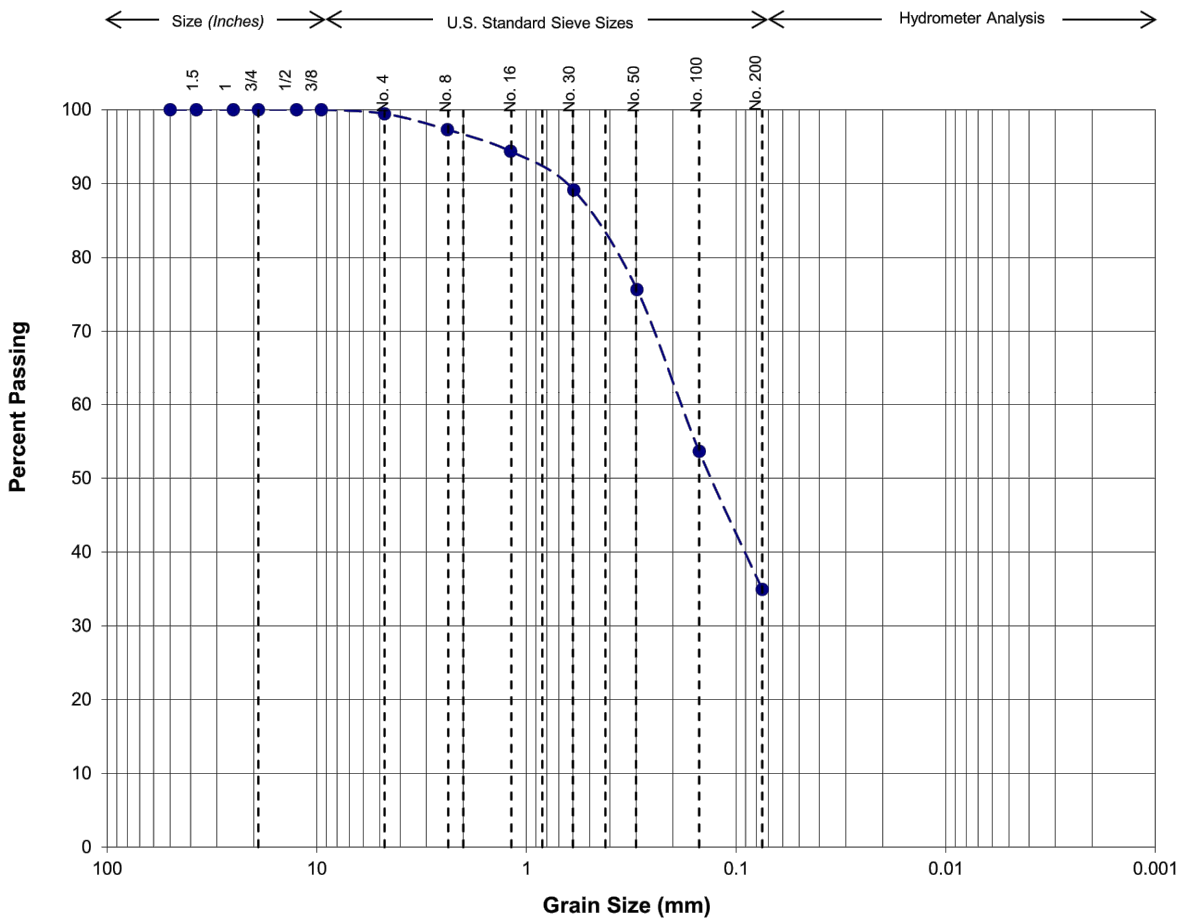

Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 1.5 - 3

USCS Soil Type: SM

Passing No. 200 (%): 35

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GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

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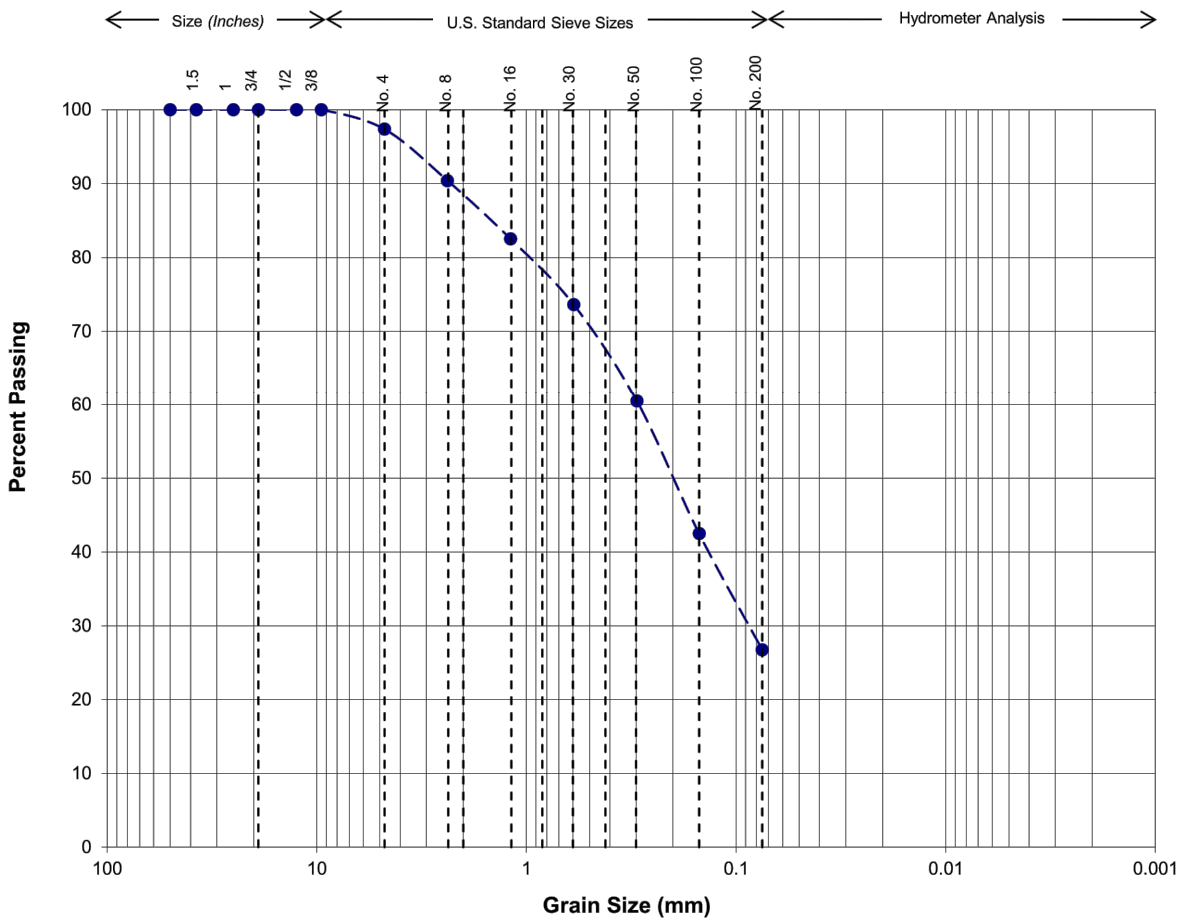

Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 4.5 - 5.5

USCS Soil Type: SM

Passing No. 200 (%): 27

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GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

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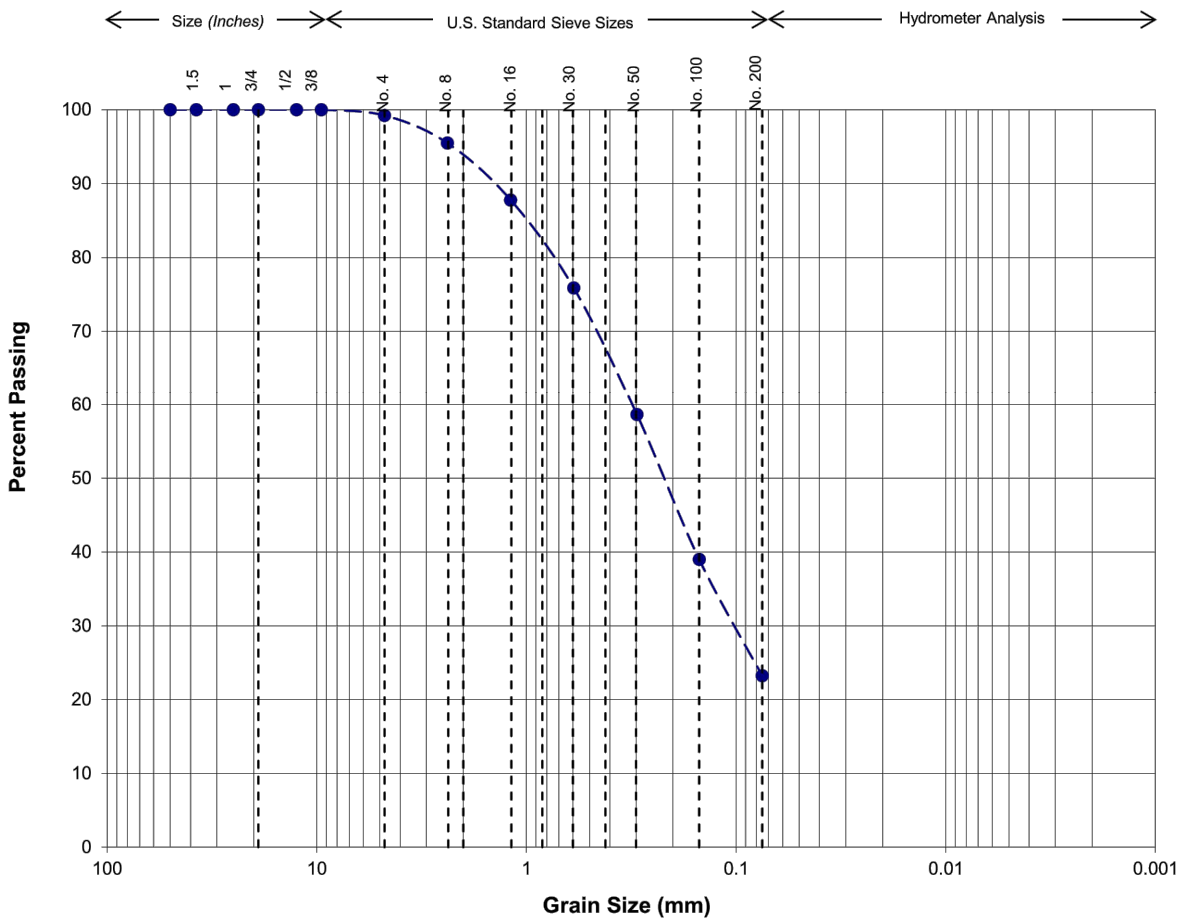

Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 7 - 8.5

USCS Soil Type: SM

Passing No. 200 (%): 23

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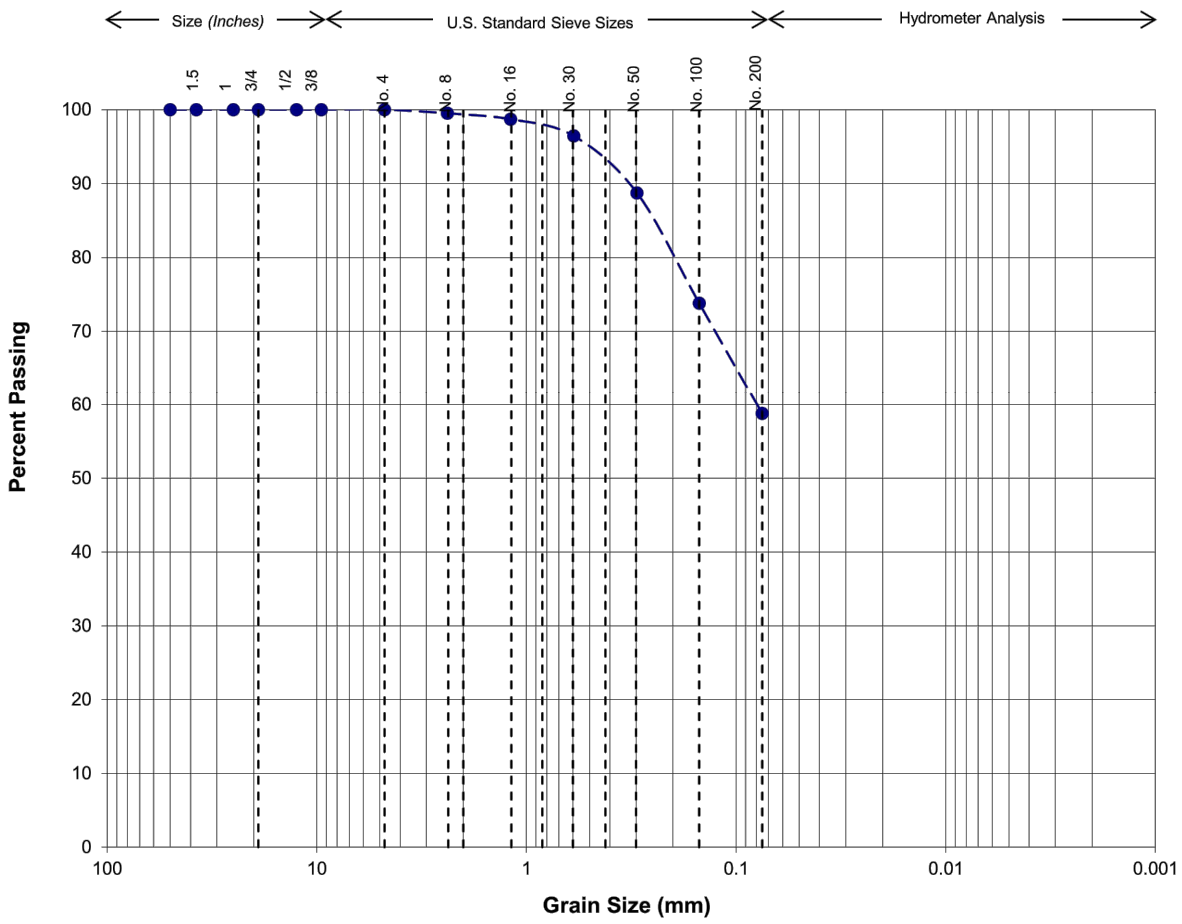
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.8



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-6

Depth (ft): 1 - 2.5

USCS Soil Type: CL

Passing No. 200 (%): 59

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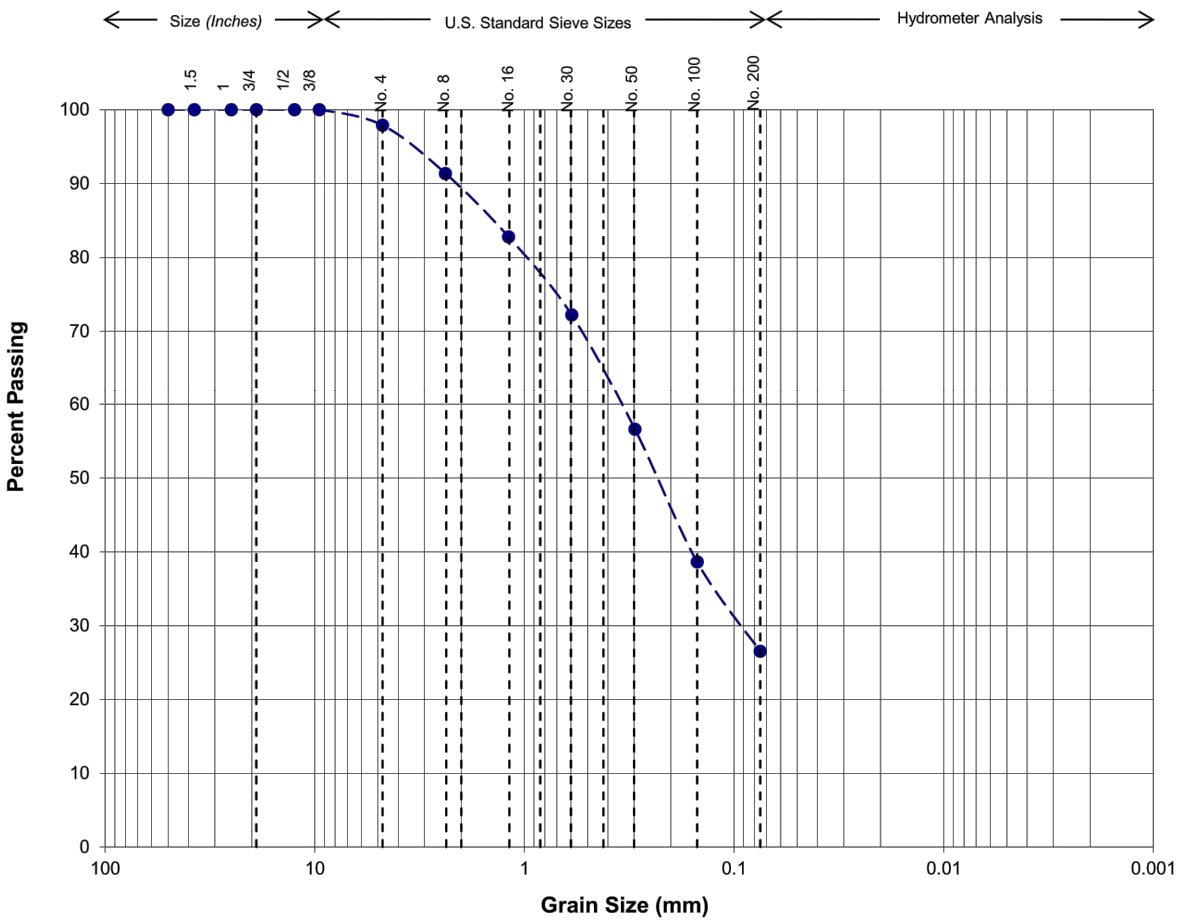
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.9



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-6

Depth (ft): 2.5 - 4

USCS Soil Type: SM

Passing No. 200 (%): 27

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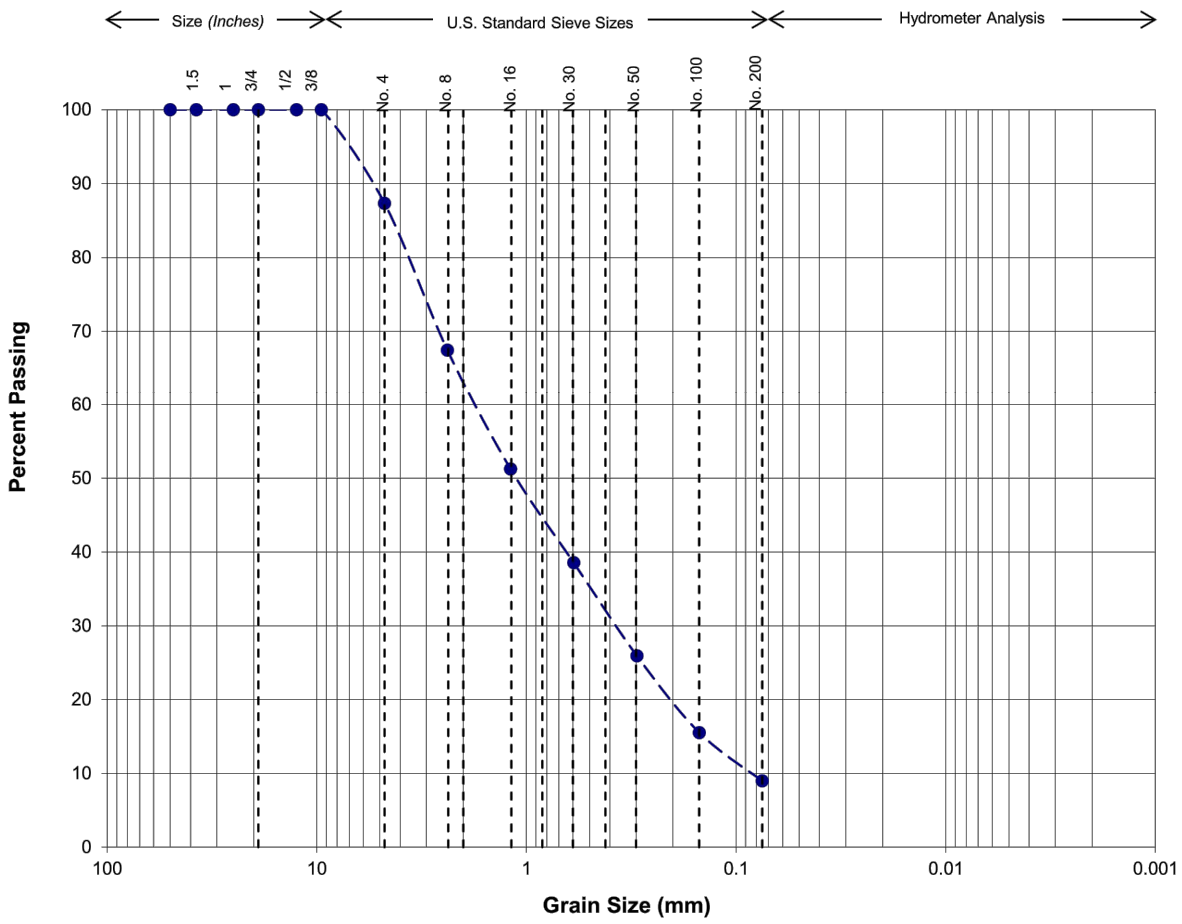
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.10



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-6

Depth (ft): 5 - 6

USCS Soil Type: SP-SM

Passing No. 200 (%): 9

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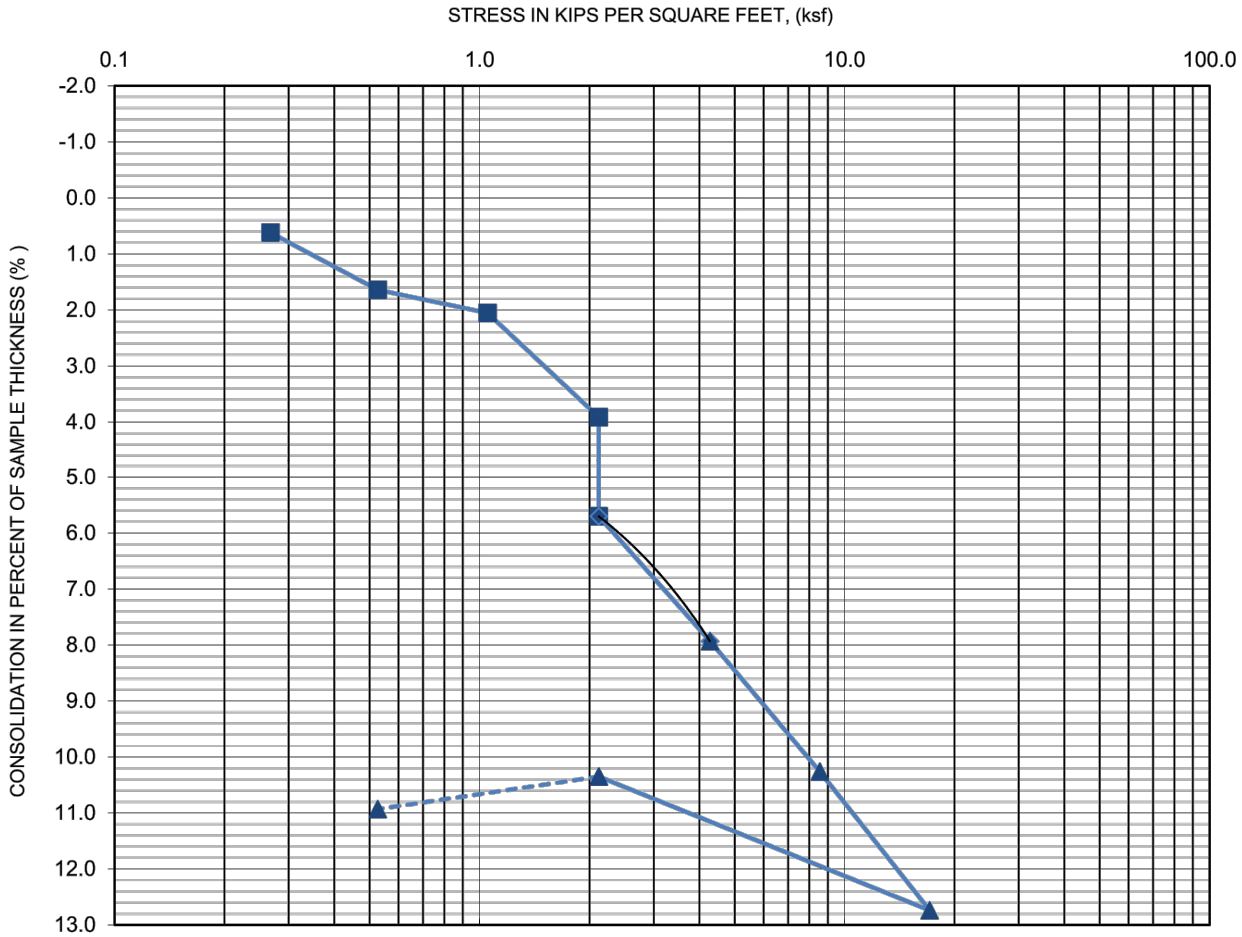
GRADATION ANALYSIS TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.11



Sample Location: B-2

Depth (ft): 1.5 - 3

USCS Soil Type: SM

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CONSOLIDATION TEST RESULTS

COLE GRADE ROAD FIRE STATION

VALLEY CENTER, CALIFORNIA

BY: CLS	DATE: AUG 2020	PROJECT: 2020074	APPENDIX: C.12

Attachment 6 – Improvement Priority Lists for Station No. 1 and 2

Improvement Priority List for Fire Station No. 1

- Increase the height of the apparatus bay doors from approximately 10 feet 7 inches to 12 feet. New apparatus bay doors will be required in addition to modifications to the structure to achieve the increased height.
- Install a new two-stage compressor and construct a compressor enclosure. Plumb the apparatus bay for compressed air
- Design and install a new HVAC system throughout the main fire station building. This task will include consolidating the computer and telecommunications equipment in one location so that it can be effectively cooled. Ductless mini-splits are the preferred HVAC technology, if feasible
- Reconfigure the living space to provide dorm and dayroom space for four persons and to accommodate three refrigerators in the kitchen area
- Modernize the kitchen with updated appliances and countertops
- Upgrade the water heaters
- Provide a covered porch area at the main public entrance
- Reconfigure the front office to include a public counter with security measures and a plan layout counter area
- Behind the public counter, reconfigure the office space to provide several workstations on the perimeter and a centrally located conference table for small meetings
- Reconfigure the workout area to accommodate interior and exterior space

Improvement Priority List for Fire Station No. 2

- Increase the height of the apparatus bay doors from approximately 10 feet to 12 feet. New apparatus bay doors will be required in addition to modifications to the structure to achieve the increased height.
- Design and install a new HVAC system throughout the fire station. Ductless mini-splits are the preferred HVAC technology, if feasible
- Add a urinal to the Men’s restroom
- Reconfigure dorm space to improve functionality and comfort
- Upgrade the vanity in the Captain’s restroom
- Remodel the kitchen to provide space for three refrigerators (to be relocated from the laundry area), update the appliances and countertops
- Provide a screened in area with a half-wall and exercise flooring for the rear patio area where the exercise equipment is located
- Remodel the laundry area to provide storage and an area to fold clothes
- Relocate storage from the area adjacent to the dayroom to the laundry room to free up space to expand the adjacent office to provide three workstations
- Replace and expand the concrete area in the rear of the station
- Provide a “roof” for the existing metal framework to provide a partial enclosure for an antique fire engine

ATTACHMENT 7		
Preliminary Cost Worksheet		
	Subtotals	Totals
Preconstruction Services		
Design Team (Architect and Subconsultants)		
Schematic Design		
Design Development		
Construction Documents		
Subtotal		
Note: Do not include design team construction administration services in the preconstruction services budget		
Design Builder (DB)		
DB Cost for Preconstruction Services (provide breakdown on separate sheet)		
Proposed DB Design Contingency		
Proposed DB Fee for All Pre-Construction Services		
Subtotal		
Total Preconstruction Services Budget		
Construction Services		
General Conditions/General Requirements (provide monthly breakdown on separate sheet, identify staffing levels and hours)		
Proposed DB Contingency (percentage)		
Proposed DB Fee for Construction (percentage)		
Bonds and Insurance		
Performance/Payment Bonds (__%)		
Liability Insurance (__%)		
Builder's Risk (__%)		

Valley Center Fire Protection District Insurance Requirements

Insurance Types and Limits, Indemnification and Best Practices for Contract Services to the Valley Center Fire

Table of Contents

Insurance Requirements

Insurance Requirements for ALL District Contracts

Prior to the beginning of and throughout the duration of the Services, and for any additional period of time as specified below, CONTRACTOR shall, at its sole cost and expense, maintain insurance in conformance with the requirements set forth below. CONTRACTOR shall submit Certificates of Insurance for the District's review and acceptance. The Notice to Proceed shall not be issued, and CONTRACTOR shall not commence Services until such insurance has been accepted by the District.

No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR hereunder.

A. Commercial General Liability

a. CONTRACTOR shall provide Commercial General Liability insurance covering claims for Bodily, Injury, Personal and Advertising Injury, and Property Damage on a policy form that provides coverage at least as broad as coverage provided under the Insurance Services Office (ISO) form CG 00 01, and that includes, but is not limited to, the coverage limits and coverage provisions outlined below.

b. The required coverage limits shall be the greater of the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the Named Insured, including applicable Umbrella or Excess Limits, or the following:

$5,000,000 per Occurrence	Each Pollution Condition;
$5,000,000	Aggregate Liability.
$2,000,000	General Aggregate;
$2,000,000	Products - Completed Operations Aggregate.

c. Coverage must be on an "occurrence" basis.

d. Coverage must be included for "products-completed operations" without any "prior work" coverage limitation or exclusion applicable to any Services to be performed under this Agreement.

e. Contractual Liability coverage at least as broad as coverage provided by the ISO CG 00 01 policy form must be included.

f. To the fullest extent permitted by law, the District and its directors, officers, officials, agents, volunteers, and employees must be covered as *Additional Insureds* on a primary and noncontributory basis The additional insureds must be covered for:
   i. Liability arising out of any premises or property utilized for any Services performed under this Agreement, and
   ii. Liability arising out of or related to this Agreement, including any Services performed hereunder by or on behalf of CONTRACTOR, and

iii. Products and completed operations of CONTRACTOR.

A severability of interests provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the insurer's limits of liability.

B. **Workers' Compensation and Employer's Liability**

Workers' Compensation coverage shall be on a state-approved policy form providing statutory benefits as required by law and Employer's Liability coverage with limits no less than $1,000,000 per accident or disease for all covered losses. If CONTRACTOR is self-insured with respect to Workers' Compensation coverage, CONTRACTOR shall provide a Certificate of Consent to Self-Insure from the California Department of Industrial Relations confirming CONTRACTOR's self-insured status. Such self-insurance shall meet the minimum limit requirements and waive subrogation rights in favor of the District as stated below. If the CONTRACTOR is a sole proprietorship or partnership, with no employees, and is exempt from carrying Workers Compensation insurance, CONTRACTOR must submit a letter to the District stating that he/she is either the owner of the entity or a partner of the entity performing the Services, and is exempt from the State of California's Workers Compensation requirements because he/she has no employees.

CONTRACTOR and its Workers' Compensation insurance must waive any rights of subrogation against the District and its directors, officers, officials, agents, volunteers, and employees, and CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).

C. Excess or Umbrella Liability Insurance

If excess or umbrella policies are used to meet the insurance requirements of this Agreement, they shall provide coverage at least as broad as specified for the underlying coverages, and the full limits of the umbrella or excess coverage shall be available to the District. To the fullest extent permitted by law, the District and its directors, officers, officials, agents, volunteers and employees must be covered as additional insureds and such policy or policies shall contain or be endorsed to contain a provision that coverage shall also apply on a primary and noncontributory basis to the District *before* the District's own primary insurance or self-insurance shall be called upon to protect it as a Named Insured. A severability of interests provision must apply for all additional insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom the claim is made or suit is brought, except with respect to the insurer's limits of liability.

1. Business Auto Liability

a. CONTRACTOR shall provide Business Auto Liability coverage on a policy form that provides coverage at least as broad as coverage provided under ISO Business Auto Coverage form CA 00 01, and that includes, but is not limited to, the coverage limits and coverage provisions outlined below.

b. Coverage must be provided for "Bodily Injury" and "Property Damage" Liability caused by an accident and resulting from the ownership, maintenance or use of covered autos.

c. The required coverage limits shall be the greater of the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the Named Insured, including applicable Umbrella or Excess Limits, or the minimum limits specified below:

   $1,000,000 per Occurrence/Accident for Bodily Injury and Property Damage Liability.

d. Covered "autos" must include all owned, non-owned and hired vehicles.

e. To the fullest extent permitted by law, the District and its directors, officers, officials, agents, volunteers, and employees must be covered as *Additional Insureds* with respect to "any auto" owned, leased, hired or borrowed by CONTRACTOR. The policy(ies) shall contain or be endorsed to contain a provision that coverage shall apply on a primary and noncontributory basis to the District *before* the District's own primary insurance or self-insurance shall be called upon to protect it as a Named Insured.

f. A severability of interests provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the insurer's limits of liability.

g. [**Where applicable**] The policy shall be endorsed to include Transportation Pollution Liability insurance covering materials to be transported by CONTRACTOR in any Services to be performed under this Agreement. Alternatively, this coverage may be provided on the CONTRACTOR's Pollution Liability Policy.

2. <u>Professional Liability (aka Errors and Omissions)</u>
Architects, Engineers, Surveyors and Third-Party Construction Management Entities.

The required coverage limits shall be the greater of the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the Named Insured, including applicable Umbrella or Excess Limits, or the following: $1,000,000 per

occurrence or claim and $2,000,000 aggregate. Coverage may be written on a **claims-made** form. If coverage is on a **claims-made** basis, the coverage must be maintained for at least 3 years after all Services under this Agreement are complete and additional **claims-made** coverage requirements apply as described below.

Pollution Liability

a. CONTRACTOR shall provide pollution liability coverage that includes, but is not limited to, the coverage limits and coverage provisions outlined below.
b. Coverage must be included for bodily injury and property damage, including coverage for loss of use and diminution in property value, and for resultant clean-up costs, arising out of the or resulting from:
   (i) any Services performed under this Agreement, including
   (ii) any storage or transportation, including the loading or unloading of, hazardous wastes, hazardous materials, or contaminants.

   The required coverage limits shall be the greater of the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the Named Insured, including applicable Umbrella or Excess Limits, or the following:

$5,000,000 per Occurrence	Each Pollution Condition;
$5,000,000	Aggregate Liability.

c. Coverage may be written on a **claims-made** form. If coverage is on a **claims-made** basis, the coverage must be maintained for at least 3 years after all Services performed under this Agreement are complete and additional **claims-made** coverage requirements apply as described below.
d. To the fullest extent permitted by law, the District and its directors, officers, officials, agents, volunteers, and employees must be covered as *Additional Insureds by way of an endorsement to the policy.* The policy(ies) shall also contain or be endorsed to contain a provision that coverage shall apply on a primary and noncontributory basis to the District *before* the District's own primary insurance or self-insurance shall be called upon to protect it as a Named Insured.
e. A severability of interests provision must apply for all the additional insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the insurer's limits of liability.

Provisions for All Required Insurance for District Contractors

A. Deductibles, Self-Insurance, Self-Insured Retentions

Any deductibles, self-insurance, or self-insured retentions (SIRs) applicable to required insurance coverage must be declared to and accepted by the District. At the option and

request of the District, CONTRACTOR shall provide documentation of its financial ability to pay the deductible, self-insurance, or SIR.

B. Acceptability of Insurers

Unless otherwise reviewed and accepted by the District, all required insurance must be placed with insurers with a current A. M. Best's rating of no less than A – VII. The insurers shall be admitted, or approved by the Surplus Lines Association, to do business in California.

C. Claims-made Coverage

For any coverage that is provided on a **claims-made** coverage form (which type of form is permitted only where specified in the insurance requirements outlined above):

(i) The retroactive date must be shown, and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.

(ii) Insurance must be maintained and Certificates of Insurance must be provided to the District for at least three (3) years after expiration of this Agreement.

(iii) If coverage is canceled or non-renewed, and not replaced with another **claims-made** policy form with a retroactive date prior to the effective date of this Agreement or the start of any Services related to this Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after expiration of the Agreement.

(iv) If requested by the District, a copy of the policy's claims reporting requirement must be submitted to the District for review.

D. Notice of Claims

CONTRACTOR agrees to provide immediate notice to the District of any loss or claim against CONTRACTOR arising out of or in connection with this Agreement, or Services performed under this Agreement. The District assumes no obligation or liability by such notice, but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve the District.

E. Proof of Compliance

CONTRACTOR agrees to provide evidence of insurance required herein, satisfactory to the District, consisting of Certificates of Insurance, evidencing all of the coverages required. CONTRACTOR agrees, upon request by the District, to provide complete, certified copies of any policies within 10 days of such request. (Copies of policies may be redacted to eliminate premium details.) All Certificates of Insurance must be received and accepted by the District before any Services are performed under this Agreement commences. Acceptance of CONTRACTOR's Certificates of Insurance or any other evidence of insurance coverage does not constitute any guarantee that CONTRACTOR's insurance meets the requirements herein. It is CONTRACTOR's responsibility to ensure its compliance with these insurance requirements. Any actual or alleged failure on the part of the District to obtain proof of insurance required under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the District, in this or any regard.

F. Notice of Cancellation/Non-Renewal/Material Reduction

CONTRACTOR agrees to provide written notice to the District thirty (30) days prior to cancellation of coverage required under this Agreement, or of any material reduction or non-renewal of such coverage, other than for non-payment of premium which shall require a 10-day prior written notification. Replacement of coverage with another policy or insurer, without any lapse in coverage or any reduction below these requirements does not require notice beyond submission to the District of an updated Certificate of Insurance.