PROJECT MANUAL

SITE IMPROVEMENTS / PHASE 2 PAVING

NEVADA UNION HIGH SCHOOL

Grass Valley, California

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DOCUMENT 000100 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Andrew J Pawlowski
2. C 25996

B. Electrical Engineer:

1. Scott Wheeler
2. E 015494

C. Structural Engineer:

1. Dave Hodder
2. S5152

D. Civil Engineer:

1. Bryan McAlister
2. C058570

E. Landscape Architect:

1. Josephine McProud
2. 2090

END OF DOCUMENT 000100

TABLE OF CONTENTS

07 92 00 JOINT SEALANTS

DIVISION 08 - OPENINGS
08 71 00 DOOR HARDWARE

DIVISION 09 - FINISHES
09 91 13 EXTERIOR PAINTING

DIVISION 10 - SPECIALTIES
10 14 00 SIGNAGE

DIVISION 12 - FURNISHINGS
12 93 00 SITE FURNISHINGS

DIVISION 22 - PLUMBING
22 11 13 FACILITY WATER DISTRIBUTION PIPING
22 13 13 FACILITY SANITARY SEWERS

DIVISION DIVISION 26 - ELECTRICAL
26 00 10 BASIC ELECTRICAL REQUIREMENTS
26 05 19 BUILDING WIRE AND CABLE
26 05 26 GROUNDING AND BONDING
26 05 43 UNDERGROUND DUCTS
26 05 53 ELECTRICAL IDENTIFICATION
26 24 13 SWITCHBOARDS
26 28 16 OVERCURRENT PROTECTIVE DEVICES
26 56 00 EXTERIOR LIGHTING

DIVISION 31 - EARTHWORK
31 10 00 SITE CLEARING
31 20 00 EARTH MOVING
CONSTRUCTION SITE BEST MANAGEMENT PRACTICES
31 50 00 EXCAVATION SUPPORT AND PROTECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS
32 12 16 ASPHALT PAVING
32 13 13 CONCRETE PAVING
32 31 13 CHAIN LINK FENCES AND GATES
32 80 00 IRRIGATION SYSTEM
32 90 00 LANDSCAPE PLANTING
32 94 00 PAVEMENT MARKING

PROSPECTIVE BIDDERS ARE REQUIRED TO SUBMIT TO THE DISTRICT A COMPLETED SET OF PREQUALIFICATION DOCUMENTS ON FORMS PROVIDED BY THE DISTRICT. THESE DOCUMENTS WILL BE THE BASIS FOR DETERMINING WHICH BIDDERS ARE QUALIFIED TO BID ON THIS PROJECT.

BIDDING DOCUMENTS

FOR THE

NEVADA JOINT UNION HIGH SCHOOL DISTRICT

FOR

NEVADA UNION HIGH SCHOOL SITE IMPROVEMENTS / PHASE 2 PAVING

AT

NEVADA UNION HIGH SCHOOL

11761 RIDGE ROAD,

GRASS VALLEY, CA 95945

DSA Application No. 02-117368

NEVADA JOINT UNION HIGH SCHOOL DISTRICT
11645 Ridge Road,
Grass Valley, CA 95945

PROSPECTIVE BIDDERS ARE REQUIRED TO SUBMIT TO THE DISTRICT A COMPLETED SET OF PREQUALIFICATION DOCUMENTS ON FORMS PROVIDED BY THE DISTRICT. THESE DOCUMENTS WILL BE THE BASIS FOR DETERMINING WHICH BIDDERS ARE QUALIFIED TO BID ON THIS PROJECT.

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NOTICE INVITING BIDS

NEVADA JOINT UNION HIGH SCHOOL DISTRICT

NOTICE IS HEREBY GIVEN that the Nevada Joint Union High School District, acting by and through its Governing Board, hereinafter referred to as "District", will receive prior to **3:00 p.m. on May 24, 2019** sealed bids for the award of a Contract for the following:

NEVADA UNION HIGH SCHOOL SITE IMPROVEMENTS / PHASE 2 PAVING

New paving along Ali Avenue to Ridge Road and selected parking lots (overlays in some areas), pedestrian path of travel improvements (stairs, ramps, hand rails, treads), underground utility improvements, new site lighting, new student bus shelter, and new landscaping & irrigation.

All bids shall be made and presented only on the forms presented by the District. Bids shall be received at the **NJUHSD District Office at 11645 Ridge Road, Grass Valley, California 95945,** and shall be opened and publicly read aloud at the above state time and place. Any bids received after the time specified above or after any extensions due to material changes shall be returned unopened.

The Contract Time is 152 calendar days. Engineer's estimate is $5.2M.

CONTRACTOR should consult the General Conditions, Supplementary Conditions, and General Requirements regarding Milestones and Liquidated Damages.

Prequalification of Bidders

As a condition of submitting a bid for this Project, and in accordance with California Public Contract Code section 20111.6, prospective bidders are required to submit to the District a completed set of prequalification documents on forms provided by the District. These documents will be the basis for determining which bidders are qualified to bid on this Project.

Bids will not be accepted if a Contractor has not been prequalified. Prequalification documents are available from the Nevada Joint Union High School District Website at www.NJUHSD.com, top tab Measure B. Prequalification documents must be submitted on or before May 12, 2019**.** Contractors will be notified by e-mail of their prequalification rating within a reasonable period of time after submission of their prequalification documents, but not less than five (5) business days prior to the bid opening date.

Contractors will be notified by telephone, fax or by e-mail of their prequalification rating within a reasonable period of time after submission of their prequalification documents, but not less than five (5) business days prior to the bid opening date.

If this Project includes work that will be performed by mechanical, electrical or plumbing ("MEP") subcontractors (contractors that **hold** C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses), such MEP subcontractors must also be prequalified. A list of prequalified MEP subcontractors will be made available by the District to all bidders at least five business days prior to the bid opening date. It is the responsibility of the bidder to ensure that all MEP subcontractors **holding** any of the licenses listed above are properly prequalified before submitting a bid. This prequalification requirement applies even if

the subcontractor will perform, or is designated to perform, work that does not require one of the licenses listed above, but the subcontractor **holds** one of the licenses listed above.

There are No Additive or Deductive Bid Alternates

Miscellaneous Information

Bids shall be received in the place identified above, and shall be opened and publicly read aloud at the above-stated time and place.

The bid documents are available at the **Nevada County Contractors' Association** (www.nccabuildingpros.com), 149 Crown Point Circle #A, Grass Valley, CA 95945; the **Placer County Contractors Association / The El Dorado Builders Exchange** (www.placerbx.com), 10656 Industrial Ave #160, Roseville, CA 95678); **Dodge Data & Analytics,** 300 American Metro Blvd. Suite 185, Hamilton, NJ 08619 (www.construction.com); **Construction Bidboard** (www.ebidboard.com), 11622 El Camino Real, #100, San Diego, CA 92130; or ordered from **The Real Graphic Source** (at contractor's expense) by calling 530-273-8835. Additionally, bid documents may be downloaded from the District's website, www.njuhsd.com, under top tab Measure B.

There will be a mandatory Pre-Bid Conference at 10:00 a.m. on May 15th at Nevada Union High School. Meet at the main entrance to the school by the flagpole. Any Contractor bidding on the Project who fails to attend the entire mandatory job walk and conference will be deemed a non-responsive bidder and will have its bid returned unopened.

Each bidder shall be a licensed contractor pursuant to the California Business and Professions Code, and be licensed to perform the work called for in the Contract Documents. The successful bidder must possess a valid and active **Class A** License at the time of bid and throughout the duration of this Contract. The Contractor's California State License number shall be clearly stated on the bidder's proposal.

Subcontractors shall be licensed pursuant to California law for the trades necessary to perform the Work called for in the Contract Documents.

Each bid must strictly conform with and be responsive to the Contract Documents as defined in the General Conditions.

The District reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding.

Each bidder shall submit with its bid — on the form furnished with the Contract Documents — a list of the designated subcontractors on this Project as required by the Subletting and Subcontracting Fair Practices Act, California Public Contract Code section 4100 et seq.

In accordance with California Public Contract Code section 22300, the District will permit the substitution of securities for any moneys withheld by the District to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the District, or with a state or federally chartered bank as the escrow agent, who shall then pay such moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Each bidder's bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of bid as a guarantee that the bidder will enter into the proposed Contract, if the same is awarded to such bidder, and will provide the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event of failure to enter into said Contract or provide the necessary documents, said security will be forfeited.

The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. The District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the Contract. These per diem rates, including holiday and overtime work, as well as employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the District, and are also available from the Director of the Department of Industrial Relations. Pursuant to California Labor Code section 1720 et seq., it shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in the Labor Code, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

The Contractor and all subcontractors shall furnish certified payroll records as required pursuant Labor Code section 1776 directly to the Labor Commissioner in accordance with Labor Code section 1771.4 on at least on a monthly basis (or more frequently if required by the District or the Labor Commissioner) and in a format prescribed by the Labor Commissioner. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

Separate payment and performance bonds, each in an amount equal to 100% of the total Contract amount, are required, and shall be provided to the District prior to execution of the Contract and shall be in the form set forth in the Contract Documents.

All bonds (Bid, Performance, and Payment) must be issued by a California admitted surety as defined in California Code of Civil Procedure section 995.120.

Where applicable, bidders must meet the requirements set forth in Public Contract Code section 10115 et seq., Military and Veterans Code section 999 et seq. and California Code of Regulations, Title 2, Section 1896.60 et seq. regarding Disabled Veteran Business Enterprise ("DVBE") Programs. Forms are included in this Bid Package.

Any request for substitutions pursuant to Public Contract Code section 3400 must be made at the time of Bid on the Substitution Request Form set forth in the Contract Documents and included with the bid.

No telephone or facsimile machine will be available to bidders on the District premises at any time.

It is each bidder's sole responsibility to ensure its bid is timely delivered and received at the location designated as specified above. Any bid received at the designated location after the scheduled closing time for receipt of bids shall be returned to the bidder unopened.

NEVADA JOINT UNION HIGH SCHOOL DISTRICT

INSTRUCTIONS TO BIDDERS

1. Preparation of Bid Form. Proposals under these specifications shall be submitted on the blank forms furnished herewith at the time and place stated in the Notice Inviting Bids. All blanks in the bid form must be appropriately filled in, and all proposed prices must be stated clearly and legibly in both words and numerals. All bids must be signed by the bidder in permanent blue ink and submitted in sealed envelopes, bearing on the outside, the bidder's name, address, telephone number, and California Contractor's License number, and the name of the Project for which the bid is submitted. The District reserves the right to reject any bid if all of the above information is not furnished. It is each bidder's sole responsibility to ensure its bid is timely delivered and received at the location designated as specified above. Any bid received at the designated location after the scheduled closing time for receipt of bids shall be returned to the bidder unopened.

2. Bid Security. Each bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District, in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of such bidder's bid as a guarantee that the bidder will enter into the Contract, if the same is awarded to such bidder, and will provide the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event that a bidder is awarded the Contract and such bidder fails to enter into said Contract or provide the surety bond or bonds within five (5) calendar days after award of the Contract to bidder, said security will be forfeited.

3. Signature. The bid form, all bonds, all designations of subcontractors, the Contractor's Certificate, the Agreement, and all Guarantees must be signed in permanent blue ink in the name of the bidder and must bear the signature in longhand of the person or persons duly authorized to sign the bid.

If bidder is a corporation, the legal name of the corporation shall first be set forth, together with two signatures: one from the President and one from the Secretary or Assistant Secretary. Alternatively, the signature of other authorized officers or agents may be affixed, if a certified copy of the resolution of the corporate board of directors authorizing them to do so is provided to the District. Such documents shall include the title of such signatories below the signature and shall bear the corporate seal.

If bidder is a partnership, the true name of the firm shall first be set forth, together with the names of all persons comprising the partnership or co-partnership. The bid must be signed by all partners comprising the partnership unless proof in the form of a certified copy of a statement of partnership acknowledging the signer to be a general partner is presented to the District, in which case the general partner may sign.

Bids submitted as joint ventures must so state and be signed by each joint venturer.

Bids submitted by individuals must be signed by the bidder unless an up to date power- of-attorney is on file in the District office, in which case, said person may sign for the individual.

The above rules also apply in the case of the use of a fictitious firm name. In addition, however, where a fictitious name is used, it must be so indicated in the signature.

4. Modifications. Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, or any other modification of the bid form which is not specifically called for in the Contract Documents may result in the District's rejection of the bid as not being responsive to the Notice Inviting Bids. **No oral or telephonic modification of any bid submitted will be considered**.

5. Erasures, Inconsistent or Illegible Bids. The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction creates no inconsistency and is suitably authenticated by affixing in the margin immediately opposite the correction the signature or signatures of the person or persons signing the bid. In the event of inconsistency between words and figures in the bid price, words shall control figures. In the event that the District determines that any bid is unintelligible, inconsistent, or ambiguous, the District may reject such bid as not being responsive to the Notice Inviting Bids.

6. Examination of Site and Contract Documents. Each bidder shall visit the site of the proposed work and become fully acquainted with the conditions relating to the construction and labor so that the facilities, difficulties, and restrictions attending the execution of the work under the Contract are fully understood. Bidders shall thoroughly examine and be familiar with the drawings and specifications and all others documents and requirements that are attached to and/or contained in the Project Manual or other documents issued to bidders. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, addendum, or other document or to visit the site and become acquainted with conditions there existing shall not relieve any bidder from obligations with respect to the bid or to the contract. The submission of a bid shall be taken as prima facie evidence of compliance with this Section. Bidders shall not, at any time after submission of the bid, dispute, complain, or assert that there were any misunderstandings with regard to the nature or amount of work to be done.

7. Withdrawal of Bids. Any bid may be withdrawn, either personally or by written request, at any time prior to the scheduled closing time for receipt of bids. The bid security for bids withdrawn prior to the scheduled closing time for receipt of bids, in accordance with this paragraph, shall be returned upon demand therefor.

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

8. Agreements, Insurance and Bonds. The Agreement form which the successful bidder, as Contractor, will be required to execute, and the forms and amounts of surety bonds and insurance endorsements which Contractor will be required to be furnished at the time of execution of the Agreement, are included in the bid documents and should be carefully examined by the bidder. The number of executed copies of the Agreement, the Performance Bond, and the Payment Bond required is two (2). Payment and Performance bonds must be executed by an admitted surety insurer as defined in Code of Civil Procedure 995.120.

9. Interpretation of Plans and Documents/Pre-Bid Clarification. If any prospective bidder is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in, or omissions, a written request for an interpretation or correction thereof may be submitted to the District. The bidder submitting the request shall be responsible for its prompt delivery. **Any interpretation or correction of the Contract Documents will only be made by Addendum duly issued, and a copy of such Addendum will be made available for each contractor receiving a set of the Contract Documents.** No person is authorized to make any oral interpretation of any provision in the Contract Documents, nor shall any oral interpretation be binding on the District. If discrepancies on drawings, specifications or elsewhere in the Contract Documents are not covered by addenda, bidder shall include in their bid methods of construction

and materials for the higher quality and complete assembly. Each request for clarification shall be submitted in writing, via email, to only the following persons:

TO: Andrew Pawlowski, ajp@sitelinearch.com (Architect of Record)
CC: Jordan Kohler, jkohler@njuhsd.com (District Director of Facilities and Construction)

Each transmitted request shall contain the name of the person and/or firm filing the request, address, telephone, and fax number, Specifications and/or Drawing number. Bidder is responsible for the legibility of hand written requests. Pre-bid clarification request shall be filed a minimum of **six (6)** days prior to bid opening. Requests received less than **six (6)** days before bid opening shall not be considered or responded to. A written response to timely pre-bid clarifications requests which materially affects the bidders price will be made by Addendum issued by the District not less than seventy-two (72) hours prior to bid opening.

10. Bidders Interested in More Than One Bid. No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one prime bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a proposal or quoting prices to other bidders or making a prime proposal.

11. Award of Contract. The Contract will be awarded to the lowest responsive responsible bidder by action of the governing Board. The District reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding. In the event an award is made to bidder, and such bidder fails or refuses to execute the Contract and provide the required documents within five (5) calendar days after award of the Contract to bidder, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders**. Each bid must conform and be responsive to the Contract Documents as defined in the General Conditions**.

12. Bid Protest Procedure. Any bidder may file a bid protest. The protest shall be filed in writing with the District's Director of Facilities and Construction not more than five (5) business days after the date of the bid opening. An e-mail address shall be provided and by filing the protest, protesting bidder consents to receipt of e-mail notices for purposes of the protest and protest related questions and protest appeal, if applicable. The protest shall specify the reasons and facts upon which the protest is based.

a. Resolution of Bid Controversy: Once the bid protest is received, the apparent lowest responsible bidder will be notified of the protest and the evidence presented. If appropriate, the apparent low bidder will be given an opportunity to rebut the evidence and present evidence that the apparent low bidder should be allowed to perform the Work. If deemed appropriate by the District, an informal hearing will be held. District will issue a written decision within fifteen (15) calendar days of receipt of the protest, unless factors beyond the District's reasonable control prevent such resolution. The decision on the bid protest will be copied to all parties involved in the protest.

b. Appeal: If the protesting bidder or the apparent low bidder is not satisfied with the decision, the matter may be appealed to the District Superintendent or their designee, within three (3) business days after receipt of the District's written decision on the bid protest. The appeal must be in writing and sent via overnight registered mail with all accompanying information relied upon for the appeal and an e-mail address from which questions and responses may be provided to:

Superintendent Brett McFadden
Nevada Joint Union High School District
11645 Ridge Road, Grass Valley, CA 95945

c. Appeal Review: The District Superintendent or their designee shall review the decision on the bid protest with the Director of Facilities and Construction and issue a written response to the appeal, or if appropriate, appoint a Hearing Office to conduct a hearing and issue a written decision. The written decision of the Superintendent (or their designee) or the Hearing Officer shall be rendered within fifteen (15) calendar days and shall state the basis for the decision. The decision concerning the appeal will be final and not subject to any further appeals.

d. Reservation of Rights to Proceed with Project Pending Appeal. The District reserves the right to proceed to award the Project and commence construction pending an Appeal. If there is State Funding or a critical completion deadline, the District may choose to shorten the time limits set forth in this Section if written notice is provided to the protesting party. E-mailed notice with a written confirmation sent by First Class Mail shall be sufficient to constitute written notice. If there is no written response to a written notice shortening time, the District may proceed with the award.

e. Finality. Failure to comply with this Bid Protest Procedure shall constitute a waiver of the right to protest and shall constitute a failure to exhaust the protesting bidder's administrative remedies.

13. Alternates. If alternate bids are called for, the Contract may be awarded at the election of the Governing Board to the lowest responsible and responsive bidder using the method and procedures outlined in the Notice Inviting Bids and as specified in the section entitled Alternate/Deductive Bid Alternates.

a. Subcontractor Listing for Alternates. If alternate bids are called for and the bidder intends to use different or additional subcontractors, a separate list of subcontractors must be submitted for each such alternate.

14. Evidence of Responsibility. Upon the request of the District, a bidder whose bid is under consideration for the award of the Contract shall submit promptly to the District satisfactory evidence showing the bidder's financial resources, surety and insurance claims experience, construction experience, completion ability, workload, organization available for the performance of the Contract, and other factors pertinent to a Project of the scope and complexity involved.

15. Listing Subcontractors. Each bidder shall submit with his bid, on the form furnished with the Contract Documents, a list of the names, license numbers, scopes of work, locations of the places of business, contact information, and Department of Industrial Relations ("DIR") registration numbers of each subcontractor who will perform work or labor or render service to the bidder in or about the project, or a subcontractor who under subcontract to the bidder, specially fabricates and installs a portion of the work, in an amount in excess of one-half of 1 percent of the bidder's total bid as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100, et seq.) Pursuant to Labor Code section 1725.5, all subcontractors (of any tier) performing work on this Project must be properly registered with DIR.

16. Workers' Compensation. In accordance with the provisions of Labor Code section 3700, the successful bidder as the Contractor shall secure payment of compensation to all employees. The Contractor shall sign and file with the District the following certificate prior to performing the work under this contract: "I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract." The form of such certificate is included as a part of the Bid Documents.

17. Contractor's License. To perform the work required by this notice, the Contractor must possess the Contractor's License as specified in the Notice Inviting Bids, and the Contractor must maintain the

license throughout the duration of the contract. If, at the time of bid, bidder is not licensed to perform the Project in accordance with Division 3, Chapter 9, of the Business and Professions Code for the State of California and the Notice to Contractors calling for bids, such bid will not be considered and the Contractor will forfeit its bid security to the District.

18. Anti-Discrimination. It is the policy of the District that in connection with all work performed under contracts, there be no discrimination against any prospective or active employee engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age, or marital status. The Contractor agrees to comply with applicable federal and California laws, including, but not limited to, the California Fair Employment and Housing Act, beginning with Government Code section 12900 and Labor Code section 1735. In addition, the Contractor agrees to require like compliance by any subcontractors employed on the work by such Contractor.

19. Preference for Materials and Substitutions.

a. One Product Specified. Unless the Plans and Specifications state that no Substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, construction, or any specific name, make, trade name, or catalog number, with or without the words, "or equal," such specification shall be read as if the language "or equal" is incorporated.

b. Request for Substitution. Bidder may, unless otherwise stated, offer any material, process, article, etc., which is materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Document. If bidder desires to offer a Substitution for a Specified Item, such bidder must make a request in writing on the District's Substitution Request Form ("Request Form") and submit the completed Request Form with the bidder's bid. The Request Form must be accompanied by evidence as to whether the proposed substitution:

1) Is equal in quality, service, and ability to the Specified Item as demonstrated by a side by side comparison of key characteristics and performance criteria (CSI comparison chart);
2) Will entail no changes in detail, construction and scheduling of related work;
3) Will be acceptable in consideration of the required design and artistic effect;
4) Will provide no cost disadvantage to the District;
5) Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
6) Will require no change in the Contract Time.

In completing the Request Form, bidder must state with respect to each requested substitution whether bidder will agree to provide the Specified Item in the event that the District denies bidder's request for substitution of a Specified Item. In the event that bidder does not agree in the Request Form to provide the Specified Item and the District denies the requested Substitution, the bidder's bid shall be considered non-responsive and the District may award the Contract to the next lowest bidder or in its sole discretion, release all bidders. In the event that bidder has agreed in the Request Form to provide the Specified Item and the District denies bidder's requested substitution for a Specified Item, bidder shall execute the Agreement and provide the Specified Item without any additional cost or charge to the District, and if bidder fails to execute the Agreement with the Specified Item(s), bidder's bid bond will be forfeited.

After the bids are opened, the apparent lowest bidder shall provide, within five (5) calendar days of opening such bids, any and all Drawings, Specifications, samples, performance data, calculations,

and other information as may be required to assist the Architect and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by bidder, the District will make its final decision as to whether the bidder's request for Substitution for any Specified Items will be granted. The District shall have sole discretion in deciding as to whether a proposed request for Substitution is equal to or better than a Specified Item. Any request for Substitution which is granted by the District shall be documented and processed through a Change Order. The District may condition its approval of any Substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the Substitution. Any and all risks of delay due to DSA, or any other governmental agency having jurisdiction shall be on the bidder.

20. Disqualification of Bidders and Proposals. More than one proposal for the same work from any individual, firm, partnership, corporation, or association under the same or different names will not be accepted; and reasonable grounds for believing that any bidder is interested in more than one proposal for the work will be cause for rejecting all proposals in which such bidder is interested and the bidder will forfeit their bid security to the District.

21. Unbalanced or Altered Bids. Proposals in which the prices are obviously unbalanced, and those which are incomplete or show any alteration of form, or contain any additions or conditional or alternate bids that are not called for or otherwise permitted, may be rejected. A proposal on which the signature of the bidder has been omitted may be rejected. If, in the District's sole discretion, it determines any pricing, costs or other information submitted by a bidder may result in an unbalanced bid, the District may deem such bid non-responsive. A bid may be determined by the District to be unbalanced if the bid is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the District even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advanced payment.

22. Employment of Apprentices. The Contractor and all Subcontractors shall comply with the provisions of California Labor Code including, but not limited to sections 1777.5, 1777.6, and 1777.7 concerning the employment of apprentices. The Contractor and any Subcontractor under him shall comply with the requirements of said sections, including applicable portions of all subsequent amendments in the employment of apprentices; however, the Contractor shall have full responsibility for compliance with said Labor Code sections, for all apprenticeable occupations, regardless of any other contractual or employment relationships alleged to exist.

23. Non-Collusion Declaration. Public Contract Code section 7106 requires bidders to submit declaration of non-collusion with their bids. This form is included with the bid documents and must be signed and dated by the bidder under penalty of perjury.

24. Wage Rates, Travel and Subsistence.

a. The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. Pursuant to Labor Code section 1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the contract. Copies are available from the District to any interested party on request and are also available from the Director of the

Department of Industrial Relations. The Contractor shall obtain copies of the above-referenced prevailing wage sheets and post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

b. Any worker employed to perform work on the Project and such work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

c. Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

d. These per diem rates, including holiday and overtime work, and employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the administrative office of the District, located as noted above and are also available from the Director of the Department of Industrial Relations. It is the Contractor's responsibility to ensure the appropriate prevailing rates of per diem wages are paid for each classification. It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

25. DIR Registration of Contractor and Subcontractors. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

This Project is a public works project as defined in Labor Code section 1720. Each contractor bidding on this Project and all subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with DIR and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. For more information and up to date requirements, contractors are recommended to periodically review the DIR's website at www.dir.ca.gov. Contractor shall be solely responsible for ensuring compliance with Labor Code section 1725.5 as well as any requirements implemented by DIR applicable to its services or its subcontractors throughout the term of the Agreement and in no event shall contractor be granted increased payment from the District or any time extensions to complete the Project as a result of contractor's efforts to maintain compliance with the Labor Code or any requirements implemented by the DIR. Failure to comply with these requirements shall be deemed a material breach of this Agreement and grounds for termination for cause. The contractor and all subcontractors shall furnish certified payroll records as required pursuant Labor Code section 1776 directly to the Labor Commissioner in accordance with Labor Code section 1771.4 on at least on a monthly basis (or more frequently if required by the District or the Labor Commissioner) and in a format prescribed by the Labor Commissioner. The District reserves the right to withhold contract payments if the District is notified, or determines as the result of its own investigation, that contractor is in violation of any of the requirements set forth in Labor Code section 1720 et seq. at no penalty or cost to the District. Monitoring and enforcement of the prevailing wage laws and

related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

26. No Telephone or Facsimile Availability. No telephone or facsimile machine will be available to bidders on the District premises at any time.

27. Obtaining Bidding Documents. Nevada Joint Union High School District Bidding Documents may be obtained from:

Nevada County Contractors' Association (www.nccabuildingpros.com), 149 Crown Point Circle #A, Grass Valley, CA 95945; the **Placer County Contractors Association / The El Dorado Builders Exchange** (www.placerbx.com), 10656 Industrial Ave #160, Roseville, CA 95678); **Dodge Data & Analytics,** 300 American Metro Blvd. Suite 185, Hamilton, NJ 08619 (www.construction.com); **Construction Bidboard** (www.ebidboard.com), 11622 El Camino Real, #100, San Diego, CA 92130; or ordered from **The Real Graphic Source** (at contractor's expense) by calling 530-273-8835. Bid documents may be downloaded from the District's website, www.njuhsd.com, under top tab Measure B.

Bidder shall utilize a complete set of Bidding Documents in preparing a bid. The failure or omission of bidder to receive any Bidding Document, form, instrument, Addendum, or other document shall not relieve bidder from any obligations with respect to the bid and/or Contract.

28. Addenda. Clarification or any other notice of a change in the Bidding Documents will be issued only by the District and only in the form of a written Addendum, transmitted by fax, e-mail, or available for pick up to all who are known by the issuing office to have received a complete set of Bidding Documents. Any other purported Addenda are void and unenforceable.

Bidder is responsible for ascertaining the disposition of all Addenda issued regardless of District notification and to acknowledge all Addenda in the submitted sealed bid prior to the bid opening. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for inspection. Each Addendum will be numbered, dated, and identified with the Project number. Oral statements or any instructions in any form, other than Addendum as described above, shall be void and unenforceable. Addenda issued by the District and not noted as being acknowledged by bidder as required in the Bid Form, may result in the bid being deemed non-responsive.

29. Debarment. Bidder may also be subject to debarment, in addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

a. Intentionally or with reckless disregard, violated any term of a contract with the District

b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;

c. Committed an act or offense which indicates a lack of business integrity or business honesty; or,

d. Made or submitted a false claim against the District or any other public entity (See Government Code section 12650, et seq., and Penal Code section 72)

CHECKLIST OF MANDATORY BID FORMS

(For Contractor's use and reference only. Additional documents may be required so bidders should carefully review all Contract Documents and Bid Documents)

- ❑ Designation of Subcontractors
- ❑ Bid Form
- ❑ Contractor's Certificate Regarding Workers Compensation
- ❑ Non-Collusion Declaration
- ❑ Bid Bond (or Bid Guarantee form if Security is other than Bid Bond)
- ❑ Substitution Request Form (If Substitution Request Form is not submitted then NO Substitutions will be allowed after the bids are opened)
- ❑ Acknowledgment of Bidding Practices Regarding Indemnity
- ❑ DVBE Participation Statement
- ❑ Contractor's Certificate Regarding Drug-Free Work Place
- ❑ Contractor's Certificate Regarding Alcoholic Beverage and Tobacco-Free Campus Policy

PRE-BID CLARIFICATION FORM (For Contractor's Use)

PROJECT NAME:	NUHS Site Improvements / Phase 2 Paving		
DSA APPLICATION NUMBER:	02-117368		
TO:	Andrew Pawlowski Jordan Kohler	EMAIL:	ajp@sitelinearch.com jkohler@njuhsd.com

DATE:			
FROM:		EMAIL:	
DOCUMENT/DIVISION NUMBER:		DRAWING NUMBER:	

REQUESTED CLARIFICATION:
RESPONSE TO CLARIFICATION:

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.,) and any amendments thereof, each Bidder shall set forth below: (a) the name, license number, and location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor, who will perform work or labor or work or improvement to be performed under this Contract, or a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the work or improvements according to detailed Drawings contained in the Plans and Specifications in an amount in excess of one-half of one percent of the Contractor's total bid; and (b) the portion and description of the work which will be done by each subcontractor under this Act. The Contractor shall list only one subcontractor for each such portion as is defined by the Contractor in this bid. All subcontractors shall be properly licensed by the California State Licensing Board.

If a Contractor fails to specify a subcontractor, or if a Contractor specifies more than one subcontractor for the same portion of work to be performed under the Contract in excess of one-half of one percent of the Contractor's total bid, the Contractor shall be deemed to have agreed that the Contractor is fully qualified to perform that portion, and that the Contractor alone shall perform that portion.

No Contractor whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontractor to be voluntarily assigned or transferred or allow the relevant portion of the work to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the Contractor's total bid where the original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act.

Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the Contractor's total bid where no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding, reduced to writing as a public record, of the authority awarding this Contract setting forth the facts constituting the emergency or necessity.

All subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project.

NOTE: If alternate bids are called for and bidder intends to use different or additional subcontractors on the alternates, a separate list of subcontractors must be provided for each such Alternate.

DESIGNATION OF SUBCONTRACTORS FORM

Scope of Work	Name of Subcontractor	Location & Place of Business	License Type and Number	DIR Registration Number	*E-Mail & Telephone**

Scope of Work	Name of Subcontractor	Location & Place of Business	License Type and Number	DIR Registration Number	*E-Mail & Telephone**

* This information must be provided at the time of submission of bid or must be provided within 24 hours after the time set for the opening of bids. Bidders who choose to provide this information within 24 hours after the time set for the opening of bids are solely responsible to ensure the District receives this information in a timely manner. The District is not responsible for any problems or delays associated with emails, faxes, delivery, etc. Absent a verified fax or email receipt date and time by the District, the District's determination of whether the information was received timely shall govern and be determinative. Bidder shall not revise or amend any other information in this form submitted at the time of bid. The information submitted at the time of bid shall govern over any conflicts, discrepancies, ambiguities or other differences in any subsequent Subcontractor Designation Forms submitted by the bidder.

Proper Name of Bidder: _____

Date: _____

Name: _____

Signature of Bidder Representative: _____

Address: _____

Phone: _____

_____

BID FORM

FOR

NEVADA UNION HIGH SCHOOL SITE IMPROVEMENTS / PHASE 2 PAVING

NEVADA UNION HIGH SCHOOL
11761 Ridge Road
Grass Valley, CA 95945

DSA Application No. **02-117368**

FOR

NEVADA JOINT UNION HIGH SCHOOL DISTRICT

CONTRACTOR NAME: _____

ADDRESS: _____

_____

TELEPHONE: ( ) _____

FAX: ( ) _____

EMAIL _____

TO: Nevada Joint Union High School District, acting by and through its Governing Board, herein called "District".

1. Pursuant to and in compliance with your Notice Inviting Bids and other documents relating thereto, the undersigned bidder, having familiarized himself with the terms of the Contract, the local conditions affecting the performance of the Contract, the cost of the work at the place where the work is to be done, with the Drawings and Specifications, and other Contract Documents, hereby proposes and agrees to perform within the time stipulated, the Contract, including all of its component parts, and everything required to be performed, including its acceptance by the District, and to provide and furnish any and all labor, materials, tools, expendable equipment, and utility and transportation services necessary to perform the Contract and complete all of the Work in a workmanlike manner required in connection with the construction of:

DSA APPLICATION NO. 02-117368

NEVADA UNION HIGH SCHOOL SITE IMPROVEMENTS / PHASE 2 PAVING

in the District described above, all in strict conformance with the drawings and other Contract Documents on file at the Facilities and Construction Office of said District for amounts set forth herein.

2. BIDDER ACKNOWLEDGES THE FOLLOWING ADDENDUM:

Number	Number	Number	Number	Number	Number	Number	Number
_____	_____	_____	_____	_____	_____	_____	_____

Acknowledge the inclusion of all addenda issued prior to bid in the blanks provided above. Your failure to do so may render your bid non-responsive.

3. TOTAL CASH PURCHASE PRICE IN WORDS & NUMBERS:

_____ DOLLARS

($ _____)

4. ALTERNATE BIDS: There are no alternate additive or deductive bids.

5. UNIT PRICING: Contractor to provide unit pricing for the following items:

A. Price per square foot of (1,500) square feet of asphaltic concrete paving per sheet C4.6, detail 6 and the specifications: $_____

B. Price per square foot of (100) square feet of concrete paving per sheet C4.6, detail 7 and the specifications: $_____

C. Price per square foot of (100) square feet of concrete sidewalk per sheet C4.6, detail 5 and the specifications: $_____

D. Price per cubic yard for removal and off-haul from site of (6) cubic yards subsurface rock: $_____

E. Price per cubic yard for removal and off-haul from site of (15) cubic yards of unsuitable subgrade soils: $_____

F. Price per cubic yard for removal and off-haul from site of (25) cubic yards of unsuitable subgrade soils: $_____

G. Price per cubic yard for import, placement, and compaction of (15) cubic yards of suitable subgrade per details and specifications: $_____

H. Price per cubic yard for import, placement, and compaction of (25) cubic yards of suitable subgrade per details and specifications: $_____

I. Price per linear foot for fabrication and installation of (15) linear feet of guardrail with handrail per sheet A3.1 detail A15 and specifications: $_____

6. TIME FOR COMPLETION: The District may give a notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received the notice to proceed, the Contractor shall complete the work in the time specified in the Agreement. By submitting this bid, Contractor has thoroughly studied this Project and agrees that the Contract Time for this Project is adequate for the timely and proper completion of the Project. Further, Contractor has included in the analysis of the time required for this Project, Rain Days, Governmental Delays, and the requisite time to complete Punch List.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause a hardship to it, the Contractor may terminate the contract with written notice to the District within ten (10) days after receipt by the Contractor of the District's notice of postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder, if applicable.

It is understood that the District reserves the right to reject any or all bids and/or waive any irregularities or informalities in this bid or in the bid process. The Contractor understands that it may not withdraw this bid for a period of ninety (90) days after the date set for the opening of bids.

7. Attached is bid security in the amount of not less than ten percent (10%) of the bid:

Bid bond (10% of the Bid), certified check, or cashier's check (circle one)

8. The required List of Designated Subcontractors is attached hereto.

9. The required Non-Collusion Declaration is attached hereto.

10. The Substitution Request Form, if applicable, is attached hereto.

11. It is understood and agreed that if written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned after the opening of the bid, and within the time this bid is required to remain open, or at any time thereafter before this bid is withdrawn, the undersigned will execute and deliver to the District a Contract in the form attached hereto in accordance with the bid as accepted, and that he or she will also furnish and deliver to the District the Performance Bond and Payment Bond, all within five (5) calendar days after award of Contract, and that the work under the Contract shall be commenced by the undersigned bidder, if awarded the Contract, by the start date provided in the District's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents.

12. The names of all persons interested in the foregoing proposal as principals are as follows:

_____

_____

_____

_____

_____

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, state the legal name of such corporation, as well as the names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state the true names of the firm, as well as the names of all individual co-partners comprising the firm; if bidder or other interested person is an individual, state the first and last names in full.)

13. PROTEST PROCEDURES. If there is a bid protest, the grounds shall be submitted as set forth in the Instructions to Bidders.

14. The undersigned bidder shall be licensed and shall provide the following California Contractor's license information:

License Number: _____

License Expiration Date: _____

Name on License: _____

Class of License: _____

DIR Registration Number: _____

If the bidder is a joint venture, each member of the joint venture must include the above information.

15. Time is of the essence regarding this Contract, therefore, in the event the bidder to whom the Contract is awarded fails or refuses to post the required bonds and return executed copies of the Agreement form within five (5) calendar days from the date of receiving the Notice of Award, the District may declare the bidder's bid deposit or bond forfeited as damages.

16. The bidder declares that he/she has carefully examined the location of the proposed Project, that he/she has examined the Contract Documents, including the Plans, General Conditions, Supplemental Conditions, Addenda, and Specifications, all others documents and requirements that are attached to and/or contained in the Project Manual, all other documents issued to bidders and read the accompanying instructions to bidders, and hereby proposes and agrees, if this proposal is accepted, to furnish all materials and do all work required to complete the said work in accordance with the Contract Documents, in the time and manner therein prescribed for the unit cost and lump sum amounts set forth in this Bid Form.

17. DEBARMENT. In addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

a. Intentionally or with reckless disregard, violated any term of a contract with the District;

b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;

c. Committed an act or offense which indicates a lack of business integrity or business honesty; or

d. Made or submitted a false claim against the District or any other public entity. (See Government Code section 12650, et seq., and Penal Code section 72)

18. DESIGNATION OF SUBCONTRACTORS. In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.) and any amendments thereof, each bidder shall list subcontractors on the District's form Subcontractor list. This subcontractor list shall be submitted with the bid and is a required form

I agree to receive service of notices at the e-mail address listed below.

I the below-indicated bidder, declare under penalty of perjury that the information provided and representations made in this bid are true and correct.

_____
Proper Name of Company

_____
Name of Bidder Representative

_____
Street Address

_____
City, State, and Zip

(_____)_____
Phone Number

(_____)_____
Fax Number

_____
E-Mail

By: _____ Date: _____
Signature of Bidder Representative

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of authorized officers or agents and the document shall bear the corporate seal; if bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his signature shall be placed above.

All signatures must be made in permanent blue ink.

CONTRACTOR'S CERTIFICATE REGARDING WORKERS' COMPENSATION FORM

Labor Code section 3700 in relevant part provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

1. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this State.

2. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to employees.

3. For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

I am aware of the provisions of Labor Code section 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provision before commencing the performance of the work of this Contract.

_____

(Signature)

_____

(Print)

_____

(Date)

In accordance with Article 5 (commencing at section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and submitted with the Contractor's bid.

NON-COLLUSION DECLARATION

The undersigned declares:

I am the _____ [Title] of _____ [Name of Company], the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [Date], at _____ [City], _____ [State].

Signed: _____

Typed Name: _____

BID GUARANTEE FORM

(Use only when not using a Bid Bond)

Accompanying this proposal is a cashier's check payable to the order of the Nevada Joint Union High School District or a certified check payable to the order of the Nevada Joint Union High School District in an amount equal to ten percent (10%) of the base bid and alternates ($_____).

The proceeds of this check shall become the property of said District, if, this proposal shall be accepted by the District through the District's Governing Board, and the undersigned fails to execute a Contract with and furnish the sureties required by the District within the required time; otherwise, said check is to be returned to the undersigned.

_____

Bidder

Note: Use this form, in lieu of Bid Bond form, when a cashier's check or certified check is accompanying the bid

BID BOND FORM

KNOW ALL MEN BY THESE PRESENT that we, the undersigned, (hereafter called "Principal"), and _____ (hereafter called "Surety"), are hereby held and firmly bound unto the Nevada Joint Union High School District (hereafter called "District") in the sum of _____ ($_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors, and assigns.

SIGNED this _____ day of _____, 20___.

The condition of the above obligation is such that whereas the Principal has submitted to the District a certain Bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the construction of _____.

NOW, THEREFORE,

a. If said Bid is rejected, or

b. If said Bid is accepted and the Principal executes and delivers a Contract or the attached Agreement form within five (5) calendar days after acceptance (properly completed in accordance with said Bid), and furnishes bonds for his faithful performance of said Contract and for payment of all persons performing labor or furnishing materials in connection therewith,

Then this obligation shall be void; otherwise, the same shall remain in force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or the call for bids, or the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of said Contract, or the call for bids, or the work, or to the specifications.

In the event suit is brought upon this bond by the District and judgment is recovered, the Surety shall pay all costs incurred by the District in such suit, including without limitation, attorneys' fees to be fixed by the court.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year first set forth above.

(Corporate Seal)

By _____
Principal's Signature

_____
Typed or Printed Name

_____
Principal's Title

(Corporate Seal)

By _____
Surety's Signature

_____
Typed or Printed Name

_____
Title

(Attached Attorney in Fact Certificate)

_____
Surety's Name

_____
Surety's Address

_____
Surety's Phone Number

IMPORTANT:

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant, or loan funds, it must also appear on the Treasury Department's most current list (Circular 570 as amended).

THIS IS A REQUIRED FORM.

Any claims under this bond may be addressed to:

(Name and Address of Surety)

_____

_____

_____

(Name and Address of agent or representative for
service of process in California if different from above)

_____

_____

_____

(Telephone Number of Surety and agent or
representative for service of process in California).

_____

_____

_____

REQUEST FOR SUBSTITUTION AT TIME OF BID

Pursuant to Public Contract Code section 3400, bidder submits the following request to Substitute with the bid that is submitted. I understand that if the request to substitute is not an "or equal" or is not accepted by District and I answer "no" I will not provide the specified item, then I will be held non-responsive and my bid will be rejected. With this understanding, I hereby request Substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction:

	Specification Section	Specified Item	Requested Substituted Item	Contractor Agrees to Provide Specified Item if request to Substitute is Denied[1] (circle one)	District Decision (circle one)
1.				Yes No	Grant Deny
2.				Yes No	Grant Deny
3.				Yes No	Grant Deny
4.				Yes No	Grant Deny
5.				Yes No	Grant Deny
6.				Yes No	Grant Deny
7.				Yes No	Grant Deny
8.				Yes No	Grant Deny
9.				Yes No	Grant Deny
10.				Yes No	Grant Deny
11.				Yes No	Grant Deny
12.				Yes No	Grant Deny

This Request Form must be accompanied by evidence as to whether the proposed Substitution (1) is equal in quality, service, and ability to the Specified Item; (2) will entail no change in detail, construction, and scheduling of related work; (3) will be acceptable in consideration of the required design and artistic effect; (4) will provide no cost disadvantage to the District; (5) will require no excessive or more expensive

[1] Bidder must state whether bidder will provide the Specified Item in the event the Substitution request is evaluate and denied. If bidder states that bidder will not provide the Specified Item the denial of a request to Substitute shall result in the rejection of the bidder as non-responsive. However, if bidder states that bidder will provide the Specified Item in the event that bidder's request for Substitution is denied, bidder shall execute the Agreement and provide the Specified Item(s). If bidder refuses to execute the Agreement due to the District's decision to require the Specified Item(s) at no additional cost, bidder's Bid Bond shall be forfeited.

maintenance, including adequacy and availability of replacement parts; (6) will require no change of the construction schedule or milestones for the Project; and, (7) Contractor agrees to pay for any DSA Fees or other Governmental Plan check costs associated with this Substitution Request. (See General Conditions Section 3.6)

The undersigned states that the following paragraphs are correct:

1. The proposed Substitution does not affect the dimensions shown on the Drawings.

2. The undersigned will pay for changes to the building design, including Architect, engineering, or other consultant design, detailing, DSA plan check or other governmental plan check costs, and construction costs caused by the requested substitution.

3. The proposed substitution will have no adverse effect on other trades, the Contract Time, or specified warranty requirements.

4. Maintenance and service parts will be available locally for the proposed substitution.

5. In order for the Architect to properly review the substitution request, within five (5) days following the opening of bids, the Contractor shall provide samples, test criteria, manufacturer information, and any other documents requested by Architect or Architect's engineers or consultants, including the submissions that would ordinarily be required under Article 3.7 for Shop Drawings along with a document which provides a side by side comparison of key characteristics and performance criteria (often known as a CSI side by side comparison chart).

6. If Substitution Request is accepted by the District, Contractor is still required to provide a Submittal for the substituted item pursuant to Article 3.7 and shall provide required Schedule information (including schedule fragnets, if applicable) for the substituted item as required under Article 8.3.2.1. The approval of the Architect, Engineer, or District of the substitution request does not mean that the Contractor is relieved of Contractor's responsibilities for Submittals, Shop Drawings, and schedules under Article 3.7 and 8.3.2 if the Contractor is awarded the Project.

Name of Bidder: _____

By: _____

District: _____

By: _____

ACKNOWLEDGMENT OF BIDDING PRACTICES REGARDING INDEMNITY FORM

TO: Nevada Joint Union High School District

RE: Project Number _____

Construction Contract for _____

Please be advised that with respect to the above-referenced Project the undersigned Contractor on behalf of itself and all subcontractors hereby waives the benefits and protection of Labor Code section 3864, which provides:

"If an action as provided in this chapter is prosecuted by the employee, the employer, or both jointly against the third person results in judgment against such third person, the employer shall have no liability to reimburse or hold such third person harmless on such judgment or settlement in the absence of a written agreement to do so executed prior to the injury."

This Agreement has been signed by an authorized representative of the contracting party and shall be binding upon its successors and assignees. The undersigned further agrees to promptly notify the District of any changes of ownership of the contracting party or any subcontractor while this Agreement is in force.

_____
Contracting Party

_____
Name of Agent/Title

DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) PARTICIPATION STATEMENT

Each bidder must complete this form in order to comply with the Nevada Joint Union High School District ("District") policy for participation of disabled veteran business enterprises (School District projects funded in whole or in part by the State of California pursuant to the Leroy F. Greene School Facilities Act of 1998. (Education Code §17070.10, *et seq*.)

Project Name: _____

Bid No.: _____

DSA No.: _____

The undersigned, on behalf of the Contractor named below, certifies that the Contractor has made reasonable efforts to secure participation by DVBE in the Contract to be awarded for the above-referenced Bid No., including participation by DVBE subcontractors and/or material suppliers. **Check only one of the following**:

- ❑ The Contractor was unable after reasonable efforts to secure DVBE participation in the Contract for the above-referenced Project/Bid No. However, the Contractor will use DVBE services if the opportunity arises at any time during construction of the Project. Upon completion of the Project, the Contractor will report to the District the total dollar amount of DVBE participation in any Contract awarded to Contractor, and in any change orders, for the above-referenced Project.

- ❑ The Contractor has secured DVBE participation in the Contract for the above referenced Project/Bid No., and anticipates that such DVBE participation will equal approximately _____dollars ($_____), which represents approximately _____percent (___%) of the total Contract for such Project. Upon completion of the Project, Contractor will report to the District the actual total dollar amount of DVBE participation in the Contract awarded to Contractor, and in any change orders, for such Project

Company: _____

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR'S CERTIFICATE REGARDING DRUG-FREE WORKPLACE

This Drug-Free Workplace Certification form is required from all successful bidders pursuant to the requirements mandated by Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by performing certain specified acts. In addition, the Act provides that each contract or grant awarded by a State agency may be subject to suspension of payments or termination of the contract or grant, and the Contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

Pursuant to Government Code section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace by doing all of the following:

1. Publishing a statement, notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace, and specifying actions which will be taken against employees for violations of the prohibition.

2. Establishing a drug-free awareness program to inform employees about all of the following:

   a. The dangers of drug abuse in the workplace;
   b. The person's or organization's policy of maintaining a drug-free workplace;
   c. The availability of drug counseling, rehabilitation and employee-assistance programs; and
   d. The penalties that may be imposed upon employees for drug abuse violations;

3. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by subdivision (a) and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will (a) publish a statement notifying employees concerning the prohibition of controlled substance at the workplace, (b) establish a drug-free awareness program, and (c) require each employee engaged in the performance of the contact be given a copy of the statement required by section 8355(a) and require such employee agree to abide by the terms of that statement.

I also understand that if the Nevada Joint Union High School District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of Section 8355, that the contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350 et seq.

I acknowledge that I am aware of the provisions of Government Code section 8350 et seq. and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

DATE:_____ _____
CONTRACTOR

By:_____
Signature

CONTRACTOR'S CERTIFICATE REGARDING ALCOHOLIC BEVERAGE AND TOBACCO-FREE CAMPUS POLICY

The Contractor agrees that it will abide by and implement the District's Alcoholic Beverage and Tobacco-Free Campus Policy, which prohibits the use of alcoholic beverages and tobacco products, of any kind and at any time, in District-owned or leased buildings, on DISTRICT property and in DISTRICT vehicles.

Tobacco products include: (Business and Professions Code 22950.5; Education Code 48901)

1. Any product containing, made, or derived from tobacco or nicotine that is intended for human consumption, whether smoked, heated, chewed, absorbed, dissolved, inhaled, snorted, sniffed, or ingested by any other means, including, but not limited to, cigarettes, cigars, little cigars, chewing tobacco, pipe tobacco, or snuff.

2. An electronic device that delivers nicotine or other vaporized liquids to the person inhaling from the device, including, but not limited to, an electronic cigarette, cigar, pipe, or hookah.

3. Any component, part, or accessory of a tobacco product, whether or not sold separately.

This policy does not prohibit the use or possession of prescription products and other cessation aids that have been approved by the U.S. Department of Health and Human Services, Food and Drug Administration, such as nicotine patch or gum.

Smoking or use of any tobacco-related product or disposal of any tobacco-related waste is prohibited within 25 feet of any playground, except on a public sidewalk located within 25 feet of the playground. In addition, any form of intimidation, threat, or retaliation against a person for attempting to enforce this policy is prohibited. (Health and Safety Code 104495)

The Contractor shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed in all entrances to school property at all times.

The Contractor agrees that it will abide by and implement the District's Alcoholic Beverage and Tobacco-Free Campus Policy, which prohibits the use of alcoholic beverages and tobacco products, of any kind and at any time, in District-owned or leased buildings, on DISTRICT property and in DISTRICT vehicles. The Contractor shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed in all entrances to school property at all times.

DATE:_____

_____
CONTRACTOR

By:_____
Signature

[End of Bid Documents to be Submitted with Bid]

AGREEMENT FORM

THIS AGREEMENT, entered into this____ day of_____, 20__ in the County of Nevada of the State of California, by and between the Nevada Joint Union High School District, hereinafter called the "District", and _____, hereinafter called the "Contractor".

WITNESSETH that the District and the Contractor for the consideration stated herein agree as follows:

ARTICLE 1 - SCOPE OF WORK: The Contractor shall furnish all labor, materials, equipment, tools, and utility and transportation services, and perform and complete all work required in connection with **Nevada Union High School (NUHS) Site Improvements / Phase 2 Paving** ("Project") in strict accordance with the Contract Documents enumerated in Article 7 below. The Contractor shall be liable to the District for any damages arising as a result of a failure to comply with that obligation, and the Contractor shall not be excused with respect to any failure to so comply by an act or omission of the Architect, Engineer, Inspector, Division of the State Architect (DSA), or representative of any of them, unless such act or omission actually prevents the Contractor from fully complying with the Contract Documents and the Contractor protests, in accordance with the Contract Documents, that the act or omission is preventing the Contractor from fully complying with the Contract Documents. Such protest shall not be effective unless reduced to writing and filed with the District office within seven (7) days of the date of occurrence of such act or omission preventing the Contractor from fully complying with the Contract Documents.

ARTICLE 2 - TIME OF COMPLETION: The District may give notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received a notice to proceed, the Contractor shall reach Substantial Completion (See Article 1.1.46) of the Work within **One Hundred Fifty-Two (152)** calendar days from receipt of the Notice to Proceed. This shall be called Contract Time. (See Article 8.1.1). It is expressly understood that time is of the essence.

Contractor has thoroughly studied the Project and has satisfied itself that the time period for this Project was adequate for the timely and proper completion of the Project within each milestone and within the Contract time. Further, Contractor has included in the analysis of the time required for this Project, items set forth in General Conditions Article 8.3.2.1, Submittal Schedules, Rain Day Float, and Governmental Delay Float.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the District's postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause hardship to it, the Contractor may terminate the Contract with written notice to the District within ten (10) days after receipt by the Contractor of the District's notice of postponement. It is further understood by the Contractor that in the event that the Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay the Contractor for the work performed by the Contractor at the time of notification of postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder.

ARTICLE 3 - LIQUIDATED DAMAGES: It being impracticable and infeasible to determine the amount of actual damage, it is agreed that the Contractor will pay the District the sum of **Two Thousand Dollars ($2,000.00)** per calendar day for each and every day of delay beyond the Contract Time set forth in Article 2 of this Agreement (inclusive of Milestones that are critical on the critical path or noted as critical to the District) as liquidated damages and not as a penalty or forfeiture. In the event Liquidated Damages are not paid, the Contractor further agrees that the District may deduct such amount thereof from any money due or that may become due the Contractor under the Contract (See Article 9.6 and 2.2 of the General Conditions).

ARTICLE 4 - CONTRACT PRICE: The District shall pay to the Contractor as full consideration for the faithful performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, the sum of _____ DOLLARS ($_____), said sum being the total amount stipulated in the Bid Contractor submitted. Payment shall be made as set forth in the General Conditions.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to in advance by the Contractor and the District, subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that the Contractor proceeds with a Change in work without an agreement between the District and Contractor regarding the cost of a Change Order, the Contractor waives any Claim of additional compensation for such additional work.

ARTICLE 5 - HOLD HARMLESS AGREEMENT: Contractor shall defend, indemnify and hold harmless District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from all liabilities, claims, actions, liens, judgments, demands, damages, losses, costs or expenses of any kind arising from death, personal injury, property damage or other cause based or asserted upon any act, omission, or breach connected with or arising from the progress of Work or performance of service under this Agreement or the Contract Documents. As part of this indemnity, Contractor shall protect and defend, at its own expense, District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from any legal action including attorney's fees or other proceeding based upon such act, omission, breach or as otherwise required by this Article.

Furthermore, Contractor agrees to and does hereby defend, indemnify and hold harmless District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from every claim or demand made, and every liability, loss, damage, expense or attorney's fees of any nature whatsoever, which may be incurred by reason of:

(a) Liability for (1) death or bodily injury to persons; (2) damage or injury to, loss (including theft), or loss of use of, any property; (3) any failure or alleged failure to comply with any provision of law or the Contract Documents; or (4) any other loss, damage or expense, sustained by any person, firm or corporation or in connection with the Work called for in this Agreement or the Contract Documents, except for liability resulting from the sole or active negligence, or the willful misconduct of the District.

(b) Any bodily injury to or death of persons or damage to property caused by any act, omission or breach of Contractor or any person, firm or corporation employed by Contractor, either directly or by independent contract, including all damages or injury to or death of persons, loss (including theft) or loss of use of any property, sustained by any person, firm or corporation, including the District, arising out of or in any way connected with Work covered by this Agreement or the Contract Documents, whether said injury or damage occurs either on or off District property, but not for any loss, injury, death or damages caused by the sole or active negligence or willful misconduct of the District.

(c) Any dispute between Contractor and Contractor's subcontractors/suppliers/ Sureties, including, but not limited to, any failure or alleged failure of the Contractor (or any person hired or employed directly or indirectly by the Contractor) to pay any Subcontractor or Materialman of any tier or any other person employed in connection with the Work and/or filing of any stop notice or mechanic's lien claims.

(d) Any claims, allegations, penalties, assessments, or liabilities to the extent caused by the Contractor's failure or the failure of any Subcontractor of any tier, to fully comply with the DIR registration requirements under Labor Code section 1725.5 at all times during the performance of any Work on the Project and shall reimburse the District for any penalties assessed against the District arising from any failure by the Contractor or any Subcontractor of any tier from complying with Labor Code sections 1725.5 and 1771.1. Nothing in this paragraph, however, shall require the Contractor or any Subcontractor to be liable to the District or indemnify the District for any penalties caused by the District in accordance with Labor Code section 1773.3 (g).

Contractor, at its own expense, cost, and risk, shall defend any and all claims, actions, suits, or other proceedings that may be brought or instituted against the District, its officers, agents or employees, on account of or founded upon any cause, damage, or injury identified herein Article 5 and shall pay or satisfy any judgment that may be rendered against the District, its officers, agents or employees in any action, suit or other proceedings as a result thereof.

The Contractor's and Subcontractors' obligation to defend, indemnify and hold harmless the Owner, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors hereunder shall include, without limitation, any and all claims, damages, and costs for the following: (1) any damages or injury to or death of any person, and damage or injury to, loss (including theft), or loss of use of, any property; (2) breach of any warranty, express or implied; (3) failure of the Contractor or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; (4) products installed in or used in connection with the Work; and (5) any claims of violation of the Americans with Disabilities Act ("ADA").

ARTICLE 6 - PROVISIONS REQUIRED BY LAW: Each and every provision of law and clause required to be inserted in this Contract shall be deemed to be inserted herein, and this Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not inserted correctly, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 7 - COMPONENT PARTS OF THE CONTRACT: The Contract entered into by this Agreement consists of the following Contract Documents, all of which are component parts of the Contract as if herein set out in full or attached hereto.

Notice Inviting Bids
Instructions to Bidders
Designation of Subcontractors
Non-Collusion Declaration
Bid Guarantee Form
Bid Bond
Bid Form
Contractor's Certificate Regarding Worker's Compensation
Acknowledgment of Bidding Practices Regarding Indemnity

DVBE Participation Statement and Close-Out Forms
Agreement Form
Payment Bond
Performance Bond
Guarantee
Escrow Agreement for Security Deposit In Lieu of Retention
Workers' Compensation/Employers Liability Endorsement
General Liability Endorsement
Automobile Liability Endorsement
Contractor's Certificate Regarding Drug-Free Workplace
Contractor's Certificate Regarding Alcohol and Tobacco
Contractor's Certificate Regarding Background Checks
General Conditions
Supplementary and Special Conditions
Specifications
All Addenda as Issued
Drawings/Plans
Substitution Request Form
Requirements, Reports and/or Documents in the Project Manual or Other Documents Issued to Bidders

All of the above named Contract Documents are intended to be complementary. Work required by one of the above named Contract Documents and not by others shall be done as if required by all.

ARTICLE 8 - PREVAILING WAGES: Wage rates for this Project shall be in accordance with the general prevailing rate of holiday and overtime work in the locality in which the work is to be performed for each craft, classification, or type of work needed to execute the Contract as determined by the Director of the Department of Industrial Relations. Copies of schedules of rates so determined by the Director of the Department of Industrial Relations are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

The following are hereby referenced and made a part of this Agreement and Contractor stipulates to the provisions contained therein.

1. Chapter 1 of Part 7 of Division 2 of the Labor Code (Section 1720 et seq.)

2. California Code of Regulations, Title 8, Chapter 8, Subchapters 3 through 6 (Section 16000 et seq.)

ARTICLE 9 - RECORD AUDIT: In accordance with Government Code section 8546.7(and Davis Bacon, if applicable) and Article 13.11 of the General Conditions, records of both the District and the Contractor shall be subject to examination and audit for a period of five (5) years after a Final Retention Payment or the Recording of a Notice of Completion, whichever occurs first.

ARTICLE 10 - CONTRACTOR'S LICENSE: The Contractor must possess throughout the Project a **Class A** Contractor's License, issued by the State of California, which must be current and in good standing.

IN WITNESS WHEREOF, this Agreement has been duly executed by the above named parties, on the day and year first above written.

Nevada Joint Union High School District

By: Brett W. McFadden

By: _____
Superintendent

Dated: _____

CONTRACTOR:

_____
Typed or Printed Name

_____
Title

_____
Signature

_____
Type or Printed Name

_____
Title (Authorized Officers or Agents)

_____
Signature

(CORPORATE SEAL)

PAYMENT BOND

(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the NEVADA JOINT UNION HIGH SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: _____ (hereinafter referred to as the "Public Work"); and

WHEREAS, said Contractor is required to furnish a bond in connection with said Contract, and pursuant to California Civil Code section 9550;

NOW, THEREFORE, We, _____, the undersigned Contractor, as Principal; and _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the **NEVADA JOINT UNION HIGH SCHOOL DISTRICT** and to any and all persons, companies, or corporations entitled by law to file stop notices under California Civil Code section 9100, or any person, company, or corporation entitled to make a claim on this bond, in the sum of _____ Dollars ($_____), such sum being not less than one hundred percent (100%) of the total amount payable by said Obligee under the terms of said Contract, for which payment will and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, its heirs, executors, administrators, successors, or assigns, or subcontractor, shall fail to pay any person or persons named in Civil Code section 9100; or fail to pay for any materials, provisions, or other supplies, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code, with respect to work or labor thereon of any kind; or shall fail to deduct, withhold, and pay over to the Employment Development Department, any amounts required to be deducted, withheld, and paid over by Unemployment Insurance Code section 13020 with respect to work and labor thereon of any kind, then said Surety will pay for the same, in an amount not exceeding the amount herein above set forth, and in the event suit is brought upon this bond, also will pay such reasonable attorneys' fees as shall be fixed by the court, awarded and taxed as provided in California Civil Code section 9550 et seq.

This bond shall inure to the benefit of any person named in Civil Code section 9100 giving such person or his/her assigns a right of action in any suit brought upon this bond.

It is further stipulated and agreed that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, or specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described; or pertaining or relating to the furnishing of labor, materials, or equipment therefor; nor by any change or modification of any terms of payment or extension of time for payment pertaining or relating to any scheme or work of improvement herein above described;

nor by any rescission or attempted rescission of the contract, agreement or bond; nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond; nor by any fraud practiced by any person other than the claimant seeking to recover on the bond; and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given; and under no circumstances shall the Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the Obligee and the Contractor or on the part of any obligee named in such bond; that the sole condition of recovery shall be that the claimant is a person described in California Civil Code section 9100, and who has not been paid the full amount of his or her claim; and that the Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

IN WITNESS WHEREOF this instrument has been duly executed by the Principal and Surety above named, on the _____ day of _____, 20_____.

PRINCIPAL/CONTRACTOR:

_____

By: _____

SURETY:

_____

By: _____
Attorney-in-Fact

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)	(Name and Address of agent or representative for service for service of process in California)
_____	_____
_____	_____
Telephone:_____	Telephone: _____

A notary public or other office completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF)

On _____, before me, _____, personally appeared _____, who proved on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) as the Attorney-in-Fact of _____ (Surety) and acknowledged to me that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____ (SEAL)
Notary Public in and for said State

Commission expires:_____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be attached hereto.

PERFORMANCE BOND

(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the NEVADA JOINT UNION HIGH SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: **Nevada Union High School (NUHS) Site Improvements / Phase 2 Paving (**hereinafter referred to as the "Public Work"); and

WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain contract for said Public Work dated _____ _____, (hereinafter referred to as the "Contract"), which Contract is incorporated herein by this reference; and

WHEREAS, the Contractor is required by said Contract to perform the terms thereof and to provide a bond both for the performance and guaranty thereof.

NOW, THEREFORE, we, _____, the undersigned Contractor, as Principal, and _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the NEVADA JOINT UNION HIGH SCHOOL DISTRICT in the sum of _____ Dollars ($_____), said sum being not less than one hundred percent (100%) of the total amount payable by said Obligee under the terms of said Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if the bounded Contractor, his or her heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in said Contract and any alteration thereof made as therein provided, on his or her part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill guarantees of all materials and workmanship; and indemnify, defend and save harmless the Obligee, its officers and agents, as stipulated in said Contract, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any change, extension of time, alteration in or addition to the terms of the contract or to the work to be performed there under or the specifications accompanying the same, nor by any change or modification to any terms of payment or extension of time for any payment pertaining or relating to any scheme of work of improvement under the contract. Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any overpayment or underpayment by the Obligee that is based upon estimates approved by the Architect. The Surety stipulates and agrees that none of the aforementioned changes, modifications, alterations, additions, extension of time or actions shall in any way

affect its obligation on this bond, and it does hereby waive notice of any such changes, modifications, alterations, additions or extension of time to the terms of the contract, or to the work, or the specifications as well notice of any other actions that result in the foregoing.

Whenever Principal shall be, and is declared by the Obligee to be, in default under the Contract, the Surety shall promptly either remedy the default, or shall promptly take over and complete the Contract through its agents or independent contractors, subject to acceptance and approval of such agents or independent contractors by Obligee as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages; or, at Obligee's sole discretion and election, Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Obligee of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as Work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the "balance of the Contract Price" (as hereinafter defined), and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the Obligee under the Contract and any modifications thereto, less the amount previously paid by the Obligee to the Principal, less any withholdings by the Obligee allowed under the Contract. Obligee shall not be required or obligated to accept a tender of a completion contractor from the Surety.

Surety expressly agrees that the Obligee may reject any agent or contractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal. Unless otherwise agreed by Obligee, in its sole discretion, Surety shall not utilize Principal in completing the Contract nor shall Surety accept a bid from Principal for completion of the work in the event of default by the Principal.

No final settlement between the Obligee and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

The Surety shall remain responsible and liable for all patent and latent defects that arise out of or relate to the Contractor's failure and/or inability to properly complete the Public Work as required by the Contract and the Contract Documents. The obligation of the Surety hereunder shall continue so long as any obligation of the Contractor remains.

Contractor and Surety agree that if the Obligee is required to engage the services of an attorney in connection with enforcement of the bond, Contractor and Surety shall pay Obligee's reasonable attorneys' fees incurred, with or without suit, in addition to the above sum.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including reasonable attorneys' fees to be fixed by the Court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20_____.

PRINCIPAL/CONTRACTOR:

_____

By: _____

SURETY:

_____

By: _____
Attorney-in-Fact

The rate of premium on this bond is _____ per thousand.

The total amount of premium charged: $_____ (This must be filled in by a corporate surety).

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)	(Name and Address of agent or representative for service for service of process in California)
_____	_____
_____	_____
Telephone:_____	Telephone: _____

A notary public or other office completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF)

On _____, before me, _____, personally appeared _____, who proved on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) as the Attorney-in-Fact of _____ (Surety) and acknowledged to me that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____ (SEAL)
Notary Public in and for said State

Commission expires:_____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be attached hereto.

GUARANTEE

Guarantee for _____. We hereby guarantee that the _____, which we have installed in _____ _____ has been done in accordance with the Contract Documents, including without limitation, the drawings and specifications, and that the work as installed will fulfill the requirements included in the bid documents. The undersigned and its surety agrees to repair or replace any or all such work, together with any other adjacent work, which may be displaced in connection with such replacement, that may prove to be defective in workmanship or material within a period of **One (1**) year from the date of the Notice of Completion of the above-mentioned structure by the Nevada Joint Union High School District, ordinary wear and tear and unusual abuse or neglect excepted.

In the event the undersigned or its surety fails to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, but not later than ten (10) days after being notified in writing by the District or within forty eight (48) hours in the case of an emergency or urgent matter, the undersigned and its surety authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned and its surety, who will pay the costs and charges therefor upon demand. The undersigned and its surety shall be jointly and severally liable for any costs arising from the District's enforcement of this Guarantee.

	Countersigned
_____	_____
(Proper Name)	(Proper Name)
By: _____	By: _____
_____	_____
(Signature of Subcontractor or Contractor)	(Signature of General Contractor if for Subcontractor)

Representatives to be contacted for service:

Name: _____

Address: _____

_____

Phone Number: _____

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the Nevada Joint Union High School District, 11645 Ridge Road, Grass Valley, CA 95945, hereinafter called "Owner", and _____ whose address is _____, hereinafter called "Contractor", and _____ whose address is _____, hereinafter called "Escrow Agent".

For the consideration hereinafter set forth, the Owner, Contractor and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for Retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for ____ _____in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the Retention earnings directly to the escrow agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as Retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of the Owner, and shall designate the Contractor as beneficial owner.

2. The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

3. When the Owner makes payments of Retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days' written notice to the Escrow Agent from the Owner of the notice of default under Article 2.2, Article 9.6 or Article 14, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the

Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Owner:

_____
Title

_____
Name

_____
Signature

_____
Address

On behalf of Contractor:

_____
Title

_____
Name

_____
Signature

_____
Address

On behalf of Agent:

Title

Name

Signature

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date set forth above.

OWNER	CONTRACTOR
Title	Title
Name	Name
Signature	Signature

INSURANCE DOCUMENTS & ENDORSEMENTS

The following insurance endorsements and documents must be provided to the Nevada Joint Union High School District within seven (7) calendar days after receipt of notification of award. If the apparent low bidder fails to provide the documents required below, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders, and the bidder's bid security will be forfeited. All insurance provided by the bidder shall fully comply with the requirements set forth in Article 11 of the General Conditions.

1. General Liability Insurance: Certificate of Insurance with all specific insurance coverages set forth in Article 11 of the General Conditions, proper Project description, designation of the District as the Certificate Holder, a statement that the insurance provided is primary to any insurance obtained by the District and minimum of 30 days' cancellation notice. Bidder shall also provide required additional insured endorsement(s) designating all parties required in Article 11 of the General Conditions. The additional insured endorsement shall be an ISO CG 20 10 (04/13), or an ISO CG 20 38 (04/13), or their equivalent as determined by the District in its sole discretion.

Incidents and claims are to be reported to the insurer at:

Attn: _____
(Title) (Department)

_____
(Company)

_____
(Street Address)

_____
(City) (State) (Zip Code)

(_____) _____
(Telephone Number)

2. Workers' Compensation/ Employer's Liability Insurance: Certificate of Workers' Compensation Insurance meeting the coverages and requirements set forth in Article 11 of the General Conditions, minimum of 30 days' cancellation notice, proper Project description, waiver of subrogation and any applicable endorsements.

3. Automobile Liability Insurance: Certificate of Automobile Insurance meeting the coverages and requirements set forth in Article 11 of the General Conditions, minimum 30 days' cancellation notice, any applicable endorsements and a statement that the insurance provided is primary to any insurance obtained by the District.

Incidents and claims are to be reported to the insurer at:

Attn: _____
(Title) (Department)

_____
(Company)

_____
(Street Address)

_____
(City) (State) (Zip Code)

(_____) _____
(Telephone Number)

DATE:_____ _____
CONTRACTOR

By:_____
Signature

DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) CONTRACTOR CLOSE-OUT STATEMENT

The Contractor shall complete this form, as a condition to Final Payment, for purposes of reporting participation by Disabled Veteran Business Enterprises (DVBE) in the Contract for the Project/Bid No. specified below.

Project Name: _____

Bid No.: _____

DSA No.: _____

Name	Address/Phone	Category of Work*	$ Amount of Contract

* Categories of work include: (1) construction services (specify services that DVBE will provide); (2) architecture and engineering services; (3) procurement of materials, supplies and equipment; and (4) information technology.

The undersigned, on behalf of the Contractor, certifies that DVBE participation on the Contract for Bid No. _____equaled _____ dollars ($_____), which represents approximately ____ percent (___%) of the total Contract price including change orders for the Project.

Company: _____

Name:_____

Title: _____

Signature: _____

Date: _____

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(Modernization Projects)

_____ certifies that it has performed one of the following:
[Name of contractor/consultant]

☐ Pursuant to Education Code section 45125.1, Contractor has conducted criminal background checks, through the California Department of Justice, of all employees providing services to the _____ District, pursuant to the contract/purchase order dated _____, and that none have been convicted of serious or violent felonies, as specified in Penal Code sections 1192.7(c) and 667.5(c), respectively.

As further required by Education Code section 45125.1, attached hereto as Attachment "A" is a list of the names of the employees of the undersigned who may come in contact with pupils.

OR

☐ Pursuant to Education Code section 45125.2, Contractor will ensure the safety of pupils by one or more of the following methods:

☐ 1. The installation of a physical barrier at the worksite to limit contact with pupils.

☐ 2. Continual supervision and monitoring of all employees of the entity by an employee of the entity whom the Department of Justice has ascertained has not been convicted of a violent or serious felony.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Date_____, 20___

_____
[Name of Contractor/Consultant]

_____

By its:_____

ATTACHMENT A:

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(INSERT NAMES OF EMPLOYEES WHO MAY COME IN CONTACT WITH PUPILS)

ARTICLE 1
DEFINITIONS

1.1 BASIC DEFINITIONS

NOTE: The following shall not be construed as a comprehensive list of all definitions in the Contract Documents and there may be other definitions set forth in the Contract Documents. Additionally, any references to any DSA forms, documents or requirements shall be construed to incorporate any updates, supplements, or additions. The Contractor shall be required to meet the latest DSA requirements applicable to the Project.

1.1.1 Action of the Governing Board is a vote of a majority of the District's Governing Board.

1.1.2 Approval means written authorization through action of the Governing Board. The Governing Board has delegated to the Director of Facilities and Construction the authority to approve certain modifications, Change Orders or Immediate Change Directives (Subject to the limits of the Delegation of Authority provided by the Board). In no case shall the Director of Facilities and Construction have authority to approve total Change Orders or Modifications to the Project exceeding 10% of the Contract Sum.

1.1.3 Architect means the architect, engineer, or other design professional engaged by the District to design and perform general observation of the work of construction and interpret the Drawings and Specifications for the Project. (See ARTICLE 4)

1.1.4 As-Builts are a set of Plans and Specifications maintained by the Contractor clearly showing all changes, revisions, substitutions, field changes, final locations, and other significant features of the Project. The As-Builts shall be maintained continuously throughout the Work for the Project and is both a prerequisite to the issuance of Payment Application and a requirement for Contract Close-Out. (See Article 3.17)

1.1.5 Beneficial Occupancy is the point in time when a building or buildings are fit for occupancy is fit for occupancy and its intended use. Basic requirements are the building is safe, at or near Substantial Completion, and all fire/ life safety items are approved and operational. The fact that a building is occupied does not mean that the building is ready for Beneficial Occupancy if there are elements that are unsafe or if fire/ life safety items are not approved and operational. Taking occupancy on a structure that is under a fire watch is not considered beneficial occupancy. Further, taking of Beneficial Occupancy is not a point in time when retention is due unless the entire school has obtained a Certificate of Substantial Completion that meets the definition of 1.1.46.

1.1.6 Claims. A Claim is a request for payment, supported by back-up documentation which includes, invoices time sheets, or other documents substantiating legitimacy or entitlement that is submitted during the Project or immediately following the Project made prior to the Final Retention Payment Application and prior to Final Completion of the Project. A "Claim" means a separate demand by the Contractor for (1) time extension, (2) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the CONTRACT and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (3) and amount the payment of which is disputed by the District. (See Article 4.6)

1.1.7 Change Order (CO). A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect, stating their agreement upon (1) A description of a change in the Work, (2) The amount of the adjustment in the Contract Sum, if any; and (3) The extent of the adjustment in the Contract Time, if any. (See Article 7.2)

1.1.8 Change Order Request (COR). A COR is a written request supported by backup documentation prepared by the Contractor requesting that the District and the Architect issue a CO based upon a proposed change, or a change that results in an adjustment in cost, time or both, or arising from an RFP, CCD or ICD. (See Article 7.6)

1.1.9 Close-Out means the process for Final Completion of the Project, but also includes the requirements for the DSA Certification that the Project is Complete (See DSA Certification Guide). (See Article 9.9)

1.1.10 Construction Change Document (CCD). A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for work affecting structural, access or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required. (See Article 7.3)

1.1.11 Complete/ Completion/ Final Completion means that all Work in the Contract Documents is finished, the requirements of the Contract Documents have been met, the Project has been Closed Out, and all Work has ceased on the Project. This may also be referred to as Final Completion. In most cases, the recording of a Notice of Completion shall represent Completion of the Project. Beneficial Occupancy does not mean the Work is Complete.

1.1.12 Completion Date is the date when all Work for the Project shall be Substantially Complete and is the date assigned at the end of the Contract Time for the Project. (See Article 1.1.46

1.1.13 Construction Manager. The Construction Manager is a consultant to the District contracted to assist in Project planning, management and construction of the Project. If there is a Construction Manager, they may assist in various aspects of the Project including, but not limited to Monitoring the progress of the construction, reviewing and monitoring the schedule, progress of work, monitoring pay requests, facilitating communications, advising the District and its Board of Education on various aspects of the construction process, monitoring the RFI, COR, CCD, ICD, RFP, Claims, Disputes and other Project related processes.

1.1.14 Contract or Agreement when the terms are used in these General Conditions shall be references to the Contract Documents as defined herein.

1.1.15 Contract Documents (sometimes referred to as Construction Documents) consist of the Agreement between District and Contractor (hereinafter the Agreement or Contract), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to bid, instructions to bidders, notice to bidders, and the requirements contained in the Bid Documents, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is a written amendment to the Contract signed by parties, a Change Order, a Construction Change Document, or a written order for a minor change in the Work issued by the Architect. The Contract Documents collectively form the Contract. The Contract represents the entire and integrated Agreement

between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the District and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the District and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

1.1.16 Contract Time is the time period specified in the Contract Documents in which the Project shall be completed. This is sometimes referred to a Contract Duration, or "time in which the Contractor has to complete the Project". (See Article 8.1.1)

1.1.17 Contractor, District, and Architect are those mentioned as such in the Agreement. They are treated throughout the Contract Documents as if they are of singular number and neuter gender. Any reference to "Owner" shall mean "District" or Nevada Joint Union High School District.

1.1.18 Cure is the act of remedying a material failure to perform under the terms of the Contract Documents during the time provided to correct Contractor's Default. Specific time periods are provided to Cure and Correct a Contractor Default under Article 14 and for a Partial Default under Article 2.2 as well as elsewhere in the Contract Documents.

1.1.19 Days mean calendar days unless otherwise specifically stated.

1.1.20 Default is a material breach of Contract. A Termination for Cause under Article 14 is a declaration of Default of the Contract and shall act as a demand upon the Surety to perform under the terms of the Performance Bond. Partial Defaults may also be tendered to the Surety at District's discretion. (See Article 2.2)

1.1.21 Dispute. A dispute is a disagreement on terms or conditions of the Project where the Contractor's opinion of the Project, Payment, Change Order or Request for Proposal differs from that of the District or Architect. A dispute only rises to the level of a claim once the dispute is assembled with back-up documentation and presented for evaluation. (See Article 4.6)

1.1.22 District Representative is the person designated by the District to represent the District during the Construction for the Project. This District Representative shall have the delegated authority as further defined in Article 1.1.2. This District Representative may be an employee of the District who may have the delegated authority as set forth in Article 1.1.3, and may also include Construction Managers. In some cases, the District and its Board may be assisted by a Construction Manager. When a Construction Manager is assisting the District, the Contractor, Architect, and Inspector shall have a primary contact with the District's Construction Manager who will advise the District.

1.1.23 Drawings/Plans are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including Plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect. Sometimes Drawings will also be included in Addenda, Change Orders, and Specifications.

1.1.24 DSA is the Division of State Architect. DSA is the agency that provides design and construction oversight for K-12 Schools, Community Colleges, and State Funded Charter School Projects. DSA is the responsible agency for this Project and Contractor has submitted a bid for the Project since

Contractor is familiar with Contractor's responsibilities under the DSA requirements more thoroughly set forth at Title 24 of the California Code of Regulations. Contractor agrees to abide by the jurisdiction of DSA and shall construct the Project to conform with the approved Plans, Specifications, Addenda, and Change Orders (inclusive of approved CCD's and ICD's issued by the District pending CCD approval). See DSA website.

1.1.25 Emergency shall be defined as a sudden, unexpected occurrence, involving a clear and imminent threat to the continuation of school classes, a critical path delay that will result in not being able to occupy the school when students arrive to use the facility, danger from the facility or from outside the facility, Act of God, or other action which requires immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.

1.1.26 Float the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. (See Article 8.1.4)

1.1.27 Immediate Change Directive. (ICD) A written order prepared by the Architect and signed by the District and the Architect, directing a change in the Work where the Work must proceed immediately and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. (See Article 7.3)

1.1.28 Inspector of Record (IOR)/ Project Inspector (PI) is the individual retained by the District in accordance with Title 24 of the California Code of Regulations and who will be assigned to the Project

1.1.29 Notice of Non-Compliance (DSA Form 154) is a document issued by the Inspector if there is a deviation from the DSA approved Plans, Specifications, and Change Orders. (See Article 7.1.2)

1.1.30 Payment Application or Certificate of Payment is the Contractor's certified representation of the actual level of Work performed on the Project. Payment Applications are sometimes also called "Certificate of Payment", "Request for Payment", "Payment Application", or similar terms, and shall follow the Schedule of Values that are approved by the Architect, Inspector and District. (See Article 9.3)

1.1.31 Project is the complete construction of the Work performed in accordance with the Contract Documents.

1.1.32 Project Manual is the volume assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.1.33 Provide shall include "provide complete in place," that is "furnish and install complete."

1.1.34 Punch List/ Punch Item/ Incomplete Punch Item is a list of minor repair items, prepared after the issuance of a Certificate of Substantial Completion, by the Inspector and Architect of Work required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Closed Out. Issuance of the Retention Payment is dependent of the proper completion of the Punch List. (See Article 9.9)

1.1.34.1 *Contractor's List of Punch Items* is a list of minor repair items the Contractor submits when the Contractor considers the Work Substantially Complete. Submission of this List of

Incomplete Punch Items is the Contractor's representation that the Project is Substantially Complete. (See Article 9.9.1.1)

1.1.35 Request for Information (RFI) is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions. (See Article 7.4)

1.1.36 Request for Proposal (RFP) is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. (See Article 7.5)

1.1.37 Safety Orders are those issued by any city, county, state or federal agency having jurisdiction over the Project.

1.1.38 Schedule is the Contractor's view of the practical way in which the Work will be accomplished. In this Agreement there is a requirement for a Baseline Schedule and regular Schedule Updates that show all Work to be completed during the Contract Time and shall include all items listed under Article 8.3.2.9. See Article 8 of the General Conditions.

1.1.39 Schedule of Values is a detailed breakdown of the Contract Price for each Project, building, Phase of Work or Site as determined by the District. This Schedule of Values shall adequately detail the price for the Work so Progress Payments Applications can be meaningfully reviewed by the Inspector, Architect of Record, Engineer of Record, and District. (See Article 9.2)

1.1.40 Separate Contracts are Contracts that the District may have with other Contractors, vendors, suppliers, or entities to perform Work on the Project. This may include, but is not limited to Multi-Prime Trade Contractors, furniture installers, testing agencies, clean-up contractors, or network or low voltage contractors. Contractor shall plan for certain other contractors that may also be working on the Project site and address these other contractors in Contractor's Schedule. (See Article 6)

1.1.41 Site refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

1.1.42 Specifications are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

1.1.43 Standards, Rules, and Regulations referred to are recognized printed standards and shall be considered as one and a part of these Specifications within limits specified. Federal, state and local regulations are incorporated into the Contract Documents by reference.

1.1.44 Stop Work Order, or an Order to Comply, is issued when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order

1.1.45 Subcontractor, as used herein, includes those having direct or indirect contracts with Contractor and ones who furnished labor, material or services for a special design according to Plans, Drawings, and Specifications of this Work.

1.1.46 Substantial Completion/ Substantially Complete(d) is not reached unless and until each of the following four (4) conditions have been met: (1) all contractually required items have been installed with the exception of only minor and Incomplete Punch List Items (See Article 9.9.1.2); (2) All Fire/Life Safety Systems have been installed, and are working and signed off on the DSA Form 152 Inspection Card, and all building systems including mechanical, electrical and plumbing are all functioning; (3) all other items DSA Form 152 Inspection Card for the Project have been approved and signed off; and (4) the Project is fit for occupancy and its intended use. For the purposes of this Contract, any references to Completion Date means Substantial Completion Date.

1.1.47 Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of Article 3.10.

1.1.48 Supplementary Conditions/ Supplementary General Conditions/ Special Conditions are terms that are sometimes used interchangeably and refer to any additional requirements or changes to the General Conditions as noted.

1.1.49 Surety is the person, firm, or corporation that executes as a bid bond, Payment Bond or Performance Bond guarantor on the Contractor's Bid, Contractor's Performance on the Contract and Payment of the Contractor's Subcontractors, material suppliers, vendors and labor on the Project. The Surety is bound to the same extent as the Contractor is bound once a Default occurs. A default includes a Termination for Substantial Failure to Perform under Article 14, but also includes any breach of Contract and is subject to the requirements and responsibilities as set forth in the Performance Bond.

1.1.50 Work shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents. It shall include the initial obligation of any Contractor or Subcontractor who performs any portion of the Work, to visit the Site of the proposed Work (a continuing obligation after the commencement of the Work), to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried out under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor and its Subcontractors shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated Contract Documents and bid documents before preparing and submitting any bid.

1.1.51 Workers include laborers, workers, and mechanics.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 Correlation and Intent

1.2.1.1 *Documents Complementary and Inclusive*. The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. All Contract Documents form the Contractor's Contract with the District. Any item of Work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not

mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both. The Contractor is bound to provide the Work complete and is under a legal duty to carefully study Plans and schedule operations well ahead of time and identify inconsistencies with the Plans and Specifications and call such inconsistencies to the attention of the Architect or Registered Engineer through the Inspector under Section 4-343(b) of Title 24.

1.2.1.2 *Work to be Complete*. Contractor has thoroughly studied the Contract Documents and understands that the District contracted with Contractor to provide a complete Project which means complete systems and buildings. The entire set of Contract Documents shows a complete Project and Contractor agrees that there are multiple disciplines putting together a set of Contract Documents. Thus, if portions of a system are shown on some Drawings and not others, this does not mean the Contractor is to only provide part of a system. For example, if an air conditioning unit is shown on the mechanical Drawings, the plumbing for the air conditioning is shown on another Drawing, and the electrical shown on the electrical Drawings, the Contractor is to provide a complete and working air conditioning system. The only time when an item is supplied incomplete is if the system is shown specifically as incomplete since others will be completing the system. Work includes, but is not limited to materials, workmanship, and manufacture of fabrication of components for the Project.

1.2.1.3 *Coverage of the Drawings and Specifications*. The Drawings and Specifications generally describe the Work to be performed by Contractor. Generally, the Specifications describe Work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on either the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor. The Contractor is responsible for the whole Project as contractually set forth as the Contract Documents. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by them.

1.2.1.4 *Conflicts*. In the event there is a discrepancy between the various Contract Documents, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.5 *Conformance with Laws*. Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, even if through mistake or otherwise any such provision is not inserted, or is not correctly inserted.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. Such checking shall include review of Title 24 of the California Code of Regulations, California Building Code, local utility, local water connection, local grading and all other applicable agencies. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with the Contract Documents, Contractor shall, within five (5) days, notify the Inspector, Architect and District in writing of same and shall ensure

that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project. (See Title 24 Section 4-343)

The Contractor shall bear all expenses of correcting Work done contrary to said laws, ordinances, rules, and regulations if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said Work or (2) disregarded the Architect's instructions regarding said Work.

1.2.1.6 *Ambiguity and Inconsistency*. Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Prior to commencing any portion of the Work, Contractor shall notify Architect and District in writing of any perceived or alleged error, inconsistency, conflict, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price or the time for performance. Contractor shall maintain an adequate inspection system and perform personal observations and review work and pre-plan the project to ensure the Work performed under the Contract conforms to Contract requirements. Contractor shall maintain records of such review and observation to ensure strict compliance with the terms of the Contract.

1.2.1.7 *Typical Parts and Sections.* Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are of the same construction are shown in outline only, the complete or more detailed shall apply to the Work which is shown in outline.

1.2.1.8 *Dimensions.* Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Architect's decisions on matters relating to aesthetic effect will be final.

1.2.2 Addenda and Deferred Approvals

1.2.2.1 *Addenda* are the changes in Specifications, Drawings, Contract Documents, and Plans which have been authorized in writing by the District or Architect, and which alter, explain, or clarify the Contract Documents. Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda unless otherwise specified in the addenda.

1.2.2.2 *Deferred Approvals*. Deferred Approvals are Submittals that are reviewed by the Architect (or Engineer of Record) and submitted to DSA for approval based on thorough detailing of manufacturer and Project specific design. See Article 3.9.1and 3.9.3. The Deferred Approval item cannot be fully detailed on the originally approved Drawings or Specifications because of variations in product design and manufacture. Contract Documents which require Deferred Approval items are meant to be for illustration purposes only. Approval of Plans for such a portion of the Work may be deferred until the material suppliers and Subcontractors are selected. All Deferred Approvals are noted in the Plans and Specifications. Contractor is responsible for all Deferred Approval requirements set forth in the Contract Documents. Contractor is responsible to comply with all laws, building codes, Title 24 and regulations necessary to obtain all necessary approvals, including those required from the Division of the State Architect ("DSA") and the State Fire Marshall. Contractor shall not be granted an extension of time for

failure to plan, schedule for and obtain necessary approvals. Contractor shall Schedule all Deferred Approval items in the Baseline Schedule and Schedule Updates under Article 3.9.6

1.2.3 Specification Interpretation

1.2.3.1 *Titles*. The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved.

1.2.3.2 *As Shown, Etc*. Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 *General Conditions*. The General Conditions and Supplementary General Conditions are a part of the Contract Documents which further defines and refines the Contract entered between the Contractor and District.

1.2.3.4 *Abbreviations*. In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as "Contractor shall," "shall be," etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings. In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.2.3.5 *Plural*. Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.6 *Metric*. The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1" (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the "International System of Units" (SI) and generally follow ASTM E 380, "Standard for Metric Practice."

1.2.3.7 *Standard Specifications*. Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization's standard specifications, which are in effect at the date of the Contractor's proposal unless directed otherwise. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.4 Rules of Document Interpretation

1.2.4.1 In the event of conflict within the Drawings, the following rules shall apply:

a. General Notes, when identified as such, shall be incorporated into other portions of Drawings.

b. Schedules, when identified as such, are complementary with other notes and other portions of Drawings including those identified as General Notes.

c. Larger scale Drawings shall take precedence over smaller scale Drawings.

d. At no time shall the Contractor base construction on scaled Drawings.

1.2.4.2 Specifications shall govern as to materials, workmanship, and installation procedures.

1.2.4.3 If Contractor observes that Drawings and Specifications are in conflict, Contractor shall, prior to commencing work, notify the Architect in writing for the purposes of obtaining an interpretation of the Contact Documents.

1.2.4.4 In the case of conflict or inconsistencies, the order of precedence shall be as follows:

a. General Conditions take precedence over Drawings and Specifications.

b. Supplemental Conditions take precedence over General Conditions.

c. The Agreement Form shall take precedence over the Supplemental Conditions.

d. In the case of disagreement or conflict between or within Specifications, and Drawings, the more stringent, higher quality, and greater quantity of Work shall apply.

e. Addenda shall take precedence over Drawings and Specifications.

f. General Conditions shall take precedence over Addenda.

g. Drawings and Specifications take precedence over the Soils Report.

1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

The Drawings, Specifications, and other Contract Documents for the Project are the property of the District and/or Architect pursuant Contract requirements between the District and Architect. The Contractor may retain one Contract record set. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a Copyright in the Drawings, Specifications, and other documents prepared by the Architect. All copies except the Contractor's record set, shall be returned or properly accounted for upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work. The District and/or Architect hereby grants the Contractor,

Subcontractors, Sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings, Specifications, and other documents prepared for the Project in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the District's property interest or other reserved right.

ARTICLE 2
DISTRICT

2.1 INFORMATION AND SERVICES REQUIRED OF THE DISTRICT

2.1.1 Site Survey

The District will furnish, at its expense, a legal description of the Site and a land survey showing the boundaries of the Site. Contractor shall be responsible for all surveys regarding location of construction, grading and site work.

2.1.2 Soils

When required by the scope of the Project, the District will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required and deemed necessary by the Architect or as required by local or state codes. Such services, with written reports and appropriate written professional recommendations, may include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

2.1.3 Soils Report Part of the Contract Documents: Contractor Reliance

A soils investigation report has been obtained from test holes at the Site, and such report is incorporated into this Contract and made available for the Contractor's use in preparing its bid and Work under this Contract. Where the Plans and Specifications are more specific and provide more significant structure, systems, reinforcing, thicknesses, or construction methods, the Drawings shall control over the soils report. The soils report is available at the Architect's office for review and it is Contractor's responsibility to ensure that Contractor has reviewed the soils investigation report. Any information obtained from such report or any other information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only. If, during the course of Work under this Contract, Contractor encounters subsurface conditions which differ materially from those indicated in the soils report, then Contractor shall notify the District within five (5) calendar days of discovery of the condition, and changes to the Contract Price may be made in accordance with Article 7 entitled "Changes in the Work." Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages in the event the Contractor fails to notify District within the five-day period mentioned above.

WARNING: DISTRICT DOES NOT WARRANT THE SOILS AT THE PROJECT SITE. CONTRACTOR HAS REVIEWED AND IS FAMILIAR WITH THE REQUIREMENTS OF THE SOILS INVESTIGATION REPORT. CONTRACTOR UNDERSTANDS THAT PLANS, DRAWINGS AND SPECIFICATIONS SUPERSEDE THE SOILS REPORT IF THERE ARE CONFLICTS. FURTHER, IN ADDITION TO THE INFORMATION IN THE SOILS REPORT, CONTRACTOR HAS CONDUCTED AN INDEPENDENT INVESTIGATION OF THE PROJECT SITE AND THE SOILS CONDITIONS OF THE SITE. DISTRICT DOES NOT WARRANT THE SOILS CONDITIONS OF THE SITE AND CONTRACTOR IS FULLY RESPONSIBLE TO ASCERTAIN SITE CONDITIONS FOR THE PURPOSES OF DETERMINING CONSTRUCTION MEANS AND METHODS PRIOR TO COMMENCING CONSTRUCTION.

2.1.4 Utilities

2.1.4.1 *Location of Point of Connection*. The locations shown for the point of connection are approximate. It shall be the responsibility of the Contractor to determine the exact location of all service connections.

2.1.4.2 *Regional Notification Center.* Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) business days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. See Government Code section 4216.3. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any Subcontractor of the Contractor and the District has been given the identification number by the Contractor. Any damages arising from failure to make appropriate regional notification shall be at the sole risk of Contractor. Contractor shall solely be responsible for any fines, penalties or damages for violation of this Article and Government Code section 4216.6 or 4216.7. Any delays caused by failure to make appropriate regional notification shall be at the sole risk of Contractor and shall not be considered for extension of time pursuant to Article 8.4.

2.1.4.3 *Utilities - Removal and Restoration.* The District has endeavored to determine the existence of utilities at the Site of the Work from the records of the District of known utilities in the vicinity of the Work. The positions of these utilities as derived from such records are shown in the Contract Documents. Thus, the locations of the main or trunklines located on the Drawings are approximate locations and not exact.

No excavations were made to verify the locations shown for underground utilities. Other than the main or trunkline, which the District has endeavored to locate on the Plans, service connections or laterals to these utilities may not be shown on the Plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make its own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing work which could result in damage to such utilities. The Contractor shall immediately notify the District's representative as to any utility main or trunkline discovered by Contractor in a different position than provided by the Regional Notification Center. With respect to main or trunklines, Contractor is to immediately notify District if the location is substantially different than as shown in the Contract Documents.

Contractor shall coordinate its Work with all utilities, including, but not limited to electricity, water, gas and telephone and meet with said utilities prior to the start of any work. Contractor shall show timing of all utility coordination activities under the Scheduling requirements of Article 8.

2.1.4.4 *Other Utilities.* In case it should be necessary to remove, relocate, or temporarily maintain a utility because of interference with the Work, the work on the utility shall be performed and paid for as follows:

When it is necessary to remove, relocate or temporarily maintain a service connection, the cost of which is not required to be borne by the owner of the service connection, the Contractor shall bear all expenses incidental to the work on the service connection. The work on the service connection shall be done in a manner satisfactory to the owner thereof; it being understood that the owner

of the service connection has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is in the position shown on the Plans, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the utility. The work on the utility shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the utility has the option of doing such work with his own forces or permitting the work to be done by the Contractor.

When it is necessary to remove, relocate, or temporarily maintain a utility which is not shown on the Plans or is in a position different from that shown on the Plans and were it in the position shown on the Plans would not need to be removed, relocated, or temporarily maintained, and the cost of which is not required to be borne by the owner thereof, the District will make arrangements with the owner of the utility for such work to be done at no cost to the Contractor, or will require the Contractor to do such work in accordance with Article 7 or will make changes in the alignment and grade of the Work to obviate the necessity to remove, relocate, or temporarily maintain the utility. Changes in alignment and grade will be ordered in accordance with Article 7 herein.

No representations are made that the obligations to move or temporarily maintain any utility and to pay the cost thereof is or is not required to be borne by the owner of such utility, and it shall be the responsibility of the Contractor to investigate to find out whether said cost is required to be borne by the owner of the utility.

The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work and for the purpose of maintaining and making repairs to their property.

2.1.5 Existing Utility Lines; Removal, Relocation

2.1.5.1 *Main or Trunkline Facilities*. If the Contractor while performing the Contract discovers utility facilities not identified in the Contract Documents, Contractor shall notify the District and utility in writing prior to commencing work.

The owner of the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

The Contractor shall exercise reasonable care and shall be compensated by the District for the actual verified field costs of locating, and removing, relocating, protecting or temporarily maintaining such main or trunkline utility facilities located in a substantially different location than in the Plans and Specifications, and for equipment in use on the project necessarily idled during such work. This Work shall be performed in accordance with Article 7 of these General Conditions.

2.1.5.2 *Assessment*. Nothing in these subparagraphs shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site and could be inferred from the Main or Trunkline shown on the Drawings.

2.1.5.3 *Notification*. If the Contractor, while performing Work under this Contract, discovers utility facilities not identified by the District in the Contract Documents. Contractor shall, within five (5) days, notify the District and the utility in writing. If Contractor fails to notify the District within forty eight hours after discovery of any utility facilities not identified by District in the Contract Documents, Contractor waives all rights to be compensated for any extra Work or damages resulting from such discovered utilities.

2.1.6 Easements

District shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract Documents.

2.2 DISTRICT'S RIGHT TO CARRY OUT THE WORK DUE TO PARTIAL DEFAULT IN A SPECIFIC SEGREGATED AREA OF WORK (48 HOUR NOTICE TO CURE AND CORRECT)

If the Contractor Defaults or neglects to carry out the Work in accordance with the Contract Documents, the District may provide forty-eight (48) hour written notice to cure (a shorter period of time in the case of Emergency or a critical path delay as defined in Article 2.2.1) Contractor's Partial Default in a specific segregated area of work. The District's right to issue a Partial Default of the Contractor's Work and take over that segregated area of Work includes, but is not limited to:

1. Failure to supply adequate workers on the entire Project or any part thereof;
2. Failure to supply a sufficient quantity of materials;
3. Failure to perform any provision of this Contract;
4. Failure to comply with safety requirements, or due to Contractor is creation of an unsafe condition;
5. Cases of bona fide emergency;
6. Failure to order materials in a timely manner;
7. Failure to prepare Deferred Approval items or Shop Drawings in a timely manner;
8. Failure to comply with Contractor's Baseline or Update Schedule, meet critical Milestones which would result in a delay to the critical path, or delay the Contract Time;
9. Failure to comply with the Subletting and Subcontracting Fair Practices, Public Contract Code section 4100, et seq.
10. Failure to meet the requirements of the Americans with Disabilities Act;
11. Failure to complete Punch List work;
12. Failure to proceed on an Immediate Change Directive
13. Failure to correct a Notice of Deviation

If during the forty eight (48) hour period, the Contractor fails to Cure and correct the deficiency noted in the 48 hour notice of Partial Default with diligence and promptness, the District may correct such deficiencies without prejudice to other remedies the District may have, including a Termination for Cause as set forth in Article 14. If there are inadequate funds remaining the Project balance or in the Retention Escrow to address at least 150% of the costs set forth in the Article 2.2 notice, the District may copy the Surety on the written notice of Partial Default. If a notice to the Surety is provided, except in the cases of emergency or critical path delay, the Surety has the option to take over and complete the Work described in the written notice if Surety personally delivers notice to District that it intends to perform such work. In the case where written notice has been provided, the District shall allow Surety seven (7) days to perform the Work.

2.2.1 Service of Notice of Partial Default with Right to Cure

A written notice of Partial Default and right to cure under Article 2.2 ("Article 2.2 Notice" or "Notice of Partial Default") shall be served by e-mail (with a copy provided by regular mail) to the e-mail address provided on the Bid submitted and copied to the Project Superintendent.

2.2.2 Shortened Time for Partial Default in the Case of Emergencies.

In an Emergency situation, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies by providing service of written notice of Emergency requiring a shortened time for Partial Default specifying the time given to cure, if any.

2.2.3 Shortened Time for Partial Default in the Case of Critical Path Delay

In the case of critical path delay, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies providing service of written notice of critical path delay to the Contractor with a specific description of the critical path delay items noting the line item or area of Work that is on the critical path and prescribe the length of shortened time to cure, if any.

2.2.4 Written Notice of Partial Default to be Deducted by Deductive Change Order

The District shall have the right to determine the reasonable value of the Article 2.2 Partial Default Work, or if there is an actual value for the Work, shall use that value and issue a Deductive Change Orders under Article 7.7.4

ARTICLE 3
THE CONTRACTOR

3.1 SUPERVISION AND CONSTRUCTION PROCEDURES

3.1.1 Contractor

The Contractor shall continually supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures; and shall coordinate all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. The Contractor shall not perform the Work without utilizing the Contract Documents or, where required, approved Submittals, Shop Drawings, or samples for any such portion of the Work. If any of the Work is performed by contractors retained directly by the District, Contractor shall be responsible for the coordination and sequencing of the work of those other contractors so as to avoid any impact on the Project Schedule pursuant to the requirements of Article 6 and Article 8. Specific duties of the Contractor shall include those set out in Section 43 of Title 21 of the California Code of Regulations and Section 4-343 of Title 24 of the California Code of Regulations. These duties include, but are not limited to the following:

3.1.1.1 *Responsibilities*. It is the duty of the Contractor to complete the Work covered by his or her Contract in accordance with the approved Plans and Specifications. The Contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of their duties.

3.1.1.2 Performance of the Work. The Contractor shall carefully study the approved Plans and Specifications and shall plan its schedule of operations well ahead of time. If at any time it is discovered that work is being done which is not in accordance with the approved Plans and Specifications, the Contractor shall correct the Work immediately.

3.1.2 Contractor Responsibility to Study the Plans and Specifications

All inconsistencies or timing or sequences which appear to be in error in the Plans and Specifications shall promptly be called to the attention of the Architect or, Engineer, for interpretation or correction. Local conditions which may affect the structure shall be brought to the Architect's attention at once. In no case, shall the instruction of the Architect be construed to cause work to be done which is not in conformity with the approved Plans, Specifications, change orders, construction change documents, and as required by law. (See Title 24, Section 4-343)

3.1.3 All Work Under the Direction of Inspector

Pursuant to Title 24 requirements, the Contractor shall not carry on Work except with the knowledge of the Inspector. (See Title 24 generally)

3.1.4 Contractor to Establish Timing and Protocol with Inspector

Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of submitting form DSA 156 for each new area. DSA requirements under PR 13-01 specifically gives the

Special Inspector fourteen (14) days to post to the DSA website. Contractor is responsible for delays and for failure to plan.

For some Projects, there may be a need to incrementally install certain assemblies. It is up to Contractor to identify areas and assemblies that may be constructed incrementally. Contractor must identify and establish incremental areas of construction and establish protocols with Inspector for DSA 152 approvals so they may be presented to DSA. (See PR-13 item 1.17 for further discussion)

3.1.5 Verified Reports

The Contractor shall make and submit to the office from time to time, verified reports as required in Title 24 Section 4-366. As part of the Close-Out of the Project (see Article 9.9), Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343.

Contractor shall fully comply with any and all reporting requirements of Education Code sections 17315, et seq., in the manner prescribed by Title 24, as applicable.

3.1.6 Contractor Responsibility

The Contractor shall be responsible to the District for acts and omissions of the Contractor's employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

3.1.7 Obligations not Changed by Architect's Actions

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the Contractor.

3.1.8 Acceptance/Approval of Work

The Contractor shall be responsible to determine when any completed portions of the Work already performed under this Contract or provided pursuant to Article 6 are suitable to receive subsequent Work thereon.

3.2 SUPERVISION

3.2.1 Full Time Supervision

Unless personally present on the Project site where the Work is being performed, the Contractor shall keep on the Work at all times during its progress a competent, English speaking construction Superintendent satisfactory to the District. The Superintendent shall be present on a full-time basis, shall be dedicated exclusively to the Project and shall not share superintendency duties with another project or job. The Superintendent shall not be replaced except with written consent of the District. The Superintendent shall represent the Contractor in its absence and shall be fully authorized to receive and fulfill any instruction from the Architect, the Inspector, the District or any other District Representative (including CM in the cases where the District has a CM representative). All Requests for Information shall be originated by the Superintendent and responses thereto shall be given to the Superintendent. No Work

shall begin on any day by any Subcontractor or other person on the Project site until the Superintendent has arrived, or shall any Work continue during the day after the Superintendent has departed from the Project site. The Superintendent shall have authority to bind Contractor through the Superintendent's acts. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be binding on the Contractor. Before commencing the Work, Contractor shall give written notice to District (and CM representative) and Architect of the name and a Statement of Qualifications of such superintendent. Superintendent shall not be changed except with written consent of District, unless a superintendent proves to be unsatisfactory to Contractor and ceases to be in its employ, in which case, Contractor shall notify District and Architect in writing. Contractor shall provide a replacement superintendent approved by the District prior to performing additional work.

3.2.2 Staff

Notwithstanding other requirements of the Contract Documents, the Contractor and each Subcontractor shall: (1) furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; (2) organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and (3) keep an adequate force of skilled and fit workers on the job to complete the Work in accordance with all requirements of the Contract Documents.

3.2.3 Right to Remove

District shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier.

3.3 LABOR AND MATERIALS

3.3.1 Contractor to Provide

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, air conditioning, utilities, transportation, and other facilities, services and permits necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 Quality

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of the highest quality or as specifically stated in the Contract Documents. The Contractor shall, if requested, furnish satisfactory evidence as to kind and quality of all materials and equipment within ten (10) days of a written request by the District, including furnishing the District with bona fide copies of invoices for materials or services provided on the Project. All labor shall be performed by workers skilled in their respective trades, and shall be of the same or higher quality as with the standards of other school construction.

3.3.3 Replacement

Any work, materials, or equipment, which do not conform to these requirements or the standards set forth in the Contract Documents, may be disapproved by the District, in which case, they shall be removed and replaced by the Contractor at no additional cost or extension of time to the District.

3.3.4 Discipline

The Contractor shall enforce strict discipline and good order among the Contractor's and Subcontractor's employees, and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. As used in this subsection, "unfit" includes any person who the District concludes is improperly skilled for the task assigned to that person, who fails to comply with the requirements of this article, or who creates safety hazards which jeopardize other persons and/or property.

3.3.5 Fingerprinting (Applicable at the time Project is Occupied and on all Projects where Workers will come in Contact with Pupils, such as Modernization Projects)

If applicable, Contractor shall comply with the applicable provisions of Education Code section 45125.1 in a method as determined by the District. Pursuant to Education Code section 45125.1, Contractor shall either conduct criminal background checks of all employees of Contractor assigned to the Project site, and shall certify that no employees who have been convicted of serious or violent felonies, as specified in Education Code section 45125.1, will have contact with pupils, by utilizing the Certification Regarding Background Checks and the corresponding Attachment "A" as found in the Contract Documents or shall be separated by a physical barrier from students.

If it is determined that Contractor must provide certification of employees, as part of such certification, Contractor must provide the District with a list of all employees providing services pursuant to this Agreement, and designate which sites such employees will be assigned. In performing the services set forth in this Agreement, Contractor shall not utilize any employees who are not included on the above-referenced list.

At District's sole discretion, District may make a finding, as authorized under Education Code section 45125.1, that Contractor's employees will have only "limited contact" with pupils. Contractor's failure to comply with this law shall be considered a material breach of this Agreement upon where this Agreement may be terminated, at District's sole discretion, without any further compensation to Contractor.

In the case of new construction Projects where there are no students, if the Project Schedule provides for Beneficial Occupancy or portions of the Project or if the Project should be delayed, then Contractor, at no additional costs, shall meet the requirements of either fingerprinting or providing a physical barrier as required by the District.

3.3.6 Noise, Drugs, Tobacco, and Alcohol

Contractor shall take all steps necessary to insure that employees of Contractor or any of its Subcontractors' employees do not use, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the Project. Contractor shall further prevent any of its employees or its Subcontractor employees from playing any recorded music devices or radios or wearing any radio headphone devices for entertainment while working on the Project. Likewise, Contractor shall prevent its employees or Subcontractor's employees from bringing any animal onto the Project. Contractors shall not violate any written school policies.

3.3.7 Delivery of Material

Contractor shall place orders for materials or equipment so that the Work may be completed in accordance with the Construction schedule for the Work as set forth in Article 8 of this Agreement. Contractor shall, upon demand from the Architect, furnish to the Architect documentary evidence including, but not limited to purchase orders, invoices, bills of materials, work orders and bills of lading, showing that orders have been placed. Contractor shall have a system to receive materials and to ensure that the proper materials are being delivered, including in the case of critical materials to the Project, checking the delivery against Shop Drawings and ensuring that the materials meet the requirements of not only the Plans and Specifications, but also the approved Shop Drawings and Submittals and in conformance with Contractor's plan for delivery of materials (including but not limited to Contractor's representations in the Schedules for the Project and Contractor's equipment and materials schedule under Article 3.7.2.2). Contractor shall be responsible for all costs of accepting non-conforming materials delivered to the Project given Contractor's responsibilities and system for acceptance of deliveries. Contractor shall notify Inspector and District Representative (including CM) as early as possible, in writing, of the delivery of materials for the Project. The deliveries shall include documentation identifying the shipment sufficiently so that the Inspector, Architect or District Representative (including CM) may review the materials that are received. Under no circumstances shall materials be delivered to the Project site that are meant for another Project.

3.3.8 Liens and Other Security Interests of Subcontractors and Material Suppliers

No material, supplies, or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by it, to District free from any claims, security interests, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract shall have any right to place a lien upon the premises or any improvement or appurtenance thereof, except that Contractor may install metering devices or other equipment of a utility company or political subdivision, title to which is commonly retained by the utility company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise District as to its owner within five (5) days of such installation in writing, prior to making the installation.

Contractor agrees to indemnify, defend and hold the District harmless from any liens, stop notices, or assertion of security interests, including judgments and levies. If after written notice Contractor fails to address the lien, stop notice, or other security interest, the District may proceed to address the lien, stop notice or claim and seek reimbursement from Contractor.

3.3.9 Title to Materials

The title to new materials or equipment for the Work of this Contract shall remain with Contractor until incorporated in the Work of this Contract until final acceptance of the Project; no part of said materials shall be removed from its place of storage, and Contractor shall keep an accurate inventory of all said materials and equipment in a manner satisfactory to the District or its authorized representative. Responsibility for materials remains with Contractor and Contractor shall replace materials in case of loss. District similarly may pay for materials stored off site, but Contractor shall remain responsible for the materials that are stored off site.

3.3.10 Assemblies

For all material and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary, (including engineering as specifically required with Shop Drawings or Deferred Approvals) for complete assemblies and complete working systems. Incidental items not indicated on the Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized in the Contract Documents in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and Specifications.

3.3.11 Noise Control

The Contractor shall be responsible for the installation of noise reducing devices on construction equipment. Contractor shall comply with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction equipment noise is subject to the control of the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations). If school is in session at any point during the progress of the Project, and, in the District's reasonable discretion, the noise from such Work disrupts or disturbs the students or faculty or the normal operation of the school, at the District's request, the Contractor shall schedule the performance of all such Work around normal school hours or make other arrangements so that the Work does not cause such disruption or disturbance. There are specific periods of testing at operational schools and it is critical that Contractor control noise during periods of testing. In no event shall Contractor have a right to receive additional compensation or an extension to the Contract time as a result of any such rescheduling or the making of such arrangements. These controls shall be implemented during site preparation and construction. All noise related issues, including school operations, and noise during testing should be detailed in the Schedule provided pursuant to Article 8

3.4 WARRANTY

The Contractor warrants to the District and Architect that material and equipment furnished under the Contract will be of the highest quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty to District includes, but is not limited to, the following representations:

3.4.1 In addition to any other warranties provided elsewhere, Contractor shall, and hereby does, warrant all Work after the date of Notice of Completion of Work by District and shall repair or replace any or all such Work, together with any other Work, which may be displaced in so doing that may prove defective in workmanship or materials within a one (1) year period from date of Final Completion which shall be no later than the final date of Punch List as noted at Article 9.11) without expense whatsoever to District, ordinary wear and tear, unusual abuse or neglect excepted. District will give notice of observed defects with reasonable promptness. Contractor shall notify District upon completion of repairs.

3.4.2 In the event of failure of Contractor to comply with above mentioned conditions within one week after being notified in writing, District is hereby authorized to proceed to have defects repaired and made good at expense of Contractor who hereby agrees to pay costs and charges therefore immediately on demand.

3.4.3 If, in the opinion of the District, defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District, the District will attempt to give the notice required by this Article. If the Contractor cannot be contacted or does not comply with the District's requirements for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or attention which shall be charged against Contractor. Such action by the District will not relieve the Contractor of the guarantee provided in this Article or elsewhere in this Contract.

3.4.4 This Article does not in any way limit the guarantee on any items for which a longer warranty is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish District all appropriate guarantee or warranty certificates upon completion of the project.

3.5 TAXES

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. District is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

3.6 PERMITS, FEES AND NOTICES

3.6.1 Payment

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are necessary after execution of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). District shall be responsible for all testing and inspection as required by the DSA on-site or within the distance limitations set forth in Article 13.5.2, unless a different mileage range is specified in the Supplemental Conditions.

3.6.1.1 *DSA Fees*. DSA policy is to charge CCD review fees for processing and approval of changes in the Plans and Specifications through the Construction Change Document process. Contractor is specifically directed to the current DSA IR A-30 which provides fee structure and charges that will be incurred for proceeding with respect to the CCD process, a process that must be followed for each change in the Plans and Specifications.

3.6.2 Compliance

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work. Specifically, the Division of State Architect provides State oversight of the Project and enforcement of Title 24 rules and regulations. Contractor is directed to the DSA website. There will be local governmental oversight from City, County or both. Finally, Regional Water Quality Control Board, State Fire Marshall, local fire marshal, Department of Industrial Relations, Department of Labor Standards Enforcement, and Air Quality Management District (Local and State) are some of the agencies that provide oversight and may require specific permits, fees, or provide oversight over the Project. Contractor represents understanding and specialized knowledge of the rules governing school districts and Contractor shall maintain compliance over the applicable rules and will file all documents required in order to ensure compliance with State, local, and other rules that apply to the Project.

3.6.3 Responsibility

The Contractor shall perform all Work in conformance with every law, statute, ordinance, building code, rule or regulation. The Contractor shall assume full responsibility for such Work and shall bear the attributable cost of correction or project delay.

Pursuant to Title 24 Section 4-343(b):

> "Contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time.... All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the inspector, for interpretation or correction."

To help Contractor plan its operations, Contractor is directed to study the current version of the DSA 152 Inspection Card Manual identifying the exact steps the Inspector is to follow in the review and sign off process for the DSA 152. The DSA 152 Inspection Card Manual provides specific detail as to the order of operations, review items and compliance items beyond the Specifications and Plans which are reviewed for DSA compliance. The most current version of this manual is located on DSA's website.

Contractor is also specifically directed to the time periods for posting of Special Inspection Reports and Inspector Notifications under DSA PR 13-01 since the timing of Inspection is not a Governmental Entity related delay.

3.7 SUBMITTALS REQUIRED AT THE COMMENCEMENT OF THE PROJECT

3.7.1 Requirements Within Ten (10) Calendar Days

Within ten (10) calendar days after Notice to Proceed, Contract shall submit the following:

3.7.1.1 Detailed Schedule of Values (See Article 9.2)

3.7.1.2 Submittal Listing and Schedule for Submittals

3.7.1.3 Critical Path Baseline Schedule (See Article 8)

3.7.2 Requirements Within Thirty-Five (35) Calendar Days

Within thirty-five (35) calendar days after Notice to Proceed, Contractor shall submit the following:

3.7.2.1 *All Submittals for the Project* except those specifically agreed upon by District and Architect, in writing, and shall be specifically incorporated into the Submittal section of the Schedule so as to not delay the Work. The agreement to allow a later Submittal does not mean that Article 3.3.7 is waived. Contractor shall order materials and ensure prices are honored and secured for the Project.

a. Structural Steel may be included as a later Submittal than 35 days if Structural Steel is a significant portion of the Work, at least one or some of the Project is a structural steel structural system, or as specifically agreed upon by the Architect or District.

b. It is specifically agreed that submissions of structural steel Submittals shall not be piecemeal (unless some portion is requested separately by the District or Architect), shall provide complete designs, shall be stamped by the structural steel Subcontractor, Contractor, and structural steel Subcontractor's structural engineer at time of submission and as further addressed in Article 3.9.

c. In no case shall the submission of structural steel Drawings delay the critical path for the schedule. If a Milestone is provided for submission of complete structural steel Shop Drawings then the date shall be no later than as set forth in the Milestone

3.7.2.2 *Exceptions to Submittal Within Thirty-Five (35) Days by Written Agreement*. A written request detailing the specific reasons for a submission later than 35 days due to complexity of design or non-critical path status of the Submittal shall be submitted at the time the Baseline Schedule is submitted. The Baseline Schedule shall not include a delayed Submittal until written agreement is provided. In addition to the request for providing a Submittal after the thirty-five (35) day period, a copy of the Contract with the Subcontractor who shall be performing the Submittal, a written statement from the Subcontractor verifying that work has commenced on the Submittal and providing Subcontractor's own schedule of Milestones and completion dates, and a corresponding Submittal designation in the Schedule as required under Article 8. Approval of a delayed Submittal shall not result in any increase in the Contract Price or result in an extension of time for the completion of the Project.

3.7.2.3 *Piecemeal Submissions of Submittals*. Piecemeal Submittals mean providing portions of Shop Drawings or Submittals as they are being completed. The submission of piecemeal Submittals results in the appearance of a submission when there is inadequate information for the Architect or Engineer to adequately review a submission. Piecemeal differs from submission of complete buildings or phases of buildings or complete assemblies. The Architect may agree to allow submission of single buildings or areas as long as the Submittals are complete. .

3.8 DOCUMENTS, SAMPLES, AND COMPUTER AT THE SITE

The Contractor shall maintain at the Site for the District one current copy of the California Building Code, Titles 19 and 24 of the California Code of Regulations, any other document required by DSA, and one record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required Submittals. These documents shall be available to the Architect and shall be delivered to the Architect for delivery to the District upon completion of the Work.

Contractor shall have an operational computer with internet access so Contractor can review and post documents as required for the Project, including but not limited to the filing and posting of DSA required documents for the Project.

Contractor shall be prepared to review documents posted to the DSA Project website.

3.9 SUBMITTALS INCLUDING SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.9.1 Definitions

3.9.1.1 *Deferred Approvals*. Approval of certain aspects of the construction may be deferred until the construction Contract has been awarded. To facilitate the design process, DSA grants Deferred Approval to the design and detailing of certain elements of the Project at the request of the Architect or Engineer of Record. Design elements that may be deferred may include, but are not limited to access floors, bleachers, elevator guide rails and related elevator systems, exterior wall systems - precast concrete, glass fiber reinforced concrete, etc., skylights, window wall systems, storefronts, stage rigging, and other systems as noted in the Contract Documents. (Also see Article 1.2.2.2 and 3.9.3)

3.9.1.2 *Shop Drawings.* The term "Shop Drawings" as used herein means Drawings, diagrams, equipment or product schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting Drawings; manufacturer's standard Drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other Drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents.

3.9.1.3 *Manufactured* applies to standard units usually mass-produced, and "Fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall: establish the actual detail of all manufactured or Fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.9.1.4 *Submittals* is a term used interchangeably and sometimes refers to Shop Drawings, Product Data, and samples since all Subcontractor submissions are tracked in a Submittal Log and may include any of the noted items. However, generally, a Submittal is a manufacturer's product information and Product Data including description, characteristics, size, physical characteristics, and requirements to prepare the jobsite for receiving of the particular manufactured item.

3.9.1.5 *Samples*. The term "samples" as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, Fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Architect to determine whether the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.9.2 Shop Drawings.

3.9.2.1 *When Shop Drawings Are Required.* Shop Drawings are required for prefabricated components and for installation and coordination of these prefabricated components into the Project. In addition, Shop Drawings, are prepared to address the actual size and installation of components from various Subcontractors and provides an opportunity for the Contractor to coordinate and address conflicts between the subcontracting trades. In some cases, each Subcontractor or trade will provide Shop Drawings in a BIM format or other format as agreed by District.

3.9.2.2 *Purpose for Shop Drawings.* Shop Drawings are the Contractor's manufacturer, Subcontractor, supplier, vendor or the Contractor's detailed drawings showing particularized

method for assembly, specifics to a manufacturer, manufacturer component installation requirements, specifics as to a manufactured item, alterations to a manufactured, a custom created item, or drawn version of more detailed information expanding on the Architect's design shown in the Contact Documents. The Shop Drawings address the appearance, performance, size, weight, characteristics and prescriptive descriptions associated with the Contractor or Contractor's Subcontractor's plan for installation or assembly based on the design in the Specifications and Contract Documents. The Shop Drawing often is more detailed than the information shown in the Contract Documents to give the Architect and Engineer the opportunity to review the fabricator's version of the product (along with particulars specific to that particular product), prior to fabrication. References to the Contract Documents, Construction Documents, Drawings, Plans, and Specifications assist the Architect and Engineer in their review of the Shop Drawings. Attachment of manufacturer's material Specifications, "catalog cut sheets," and other manufacturer's information may be provided to accompany Shop Drawings. Because Shop Drawings facilitate the Architect's and Engineer's approval of the system, they should be as clear and complete as possible so they may be reviewed by Architect or Engineer for the Project.

3.9.2.3 *Shop Drawing Requirements.* The Contractor shall obtain and submit with Shop Drawings all seismic and other calculations and all Product Data from equipment manufacturers. "Product Data" as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

3.9.2.4 *Not a Reproduction of Architectural or Engineering Drawings.* The Shop Drawings are not a reproduction of the architectural or engineering Drawings. Instead, they must show more detail than the Construction Documents and details the fabrication and/or installation of the items to the manufacturer's production crew or Contractor's installation crews.

3.9.2.5 *Shop Drawings Engineering Requirements*: Some Shop Drawings require an engineer stamp to be affixed on the Drawings and calculations. In such cases, a current and valid engineering stamp shall be affixed by a California registered engineer. No out of State engineers shall stamp Shop Drawings. (See DSA IR A-18). In most cases, an engineer means California registered mechanical, structural, electrical or plumbing engineer. California Registered Civil Engineers will not be accepted for structural details unless specifically approved by DSA.

3.9.2.6 *DSA Approvals Required Prior to Work*. No work on a Shop Drawing that requires DSA approval may proceed until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for corrections in Contractor's Schedule as required pursuant to Article 8.

3.9.2.7 *Shop Drawing Identification.* All Shop Drawings must be properly identified with the name of the Project and dated, and accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor.

3.9.3 Deferred Approvals

Deferred approvals shall be submitted and processed to ensure all DSA and other governmental approvals are secured so as to not delay the Project. There may be additional requirements

for Deferred Approvals at Division 1 of the Specifications. All Deferred Approvals shall be prepared by Contractor or Contractor's agent early enough so as to not delay the Project. Contractor is aware that Title 24 California Code of Regulations Section 4-317 have specific requirements for Deferred Approval as to governing agencies and as to the Architect and Engineer for the Project. As a result, any delay associated with the time for approval by applicable agencies or by the Architect or Architect's consultants shall be Contractor's. Contractor is required to comply with inclusion of Deferred Approvals in the Schedule as required under Article 3.9.6*DSA Approvals Required Prior to Work.* No work on a Deferred Approval item may proceed on the components until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for any DSA revisions in Contractor's Schedule as required pursuant to Article 8.

3.9.4 Submittals and Samples

3.9.4.1 *Information Required With Submittals*: Manufacturer, trade name, model or type number and quantities: Information provided must be of sufficient detail to allow Architect and Engineer to compare the submitted item with the specified products and acceptable products listed, in the Specifications and addenda.

3.9.4.2 *Description of Use and Performance Characteristics*: Information should be furnished describing the normal use and expected performance of the product. The Architect and Contractor review this information to confirm that the product is appropriate for the intended use.

3.9.4.3 *Size and Physical Characteristics:* The size and physical characteristics, such as adjustment capabilities, which is reviewed by both the Contractor and Architect. The Contractor has the most available information for comparing adjoining materials and equipment. The Contractor also needs to know the size and weight of the equipment for lifting and handling considerations.

3.9.4.4 *Finish Characteristics:* The Architect reviews the available finishes and selects the appropriate finish, if the finish was not previously specified in the documents. The Contractor should confirm that finish requirements in the Specifications are being met by the product.

3.9.4.5 *Contractor Responsible for Jobsite Dimensions*: Some material is custom-Fabricated to job conditions, requiring dimensions from the jobsite. These jobsite dimensions are provided by the Contractor as part of the Contractor's responsibilities for the Project and shall be provided prior to release of the product for manufacture. Contractor shall not rely on Architect or Engineers to provide jobsite dimensions.

3.9.4.6 *Full Range of Samples Required (When Specific Items Not Specified).* Except in cases where the exact color and type of item is specified since the District is utilizing items Standardized or pre-selected by District, the full range of color, graining, texture, or other characteristics are anticipated for review in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics which will be present in the finished products. Products delivered or erected without Submittal and approval without providing a full range of samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications or Specification Section 1, samples shall be submitted in duplicate.

3.9.4.7 *Labeling of Samples.* All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted and the date.

3.9.4.8 *Transmittal letter.* All samples shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number.

3.9.4.9 *Labels and Instructions.* All samples of materials shall be supplied with the manufacturer's descriptive labels and application instructions. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.9.4.10 *Architect's Review.* The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the timing for review and appropriate action in compliance with the Architect's (or District's) standard procedures. In the cases where a CM is hired by the District, CM may be the party that receives and performance logging and initial processing of the Samples. CM may, in some cases, reject samples that are not in conformance with Contract requirements.

3.9.5 Submittal Submission Procedure

3.9.5.1 *Transmittal Letter and Other Requirements.* All Submittals must be properly identified with the name of the Project and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" on the submissions, all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Refer to Division 1. In the case where a CM is hired on the Project, the CM may be designated to receive the Submittals for the Project, log the Submittals, and in some cases reject Submittals that do not conform to Contract requirements. Submittal Procedures for further information.

3.9.5.2 *Copies Required.* Each Submittal shall include one (1) legible, reproducible (if electronic is available, electronic copies shall also be provided) and five (5) legible prints of each drawing or schedule, table, cut sheet, etc., including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications, until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: (1) manufacturers' descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; (2) wiring diagrams and controls; (3) schedules; (4) all seismic calculations and other calculations; and (5) other pertinent information as required by the District or Architect. (See also Division 1)

3.9.5.3 *Corrections.* The Contractor shall make all corrections required by Architect, District or CM and shall resubmit, as required by Architect or CM, corrected copies of Shop Drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required Submittals of Shop Drawings, Product Data, or samples are subject to charge to the Contractor pursuant to Article 4.5.

3.9.5.4 *Approval Prior to Commencement of Work*. No portion of the Work requiring a Shop Drawing or sample submission or other Submittal shall be commenced until the submission has been reviewed by Contractor and Architect (and CM, if applicable) and approved by Architect (and CM where applicable) unless specifically directed in writing by the Architect. All such portions of the Work shall be in accordance with approved Shop Drawings and samples.

3.9.5.5 *District's Property.* All Submittals, Shop Drawings, computer disks, BIM modeling information, clash checks, schedules, annotated Specifications, samples and other Submittals shall become the District's property upon receipt by the District or Architect.

3.9.6 Schedule Requirements for Submittals

Contractor shall obtain and shall submit all required Submittals (i.e. Shop Drawings, Deferred Approvals, Samples, etc.), in accordance with Contractor's "Schedule for Submission of Shop Drawings and Samples" as required in the scheduling portion of the General Conditions at Articles 8 and the Specifications (as long as the Specifications do not conflict with General Conditions. In the case of conflict, the conflicting provision shall be controlled by the General Conditions and the remaining Specifications sections shall be interpreted as if the general conditions language is inserted) with such promptness as to cause no delay in its own Work or in that of any other contractor or subcontractor but in no event later than thirty five (35) days after the Notice to Proceed is issued except in the specific cases noted as an exception under Article 3.7.2.1. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have Shop Drawings and samples submitted in accordance with Division 1 and the Schedule. Each Subcontractor shall submit all Shop Drawings, samples, and manufacturer's descriptive data for the review of the District, the Contractor, and the Architect through the Contractor.

3.9.6.1 *Consideration of Schedule.* Contractor has considered lead times, DSA or other agency governmental review times, Architect or Engineer review times, manufacturing seasons, and specific long lead procurement concerns for all submittals for the Project.

3.9.7 General Submittal Requirements

3.9.7.1 *Contractor Submittal Representations and Coordination.* By submitting Shop Drawings, Product Data, samples, etc., the Contractor represents that it has determined and verified all materials, field measurements, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents, including the construction schedule.

3.9.7.2 *Contractor Coordination.* Contractor shall stamp, sign, and date each Submittal indicating its representation that the Submittal meets all of the requirements of the Contract Documents and evidence Contractor's review through execution of the following stamp to be placed on each Shop Drawings:

> "[Contractor] has reviewed and approved the field dimensions and the construction criteria, and has also made written notation regarding any information in the Shop Drawings and Submittals that does not conform to the Contract Documents. This Shop Drawing or Submittal has been coordinated with all other Shop Drawings and Submittals received to date by me as Contractor and this duty of coordination has not been delegated to Subcontractors, material suppliers, the Architect, or the Engineers on this Project.
>
> _____
> Signature of Contractor and date

3.9.7.3 *No Deviation from Contract Documents.* The submission of the Shop Drawings, Product Data, samples, etc., shall not deviate from the *requirement*s of the Contract Documents

including detailing and design intent which is specifically outlined in Contract Documents except as specifically authorized by the Architect or through an accepted substitution pursuant to Article 3.10.4. All deviations from the Contract Documents shall be narratively described in a transmittal accompanying the Shop Drawings. However, Shop Drawings shall not be used as a means of requesting a substitution, the procedure for which is defined in Article 3.10.4, "Substitutions."

3.9.7.4 *Contractor Responsibility for Shop Drawings Conformance to Contract Documents*. Review by District and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper Shop Drawings in accordance with the Contract Documents.

3.9.7.5 *Incomplete Submittals.* Any submission, which in Architect's opinion is incomplete, contains errors, or has been checked superficially, will be returned not reviewed by the Architect for resubmission by the Contractor. Refer to Submittal Procedures of the Specifications for additional information. The Contractor shall be responsible for any related delays and shall not be the basis for any Claim.

3.9.7.6 *Shop Drawings and Submittals Shall Not Be Used as a Method to Make a Substitution.* Shop Drawings and Submittals shall not be used as a means of requesting a substitution or to make changes in the Contract Documents. If changes are made to the Contract Documents through the Shop Drawings, the Architect shall have the right to reject the Submittal. If the Architect does not note the deviation from the approved Plans and Specifications, the Contractor is still responsible for the change and the Architect or the District may require the Shop Drawings be revised to properly reflect the approved Contract Documents. The Architect or District may also require that the Contractor bear all costs under Article 4.5 and consequential damages associated with a CCD to revise Plans and Specifications to accommodate the deviation from approved Plans and Specifications.

3.9.7.7 Extent of Review. In reviewing Shop Drawings, the Architect will not verify dimensions and field conditions. The Architect will review and approve Shop Drawings, Product Data, samples, etc., for aesthetics and for conformance with the design concept of the Work and the information in the Contract Documents. The Architect's review shall neither be construed as a complete check which relieves the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in Shop Drawings or schedules, for proper fitting of the Work, coordination of the differing Subcontractor trades and Shop Drawings and Work which is not indicated on the Shop Drawings at the time of submission of Shop Drawings. Contractor and Subcontractors shall be solely responsible for any quantities which may be shown on the Submittals or Contract Documents.

3.10 SUBSTITUTIONS

3.10.1 Definition

A Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of this Article.

3.10.2 One Product Specified

Unless the Specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words "or equal." Subject to the requirements of properly submitting a Substitution Request for as Addressed in Article 3.10.4, the Contractor may, unless otherwise stated, offer any material, process, article, etc., which shall be materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Documents.

3.10.3 Products Specified Which Are Commercially Unavailable

If the Contractor fails to make a request for substitutions for products, prior to the submission of its bid, and such products subsequently become commercially unavailable, the Contractor may request a substitution for such commercially unavailable item. The decision to grant this request is solely at the District's discretion. The written approval of the District, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. The District may condition its approval of the substitution upon the delivery to District of an extended warranty or other assurances of adequate performance of the substitution as well as an equitable deduction in the Contract Price should the substituted item cost less than the Specified Item. All risks of delay due the approval of a requested substitution by the DSA, or any other governmental agency having jurisdiction, shall be on the requesting party. All additional costs, DSA review costs, all procurement and construction delays, and all costs for review by the Architect or its consultants shall be the responsibility of the Contractor and will be deducted from Contractor's pay request.

3.10.4 Substitution Request Form

Requests for substitutions of products, materials, or processes in place of a Specified Item must be in writing on the District's Substitution Request Form ("Request Form") at the time of submitting bids to the District, except as provided for in Article 3.10.3.

The Request Form must be accompanied by evidence as to whether the proposed substitution:

a. Is equal in quality/service/ability to the Specified Item;

b. Will entail no changes in detail, construction, and scheduling of related work;

c. Will be acceptable in consideration of the required design and artistic effect;

d. Will provide no cost disadvantage to the District;

e. Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and

f. Will required no change of the construction schedule.

In completing the Request Form, the bidder must state, with respect to each requested substitution, whether the bidder will agree to provide the Specified Item in the event that the District denies the bidder's request for such requested substitution. In the event that the bidder has agreed in the Request

Form to provide the Specified Item and the District denies the bidder's requested substitution for a Specified Item, the bidder shall provide the Specified Item without any additional cost or charge to the District.

After bids are opened, the apparent lowest bidder shall provide, within five (5) days of opening such bids, any and all Drawing, Specifications, samples, performance data, calculations, and other information, as may be required to assist the Architect, CM and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by the bidder, the District will make its final decision as to whether the bidder's request for substitution for any Specified Items will be granted. The decision as to whether a proposed request for substitution is equal to a Specified Item shall be at the sole discretion of the District. Any request for substitution that is granted by the District shall be documented and processed though a Change Order. Contractor must submit a complete Submittal of the requested substitution and a Shop Drawing showing configuration, dimensions, and other critical information associated with the substitution that meets the requirements of Article 3.9. The District may condition its approval of any substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the substitution. Any and all risks of delay due to approval by the DSA or any other governmental agency having jurisdiction shall be on the bidder.

If the Architect and District accept a proposed substitution, the Contractor agrees to pay for all DSA review costs, engineering and design services, including, without limitation, compensation to the Architect and affected engineers for their required time to process such substitution through the Division of the State Architect, if required, and to make all changes and adjustments in materials or the work of all trades directly or indirectly affected by the substituted item or items at no cost to the District.

3.10.5 Substitution Requests After Bid

The District, in its sole discretion, may accept a request for substitution by the Contractor or may request Contractor substitute a specified item. Any substitutions requested after bids are opened shall be subject to the same conditions and requirements set forth in Article 3.10.4 above. If any substitutions, that in the District or Architect's determination, results in a credit to the District, the credit amount shall be agreed upon in writing, otherwise, the request for substitution shall be deemed denied.

3.11 INTEGRATION OF WORK

3.11.1 Scope

The Contractor shall be responsible for cutting, fitting, or patching to complete the Work and to make all parts fit together properly. Contractor shall be responsible for ensuring that all trades are coordinated and scheduled so as to ensure the timely and proper execution of the work. When modifying existing work or installing new Work adjacent to existing work, Contractor shall match, as closely as conditions of Site and materials will allow, the finishes, textures, and colors of the original work, refinishing existing work at no additional cost to District. All cost caused by defective or ill-timed work shall be borne by Contractor. Contractor shall be solely responsible for protecting existing work on adjacent properties and shall obtain all required permits for shoring and excavations near property lines.

3.11.2 Structural Members

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary

to such authority is at the Contractor's risk and subject to replacement at its own expense without reimbursement under the Contract. Schedule delays resulting from Agency approvals for unauthorized work shall be the Contractor's responsibility.

3.11.3 Subsequent Removal

Permission to patch any areas or items of the Work shall not constitute a waiver of the District's or the Architect's right to require complete removal and replacement of the areas of items of the Work if, in the opinion of the Architect or the District, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents.

3.12 CLEANING UP

3.12.1 Contractor's Responsibility to Clean Up

Contractor at all times shall keep premises free from debris such as waste, dust, excess water, storm water runoffs, rubbish, and excess materials and equipment. Contractor shall not leave debris under, in, or about the premises, but shall promptly remove same from the premises and dispose of it in a lawful manner. Disposal receipts or dump tickets shall be furnished to the Architect within five (5) days of request.

Contractor shall remove rubbish and debris resulting from the Work on a daily basis. Contractor shall maintain the structures and Site in a clean and orderly condition at all times until acceptance of the Project by the District. Contractor shall keep its access driveways and adjacent streets, sidewalks, gutters and drains free of rubbish, debris and excess water by cleaning and removal each day. All concrete, sidewalks, and paths of travel shall be broom cleaned daily.

3.12.2 General Final Clean-Up

Upon completion of Work, Contractor shall employ experience workers or professional cleaners for final cleaning. Contractor shall clean each surface to the condition expected in a normal, commercial, building cleaning and maintenance program including, but not limited to, the performed of the following:

a. Clean interior and exterior of buildings, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected, so surfaces are free from foreign material or discoloration;

b. Clean the Project site. The grounds should be cleared of any Contractor equipment, raked clean of debris and trash removed. Sweep paved areas broom clean;

c. Repair or replace any damaged materials. Replace any chipped or broken glass;

d. Remove any and all stains;

e. Remove labels that aren't permanent labels;

f. Clean and polish all glass, plumbing fixtures, equipment, finish hardware and similar finish surfaces. Remove any glazing compounds;

g. Remove temporary utilities, fencing, barricades, planking, sanitary facilities and similar temporary facilities from Site;

h. Remove temporary film that remains on any hardware, doors or other surfaces; and

i. Seal the bottom and tops of all doors.

3.12.3 Special Clean-Up.

In addition to the general cleaning, the following special cleaning shall be done at the completion of the Work in accordance with the Specifications including, but not limited to:

a. Remove putty stains from glazing, then wash and polish glazing;

b. Remove marks, stains, fingerprints and other soil or dirt from painted, stained or decorated work;

c. Remove temporary protection and clean and polish floors and waxed surfaces;

d. Clean and polish hardware and plumbing trim; remove stains, dust, dirt, plaster and paint;

e. Wipe surfaces of mechanical and electrical equipment;

f. Remove spots, soil, plaster and paint from tile work, and wash tile;

g. Clean all fixtures and equipment, remove excess lubrication, clean light fixtures and lamps, polish metal surfaces;

h. Vacuum-clean carpeted surfaces; and

i. Remove debris from roofs, down spout and drainage system.

3.12.4 Failure to Cleanup

If the Contractor fails to clean up as provided in the Contract Documents, the District may do so, and the cost thereof shall be the responsibility of the Contractor pursuant to Article 2.2 and seek a Deductive Change Order.

3.13 ACCESS TO WORK

The Contractor shall provide the District, the Architect, Engineers and the Inspector of Record, access to the Work in preparation and progress wherever located. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES AS ADDRESSED IN ARTICLE 6.

3.13.1 Special Inspection, Inspections or Tests Out of State, Out of Country or Remote from Project

If Contractor has a Subcontractor or supplier that requires in plant or special inspections or inspections or tests that are out of the country, out of the state, or a distance of more than 200 miles from the Project site, the Special Inspector or Inspector shall be provided access so the special inspection or inspection may occur in the remote location. In some cases, the DSA Inspector may also require access in addition to Special Inspectors and individuals performing tests. Inspections/tests shall occur during normal work hours. (See also Article 4.3.6)

3.14 ROYALTIES AND PATENTS

3.14.1 Payment and Indemnity for Infringement

Contractor shall hold and save the District and its officers, agents, and employees, the Construction Manager, the Architect, and the Architect's consultants harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the District, unless otherwise specifically provided in the Contract Documents, and unless such liability arises from the sole negligence, or active negligence, or willful misconduct of the District, the Architect, or the Architect's consultants.

3.14.2 Review

The review by the Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

3.15 INDEMNIFICATION

3.15.1 Contractor

See Agreement Form. Contractor shall ensure that its contract with each of its Subcontractors contains provisions requiring the Subcontractors to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California to a minimum level as set forth in this Article and consistent with the indemnity and hold harmless language in the Agreement Form.

The Contractor's and Subcontractors' obligation to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors hereunder shall include, without limitation, any and all claims, damages, and costs for the following: (1) any damages or injury to or death of any person, and damage or injury to, loss (including theft), or loss of use of, any property; (2) breach of any warranty, express or implied; (3) failure of the Contractor or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; (4) products installed in or used in connection with the Work; and (5) any claims of violation of the Americans with Disabilities Act ("ADA")

3.16 SUBMISSION OF DAILY REPORTS

3.16.1 General

By 10:00 a.m. on the following business day, the Contractor shall submit a Daily Report to the Inspector and copy the Architect for the previous day's Work. If there is a Construction Manager, the original Daily Report is to be provided to the Construction Manager and copies sent to the Architect and the Inspector. Daily Reports shall be prepared on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day. The District reserves the right to note inconsistencies or inaccuracies in the Daily Reports. In such cases, pertinent notes shall be entered by each party to explain points which cannot be resolved that day. Each party shall retain a signed copy of the report. Daily Reports by Subcontractors or others shall be submitted through the Contractor.

3.16.2 Labor

The Daily Report shall show names of workers, classifications, hours worked and hourly rate. The locations where work occurred shall also be identified in the Daily Report. Project superintendent expenses are not allowed.

3.16.3 Materials

The Daily Report required shall describe and list quantities of materials used and unit costs.

3.16.4 Equipment

The Daily Report required shall show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost. Move-on and move-off fees shall be noted.

3.16.5 Other Services and Expenditures

Other services and expenditures shall be described in the Daily Report in detail as the District requires.

3.16.6 Failure to Submit Daily Report

If Contractor does not submit its Daily Report by 10 am the next business day, the Inspector of Record shall prepare a Daily Report addressing each of the above items. The cost for the Inspector's services to prepare the Daily Report shall be addressed through a Deductive Change Order under Article 7.7.4.

3.17 AS-BUILT DRAWINGS AND ANNOTATED SPECIFICATIONS

Throughout the duration of the Project, Contractor shall maintain on a current basis an accurate and complete set of As-Built Drawings (and Annotated Specifications) clearly showing all changes, revisions to Specifications and substitutions during construction, including, without limitation, field changes and the final location of all electrical and mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features. In case a Specification allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the As-Built Drawings and Annotated Specifications as often as necessary to keep them current, but no less often than weekly.

Contractor shall update As-Built Drawings with complete information on an area of Work at or near the time when the Work is being performed and prior to any DSA 152 sign off and prior to any Work being covered.

The As-Built Drawings and Annotated Specifications shall be kept at the Site and available for review and inspection by the District and the Architect. Failure to maintain and update the As-Built Drawings is a basis to withhold Progress Payments pursuant to Article 9.6.

3.17.1 Upon Beneficial Occupancy

Contractor shall obtain and pay for reproducible Plans upon Beneficial Occupancy. Contractor shall deliver Plans to District Representative (Construction Manager if one is hired for the Project).

3.17.2 As-Builts at Completion of Work

Upon completion of the Work and prior to and as a condition precedent to Application for Retention Payment, the Contractor will provide one neatly prepared and complete set of As-Built Drawings and Annotated Specifications to the District. Contractor shall certify the As-Builts as a complete and accurate reflection of the actual construction conditions of the Work by affixing a stamp indicating the Drawings are As-Builts and certifying accuracy on the final set of As-Builts. Failure to deliver a complete As-Built set of Drawings may result in significant withholdings to ensure Work is properly documented. (See Article 9.9.2)

3.17.3 Log of Control and Survey Documentation

Contractor shall complete and maintain an accurate log or all control and survey documentation for the Project as the Work progresses. All reference and control points shall be recorded on the As-Built Drawings. The basis of elevations shall be one of the established benchmarks that must be maintained on the As-Builts.

3.17.4 Record Coordinates for Key Items

Contractor shall record, by coordinates, all utilities on-site with top of pipe elevations, major grade and alignment changes, rim, grate or top of curb and flow line elevations of all drainage structures and sewer manholes. Contractor shall update record information at or near the time when work is occurring in an area and prior to DSA 152 sign off on any category of Work and prior to covering the Work.

3.17.5 BIM As-Built Drawings

If BIM is utilized for the Project, then an electronic version of such As-Built Drawings and Annotated Specifications will be delivered to District (in an acceptable format to District).

3.18 EQUIPMENT MANUALS

Contractor shall obtain and furnish three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in logical,

sequential order, labeled, indexed, and placed in three-ring binders. At the completion of its Work, the Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Retention Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in logical, sequential order, labeled, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the District through the Architect.

3.19 DIR REGISTRATION

Strict compliance with all DIR registration requirements in accordance with Labor Code sections 1725.5 and 1771.1 is a material obligation of the Contractor and all of its subcontractors (of any tier) under the Contract Documents. The foregoing includes, without limitation, compliance with DIR registration requirements at all times during performance of the Work by the Contractor and all of its subcontractors of any tier. The failure of the Contractor and all subcontractors of any tier to be properly registered with DIR at all times during performance of the Work is a material breach of the Contract and subject to termination for cause.

An affirmative and ongoing obligation of the Contractor under the Contract Documents is the verification that all subcontractors of any tier are at all times during performance of the Work are in full and strict compliance with the DIR registration requirements. The Contractor shall not permit or allow any subcontractor of any tier to perform any Work without the Contractor's verification that all subcontractors are in full and strict compliance with the DIR registration requirements. Any subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1. Contractor or its subcontractors of any tier shall not be entitled to any additional costs or time arising from or in any way related to compliance with the DIR registration requirements.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT AND CLAIMS

4.1 ARCHITECT

4.1.1 Replacement of Architect

In the case of the termination of the Architect, the District may appoint an Architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be the same as that of the former Architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 Status

Pursuant to Titles 2 of the California Code of Regulations and as required pursuant to the Field Act, Education Code 17280 et seq., the Architect will provide administration of the Contract Documents and the Work, and will be the District's representative during construction, as well as during the one (1) year period following the commencement of any warranties. The Architect will have authority to act on behalf of the District only to the extent provided in the Contract Documents.

4.2.2 Site Visits

The Architect will visit the Site at intervals necessary in the judgment of the Architect to become generally familiar with the progress and quality of the Work and to determine in general if the Work is being performed in accordance with the Contract Documents and as otherwise required by DSA.

4.2.3 Limitations of Construction Responsibility

The Architect, District and CM shall not have control over, charge of, or be responsible for construction means, methods, techniques, schedules, sequences or procedures, fabrication, procurement, shipment, delivery, receipt, installation, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility under the Contract Documents. The Architect, District and CM shall not be responsible for the Contractor's, Subcontractors', material or equipment suppliers', or any other person's schedules or failure to carry out the Work in accordance with the Contract Documents. The Architect, District and CM shall not have control over or charge of acts or omissions of the Contractor, Subcontractors, their agents or employees, or any other persons or entities performing or supplying portions of the Work. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect, District or CM in the Architect, District or CM's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4.2.4 Communications Facilitating Contract Administration

Except where a CM is on the Project, or as otherwise provided in the Contract Documents or when direct communications are warranted by special circumstances, the District and the Contractor shall communicate through the Architect. In the cases where a CM is hired for the Project, all communication shall be through the CM (unless otherwise directed) with copies to the District, Architect

and Inspector. Where direct communication is necessary between the District and the Contractor, the District's communication shall be through the District's authorized designated person. The Architect and CM shall be promptly informed, and shall receive copies of all written communications. Contractor shall not rely upon any communications from the District that is not from the District's Representative. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material or equipment suppliers shall be through the Contractor. In the case where a CM is hired for the Project, the CM shall be the main point of contact for communication of information. Copies should be sent to the Architect, District Representative and Inspector.

4.2.5 Payment Applications

The Architect will review and make recommendations to the District regarding the amounts due the Contractor on the Certificates for Payment pursuant to Article 9.3.4and subject to the Inspector's review, (CM review, if applicable) and Architect's observation. This review of Payment Applications is sometimes called a "Pencil Draft." Return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the Prompt Payment of a Request for Payment or Request for Retention.

4.2.6 Rejection of Work

In addition to the rights, duties, and obligations of the Inspector under this Article, the Architect may recommend to the District that the District reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable to achieve the intent of the Contract Documents, the Architect (and/or CM) may recommend to the District that the District require additional inspection or testing of the Work in accordance with Article 13.5, whether or not such Work is Fabricated, installed, or completed. District may have Non-conforming Work removed and replaced pursuant to Article 9.7. However, neither this authority of the Architect (or CM) nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect (or CM) to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

Contractor shall, without charge, replace or correct Work found by the District to not be in conformance to Contract requirements. Contractor shall promptly segregate and remove rejected materials from the Project site.

This section is does not address a Notice of Non-Compliance and the remedies associated with a Notice of Non-Compliance which are addressed at Article 7.1.2

4.2.7 Warranties upon Completion

The Architect (and where applicable CM), in conjunction with the Inspector will conduct field reviews of the Work to determine the date of Substantial Completion and of Final Completion, shall receive and forward to the District for the District's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment when the Architect believes the Work has been completed in compliance with the requirements of the Contract Documents (See Article 9.11 for Close-Out). The handling by the Architect (or where applicable CM) of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

On some Projects, the District will take a phased occupancy of the Project. In those cases, the District may commence the running of warranties on the buildings, or phases that are accepted after Punch List is completed and the District has accepted Completion of the separate phase. A separate Notice of Completion may be filed for the separate building or phase of work and warranties shall commence for the separate phase only to the extent that warranties do not require coordination or connection to other buildings or other parts of the site and only if the warranted item is completed to its entirety in the segregated building or phased area.

If written warranties are not provided at the time the Punch List is nearing completion, Architect (with recommendations from the CM and Inspector) shall determine the dollar value of the warranties and shall make recommendation for withholdings necessary to effectuate the transfer of such warranties to the District for future use as part of the Punch List for the Project pursuant to Article 9.6.

Warranties are not commenced through utilizing of equipment for testing and operation as necessary to acclimate buildings or where necessary to test systems.

4.2.8 Interpretation

The Architect will interpret and decide matters concerning performance and requirements of the Contract Documents. Architect shall make clarifications as necessary to interpret the Contract Documents.

4.3 PROJECT INSPECTOR

4.3.1 General

One or more Project Inspectors employed by the District and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector(s) duties are as specifically defined in Title 24 Section 4-333 and 4-342 and in DSA IR A-8.

4.3.2 Inspector's Duties and DSA Noted Timelines for Inspection

All Work shall be under the observation of the Inspector. Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of submitting form DSA 156 for each new area. The Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector such information as may be necessary to keep the Inspector fully informed regarding progress and manner of Work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector is not authorized to make changes in the Drawings or Specifications nor shall the Inspector's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

Inspector shall electronically post DSA required documents on the DSA electronic posting website. It is the Contractor's responsibility to determine the status of posting and determine if all the

criteria for sign off of a category of Work on the Project Inspection Card (Form DSA 152) as defined more thoroughly in the most current version of the DSA 152 manual posted on the DSA website.

Inspector may collaborate with Contractor about approval of areas that may be constructed and approved incrementally under the DSA 152 card pursuant to the guidelines of PR-13 at Article 1.17. Inspector shall work with Contractor to present incremental approval proposals to DSA.

4.3.3 Inspector's Authority to Reject or Stop Work

The Inspector shall have the authority to reject Work whenever provisions of the Contract Documents are not being complied with, and Contractor shall instruct its Subcontractors and employees accordingly. In addition, the Inspector may stop any Work that poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work Order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

4.3.4 Inspector's Facilities

Within seven (7) days after the notice to proceed, the Contractor shall provide the Inspector with the temporary facilities as required. More specific requirements for the Inspector facilities may be further described under Division 1 of the Specifications.

4.3.5 Testing Times

The District will provide inspection and testing at its cost during the normal eight (8) hour day Monday through Friday (except holidays). Work by the Contractor outside of the normal eight (8) hour day shall constitute an authorization from the Contractor to the District to provide inspection and testing as required outside of the normal eight (8) hour day. Contractor shall provide adequate time for inspections so as to not delay the Work. An advanced timing protocol may be established pursuant to Article 4.3.2. If the Contractor is behind Schedule then it is incumbent on the Contractor to provide advance forecast through look ahead of the anticipated date for inspection so the Inspector may plan their activities so as to not delay the Project. Contractor shall reimburse District for any additional costs associated with inspection and testing (including re-inspection and re-testing) outside the normal eight-hour day and for any retests caused by the Contractor.

It is the Contractor's responsibility to request special inspections with sufficient time so all testing may be timely completed and posted so work may proceed and the Inspector's signature is attached to the Project Inspection Card (Form 152). Specifically, timely request for special inspection under the DSA Verified Report Forms 291 (laboratory), DSA Verified Report Form 292 (Special Inspection), and DSA Verified Report 293 (geotechnical) since DSA requirements under PR 13-01 specifically gives the Special Inspections 14 days to post to the DSA website. Failure to plan and pay (if applicable) for quicker delivery of Special Inspections may be counted as Float, but is not considered Governmental Delay Float under Article 8.1.4.

4.3.6 Special Inspections, Inspections or Tests Out of State, Out of Country or Remote from Project

If Contractor has a Subcontractor or supplier that requires in plant or special inspections, inspections or tests that are out of the country, out of the state or a distance of more than 200 miles from the Project Site, the District shall provide the Special Inspector or individual performing tests time for

inspection and testing during normal work hours. Contractor, however, is responsible for the cost of travel, housing, food, out of area premiums that may be in the Inspector/Testing Agreement with District, or other expenses necessary to ensure proper inspection, special inspection or testing is provided by a DSA Certified Inspector, Special Inspector, or individual performing tests. In some cases all three (DSA Inspector, Special Inspector, and Tester) may be required. In addition, if the DSA Certified Inspector, Special Inspector, or individual performing test has contractual travel clauses or special rates for out of town inspection, Contractor is responsible for all costs associated with the contractual travel costs in addition to all other costs. Arrangements for inspection and/or testing shall be made far enough in advance so as to not delay the Work.

4.4 STOP WORK ORDER

DSA may issue a Stop Work Order, or an Order to Comply, when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order, except to the extent that an error or omission by the District is the basis for the issuance of the Stop Work Order.

Examples of Stop Work Orders that may be issued by DSA include DSA Bulletin 07-04 and Policy 10-01, the installation of automatic fire sprinkler systems without approved Plans, covering Work that has not been approved by Inspector on DSA Project Inspection Card (Form 152).

4.5 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE DISTRICT FOR PROFESSIONAL SERVICES

If at any time prior to the completion of the requirements under the Contract Documents, the District is required to provide or secure additional professional services (including CM, Inspection, Architect, Engineering and Special Consultant Services) for any reason by any act of the Contractor, the District may seek a Deductive Change Order for any costs incurred for any such additional services, which costs shall be deducted from the next progress payment. A Deductive Change Order shall be independent from any other District remedies and shall not be considered a waiver of any District rights or remedies. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the District. Additional services shall include, but shall not be limited to, the following:

a. Services made necessary by the default of the Contractor (Article 14 or Article 2.2).

b. Services made necessary due to the defects or deficiencies in the Work of the Contractor (Article 2.2 and Article 9.6).

c. Spurious or frivolous RFI's issued that do not conform to the requirements of Article 7.4. Issuance of the same RFI after receiving an answer from the Architect or Engineer

d. Review of Schedules that are provided by Contractor that do not Conform with the Requirements of Article 8.

e. Preparation of a CCD or ICD to correct a Contractor Deficiency, or Contractor Caused Notice of Non-Compliance (See Article 7.3).

f. Review of Incomplete Shop Drawings or Submittals, including the submission of Piecemeal Shop Drawings or Submittals unless piecemeal Submittals are specifically agreed upon by District (See Article 3.9)

g. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.

h. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors' proposed by the Contractor, and making subsequent revisions to Drawings, Specifications, obtaining DSA approvals, DSA costs for review of CCD's, other governmental agency review costs, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available). (See Article 3.10)

i. Services for evaluating and processing Claims or Disputes submitted by the Contractor in connection with the Work outside the established Change Order process.

j. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.

k. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.

l. Services in conjunction with more than one (1) re-review of Submittals of Shop Drawings, Product Data, samples, RFI's etc.

4.6 DISPUTES AND CLAIMS

4.6.1 Decision of Architect

"Disputes" or "Claims" as defined in Article 4.6.9.1 between District and Contractor involving money or time, including those alleging an error or omission by the Architect shall be referred initially to the Architect for action as provided in Article 4.6.2 within ten (10) days after Contractor's Article 7 request for Change is denied. If there is a CM, the CM shall receive the Dispute and may review and also assemble opinions and documents to assist the Architect. A decision by the Architect, as provided in Article 4.6.5, shall be required as a condition precedent to proceeding with remedies set forth in Article 4.6.9 as to all such matters arising prior to the date Retention Payment Application is due, regardless of whether such matters relate to execution and progress of the Work, or the extent to which the Work has reached Final Completion.

The condition precedent of an Architect decision shall be waived if: (1) the position of Architect is vacant; (2) the Architect has failed to take action required under Article 4.6.5 within the time periods required therein; or (3) the Dispute or Claim relates to a stop notice claim not arising from any extra Change Order or Immediate Change Directive for which approval has not been provided.

4.6.2 Architect's Review

The Architect (and CM) will review the Dispute and take one or more of the following preliminary actions upon receipt of a Dispute: (1) request additional supporting data from the claimant; (2) submit a schedule to the parties indicating when the Architect expects to take action; (3) reject the Dispute in whole or in part, stating reasons for rejection; (4) recommend approval of the Dispute; or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the Surety, if any, of the nature and amount of the Dispute.

4.6.2.1 *Architectural Immunity*. Architect review of Disputes and Claims shall be impartial and meant to resolve Disputes and Claims. Pursuant to the case, Huber, Hunt & Nichols, Inc. v. Moore (1977) 67 Cal.App.3d 278, the Architect is provided a quasi-judicial immunity for interpreting and deciding Disputes and Claims between the District and Contractor.

4.6.3 Documentation if Resolved

If a Dispute has been resolved, the Architect (and/or CM) will prepare a Change Order or obtain appropriate documentation to document the terms for Board approval.

4.6.4 Actions if Not Resolved

If a Dispute has not been resolved and all documentation requested pursuant to Article 4.6.2 has been provided, the Contractor shall, within ten (10) days after the Architect's initial response, assemble all the documents involved in the Dispute including copies of all back-up documentation of costs and the basis for the Dispute and take one or more of the following actions: (1) modify the initial Dispute; (2) notify the Architect that the initial Dispute stands; or (3) supplement with additional supporting data and re-submit to the Architect under Article 4.6.2.

4.6.5 Architect's Written Decision

If a Dispute has not been resolved after consideration of the foregoing and of other evidence presented by the parties or requested by the Architect, the Architect (or Architect through CM) shall provide a written decision twenty (20) days after compliance with Article 4.6.4. Upon expiration of such time period, the Architect (or Architect through CM) will render to the parties its written decision relative to the Dispute, including any change in the Contract Sum or Contract Time or both. The Architect may also request reasonable additional time to complete Architect's written decision.

If the resolution of the Dispute by the Architect is not satisfactory to the Contractor and copies of all back-up documentation of costs and the basis for the Dispute is fully articulated in a package of material that is complete, the Contractor may then submit a Claim to the District under Article 4.6.9.

4.6.6 Continuing Contract Performance

Pending final resolution of a Dispute or Claim, including, negotiation, mediation, arbitration, or litigation, the Contractor shall proceed diligently with performance of the Contract, and the District shall continue to make any undisputed payments in accordance with the Contract (less any withholdings or offsets). If the Claim is not resolved, Contractor agrees it will neither rescind the Contract nor stop the progress of the work, but Contractor's sole remedy shall be to submit such controversy to determination by a court of competent jurisdiction in the county where the Project is located, after the Project has been completed, and not before.

4.6.6.1 *District's Option to Submit Individual Disputes to Arbitration during Claims and Disputes Process*. At the District's sole option, in order to more efficiently resolve Claims during the Project and prior to the completion of the Claims Process, pursuant to Government Code section 9201, the District may submit individual Disputes or Claims for binding arbitration and Contractor agrees to the resolution of for each individual Dispute or Claim by an Arbitrator, including resolution of time and delays. If binding arbitration is utilized for individual Disputes or Claims, such resolution is full and final as to that particular Dispute or Claim. THIS INDIVIDUAL DISPUTE ARBITRATION PROCESS IS NOT AN ARBITRATION CLAUSE AND SHALL NOT BE CONSTRUED AS AN AGREEMENT TO ARBITRATE. THIS INDIVIDUAL DISPUTES ARBITRATION PROCESS IS FOR THE SOLE PURPOSE OF STREAMLINING AND RESOLVING DISPUTES OR CLAIMS DURING CONSTRUCTION AND SHALL BE REQUESTED ON SPECIFIC INDIVIDUAL ITEMS BY THE DISTRICT PRIOR TO RETENTION PAYMENT (EVEN IF THERE ARE DEDUCTIONS MADE FROM RETENTION PAYMENT) WHICH REPRESENTS THE FINAL COMPLETION OF THE PROJECT.

a. If there is no Retention remaining on the Project, individual Disputes initiated prior to Project Final Completion shall continue until a final disposition of the Arbitration or resolution of the individual Claim or Dispute.

b. No Tolling. The Arbitration process shall not toll the Disputes or Claims process under Article 4.6 or the requirement to submit Claims to Court under Article 4.6.9.5.

4.6.7 Claims for Concealed Trenches or Excavations Greater Than Four Feet Below the Surface

When any excavation or trenching extends greater than four feet below the surface or if any condition involving hazardous substances are encountered:

a. Immediately upon discovery, The Contractor shall promptly, and before the following conditions are disturbed, notify the District, by telephone and in writing, of the condition except:

1. If such condition is a hazardous waste condition, Contractor's bid includes removal or disposal of hazardous substances. Material that the Contractor believes may be a material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law. In such case, the notice bulletin procedures of Article 7 apply.

2. Subsurface or latent physical conditions at the Site differing from those indicated in the Drawings, Specifications, Soils Report, and from Contractor's own investigation under Article 2.1.

3. Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract.

b. The District shall investigate the conditions, and if District finds that the conditions do materially so differ, do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a Change Order or Construction Change Document under the procedures described in the Contract.

c. In the event that a dispute arises between the public entity or District and the Contractor whether the conditions materially differ, involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled Completion Date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

4.6.8 Dispute Concerning Extension of Time.

If Contractor and District cannot agree upon an extension of time, whether compensable or not, then Contractor must have first completed the procedures set forth in Article 8.4. Upon completion of the procedures set forth under Article 8.4, Contractor must then comply with the requirements in this Article including those set forth under Article 4.6.9.

4.6.9 Claims Procedures

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees to comply with the Claims requirements of Article 4.6 to quickly and efficiently resolve Disputes and Claims. Further, to provide a level of accuracy to the records submitted, the District shall have the right to audit books and records pursuant to Article 13.11 based on the actual costs incurred and to reduce the uncertainty in resolving Disputes and Claims with limited information.

4.6.9.1 *Procedure Applicable to All Claims*

a. Definition of Claim: A "Claim" is where a Dispute between the parties rises to the level where backup documentation is assembled and provided to the District as a separate demand by the Contractor for: (1) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the District under the Contract; (2) payment by the District of money or damages arising from Work done by, or on behalf of, the Contractor pursuant to the Contract and payment for which is not otherwise expressly provided for or to which the Contractor is not otherwise entitled to; or (3) an amount of payment disputed by the District. If the Claim is for damages associated with a DSA Stop Work Order, the Contractor shall not be entitled to a request for Compensation, but shall be entitled to utilize Governmental Delay Float (See Article 8.1.4.1.)

b. Filing Claim Is Not Basis to Discontinue Work: The Contractor shall promptly comply with Work under the Contract or Work requested by the District even though a written Claim has been filed. The Contractor and

the District shall make good faith efforts to resolve any and all Claims that may arise during the performance of the Work covered by this Contract.

c. Claim Notification: The Contractor shall within seven (7) calendar days after the written decision of the Architect, or if the time period for Architect's decision has passed under Article 4.6.5, submit a notification in writing sent by registered mail or certified mail with return receipt requested, with the District (and the District's CM) stating clearly the basis for the Claim and including all relevant and required documents. If the notification is not submitted within seven (7) days after the written decision of the Architect or the passage of time under Article 4.6.5, the Contractor shall be deemed to have waived all right to assert the Claim, and the Claim shall be denied. Claims submitted after the Retention Payment date shall also be considered null and void by the District. All Claims shall be reviewed pursuant to Articles 4.6.1 through 4.6.5.

The Formal Notification of Claim must be presented as follows:

(1) The term "Claim" must be at the top of the page in no smaller than 20 point writing.

(2) All documentation submitted pursuant to Article 4.6 to the Architect shall be submitted with the "Claim."

(3) A stack of documents, copy of all Project documents, or the submission of random documents shall not constitute an adequate reference to supporting documentation.

(4) Any additional or supporting documentation that Contractor believes is relevant should be submitted at this time.

d. Reasonable Documents to Support Claim: The Contractor shall furnish reasonable documentation to support the Claim. The Contractor shall provide all written detailed documentation which supports the Claim, including but not limited to: arguments, justifications, cost, estimates, Schedule analysis and detailed documentation. The format of the required reasonable documentation to support the Claim shall include, without limitation:

1. Cover letter.

2. Summary of factual basis of Claim and amount of Claim.

3. Summary of the basis of the Claim, including the specific clause and section under the Contract under which the Claim is made.

4. Documents relating to the Claim, including:

   a. Specifications sections in question.
   b. Relevant portions of the Drawings

c. Applicable Clarifications (RFI's)
d. Other relevant information, including responses that were received.
e. Contractor Analysis of Claim merit.
   (a) Contractor's analysis of any Subcontractor vendor Claims that are being passed through.
   (b) Any analysis performed by outside consultants
   (c) Any legal analysis that Contractor deems relevant
f. Break down of all costs associated with the Claim.
g. For Claims relating to time extensions, an analysis and supporting documentation evidencing any effect upon the critical path in conformance with the requirements of Article 8.4 chronology of events and related correspondence.
h. Applicable Daily Reports and logs.
   (a) If the Daily Reports or Logs are not available, lost or destroyed, there shall be a presumption that the lost documentation was unfavorable to the Contractor. See California Civil Jury Instruction 204.
i. For Claims involving overhead, cost escalation, acceleration, disruption or increased costs, a full version of job costs reports organized by category of work or Schedule of Values with budget information tracked against actual costs. Any and all supporting back-up data, including the original bid (and associated original unaltered metadata).
   (a) The metadata and bid information shall be provided confidentially and subject to a protective order to prevent dissemination to other contractors or to the public. However, the bid documentation should remain intact and available for review and inspection in case of this type of increased cost Claim.
   (b) This data on the bid shall be made available to any District attorneys or experts and shall also be utilized as evidence for any legal proceedings.
   (c) If the bid documentation is not available, lost or destroyed, there shall be a presumption that the lost bid documentation was unfavorable to the Contractor. See California Civil Jury Instruction 204.

e. Certification: The Contractor (and Subcontractors, if applicable) shall submit with the Claim a certification under penalty of perjury:

   1. That the Contractor has reviewed the Claim and that such Claim is made in good faith;

2. Supporting data are accurate and complete to the best of the Contractor's knowledge and belief;

3. The amount requested accurately reflects the amount of compensation for which the Contractor believes the District is liable.

4. That the Contractor is familiar with Government Code sections 12650 et seq. and Penal Code section 72 and that false claims can lead to substantial fines and/or imprisonment.

f. Signature of Certification: If the Contractor is not an individual, the certification shall be executed by an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

g. Upon receipt of a Claim and all supporting documents as required above, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period provided in this paragraph.

h. If the District needs approval from its governing Board to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing Board does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three days following the next duly publicly noticed meeting of the governing Board after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

i. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. If the District fails to issue a written statement, paragraph o below shall apply.

j. If the Contractor disputes the District's written response, or if the District fails to respond to a Claim issued pursuant to this Article 4.6.9 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the Claim.

k. Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the

portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures in Article 4.6.9.5.

l. For purposes of this Article 4.6.9, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

m. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this Article 4.6.9 shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

n. This Claims process does not preclude the District from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article 4.6.9 does not resolve the parties' Claim. This Claims process does not preclude the District from submitting individual Disputes or Claims to binding arbitration pursuant to Article 4.6.9.4 below.

o. Failure by the District to respond to a Claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this Article 4.6.9 shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this Article 4.6.9, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

p. If a subcontractor or a lower tier subcontractor lacks legal standing to assert a Claim against a District because privity of contract does not exist, the Contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a Claim for work which was

performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim. Within 45 days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if the Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

q. Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable.

r. The Contractor's Claim shall be denied if it fails to follow the requirements of this Article.

4.6.9.2 *District (through CM or District's Agent or Attorney) May Request Additional Information*. Within thirty (30) days of receipt of the Claim and the information under this Article, the District may request in writing any additional documentation supporting the Claim or documentation relating to defenses to the Claim which the District may assert. If additional documents are required, the time in which the Claim is evaluated may be extended by a reasonable time so the Claim and additional documents may be reviewed.

4.6.9.3 *Claims Procedures in Addition to Government Code Claim.* Nothing in the Claims procedures set forth in this Article 4 of the General Conditions shall act to waive or relieve the Contractor from meeting the requirements set forth in Government Code section 900 et seq.

4.6.9.4 *Binding Arbitration of Individual Claim Issues.* To expedite resolution of Claims pursuant to Public Contract Code section 9201, at the District's sole option, the District may submit individual Claims to Arbitration prior to Retention Payment consistent with the requirements of Article 4.6.6.1.

4.6.9.5 *Resolution of Claims in Court of Competent Jurisdiction.* If Claims are not resolved under the procedure set forth and pursuant to Article 4.6.9, such Claim or controversy shall be submitted to a court in the County of the location of the Project after the Project has been completed, and not before.

4.6.9.6 *Warranties, Guarantees and Obligations.* The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by the General Conditions and amendments thereto; and all of the rights and remedies available to District and Architect thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Article will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractual Relations Bound to Same Contract Terms at General Contractor

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the same obligations and responsibilities, assumed by Contractor pursuant to the Contract Documents. Each subcontract agreement shall preserve and protect the rights of the District and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.1.2 Subcontractor Licenses and DIR Registration

All Subcontractors shall be properly licensed by the California State Licensing Board. All Subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. No portion of the Work is permitted to be performed by a Subcontractor of any tier unless the subcontractor is properly registered with DIR. Any Subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1.

5.1.3 Substitution of Subcontractor

Substitution of Subcontractors shall be permitted only as authorized under Public Contract Code §§ 4107 et seq. Any substitutions of Subcontractors shall not result in any increase in the Contract Price or result in the granting of any extension of time for the completion of the Project.

5.1.4 Contingent Assignment of Subcontracts and Other Contracts

Each subcontract, purchase order, vendor contract or agreement for any portion of the Work is hereby assigned by the Contractor to the District provided that:

a. Such assignment is effective only after Termination of this Contract with the Contractor by the District as provided under Article 14 and only for those subcontracts and other contracts and agreements that the District accepts by notifying the Subcontractor or Materialman (as may be applicable) in writing; and

b. Such assignment is subject to the prior rights of the Surety(ies) obligated under the Payment Bond and Performance Bond.

c. The Contractor shall include adequate provisions for this contingent assignment of subcontracts and other contracts and agreements in each such document.

ARTICLE 6
CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS

6.1 DISTRICT'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 Separate Contracts.

6.1.1.1 District reserves the right to let other contracts in connection with this Work. Contractor shall afford other contractors reasonable opportunity for (1) introduction and storage of their materials; (2) access to the Work; and (3) execution of their work. Contractor shall properly connect and coordinate its work with that of other Contractors.

6.1.1.2 If any part of Contractor's Work depends on proper execution or results of any other contractor, the Contractor shall inspect and within seven (7) days or less, report to Architect, in writing, any defects in such work that render it unsuitable for proper execution of Contractor's Work. Contractor will be held accountable for damages to District for that Work which it failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute its acceptance of other contractors' Work as fit and proper for reception of its Work, except as to defects which may develop in other contractors' work after execution of Contractor's work.

6.1.1.3 To ensure proper execution of its subsequent Work, Contractor shall measure and inspect Work already in place and shall at once report to the Architect in writing any discrepancy between executed Work as built and the Contract Documents.

6.1.1.4 Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by District in prosecution of the Project and the potential impact of such Work on the Baseline Schedule or Schedule updates.

6.1.1.5 Nothing herein contained shall be interpreted as granting to Contractor the exclusive occupancy at the site of Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project Site. If execution of any contract by the District is likely to cause interference with Contractor's performance of this Contract, once Contractor provides District timely written notice and identifies the Schedule Conflict, District shall decide which contractor shall cease work temporarily and which contractor shall continue, or whether Work can be coordinated so that contractors may proceed simultaneously.

6.1.1.6 District shall not be responsible for any damages suffered or extra costs incurred by Contractor resulting directly or indirectly from award or performance or attempted performance of any other contract or contracts at the Project necessary for the performance of the Project (examples include Electrical Utility Contractor, separate offsite contractor, a separate grading contractor, furniture installation etc.)

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES BASED ON DOCUMENTATION PROVIDED WITH THIS BID OR DISCUSSED AT THE JOB WALK. CONTRACTOR HAS MADE ALLOWANCE FOR ANY DELAYS OR DAMAGES WHICH MAY ARISE FROM COORDINATION WITH CONTRACTORS REQUIRED FOR OTHER PHASES. IF ANY DELAYS SHOULD ARISE FROM ANOTHER CONTRACTOR

WORKING ON A DIFFERENT PHASE, CONTRACTOR'S SOLE REMEDY FOR DAMAGES, INCLUDING DELAY DAMAGES, SHALL BE AGAINST THE CONTRACTOR WHO CAUSED SUCH DAMAGE AND NOT THE DISTRICT. CONTRACTOR SHALL PROVIDE ACCESS TO OTHER CONTRACTORS FOR OTHER PHASES AS NECESSARY TO PREVENT DELAYS AND DAMAGES TO OTHER CONTRACTORS WORKING ON OTHER PHASES OF CONSTRUCTION.

6.1.2 District's Right to Carry Out the Work

(See Article 2.2)

6.1.3 Designation as Contractor

When separate contracts are awarded to contractors on the Project Site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate District/Contractor Agreement.

6.1.4 District Notice to the Contractor of Other Contractors

The Contractor shall have overall responsibility to reasonably coordinate and schedule Contractor's activities with the activities of the District's forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their construction schedules when:

a. Notice is provided in the Contract Documents of other scope of Work,

b. In the case where there is known Work to be performed by other Contractors

c. For outside contractors hired by utilities

d. Where the Contract Document provides "Work by Others" or "By Others"

e. Where specifically noted during the Pre-Bid Conference

f. Where specifically noted in the Mandatory Job Walk

g. By CO or ICD,

h. With respect to the installation of:
   1. Furniture,
   2. Electronics and networking equipment,
   3. Cabling,
   4. Low voltage,
   5. Off-site work,
   6. Grading (when by a separate contractor),
   7. Environmental remediation when excluded by the Contract Documents (i.e. asbestos, lead or other hazardous waste removal)
   8. Deep cleaning crews,

9. Commissioning and testing,
10. Keying and re-keying,
11. Programming

6.1.4.1 Exception where no Coordination is Required on the Part of the Contractor for Turn Key Operations. If the Contractor has specifically outlined a "Turn Key" or "Complete Delivery" of a final completed operational school in writing as part of the Baseline Schedule..

6.1.4.2 The Contractor shall make any revisions to the Baseline Schedule (or Schedule Update) and Contract Sum deemed necessary after a joint review and mutual agreement. The Baseline Schedule (or Schedule Update) shall then constitute the Schedules to be used by the Contractor, separate contractors, and the District until subsequently revised. Additionally, Contractor shall coordinate with Architect, District, and Inspector to ensure timely and proper progress of Work.

6.2 CONSTRUCTIVE OWNERSHIP OF PROJECT SITE AND MATERIAL

Upon commencement of Work, the Contractor becomes the constructive owner of the entire site, improvements, material and equipment on Project site. Contractor must ensure proper safety and storage of all materials and assumes responsibility as if Contractor was the owner of the Project site. All risk of loss or damage shall be borne by Contractor during the Work until the date of Completion. As constructive owner of the Project site, Contractor must carry adequate insurance in case of calamity and is not entitled to rely on the insurance requirements as set forth in this Agreement as being adequate coverage in case of calamity.

6.3 DISTRICT'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors, and the District as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Article 3.12, the District may clean up and allocate the cost among those it deems responsible.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGES

7.1.1 No Changes Without Authorization

There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order, Change Order Request, Immediate Change Directive, or order by the Architect for a minor change in the Work as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's Governing Board or designated representative with delegated authority (subject to Board ratification) has authorized the same and the cost thereof approved in writing by Change Order or executed Construction Change Document. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing in the Change Order. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications. Notwithstanding anything to the contrary in this Article 7, all Change Orders shall be prepared and issued by the Architect and shall become effective when executed by the District's Governing Board, the Architect, and the Contractor.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to, in writing, in advance by Contractor and District and be subject to the monetary limitations set forth in Public Contract Code section 20118.4 (Please check with the District since there are different interpretations of the limitations of Public Contract Code section 20118.4 depending on the County the Project is located). In the event that Contractor proceeds with any change in Work without first notifying District and obtaining the Architect's and District's consent to a Change Order, Contractor waives any Claim of additional compensation for such additional work and Contractor takes the risk that a Notice of Non-Compliance may issue, a critical path Project delay may occur, and the Contractor will also be responsible for the cost of preparation and DSA CCD review fees for a corrective DSA approved Construction Change Document.

CONTRACTOR UNDERSTANDS, ACKNOWLEDGES, AND AGREES THAT THE REASON FOR THIS NOTICE REQUIREMENT IS SO THAT DISTRICT MAY HAVE AN OPPORTUNITY TO ANALYZE THE WORK AND DECIDE WHETHER THE DISTRICT SHALL PROCEED WITH THE CHANGE ORDER OR ALTER THE PROJECT SO THAT SUCH CHANGE IN WORK BECOMES UNNECESSARY AND TO AVOID THE POSSIBLE DELAYS ASSOCIATED WITH THE ISSUANCE OF A NOTICE OF NON-COMPLIANCE.

7.1.2 Notices of Non-Compliance

Contractor deviation or changes from approved Plans and Specifications may result in the issuance of a Notice of Non-Compliance (See DSA Form 154). Contractor is specifically notified that deviations from the Plans and Specifications, whether major or minor, may result in the requirement to obtain a DSA Construction Change Document to correct the Notice of Non-Compliance. (See Article 7.3.1 for Definition of CCD). In some cases, the lack of a DSA approved CCD AND verification from the Inspector that a Notice of Non-Compliance has been corrected may result in a critical path delay to the next stage of Work on the Project. Specifically, a deviation from approved Plans and Specifications may prevent

approval of the category of Work listed in the DSA 152 Project Inspection Card. Any delays that are caused by the Contractor's deviation from approved Plans and Specifications shall be the Contractor's responsibility.

7.1.3 Architect Authority

The Architect will have authority to order minor changes in the Work that do not involve DSA Approval not involving any adjustment in the Contract Sum, or an extension of the Contract Time.

7.2 CHANGE ORDERS ("CO")

A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect stating their agreement upon all of the following:

a. A description of a change in the Work;

b. The amount of the adjustment in the Contract Sum, if any; and

c. The extent of the adjustment in the Contract Time, if any.

A CO may be comprised of ICD's, Response to RFP's and COR's

7.3 CONSTRUCTION CHANGE DOCUMENT (CCD Category A, and CCD Category B) and IMMEDIATE CHANGE DIRECTIVE (ICD)

7.3.1 Definitions

7.3.1.1 *Construction Change Document (CCD)*. A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for Work affecting structural, access compliance or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required.

7.3.1.2 *Immediate Change Directive (ICD)*. An Immediate Change Directive is a written order to the Contractor prepared by the Architect and signed by the District (and CM if there is a CM on the Project) and the Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The District may by ICD, without invalidating the Contract, direct immediate changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions within. If applicable, the Contract Sum and Contract Time will be adjusted accordingly.

In the case of an Immediate Change Directive being issued, Contractor must commence Work immediately or delays from failure to perform the ICD shall be the responsibility of Contractor and the failure to move forward with Work immediately shall also be grounds for Termination under Article 14.

An ICD does not automatically trigger an Article 7.6 Dispute or Claim. Contractor must timely follow the procedures outlined at Article 7.6 and 4.6 where applicable.

Refer to Division 1 and Supplementary General Conditions for a copy of the proposed Immediate Change Directive form.

7.3.2 Use to Direct Change

An ICD shall be used to move work forward immediately and to avoid delay. In some cases, an ICD shall be issued in the absence of agreement on the terms of a CO, COR, or RFP. A copy of an ICD form is provided in the Supplementary General Conditions and Division 1. The anticipated not to exceed price for the Work will be inserted into the ICD. In the case of an ICD issued to correct Contractor Deficiencies or to correct a Contractor caused Notice of Non-Compliance, the ICD may be issued with $0 and no additional time. Contract may prepare a COR associated with the ICD pursuant to Article 7. However, Contractor shall proceed with all Work required under an Approved ICD immediately upon issuance. Failure to proceed with the Work under an ICD shall be grounds for Termination for Cause under Article 14 or take over the Work under Article 2.2.

If adequate time exists, an ICD may be subject of an RFP for pricing and determination if any time that may be required. However, if an RFP is not completed, Contractor shall immediately commence Work when an ICD is issued. If the RFP is incomplete, it may still be completed to be submitted for pricing purposes as long as the RFP is submitted within the timeline provided by the RFP, or within 10 days following issuance of the ICD.

7.3.3 ICD Issued Over a Notice of Non-Compliance or to Cover Work Subject to a DSA 152 Sign Off

In some cases, an ICD shall be for the purpose of proceeding with Work to keep the Project on Schedule and as an acknowledgement by the District that Contractor is proceeding with Work contrary to a Notice of Non-Compliance, prior to issuance of a DSA approved CCD Category A, or to direct the covering of Work which has not yet received a DSA 152 Inspection Approval to move forward.

7.3.3.1 *Contractor Compliance with all Aspects of an IC*D. Contractor is to undertake the ICD and comply with all aspects of the Work outlined in the ICD. Inspector is to inspect the Work pursuant to the ICD. Failure to follow the ICD may result in deduction of the ICD Work under Article 2.2 or Termination of the Contractor pursuant to Article 14.

7.3.3.2 *Exception in the Case of DSA Issued Stop Work Order*. Contractor must proceed with an ICD even if a CCD has not been approved by DSA except in the case of a DSA issued Stop Work Order. If a DSA Stop Work Order is issued, Contractor must stop work and wait further direction from the District.

7.3.3.3 *ICD Due to Contractor Deficiency or Contractor Caused Notice of Non-Compliance.* If an ICD is issued to correct a Contractor Deficiency or a Contractor caused notice of Non-Compliance, Contractor specifically acknowledges responsibility for all consequential damages associated with the Contractor Deficiency or Contractor caused Notice of Non-Compliance and all consequential damages and costs incurred to correct the deficiency under Article 4.5

7.4 REQUEST FOR INFORMATION ("RFI")

7.4.1 Definition

A RFI is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions.

7.4.1.1 A RFI shall not be used as a vehicle to generate time extensions.

7.4.1.2 Resubmission of the same or similar RFI is not acceptable. RFI's that are similar should be addressed in Project meetings where the requestor (Contractor, Subcontractor or vendor) is able to address the particular issue with the Architect or Engineer and a resolution addressed in the minutes.

7.4.1.3 A RFI response applicable to a specific area cannot be extended to other situations unless specifically addressed in writing within the RFI or in a separate RFI.

7.4.1.4 RFI's should provide a proposed solution and should adequately describe the problem that has arisen.

7.4.2 Scope

The RFI shall reference all the applicable Contract Documents including Specification section, detail, page numbers, Drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Cost, Contract Time, or the Contract Documents.

7.4.3 Response Time

The Architect must respond to a RFI within a reasonable time after receiving such request. If the Architect's response results in a change in the Work, then such change shall be effected by a written CO, COR RFP or ICD, if appropriate. If the Architect cannot respond to the RFI within a reasonable time, the Architect shall notify the Contractor, with a copy to the Inspector and the District, of the amount of time that will be required to respond.

7.4.4 Costs Incurred

The Contractor shall be responsible for any costs incurred for professional services as more fully set forth in Article 4.5, which shall be subject to a Deductive Change Order, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request. District, at its sole discretion, shall issue a Deductive Change Order to Contractor for all such professional services arising from this Article.

7.5 REQUEST FOR PROPOSAL ("RFP")

7.5.1 Definition

A RFP is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. If Architect issues a Bulletin, the Changed items in the Bulletin shall be addressed as an RFP and all responses shall be prepared to a Bulletin as addressed in this Article 7.5. A form RFP is included in the Division 1 documents.

7.5.2 Scope

A RFP shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required by Article 7.7. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP, whether ultimately accepted or not.

7.5.3 Response Time

Contractor shall respond to an RFP within ten (10) days or the time period otherwise set forth in the RFP.

7.6 CHANGE ORDER REQUEST ("COR")

7.6.1 Definition

A COR is a written request prepared by the Contractor supported by backup documentation requesting that the District and the Architect issue a CO based upon a proposed change, cost, time, or cost and time that may be incurred on the Project or arising from an RFP, ICD, or CCD.

7.6.2 Changes in Price

A COR shall include breakdowns per Article 7.7 to validate any change in Contract Price due to proposed change or Claim.

7.6.3 Changes in Time

A COR shall also include any additional time required to complete the Project only if the delay is a critical path delay. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in Article 8. A schedule fragnet showing the time delay must be submitted with the COR. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a COR, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7 COST OF CHANGE ORDERS

7.7.1 Scope

Within ten (10) days after a request is made for a change that impacts the Contract Sum as defined in Article 9.1, the critical path, or the Contract Time as defined in Article 8.1.1, the Contractor shall provide the District and the Architect, with a written estimate of the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, and wage rates required for the change, and the effect upon the Contract Time of such CO. Changes may be made by District by an

appropriate written CO, or, at the District's option, such changes shall be implemented immediately upon the Contractor's receipt of an appropriate written Construction Change Document.

District may, as provided by law and without affecting the validity of this Agreement, order changes, modification, deletions and extra work by issuance of written CO or CCD from time to time during the progress of the Project, Contract Sum being adjusted accordingly. All such Work shall be executed under conditions of the original Agreement except that any extension of time caused thereby shall be adjusted at time of ordering such change. District has discretion to order changes on a "time and material" basis with adjustments to time made after Contractor has justified through documentation the impact on the critical path of the Project.

7.7.1.1 *Time and Material Charges.* If the District orders Work on a "time and material" basis, timesheets shall be signed daily by the Inspector or District Representative at or near the time the Work is actually undertaken and shall show the hours worked, and the Work actually completed. No time sheets shall be signed the next day. A copy shall be provided to the Person signing the document at the time the document is signed, but not before 10 am the following day.

7.7.2 Determination of Cost

The amount of the increase or decrease in the Contract Price from a CO or COR, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation. If an agreement cannot be reached within fifteen (15) days after submission and negotiation of Contractor's proposal, Contractor may submit pursuant to Article 7.7.3. Submission of sums which have no basis in fact are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.);

   1. If the District objects to 7.7.2(a) as a method for submission due to inaccuracies in the submitted amount, overstatement of manpower or time required to perform the CO, or unreliability of the data provided, the District may either have the Architect or a professional estimator determine the cost for the CO, and the applicable time extension, or the Contractor shall utilize Article 7.7.2(d) or 7.7.3.

   2. Once the District provides a written objection to use of Article 7.7.2(a) due to unreliability of the estimated price, the Contractor shall no longer utilize mutual acceptance of a lump sum as a method for submission of CO's and shall provide a breakdown of estimated or actual costs pursuant to Article 7.7.2(d) or 7.7.3

b. By unit prices contained in Contractor's original bid and incorporated in the Project documents or fixed by subsequent agreement between District and Contractor;

c. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee. However, in the case of disagreement, Contractor must utilize the procedure under Article 7.7.3; or

d. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

1. *Basis for Establishing Costs*

(1) Labor will be the cost for wages prevailing locally for each craft or type of workers at the time the extra Work is done, plus employer payments of payroll taxes and workers compensation insurance (exclude insurance costs as part of the overhead and profit mark-up), health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. In no case shall the total labor costs exceed the applicable prevailing wage rate for that particular classification. The use of a labor classification which would increase the extra Work cost will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

(2) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery. The District reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the District.

(3) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $250 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the Work is performed. Rates applied shall be appropriate based on actual equipment need and usage. Monthly, weekly or other extended use rates that results in the lowest cost shall be applied if equipment is used on site for extended periods.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the extra Work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the District than holding it at the Work Site, it shall be returned unless the Contractor elects to keep it at the Work Site at no expense to the District.

All equipment shall be acceptable to the Inspector, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

If tool and equipment charges are part of a Dispute or Claim, the District reserves the right to utilize actual costs for tools and equipment or a depreciation rate for equipment based on audit finding under Article 13.11 and deduct any rental charges that exceed actual or depreciated costs.

e. Other Items. The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

f. Invoices. Vendors' invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

g. Overhead. Overhead, including direct and indirect costs, shall be submitted with the COR and include: field overhead, home office overhead, off-site supervision, CO preparation/negotiation/research, time delays, Project interference and disruption, additional guaranty and warranty durations, on-site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, liability and property damage insurance, and additional safety equipment costs.

7.7.3 Format for COR or CO's

The following format shall be used as applicable by the District and the Contractor to communicate proposed additions to the Contract. All costs submitted shall be actual costs and labor shall be unburdened labor. Refer to Division 1 for a copy of the Construction Change Order form.

		EXTRA	CREDIT
(a)	Material (attach itemized quantity and unit cost plus sales tax)		
(b)	Labor Not to Exceed Applicable Prevailing Wage Rates (attach itemized hours and rates)		
(c)	Equipment (attach invoices)		
(d)	Subtotal		

		EXTRA	CREDIT
(e)	If Subcontractor performed work, add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed 10% of item (d).		
(f)	Subtotal		
(g)	Contractor's Overhead and Profit: Not to exceed 10% of Item (d) if Contractor performed the work. No more than 5% of Item (d) if Subcontractor performed the work. If work was performed by Contractor and Subcontractors, portions performed by Contractor shall not exceed 10% of Item (d), and portions performed by Subcontractor shall not exceed 10% of Item (d).		
(h)	Subtotal		
(i)	Bond not to exceed one percent (1%) of Item (h)		
(k)	TOTAL		
(l)	Time/ Days		

The undersigned Contractor approves the foregoing Change Order or Immediate Change Directive as to the changes, if any, and the Contract price specified for each item and as to the extension of time allowed, if any, for completion of the entire Work on account of said Change Order or Immediate Change Directive, and agrees to furnish all labor, materials and service and perform all Work necessary to complete any additional Work specified therein, for the consideration stated herein. It is understood that said Change Order or Immediate Change Directive shall be effective when approved by the Governing Board of the District.

It is expressly understood that the value of such extra Work or changes, as determined by any of the aforementioned methods, expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Any costs, expenses, damages or time extensions not included are deemed waived.

The Contractor expressly acknowledges and agrees that any change in the Work performed shall not be deemed to constitute a delay or other basis for claiming additional compensation based on theories including, but not limited to, acceleration, suspension or disruption to the Project.

7.7.3.1 *Adjustment for Time and Compensable Delay*. A CO shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined

in Article 8 of the General Contract. A schedule fragnet showing the time delay must be submitted with the CO. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a CO, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7.4 Deductive Change Orders

All Deductive Change Order(s) must be prepared utilizing the form under Article 7.7.3 (a) – (d) only, setting forth the actual costs incurred. Except in the case of an Article 2.2 or 9.6 Deductive Change Order where no mark-up shall be allowed, Contractor will be allowed a maximum of 5% total profit and overhead.

For unilateral Deductive Change Orders, or where credits are due from Contractor for Allowances, Deductive Items, Inspection, Damage, DSA CCD review costs, Architect or Inspector costs for after hours or corrective services, Work removed from the Agreement under Article 2.2 or Article 9.6, there shall be no mark-up.

District may, any time after a Deductive Change Order is presented to Contractor by District for items under Article 2.2 or Article 9.6 or if there is disagreement as to the Deductive Change Order, issue a unilateral Deductive Change Order on the Project and deduct the Deductive Change Order from a Progress Payment, Final Payment, or Retention.

7.7.5 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein. All CO's are subject to Audit under Article 13.11 for discounts, rebates and refunds.

7.7.6 Accounting Records

With respect to portions of the Work performed by CO's and CCD's on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records in a format consistent with accepted accounting standards and satisfactory to the District, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

Any time and material charges shall require Inspector's signature on time and material cards showing the hours worked and the Work actually completed. (See Article 7.7.1.1)

7.7.7 Notice Required

If the Contractor desires to initiate a Dispute or Claim for an increase in the Contract Price, or any extension in the Contract Time for completion, Contractor shall notify the applicable party responsible for addressing the Dispute or Claim pursuant to Article 4.6. No Claim or Dispute shall be considered unless made in accordance with this subparagraph. Contractor shall proceed to execute the

Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such Claim shall be authorized by a CO.

7.7.8 Applicability to Subcontractors

Any requirements under this Article 7 shall be equally applicable to CO's, COR's or ICD's issued to Subcontractors by the Contractor to the same extent required by the Contractor.

7.7.9 Alteration to Change Order Language

Contractor shall not alter or reserve time in COR's, CO's or ICD's. Contractor shall execute finalized CO's and proceed under Article 7.7.7 and Article 4.6 with proper notice. If Contractor intends to reserve time without an approved CPM schedule prepared pursuant to Article 8 or without submitting a fragnet showing delay to critical path, then Contractor may be prosecuted pursuant to the False Claim Act.

ARTICLE 8
TIME AND SCHEDULE

8.1 DEFINITIONS

8.1.1 Contract Time

Contractor shall perform and reach Substantial Completion (See Article 1.1.46) within the time specified in the Agreement Form. Moreover, Contractor shall perform its Work in strict accordance with the Project Milestones in the Contract Documents and shall proceed on a properly developed and approved Baseline Schedule, which represents the Contractor's view of the practical way in which the Work will be accomplished. Note that Contract Time includes and incorporates all Float and other Baseline inclusions as noted in Article 8.3.2.1 and as otherwise specifically noted in Article 8.

8.1.2 Notice to Proceed

District may give a Notice to Proceed within ninety (90) days of the award of the bid by District. Once Contractor has received the notice to proceed, Contractor shall complete the Work in the period of time referenced in the Contract Documents.

In the event that District desires to postpone the giving of the Notice to Proceed beyond this three-month period, it is expressly understood that with reasonable notice to the Contractor, the giving of the date to proceed may be postponed by District. It is further expressly understood by Contractor, that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the giving of the notice to proceed

If the Contractor believes that a postponement will cause a hardship to Contractor, Contractor may terminate the Contract with written notice to District within 10 days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement and the grounds for notification and hardship shall be subject to Audit pursuant to Article 13.11. Should Contractor terminate the Contract as a result of a notice of postponement, District may award the Contract to the next lowest responsible bidder.

8.1.3 Computation of Time

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.1.4 Float

Float is time the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. Project Float and Rain Days are owned by the Project and may be utilized as necessary for critical path delays once the days become available for consumption (i.e. the Rain Day arrives and is not utilized since rain did not occur or Work was performed on the interior of a building). However, Governmental Delay float shall not be utilized for purposes other than to address critical path delays that arise due to approvals, Inspector approvals or verifications on governmental forms.

8.1.4.1 *Governmental Delay Float*. It is anticipated that there will be governmental generated delays. Specific to DSA approvals, it is anticipated that no less than twelve (12) days per calendar year shall be set aside as Governmental Float to be utilized on critical path delays. A pro-rated number of days shall be calculated based on length of Contract Time. (For example, a two (2) year Contract Time shall require twenty-four (24) days of Governmental Float. If the Contract Time is 182 days, then the Contract Time shall require six (6) days of Governmental Float) This Governmental Delay float must be incorporated into the schedule and should be incorporated in each critical activity as Contractor deems fit. Specifically, major categories of Work under the DSA 152 (Project Inspection Card) should be allocated Governmental Delay Float at the Contractor's discretion. Governmental Delay Float on the Project may exceed 12 days per one (1) year period, but Contractor is required to include not be less than 12 days of Governmental Delay Float during each one (1) year period.

Contractor's failure to establish a protocol for requesting inspections is not grounds to utilize Governmental Delay Float. As noted in Article 3.1.4, 48 hours advance notice of commencing Work on a new area is required after submitting form DSA 156 and under PR 13-01 Special Inspection reports are not required to be posted until at least 14 days after the Work was inspected. Failure to plan, and pay (if applicable) for quicker delivery of Special Inspections is not Governmental Delay Float under Article 8.1.4.1. If Governmental Delay Float is not utilized, this float is carried through to other DSA 152 categories of inspection and consumed over the course of the Project

Governmental Delay Float may be utilized for a DSA Stop Work Order regardless of fault as defined under Education Code section 17307.5(b).

8.1.4.2 *Inclement Weather (Rain Days)*. The Contractor will only be allowed a time extension for unusually severe weather if it results in precipitation or other conditions which in the amount, frequency, or duration is in excess of the norm at the location and time of year in question as established by NOAA weather data. No less than 22 calendar days for each calendar year for Southern California will be allotted for in the Contractor's schedule for each winter weather period or carried at the end of the schedule as Rain Float. Float for weather days in other geographical regions shall be adjusted based on NOAA weather data for the geographical location. Contractor has anticipated all the days it takes to dry out and re-prepare areas that may be affected by weather delays which extend beyond the actual weather days. The weather days shall be shown on the schedule and if not used will become float for the Project's use. The Contractor will not be allowed a day-for-day weather delay for periods noted as float in the Schedule. The Contractor is expected to work seven (7) days per week (if necessary, irrespective of inclement weather), to maintain access, and to protect the Work under construction from the effects of inclement weather. Additional days beyond the NOAA shall be considered under the same criteria that weather days are granted below.

A Rain Day shall be granted by Architect or CM if the weather prevents the Contractor from beginning Work at the usual daily starting time, or prevents the Contractor from proceeding with seventy-five (75%) of the normal labor and equipment force towards completion of the day's current controlling item on the accepted schedule for a period of at least five hours, and the crew is dismissed as a result thereof, the Architect will designate such time as unavoidable delay and grant one (1) critical path activity calendar-day extension if there is no available float for the calendar year.

8.1.4.3 *Project Float*. The Contractor may determine some activities require a lesser duration than allocated and may set aside float in the Project Schedule. There shall be no early completion. Instead, to the extent float is either addressed at the end of the Project or throughout each category of critical path work, Project float may be used as necessary during the course of the Project and allocated on a first,

come first serve basis. However, the use of float does not extend to Governmental Delay Float, which shall only be used for Governmental Delays.

8.2 HOURS OF WORK

8.2.1 Sufficient Forces

Contractors and Subcontractors shall continuously furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

8.2.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

8.2.3 Costs for After Hours Inspections

If the Work done after hours is required by the Contract Documents, a Recovery Schedule, or as a result of the Contractor's failure to plan, and inspection must be conducted outside the Inspector's regular working hours, the costs of any after hour inspections, shall be borne by the Contractor.

If the District allows the Contractor to do Work outside regular working hours for the Contractor's convenience, the costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order shall be issued from the next Progress Payment.

If the Contractor elects to perform Work outside the Inspector's regular working hours, costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order from the next Progress Payment as a Deductive Change Order.

8.3 PROGRESS AND COMPLETION

8.3.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.3.2 Baseline Schedule Requirements

8.3.2.1 *Timing*: Within ten (10) calendar days after Notice to Proceed, Contractor shall submit a practical schedule showing the order in which the Contractor proposes to perform the Work, and the dates on which the Contractor contemplates starting and completing the salient categories of the Work. This first schedule which outlines the Contractor's view of the practical way in which the Work will be accomplished is the Baseline Schedule. If the Contractor Fails to submit the Baseline Schedule within the ten (10) days noted, then District may withhold processing and approval of progress payments pursuant to Article 9.4 and 9.6.

8.3.2.2 *District Review and Approval:* District, Architect and CM will review both a paper and electronic copy of Baseline Schedule and may provide comments as noted in this Article and either approve or disapprove the Baseline Schedule. All Schedules shall be prepared using an electronic scheduling program acceptable to District. All Schedules shall be delivered in an electronic format usable by the District. All logic ties and electronic information shall be included in the electronic copy of the Baseline Schedule that is delivered to the District.

8.3.2.3 *Schedule Must Be Within the Given Contract Time.* The Baseline Schedule shall not exceed time limits set forth in the Contract Documents and shall comply with all of the scheduling requirements as set forth in the Specifications and Contract Documents.

8.3.2.4 *Submittals Must Be Incorporated (See Articles 3.7 and 3.9)*: Contractor shall include Submittals as line items in the Baseline Schedule as required under Article 3.7.2 and 3.9.6. Submittals shall not delay the Work, Milestones, or the Completion Date. Failure to include Submittals in the Baseline Schedule shall be deemed a material breach by the Contractor.

8.3.2.5 *Float Must Be Incorporated*. The Baseline Schedule must indicate the beginning and completion of all phases of construction and shall use the "critical path method" (commonly called CPM) for the value reporting, planning and scheduling, of all Work required under the Contract Documents. The Baseline Schedule must incorporate all Milestones in the Project and apply Governmental Float at each Milestone in the Contractor's discretion. The Baseline Schedule shall incorporate any Schedule provided by the District as part of the bid and shall note durations that will not be adequate or should be shortened based on Contractor's review. These changes shall be identified and incorporated into Contractor's Baseline Schedule as long as requested changes are made within 10 days after the District chooses to move forward with the Project. Scheduling is necessary for the District's adequate monitoring of the progress of the Work and shall be prepared in accordance with the time frame described in this Article 8. The Architect may disapprove of any Schedule or require modification to it if, in the opinion of the Architect or District, adherence to the any Schedule prepared by the Contractor will not cause the Work to be completed in accordance with the Agreement.

8.3.2.6 *No Early Completion.* Contractor shall not submit any Schedule showing early completion without indicating float time through the date set for Project completion by District. Contractor's Baseline Schedule shall account for all days past early completion as float which belongs to the Project. Usage of float shall not entitle Contractor to any delay Claim or damages due to delay.

8.3.2.7 *Use of Schedule Provided in Bid Documents.* In some cases, the bid will include a preliminary schedule indicating Milestones and construction sequences for the Project along with general timing for the Project. The preliminary schedule is not intended to serve as the Baseline Schedule utilized for construction. It is up to the Contractor to study and develop a Baseline Schedule to address the actual durations and sequences of Work that is anticipated while maintaining the Milestones provided by the District. Contract shall obtain information from Contractor's Subcontractors and vendors on the planning, progress, delivery of equipment, coordination, and timing of availability of Subcontractors so a practical plan of Work is fully developed and represented in the Baseline Schedule.

8.3.2.8 *Incorrect Logic, Durations, Sequences, or Critical Path.* The District may reject or indicate durations, sequences, critical path or logic are not acceptable and request changes. The electronic copy of the Baseline Schedule shall have adequate information so logic ties, duration, sequences and critical path may be reviewed electronically. Contractor is to diligently rebuild and resubmit the Baseline Schedule to represent the Contractor's plan to complete the Work and maintain Milestones at the next progress meeting, or before the next progress meeting. If Contractor is not able to build a Baseline

Schedule that is acceptable to the District or Architect, the District reserves the right to utilize the unapproved originally submitted Baseline Schedule (See Article 8.3.2.12) and the comments submitted to hold Contractor accountable for timely delivery of Work and maintenance of Milestones. Furthermore, Contractor's representations in the Baseline Schedule, if unacceptable, may also be used as a basis for termination of the Contract under Article 14 if Contractor fails to adequately maintain the Schedule and falls significantly behind without undertaking the efforts to either submit and follow a Recovery Schedule or fail to submit a Recovery Schedule and make no effort toward recovery on the Project.

8.3.2.9 *Contractor Responsibility Even if Schedule Issues Are Not Discovered.* Failure on the Part of the District to discover errors or omissions in any Schedules submitted shall not be construed to be an approval of the error or omission and any flawed Schedule is not grounds for a time extension.

8.3.2.9 Inclusions in Baseline Schedule. In addition to scheduling requirements set forth at Article 8.3.2, Contractor is specifically directed to include (broken out separately) in Contractor's Baseline Schedule and all Schedule updates, the following items required pursuant to these General Conditions, including but not limited to:

1. Rain Day Float (excluding inclement weather) as required under Article 8.1.4.2. For example, if the NOAA provides 22 days of Rain Days, all 22 days must be incorporated and noted in the Baseline Schedule. Further, any days required to clean-up or dry out shall be included for operations that are likely to require a clean-up or dry out period. Days that are not utilized shall be considered float owned by the Project.

2. Governmental Delay Float under Article 8.1.4.1. This Governmental Delay Float shall only be utilized for Governmental Delays and shall not be considered available float owned by the Project. This float shall only be distributed to the Project upon the completion of the Project and shall be used to offset Liquidated Damages and shall not generate compensable delays.

3. Submittal and Shop Drawing schedule under Article 3.9.

4. Deferred Approvals under Article 3.9.

5. Time for separate contractors, including furniture installation and start up activities, under Article 6.1.

6. Coordination and timing of any Drawings, approvals, notifications, permitting, connection, and testing for all utilities for the Project. (See Article 2.1.4).

7. Testing, special events, or school activities

8.3.2.10 *Failure to include Mandatory Schedule Items*. District may withhold payment pursuant to Articles 9.3, 9.4 and 9.6. In lieu of withholding payment for failure to include Mandatory Schedule Items, after the District or Architect has notified the Contractor of failure to meet the Baseline Schedule or Updated Schedule requirements and provided a written notification of this failure and provided a written notice of Schedule preparation errors, and the Contractor fails to correct the noted deficiencies or

the Contractor does not provide an updated Baseline Schedule correcting the deficiencies, then Contractor shall not be granted an extension of time for failure to obtain necessary items and approvals under Article 8.3.2 and for the time required for failure to comply with laws, building codes, and other regulations (including Title 24 of the California Code of Regulations). Contractor shall maintain all required Article 8.3.2 Schedule items in the Baseline Schedule and indicate any days that have been used as allowed in Article 8. If Contractor fails to include all Article 8.3.2items in its Baseline Schedule or Schedule Updates and the District either utilizes an Unapproved Schedule under Article 8.3.2.12 or does not object to the inclusion of required scheduling items, then all mandatory Schedule inclusions, including float, shall be utilized in the District's discretion. If the Contract Time is exceeded, then Contractor shall be subject to the assessment of Liquidated Damages pursuant to Article 8.4.

8.3.2.11 *Failure to Meet Requirements*. Failure of the Contractor to provide proper Schedules as required by this Article and Article 9 is a material breach of the Contract and grounds for Termination pursuant to Article 14. The District, at its sole discretion, may choose, instead, to withhold, in whole or in part, any Progress Payments or Retention amounts otherwise payable to the Contractor.

8.3.2.12 *Use of an Unapproved Baseline Schedule*. If the Baseline Schedule submitted by the Contractor is unacceptable to the District (i.e. failing to meet the requirements of Article 8.3.2) and Contractor does not incorporate or address the written comments to the Baseline Schedule and a Baseline Schedule is not approved, but due to extreme necessity, the District moves forward without an approved Baseline Schedule, Contractor shall diligently revise and meet Schedule update requirements of Article 8 and incorporate all Article 8.3.2 comments in all updates). However, for purposes of Termination pursuant to Article 14, the unapproved Baseline Schedule initially submitted shall be treated as the Baseline Schedule with durations shortened or revised to accommodate all float, all mandatory Schedule requirements under Article 8.3.2, any requirements in the Contract Documents, and all revisions by the District or Architect.

8.3.3 Update Schedules

8.3.3.1 *Updates Shall Be Based on Approved Baseline Schedule*. Except in the case where there has not been agreement as to a Baseline Schedule, the approved Baseline Schedule shall be used to build future Schedule updates. Schedule updates shall be a CPM based Schedule consistent with the Baseline Schedule requirements of 8.3.2

In the case that no Baseline has been approved, Schedule updates shall be provided monthly and each update shall incorporate all comments and revisions noted as not complying with the requirements of Article 8.3.2. Contractor shall be held to the Article 8.3.2.12 unapproved Baseline Schedule, inclusive of all Milestones, float, comments and revisions by the District and Architect, all required Baseline Schedule Inclusions under Article 8.3.2, and any requirements in the Contract Documents.

8.3.3.2 *Schedule Updates*. Contractor shall update the approved Schedule each month to address actual start dates and durations, the percent complete on activities, actual completion dates, estimated remaining duration for the Work in progress, estimated start dates for Work scheduled to start at future times and changes in duration of Work items

8.3.3.3 *Listing of Items Causing Delays*. Schedule updates shall provide a listing of activities which are causing delay in the progress of Work and a narrative shall be provided showing a description of problem areas, anticipated delays, and impacts on the Construction Schedule. Simply stating "District Delay" or "Architect Delay" shall be an inadequate listing. Delays shall only be listed if they meet the requirements of Article 8.4.

8.3.3.4 *Recovery Schedule*. In addition to providing a schedule update every thirty (30) days, the Contractor, if requested by the Architect or District, shall take the steps necessary to improve Contractor's progress and demonstrate to the District and Architect that the Contractor has seriously considered how the lost time, the Completion Date, or the Milestones that are required to be met within the terms of the Contract. Contractor shall immediately provide a Recovery Schedule showing how Milestones and the Completion Date will be met. In no case, shall a Recovery Schedule be provided later than ten (10) days following the request for a Recovery Schedule from the Architect or District.

a. Failure to Provide a Recovery Schedule. Shall subject Contractor to the assessment of Liquidated Damages for failure to meet the Contract Time. Refusal or failure to provide a Recovery Schedule shall be considered a substantial failure of performance and a material breach of Contract and may result in Termination of the Contract pursuant to Article 14.

b. Recovery Schedule Acceleration without Additional Cost. The District may require Contractor prepare a Recovery Schedule showing how the Project shall be accelerated, without any additional cost to the District. The District may order, without additional cost, the following:

1. Increase the number of shifts;

2. Utilize overtime to recover the approved Schedule; and/or

3. Increase the days when Work occurs, including weekends, at the Project and at any manufacturer's plant.

c. Recovery Schedule Acceleration without Additional Cost. If Contractor disputes that the Recovery Schedule acceleration shall be issued without additional costs, the Contractor shall submit concurrent with Recovery Schedule acceleration notice pursuant to Articles 8.4.3 and 8.4.4.

8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES

8.4.1 Liquidated Damages

CONTRACTOR AND DISTRICT HEREBY AGREE THAT THE EXACT AMOUNT OF DAMAGES FOR FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED IS EXTREMELY DIFFICULT OR IMPOSSIBLE TO DETERMINE. IF THE WORK IS NOT SUBSTANTIALLY COMPLETED IN THE TIME SET FORTH IN THE AGREEMENT, IT IS UNDERSTOOD THAT THE DISTRICT WILL SUFFER DAMAGES. IT BEING IMPRACTICAL AND UNFEASIBLE TO DETERMINE THE AMOUNT OF ACTUAL DAMAGE, IT IS AGREED THE CONTRACTOR SHALL PAY TO THE DISTRICT THE AMOUNT LIQUIDATED DAMAGES SET FORTH IN THE AGREEMENT, FOR EACH CALENDAR DAY OF DELAY IN REACHING SUBSTANTIAL COMPLETION (SEE ARTICLE 1.1.46). CONTRACTOR AND ITS SURETY SHALL BE LIABLE FOR THE AMOUNT THEREOF PURSUANT TO GOVERNMENT CODE SECTION 53069.85.

8.4.2 Delay

Except and only to the extent provided under Article 7 and Article 8, by signing the Agreement, Contractor agrees to bear the risk of delays to Completion of the Work and that Contractor's bid for the Project was made with full knowledge of this risk.

In agreeing to bear the risk of delays to complete the Work, Contractor understands that, except and only to the extent provided otherwise in Article 7 and 8, the occurrence of events that delay the Work shall not excuse Contractor from its obligation to achieve Completion of the Project within the Contract Time, and shall not entitle the Contractor to an adjustment to the Contract time.

8.4.3 Excusable Delay

Contractor shall not be charged for Liquidated Damages because of any delays in completion of Work which are not the fault or negligence of Contractor or its Subcontractors, arising from Rain Float or Project Float, including acts of God, as defined in Public Contract Code section 7105, acts of enemy, epidemics and quarantine restrictions. Contractor shall within five (5) calendar days of beginning of any such delay notify District in writing of causes of delay; thereupon District shall ascertain the facts and extent of delay and grant extension of time for completing Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted after proper compliance with Article 8.3 requiring preparation and submission of a properly prepared CPM schedule.

8.4.3.1 *Excusable Delay Is Not Compensable*. No extended overhead, general conditions costs, impact costs, out-of-sequence costs or any other type of compensation, by any name or characterization, shall be paid to the Contractor for any delay to any activity not designated as a critical path item on the latest approved Project schedule.

8.4.3.2 *Notification*. The Contractor shall notify the Architect in writing of any anticipated delay and its cause, in order that the Architect may take immediate steps to prevent, if possible, the occurrence or continuance of delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

8.4.3.3 *Extension Request*. In the event the Contractor requests an extension of Contract time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work (See Article 7). When requesting time, i.e., extensions, for proposed Change Orders, they must be submitted with the proposed Change Order with full justification and documentation. If the Contractor fails to submit justification with the proposed Change Order it waives its right to a time extension at a later date. Such justification must be based on the official Contract schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the scope of Work. Blanket or general claims for extra days without specific detailed information as required herein or a blanket or general reservation of rights do not fulfill the requirements of this Article and shall be denied. The justification must include, but is not limited to, the following information:

a. The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.

b. Logical ties to the official Baseline Schedule or Approved Updated Schedule for the proposed changes and/or delay showing the activity/activities in the schedule

whose start or completion dates are affected by the change and/or delay. (A fragnet of any delay of over ten (10) days must be provided.)

The Contractor and District understand and expressly agree that insofar as Public Contract Code section 7102 may apply to changes in the Work or delays under this Contract, the actual delays and damages, if any, and time extensions are intended to, and shall provide, the exclusive and full method of compensation for changes in the Work and construction delays.

8.4.4 Notice by Contractor Required

The Contractor shall within five (5) calendar days of beginning of any such delay notify the District in writing of causes of delay with justification and supporting documentation. In the case of a Recovery Schedule pursuant to Article 8.3.3.4, Contractor shall submit written notice concurrent with the Recovery Schedule. District will then ascertain the facts and extent of the delay and grant an extension of time for completing the Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of the Work affected by the delay and shall not apply to other portions of the Work not so affected.

Claims relating to time extensions shall be made in accordance with applicable provisions of Article 7.

8.4.4.1 *Adjustment for Compensable Delays*. The Schedule may be adjusted for a delay if, and only if, Contractor undertakes the following:

a. Contractor submits a timely COR or CO pursuant to the requirements of Article 7.

b. Contractor submits a fragnet showing the critical path delay caused by the COR, CO, Changed Condition, CCD, or ICD

c. Contractor has addressed all required float days in the Fragnet.

d. Contractor submits a complete breakdown of all costs incurred utilizing the format of Article 7.3.3

8.4.5 No Additional Compensation for Coordinating Governmental Submittals and the Resulting Work

CONTRACTOR HAS PLANNED ITS WORK AHEAD OF TIME AND IS AWARE THAT GOVERNMENTAL AGENCIES, SUCH AS THE GAS COMPANIES, ELECTRICAL UTILITY COMPANIES, WATER DISTRICTS AND OTHER AGENCIES MAY HAVE TO APPROVE CONTRACTOR PREPARED DRAWINGS OR APPROVE A PROPOSED INSTALLATION. CONTRACTOR HAS INCLUDED DELAYS AND DAMAGES WHICH MAY BE CAUSED BY SUCH AGENCIES IN CONTRACTOR'S BID AND HAS INCLUDED ADEQUATE TIME IN THE CONTRACTOR'S BASELINE SCHEDULE. FAILURE TO ADEQUATELY PLAN AND SCHEDULE IS NOT A BASIS TO USE GOVERNMENTAL DELAY FLOAT.

8.4.6 District Right to Accelerate the Work

The District may direct the Contractor to meet schedule requirements when the Work has been delayed. The District shall compensate the Contractor for the additional costs incurred by acceleration to the extent that such costs are directly attributable to the acceleration and are incurred through no fault or negligence of the Contractor.

8.4.6.1 *Management of Acceleration*. Contractor acceleration shall not include Work that is part of the scope of Work detailed in the Plans and Specifications. Instead, the acceleration costs shall be premium or overtime and quantifiable additional work added to the Project meant to accelerate the Project. Contractor is directed to keep consistent crews on the Project so time can be tracked. If crews are circulated off the Project or crews brought in only for overtime, the District may be charged for Contract Work and not accelerated time. In such case, the District may object to the costs submitted.

8.4.6.2 *Costs for Acceleration*. Cost for Acceleration shall be supported by backup documentation, and time sheets signed by the Inspector for each day work has been performed, at or near the time when the Work was performed. A listing on the time sheet shall document all labor, materials and services utilized that day and provide areas of work, and amount of work performed. Contractor shall comply with submission requirements of Article 7.7.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum or Contract Price is stated in the Agreement and, including authorized adjustments, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents.

9.2 COST BREAKDOWN

9.2.1 Required Information

Contractor shall furnish the following:

a. Within ten (10) days after Notice to Proceed, a detailed breakdown of the Contract Price (hereinafter "Schedule of Values") for each Project, Site, building, Milestone or other meaningful method to measure the level of Project Completion as determined by the District shall be submitted as a Submittal for the Project.;

b. Within ten (10) days after the date of the Notice to Proceed, a schedule of estimated monthly payment requests due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the District may require;

c. Within ten (10) days after the date of the Notice to Proceed, address, telephone number, telecopier number, California State Contractors License number, classification and monetary value of all subcontracts for parties furnishing labor, material, or equipment for completion of the Project.

9.2.2 Information and Preparation of Schedule of Values

9.2.2.1 *Break Down of Schedule of Values*. Schedule of Values shall be broken down by Project, site, building, Milestone, or other meaningful method to measure the level of Project Completion as determined by the District.

9.2.2.2 *Based on Contractor Bid Costs.* The Schedule of Values shall be based on the costs from Contractor's bid to the District. However, the submission of the Schedule of Values shall not be front loaded so the Contractor is paid a greater value than the value of the Work actually performed and shall not shift funds from parts of the Project that are later to Work that is performed earlier.

9.2.2.3 Largest Dollar Value for Each Line Item. Identify Subcontractors and materials suppliers proposed to provide portions of Work equal to or greater than ten thousand dollars ($10,000) or one-half of one percent (0.5%) of their Contract Price, whichever is less.

9.2.2.4 *Allowances*. Any Allowances provided for in the Contract shall be a line item in the Schedule of Values.

9.2.2.5 *Labor and Materials Shall Be Separate*. Labor and Materials shall be broken into two separate line items unless specifically agreed in writing by the District.

9.2.3 District Approval Required

The District shall review all submissions received pursuant to Article 9.2 in a timely manner. All submissions must be approved by the District before becoming the basis of any payment.

9.3 PROGRESS PAYMENTS

9.3.1 Payments to Contractor

Unless there is a resolution indicating that the Work for the Project is substantially complex, within thirty-five (35) days after approval of the Request for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as certified by Architect and Inspector and verified by Contractor) up to the last day of the previous month, less the aggregate of previous payments. In the case of a Project designated substantially complex, the sum paid to the Contractor shall be equal to ninety percent (90%) of the value of the Work performed (as certified by the Architect and Inspector and verified by Contractor). The value of the Work completed shall be the Contractor's best estimate. Work completed as estimated shall be an approximation or estimate only and no mistake, inaccuracy, error or falsification in said any approved estimate shall operate to release the Contractor, or any Surety upon any bond, from damages arising from such Work, or from the District's enforcement of each and every provision of this Contract including but not limited to the Performance Bond and Payment Bond. The District shall have the right to subsequently to correct any mistake, inaccuracy, error or falsification made or otherwise set forth in any approved Request for Payment and such correction may occur in any future Payment Application or in the Retention Payment to the Contractor. No Surety upon any bond shall be relieved, released or exonerated of its obligations under this Contract or any applicable bond when the District is unable to correct an overpayment to the Contractor due to any abandonment by the Contractor or termination by the District.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for Work performed, so long as any lawful or proper direction given by the District concerning the Work, or any portion thereof, remains incomplete.

Notwithstanding anything to the contrary stated above, the Contractor may include in its Request for Payment the value of any structural steel, glue laminated beams, trusses, bleachers and other such custom-made materials prepared specifically for the Project and unique to the Project so long as all of the following requirements are satisfied:

a. The aggregate cost of materials stored off-site shall not exceed Twenty Five Thousand Dollars ($25,000) at any time or as otherwise agreed to be District in writing;

b. Title to such materials shall be vested in the District as evidenced by documentation satisfactory in form and substance to the District, including, without limitation, recorded financing statements, UCC filings and UCC searches;

c. With each Contractor Request for Payment, the Contractor shall submit to the District a written list identifying each location where materials are stored off-site (which must be a bonded warehouse) and the value of the materials at each

location. The Contractor shall procure insurance satisfactory to the District (in its reasonable discretion) for materials stored off-site in an amount not less than the total value thereof;

d. The consent of any Surety shall be obtained to the extent required prior to payment for any materials stored off-site;

e. Representatives of the District shall have the right to make inspections of the storage areas at any time; and

f. Such materials shall be: (1) protected from diversion, destruction, theft and damage to the reasonable satisfaction of the District; (2) specifically marked for use on the Project; and (3) segregated from other materials at the storage facility.

9.3.2 Purchase of Materials and Equipment and Cost Fluctuations

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays. Contractor understands that materials fluctuate in value and shall have adequately addressed market fluctuations through agreements with Contractor vendors or by other means. Contractor further understands and incorporates into Contractor's bid cost any wage rate increases during the Project for the Contractor's labor force as well as all other Subcontractor and vendor labor forces. District shall not be responsible for market fluctuations in costs or labor rate increases during the Project. Contractor further has incorporated any and all cost increases in areas of Work where there may be schedule variations so that cost increases are not passed through to the District.

9.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Contractor specifically understands that Title 24 Section 4-343 which states:

> "It is the duty of the contractor to complete the work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of such duties... In no case, however, shall the instruction of the Architect or registered Engineer be construed to cause work to be done with is not in conformity with the approved Plans, Specifications, and change orders..."

Notwithstanding any payment, the District may enforce each and every provision of this Contract which includes, but is not limited to, the Performance Bond and Payment Bond. The District may correct any error subsequent to any payment. In no event shall the Contractor or the Surety be released or exonerated from performance under this Contract when the District overpays the Contractor based upon any mistake, inaccuracy, error or falsification in any estimate that is included in any Request for Payment.

9.3.4 Issuance of Certificate of Payment

The Architect shall, within seven (7) days after receipt of the Contractor's Application for Payment, either approve such payment or notify the Contractor in writing of the Architect's reasons for

withholding approval in whole or in part as provided in Article 9.6. The review of the Contractor's Application for Payment by the Architect is based on the Architect's observations at the Project and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. In some cases, the Architect may act upon or rely on the evaluation of the Work by the Inspector. This review of Payment Applications is sometimes called a "Pencil Draft." District's return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the prompt payment of a Request for Payment or Request for Retention. The foregoing representations are subject to: (1) an evaluation of the Work for conformance with the Contract Documents, (2) results of subsequent tests and inspections, (3) minor deviations from the Contract Documents correctable prior to completion, and (4) specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute the Contractor's verified representation that the Contractor is entitled to payment in the amount certified.

9.3.5 Payment of Undisputed Contract Payments

In accordance with Public Contract Code section 7100, payments by the District to the Contractor for any and all undisputed amounts (including all Progress Payments, Final Payments or Retention Payment) is contingent upon submission of a proper and accurate Payment Application and the Contractor furnishing the District with a release of all Claims against the District related to such undisputed amounts. Disputed Contract Claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. If, however, the Contractor specifically excludes any Claims, the Contractor shall provide details such as a specific number of disputed days or costs of any such exclusion in accordance with Articles 4.6 and 7.7.

9.4 APPLICATIONS FOR PROGRESS PAYMENTS

9.4.1 Procedure

9.4.1.1 *Application for Progress.* On or before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the Architect an itemized Application for Progress Payment for operations completed. Such application shall be notarized, if required, and supported by the following or such portion thereof as Architect requires:

1. The amount paid to the date of the Payment Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;

2. The amount being requested under the Payment Application by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;

3. The balance that will be due to each of such entities after said payment is made;

4. A certification that the As-Built Drawings and Annotated Specifications are current;

5. Itemized breakdown of Work done for the purpose of requesting partial payment;

6. An updated or approved Baseline Schedule or other Schedule updates in conformance with Article 8;

7. Failure to submit an updated Schedule for the month or any previous month;

8. The additions to and subtractions from the Contract Price and Contract Time;

9. A summary of the Retention held;

10. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;

11. The percentage of completion of the Contractor's Work by line item;

12. An updated Schedule of Values from the preceding Application for Payment;

13. Prerequisites for Progress Payments; and

14. Any other information or documents reasonably requested by the District, Architect, Inspector or CM (if applicable).

9.4.1.2 *First Payment Request.* The following items, if applicable, must be completed before the first payment request will be accepted for processing:

1. Installation of the Project sign;

2. Receipt by Architect of Submittals;

3. Installation of field office;

4. Installation of temporary facilities and fencing;

5. Submission of documents listed in the Article 9.2 relating to Contract Price breakdown;

6. Preliminary schedule analysis, due within 10 days after Notice to Proceed;

7. Contractor's Baseline Schedule (to be CPM based in conformance with Article 8);

8. Schedule of unit prices, if applicable;

9. Submittal Schedule;

10. Copies of necessary permits;

11. Copies of authorizations and licenses from governing authorities;

12. Initial progress report;

13. Surveyor qualifications;

14. Written acceptance of District's survey of rough grading, if applicable;

15. List of all Subcontractors, with names, license numbers, telephone numbers, and scope of work;

16. All bonds and insurance endorsements; and

17. Resumes of General Contractor's Project Manager, and if applicable, job site secretary, record documents recorder, and job site Superintendent.

9.4.1.3 *Second Payment Request.* The second payment request will not be processed until all Submittals and Shop Drawings have been accepted for review by the Architect.

9.4.1.4 *All Payment Requests.* No payment requests will be processed unless Contractor has submitted copies of the certified payroll records for the Work which correlates to the payment request and a proper CPM schedule pursuant to Article 8 is submitted.

9.4.1.5 *Final Payment Application (90% or 95%).* See Article 9.11.1

9.4.1.6 *Final Payment Application (100%).* See Article 9.11.3

9.5 STOP NOTICE CLAIMS AND WARRANTY OF TITLE

The Contractor warrants title to all Work. The Contractor further warrants that all Work is free and clear of liens, claims, security interests, stop notices, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Failure to keep work free of liens, stop notices, claims, security interests or encumbrances is grounds to make a claim against Contractor's Payment and Performance Bond to immediately remedy and defend.

If a lien or stop notice of any nature should at any time be filed against the Work or any District property, by any entity which has supplied material or services at the request of the Contractor, Contractor and Contractor's Surety shall promptly, on demand by District and at Contractor's and Surety's own expense, take any and all action necessary to cause any such lien or stop notice to be released or discharged immediately therefrom.

If the Contractor fails to furnish to the District within ten (10) calendar days after written demand by the District, satisfactory evidence that a lien or stop notice has been so released, discharged, or secured, then District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any sum payable to Contractor under the Contract. In addition, any liens, stop notices, claims, security interests or encumbrances shall trigger the indemnification requirements under Article 3.15 and the Agreement Form, and shall act as a trigger under Civil Code section 2778 and 2779 requiring reimbursement for any and all costs following the District's written demand has been made. Any withholdings by the District for

stop notices in accordance with Civil Code section 9358 shall not be a basis by the Contractor to make a Claim for interest penalties under Public Contract Code sections 7107 or 20104.50.

9.6 DECISIONS TO WITHHOLD PAYMENT

9.6.1 Reasons to Withhold Payment

The District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required by Article 9.4 cannot be made. The District may withhold payment, in whole, or in part, to such extent as may be necessary to protect the District from loss because of, but not limited to:

a. Defective Work not remedied;

b. Stop notices served upon the District;

c. Liquidated Damages assessed against the Contractor;

d. The cost of Completion of the Contract if there exists reasonable doubt that the Work can be Completed for the unpaid balance of any Contract Price or by the completion date;

e. Damage to the District or other contractor;

f. Unsatisfactory prosecution of the Work by the Contractor;

g. Failure to store and properly secure materials;

h. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, acceptable monthly progress schedules, Shop Drawings, Submittal schedules, Schedule of Values, Product Data and samples, proposed product lists, executed Change Order, Construction Change Documents, and verified reports;

i. Failure of the Contractor to maintain As-Built Drawings;

j. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Payment Application;

k. Unauthorized deviations from the Contract Documents (including but not limited to Unresolved Notices of Deviations (DSA Form 154));

l. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion dates.

m. Failure to properly pay prevailing wages as defined in Labor Code section 1720, et seq.;

n. Failure to properly maintain or clean up the Site;

o. Payments to indemnify, defend, or hold harmless the District;

p. Any payments due to the District including but not limited to payments for failed tests, or utilities changes or permits;

q. Failure to submit an acceptable Baseline Schedule or any Schedule or Schedule update in accordance with Article 8;

r. Failure to pay Subcontractor or suppliers as required by Article 9.8.1

s. Failure to secure warranties, including the cost to pay for warranties;

t. Failure to provide releases from material suppliers or Subcontractors when requested to do so;

u. Items deducted pursuant to Article 2.2;

v. Incomplete Punch List items under Article 9.9.1.1 which have gone through the Article 2.2 process; or

w. Allowances that have not been used.

9.6.2 Reallocation of Withheld Amounts

District may, in its discretion, apply any withheld amount to payment of outstanding claims or obligations as defined in Article 9.6.1 and 9.5. In so doing, District shall make such payments on behalf of Contractor. If any payment is so made by District, then such amount shall be considered as a payment made under Contract by District to Contractor and District shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligation. District will render Contractor an accounting of such funds disbursed on behalf of Contractor.

If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after ten (10) calendar days written notice to the Contractor and without prejudice to any other remedy make good such deficiencies. The District shall adjust the total Contract price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work which is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least 150% of the estimated reasonable value of the nonconforming Work) shall be made therefor.

9.6.3 Payment After Cure

When the grounds for declining approval are removed, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

9.7 NONCONFORMING WORK

Contractor shall promptly remove from premises all Work identified by District as failing to conform to the Contract whether incorporated or not. Contractor shall promptly replace and re-execute its

own Work to comply with the Contract without additional expense to District and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

If Contractor does not remove such Work which has been identified by District as failing to conform to the Contract Documents within a reasonable time, fixed by written notice, District may remove it and may store the material at Contractor's expense. If Contractor does not pay expenses of such removal within ten (10) calendar days' time thereafter, District may, upon ten (10) calendar days' written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by Contractor.

9.8 SUBCONTRACTOR PAYMENTS

9.8.1 Payments to Subcontractors

No later than ten (10) days after receipt, or pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.8.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.8.3 Payment Not Constituting Approval or Acceptance

An approved Request for Payment, a progress payment, a Certificate of Substantial Completion, or partial or entire use or occupancy of the Project by the District shall not constitute acceptance of Work that is not in accordance with the Contract Documents.

9.8.4 Joint Checks

District shall have the right, if necessary for the protection of the District, to issue joint checks made payable to the Contractor and Subcontractors and material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, any obligation from the District to such Subcontractor, or rights in such Subcontractor against the District. The District may choose to issue joint checks at District's sole discretion and only after all the requirements of that particular school district and county are specifically met. Some school districts cannot issue joint checks, so the ability to issue joint checks depends on the school district and the specific circumstances.

9.9 COMPLETION OF THE WORK

9.9.1 Close-Out Procedures

9.9.1.1 *Incomplete Punch Items.* When the Contractor considers the Work Substantially Complete (See Article 1.1.46 for definition of Substantially Complete), the Contractor shall prepare and submit to the District a comprehensive list of minor items to be completed or corrected

(hereinafter "Incomplete Punch Items" or "Punch List"). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct the Incomplete Punch Items listed. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Contractor is aware that Title 24 Section 4-343(a) provides:

> "RESPONSIBILITIES. IT IS THE DUTY OF THE CONTRACTOR TO COMPLETE THE WORK COVERED BY HIS OR HER CONTRACT IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS THEREFOR. THE CONTRACTOR IN NO WAY IS RELIEVED OF ANY RESPONSIBILITY BY THE ACTIVITIES OF THE ARCHITECT, ENGINEER, INSPECTOR OR DSA IN THE PERFORMANCE OF SUCH DUTIES.

9.9.1.2 *Punch List Is Prepared Only After the Project Is Substantially Complete.* If any of the conditions noted in Article 1.1.46 as defining Substantial Completion are not met, the Inspector, Architect or District may reject Contractor's Incomplete Punch Items as premature. If the Architect and Inspector commence review of Incomplete Punch Items, all rights are reserved until the Project actually meets the definition of Substantially Complete. Liquidated Damages, warranties, and other contractual rights are not affected by Incomplete Punch Items unless otherwise addressed in these General Conditions.

Once the Inspector and the Architect determine the Project is Substantially Complete, a Certificate of Substantial Completion shall be issued. The Inspector and Architect shall prepare a Punch List of items which is an inspection report of the Work, if any, required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Completed by the Contractor and a final DSA Close-Out is approved. When all Work for the Project is Complete, including Punch Lists and all Work complies with the approved Contract Documents and Change Orders, the Project has reached Final Completion.

9.9.1.3 *Time for Completion of Punch List.* Contractor shall only be given a period of no more than thirty (30) days to complete the Punch List for the Project. During the Punch List period, the Contractor's Superintendent and Project Manager shall remain engaged in the Project and shall not be removed or replaced. If the Punch List is not completed at the end of the Punch List time then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

Failure to issue a timely written request for additional time to complete Punch List shall result in the deletion of the remaining Punch List Work pursuant to Article 2.2 and the issuance of a Deductive Change Order.

a. Extension of Time to Complete Punch List. If Contractor cannot finish the Punch List Work during the time period allotted under Article 9.9.1.3, the Contractor may make a written request for a Non-Compensable Punch List time extension accompanied by an estimate of the number of additional days it will take to complete the Punch List Work for a written consent from the District to allow continued Punch List Work. Punch List time extensions are a maximum of thirty (30) days for each request and must be accompanied by an itemized valued Punch List.

b. If there is no valued Punch List accompanying any request or if Contractor intends to undertake Punch List without the continued support and

supervision of its Superintendent and Project Manager (as required under Article 3.2), the District, Construction Manager or Architect may issue a valued Punch List, reject the Punch List Time Extension and deduct 150% of the valued Punch List pursuant to Article 2.2 and proceed to Close-Out the Project. Contractor shall cease work on the Project and proceed to complete Contractor's Retention Payment Application and complete the Work for the Project required pursuant to Article 9.11.3.

9.9.1.4 *District Rejection of Written Request for Punch List Time Extensions*. Following sixty (60) Days of Punch List under Article 9.9.1.3, the District has the option of rejecting Punch List Time Extension requests. The District may proceed under Article 2.2 and deduct the value of remaining Punch List Work pursuant to Article 2.2. If the District rejects the Punch List Time Extension request then Contractor shall cease Work on the Project and proceed to Final Inspection pursuant to Article 9.11.2.

9.9.1.5 *Punch List Liquidated Damages to Compensate for Added District Project Costs.* If the total time utilized for Punch List exceeds sixty (60) days [the thirty (30) day period under Article 9.9.1.3 plus an additional thirty (30) day period that has been requested in writing], and the District grants an additional written Punch List Time Extension that exceeds sixty (60) days of Punch List, then Contactor shall be charged Liquidated Damages of at least $750 per day for continued Punch List Work to partially compensate the Inspector, Architect, and Construction Manager's extended time on the Project. This Punch List Liquidated Damage number is based on anticipated cost for an Inspector on site and additional costs for the Architect and Construction Manager to reinspect Punch List items and perform the administration of the Close-out.

Contractor received thirty (30) days without any charges for Punch List Liquidated Damages and is placed on notice pursuant to this Article 9.9.1.5 that $750 is due for each day of Punch List that exceeds sixty (60) days at $750, a cost much lower than typical (and actual) costs for Inspection, Architect and Construction Manager time required during Punch List. Starting at ninety (90) days of Punch List (an excessive number of days to complete Punch List), the District shall be entitled to adjust Punch List Liquidated Damages to an estimate of the actual costs incurred to oversee, monitor and inspect the Punch List. If costs exceed $750 per day, the anticipated extended contract charges for Inspection, Architect, Construction Manager, and any other costs that will be incurred due to the extended Punch List shall be itemized and a daily rate of Punch List Liquidated Damages shall be presented in writing to the Contractor within five (5) days following the receipt of a written request for Punch List Time Extension by the Contractor that extends the Punch List time beyond ninety (90) days. This written notice of actual Punch List Liquidated Damages may be provided to the Contractor at any time following the first written request for Punch List Time extension requested under Article 9.9.1.3. The adjusted actual Punch List Liquidated Damage amount shall be applicable as Punch List Liquidated Damages commencing on the ninetieth (90^{th}) day of Punch List.

9.9.2 Close-Out Requirements for Final Completion of the Project

a. Utility Connections. Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected

b. As-Builts Up to Date and Complete. The intent of this procedure is to obtain an exact "As-Built" record of the Work upon completion of the project. The following information shall be carefully and correctly drawn on the prints and all items shall

be accurately located and dimensioned from finished surfaces of building walls on all As-Built Drawings

1. The exact location and elevations of all covered utilities, including valves, cleanouts, etc. must be shown on As-Built Drawings

2. Contractor is liable and responsible for inaccuracies in As-Built Drawings, even though they become evident at some future date.

3. Upon completion of the Work and as a condition precedent to approval of Retention Payment, Contractor shall obtain the Inspector's approval of the "As-Built" information. When completed, Contractor shall deliver corrected sepias and/or a Diskette with an electronic file in a format acceptable to the District.

4. District may withhold the cost to hire a draftsman and potholing and testing service to complete Record As-Built Drawings at substantial cost if the Contractor does not deliver a complete set of Record As-Built Drawings. This shall result in withholding of between $10,000 to $20,000 per building that does not have a corresponding Record As Built Drawing.

c. Any Work not installed as originally indicated on Drawings

d. All DSA Close-Out requirements (See DSA Certification Guide) Contractor is also specifically directed to Item 3.2 in the DSA Certification Guide and the applicable certificates for the DSA-311 form.

e. Submission of Form 6-C. Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343. The Contractor understands that the filing with DSA of a Form 6-C is a requirement to obtain final DSA Approval of the construction by Contractor and utilized to verify under penalty of perjury that the Work performed by Contractor complies with the DSA approved Contract Documents. The failure to file a DSA Form 6C has two consequences. First, the Construction of the Project will not comply with the design immunity provisions of Government Code section 830.6 and exposes the District and the individual Board members to personal liability for injuries that occur on the Project.

Secondly , under DSA IR A-20, since the Project cannot be Certified by DSA, no future or further Projects will be authorized so Contractor will have essentially condemned the campus from any future modernization or addition of new classrooms through their failure to file the DSA Form 6C.

1. *Execution of the DSA Form 6-C is Mandatory*. Refusal to execute the Form 6-C, which is a Final DSA Verified Report that all Work performed complies with the DSA approved Contract Documents is a violation of Education Code section 17312 and shall be referred to the Attorney General for Prosecution.

2. *Referral to the District Attorney for Extortion*. If the Contractor's refusal to execute the DSA Form 6C is to leverage a Dispute, Claim or litigation,

then the matter shall also be referred to the District Attorney for prosecution for extortion.

3. *Contractor shall be Responsible for All Costs to Certify the Project*. The District may certify the Project complies with Approved Plans and Specifications by utilizing the procedures under the Project Certification Guide (located at the DSA website). All costs for professionals, inspection, and testing required for an alternate Project Certification shall be the Contractor's responsibility and the District reserves its right to institute legal action against the Contractor and Contractor's Surety for all costs to certify the Project and all costs to correct Non-Compliant Work that is discovered during the Alternate Certification Process.

f. ADA Work that must be corrected to receive DSA certification. See Article 12.2.

g. Maintenance Manuals. At least thirty (30) days prior to final inspection, three (3) copies of complete operations and maintenance manuals, repair parts lists, service instructions for all electrical and mechanical equipment, and equipment warranties shall be submitted. All installation, operating, and maintenance information and Drawings shall be bound in 8½" x 11" binders. Provide a table of contents in front and all items shall be indexed with tabs. Each manual shall also contain a list of Subcontractors, with their addresses and the names of persons to contact in cases of emergency. Identifying labels shall provide names of manufactures, their addresses, ratings, and capacities of equipment and machinery.

1. Maintenance manuals shall also be delivered in electronic media for the Project. Any demonstration videos shall also be provided on electronic media.

h. Inspection Requirements. Before calling for final inspection, Contractor shall determine that the following Work has been performed:

1. The Work has been completed;

2. All fire/ life safety items are completed and in working order;

3. Mechanical and electrical Work complete, fixtures in place, connected and tested;

4. Electrical circuits scheduled in panels and disconnect switches labeled;

5. Painting and special finishes complete;

6. Doors complete with hardware, cleaned of protective film relieved of sticking or binding and in working order;

7. Tops and bottoms of doors sealed;

8. Floors waxed and polished as specified;

9. Broken glass replaced and glass cleaned;

10. Grounds cleared of Contractor's equipment, raked clean of debris, and trash removed from Site;

11. Work cleaned, free of stains, scratches, and other foreign matter, replacement of damaged and broken material;

12. Finished and decorative work shall have marks, dirt and superfluous labels removed;

13. Final cleanup, as in Article 3.12;

14. All Work pursuant to Article 9.11.2; and

15. Furnish a letter to District stating that the District's Representative or other designated person or persons have been instructed in working characteristics of mechanical and electrical equipment.

9.9.3 Costs of Multiple Inspections

More than two (2) requests of the District to make inspections required under Article 9.9.1 shall be considered an additional service of Architect, Inspector, Engineer or other consultants shall be the Contractor's responsibility pursuant to Article 4.5 and all subsequent costs will be prepared as a Deductive Change Order.

9.10 PARTIAL OCCUPANCY OR USE

9.10.1 District's Rights

The District may occupy or use any completed or partially completed portion of the Work at any stage. The District and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. If District and Contractor cannot agree as to responsibilities such disagreement shall be resolved pursuant to Article 4.6. When the Contractor considers a portion complete, the Contractor shall prepare and submit a Punch List to the District as provided under Article 9.9.1.

9.10.2 Inspection Prior to Occupancy or Use

Immediately prior to such partial occupancy or use, the District, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.10.3 No Waiver

Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 COMPLETION AND FINAL PAYMENT

9.11.1 Final Payment (90% Billing if Substantially Complex Finding and 95% Billing If No Finding Is Made)

The following items must be completed before the Final Payment Application will be accepted for processing at Substantial Completion of the Project:

a. Inspector sign-off of each item in the DSA 152 Project Inspection Card;

b. The Project has reached the Punch List items under Article 9.9.1.2 and the Project has been determined to be Substantially Complete under Article 1.1.46;

c. Removal of temporary facilities and services;

d. Testing, adjusting and balance records are complete;

e. Removal of surplus materials, rubbish, and similar elements;

f. Changeover of door locks;

g. Deductive items pursuant to Article 9.6 and Article 2.2; and

h. Completion and submission of all final Change Orders for the Project.

9.11.2 Final Inspection (Punch List Completion)

Contractor shall comply with Punch List procedures under Article 9.9.1.1, and maintain the presence of Project Superintendent and Project Manager (not replacement project superintendent or project manager) until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List.

Upon completion of the Work under Article 9.9.1, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect and the District find the Work contained in the Punch List acceptable under the Contract Documents, the Work shall have reached Final Completion. Architect shall notify Contractor, who shall then submit to the Architect its Application for Retention Payment. This Application for Retention Payment shall contain any deductions under Article 9.6, including but not limited to incomplete Punch List items under Article 9.9.1.

Upon receipt and approval of Application for Retention Payment, the Architect shall issue a Form 6 stating that to the best of its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Architect in connection with the Work, such Work has been completed in accordance with the Contract Documents. The District shall thereupon inspect such Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete (which, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of payment from the District, pay the amounts due Subcontractors.

If the Architect and the District find that the Work contained in the Punch List is unacceptable, then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

9.11.3 Retainage (100% Billing for the Entire Project)

The retainage, less any amounts disputed by the District or which the District has the right to withhold pursuant to the Contract Documents (including but not limited to incomplete Punch List items under Article 9.9.1), shall be paid after approval by the District of the Application for Retention Payment, after the satisfaction of the conditions set forth in Article 9, the Final Inspection under Article 9.11.2 is completed, and after thirty-five (35) days after the acceptance of the Work and recording of the Notice of Completion by District. No interest shall be paid on any retainage, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any escrow agreement between the District and the Contractor.

a. Procedures for Application for Retention Payment. The following conditions must be fulfilled prior to release of Retention Payment:

1. A full and final waiver or release of all stop notices in connection with the Work shall be submitted by Contractor, including a release of stop notice in recordable form, together with (to the extent permitted by law) a copy of the full and final release of all Stop Notice rights.

2. The Contractor shall have made all corrections, including all Punch List Items, to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

3. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, releases from the Surety and warranty bonds (if applicable) required by the Contract Documents for its portion of the Work.

4. Contractor must have completed all requirements set forth in Article 9.9

5. Contractor must have issued a Form 6C for the Project.

6. The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents.

7. The Contractor shall have completed final clean up as required by Article 3.12

8. Contractor shall have all deductive items under Article 9.6 and Article 2.2 submitted as part of the Retention Payment.

9.11.4 Recording of a Notice of Completion After Punch List Period and Final Inspection.

When the Work, or designated portion thereof, is complete or the District has completed the Article 9.6and/or the Article 2.2 process, whichever occurs first, the District will file either a Notice of Completion or a Notice of Completion noting valued Punch List items. Valued Punch List items will be deducted from the Retention Payment.

During the time when Work is being performed on the Punch List, the Project does not meet the definition of "Complete" under Public Contract Code section 7107(c)(1) even if there is "beneficial occupancy" of the Project since that has been no "cessation of labor" on the Project. Completion of Punch List under this Article is not "testing, startup, or commissioning by the public entity or its agent." In other words, the continuing Punch List Work is Contractor labor on the Project until each and every item of Punch List Work is complete or the time periods under Article 9.9.1 have expired.

9.11.5 Warranties

Warranties required by the Contract Documents shall commence on the date of Completion of the entire Work. Warranty periods DO NOT commence at Substantial Completion or when a particular Subcontractor work is complete. No additional charges, extras, Change Orders, or Claims may be sought for warranties commencing from the Notice of Completion.

District shall have the right to utilize equipment, test, and operate as necessary for acclimation, or testing without voiding or starting warranties. Taking beneficial occupancy shall not start warranties except in the case where the District agrees, in writing, that warranties shall commence running or where the District is taking phased occupancy of specific buildings or areas and completes separate Punch Lists as further addressed in Article 4.2.7.

9.11.6 Time for Submission of Application for Final Payment and Retention Payment (Unilateral Processing of Final and Retention Payment Application).

If Contractor submits a Final Payment Application which fails to include deductive items under Article 9.6, the District or Architect shall note this defective request for Final Payment Application. The Contractor shall be notified that specific deductive items shall be included in the Final Payment Application. If Contractor either continues to submit the Final Payment Application without deductive items under Article 9.6, or a period of 14 calendar days passes after Contractor is provided written notice of deductive items for inclusion in Final Payment Application, then District may either alter the Final Payment Application and recalculate the math on the Final Payment Application to address the Article 9.6 deductive items or process a unilateral Final Payment Application.

9.11.7 Unilateral Release of Retention

After the recordation of the Notice of Completion, or within sixty (60) days following the completion of the Punch List or the expiration of the time for completion of Punch List under Article 9.9.1, if Contractor does not make an Application for Release of Retention, the District may unilaterally release retention less any deducts under Article 9.6 and/or Article 2.2, withholds due to stop notices, or withholdings due to other defective Work on the Project. District may also choose to unilaterally release Retention after deduction of 150% of any disputed items, which may also include items under Article 9.6

and 2.2. If a deduction pursuant to Article 9.6 is made from Retention, a letter deducting specific valued items shall be considered a notice of Default under the terms of the Escrow Agreement.

9.12 SUBSTITUTION OF SECURITIES

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300 as set forth in the form contained in the Bid Documents.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor Responsibility

The Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and protection of all materials delivered and Work performed until completion and final acceptance by the District. All Work shall be solely at the Contractor's risk, with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105(b)(2).

Contractor shall take, and require Subcontractor to take, all necessary precautions for safety of workers on the Work and shall comply with all applicable federal, state, local and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. In addition to meeting all requirements of OSHA, Cal-OSHA, state, and local codes, Contractor shall furnish, erect and properly maintain at all times, as directed by District or Architect or required by conditions and progress of Work, all necessary safety devices, safeguards, construction canopies, signs, audible devices for protection of the blind, safety rails, belts and nets, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created by such features in the course of construction. Contractor shall designate a responsible member of its organization on the Work, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety and health of workers. The name and position of person so designated shall be reported to District by Contractor. Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, such violation shall be corrected promptly.

10.1.2 Subcontractor Responsibility

Contractor shall require that Subcontractors participate in, and enforce, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.3 Cooperation

All Subcontractors and material or equipment suppliers shall cooperate fully with Contractor, the District, and all insurance carriers and loss prevention engineers.

10.1.4 Accident Reports

Subcontractors shall immediately, within two (2) days, report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported within four (4) days by telephone or messenger. Contractor shall thereafter immediately, within two (2) days, report the facts in writing to the District and the Architect giving full details of the accident.

10.1.5 First-Aid Supplies at Site

The Contractor will provide and maintain at the Site first-aid supplies which complies with the current Occupational Safety and Health Regulations.

10.1.6 Material Safety Data Sheets and Compliance with Proposition 65

Contractor is required to have material safety data sheets available in a readily accessible place at the job site for any material requiring a material safety data sheet per the Federal "hazard communication" standard, or employees' "right-to-know law." The Contractor is also required to properly label any substance brought into the job site, and require that any person working with the material, or within the general area of the material, is informed of the hazards of the substance and follows proper handling and protection procedures.

Contractor is required to comply with the provisions of California Health and Safety Code section 25249, et seq., which requires the posting and giving of notice to persons who may be exposed to any chemical known to the State of California to cause cancer. The Contractor agrees to familiarize itself with the provisions of this Section, and to comply fully with its requirements.

10.1.7 Non-Utilization of Asbestos Material

NO ASBESTOS OR ASBESTOS-CONTAINING PRODUCTS SHALL BE USED IN THIS CONSTRUCTION OR IN ANY TOOLS, DEVICES, CLOTHING, OR EQUIPMENT USED TO EFFECT THIS CONSTRUCTION.

Asbestos and/or asbestos-containing products shall be defined as all items containing, but not limited to, chrysotile, amosite, anthophyllite, tremolite, and antinolite.

Any or all material containing greater than one-tenth of one percent (>.1%) asbestos shall be defined as asbestos-containing material.

All Work or materials found to contain asbestos or Work or material installed with asbestos-containing equipment will be immediately rejected and this Work will be removed at no additional cost to the District.

Decontamination and removal of Work found to contain asbestos or Work installed with asbestos-containing equipment shall be done only under supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency.

The asbestos removal contractor shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved by the asbestos consultant, who shall have sole discretion and final determination in this matter.

The asbestos consultant shall be chosen and approved by the District, who shall have sole discretion and final determination in this matter.

The Work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.

Interface of Work under this Contract with Work containing asbestos shall be executed by the Contractor at his risk and at his discretion, with full knowledge of the currently accepted standards, hazards, risks, and liabilities associated with asbestos work and asbestos-containing products. By execution of this Contract, the Contractor acknowledges the above and agrees to hold harmless District and its assigns for all asbestos liability which may be associated with this work and agrees to instruct his employees with respect to the above-mentioned standards, hazards, risks, and liabilities.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

a. Employees on the Work and other persons who may be affected thereby;

b. The Work, material, and equipment to be incorporated therein, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

c. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

Contractor is constructive owner of Project site as more fully discussed in Article 6.2.

10.2.2 Contractor Notices

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

10.2.3 Safety Barriers and Safeguards

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 Use or Storage of Hazardous Material

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the District

any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the District and local fire authorities.

10.2.5 Protection of Work

The Contractor and Subcontractors shall continuously protect the Work, the District's property, and the property of others, from damage, injury, or loss arising in connection with operations under the Contract Documents. The Contractor and Subcontractors, at their own expense, shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the District.

The Contractor, at Contractor's expense, will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work.

Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations. All permits, licenses, or inspection fees required for such repair Work shall be obtained and paid for by Contractor.

10.2.6 Requirements for Existing Sites

Contractor shall (unless waived by the District in writing):

a. When performing construction on existing sites, become informed and take into specific account the maturity of the students on the Site; and perform Work which may interfere with school routine before or after school hours, enclose working area with a substantial barricade, and arrange Work to cause a minimum amount of inconvenience and danger to students and faculty in their regular school activities. The Contractor shall comply with Specifications and directives of the District regarding the timing of certain construction activities in order to avoid unnecessary interference with school functioning.

b. Avoid performing any Work that will disturb students during testing.

c. Provide substantial barricades around any shrubs or trees indicated to be preserved.

d. Deliver materials to building area over route designated by Architect.

e. Take preventive measures to eliminate objectionable dust, noise, or other disturbances.

f. Confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits or directions of Architect; and not interfere with the Work or unreasonably encumber premises or overload any structure with materials; and enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking and require that all workers comply with all regulations while on the Project site.

g. Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved land surveyor or civil engineer and all maps and records required therefrom shall be filed with county and local authorities, at no cost to the District. All filing and plan check fees shall be paid by Contractor.

h. Provide District on request with Contractor's written safety program and safety plan for each site.

10.2.7 Shoring and Structural Loading

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform with the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel Work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the District.

10.2.8 Conformance within Established Limits

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the District or the Contractor, and shall not unreasonably encumber the premises with construction equipment or materials.

10.2.9 Subcontractor Enforcement of Rules

Subcontractors shall enforce the District's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

10.2.10 Site Access

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the District, observe the boundaries of the Site designated by the District, park only in those areas designated by the District, which areas may be on or off the Site, and comply with any parking control program established by the District, such as furnishing license plate information and placing identifying stickers on vehicles.

10.2.11 Security Services.

The Contractor shall be responsible for providing security services for the Site as needed for the protection of the Site and as determined in the District's sole discretion.

10.3 EMERGENCIES

10.3.1 Emergency Action

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 7.

10.3.2 Accident Reports

The Contractor shall promptly report in writing to the District all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses in conformance with Article 10.1.4. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported in accordance with Article 10.1.4, immediately by telephone or messenger to the District.

10.4 HAZARDOUS MATERIALS

10.4.1 Discovery of Hazardous Materials

In the event the Contractor encounters or suspects the presence on the job site of material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by § 25249.5 of the California Health and Safety Code, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the District and the Architect in writing, whether or not such material was generated by the Contractor or the District. The Work in the affected area shall not thereafter be resumed, except by written agreement of the District and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the District and the Contractor.

10.4.2 Hazardous Material Work Limitations

In the event that the presence of hazardous materials is suspected or discovered on the Site (except in cases where asbestos and other hazardous material Work in the Contractor's responsibility), the District shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by District, as certified by an independent testing laboratory and approved by the appropriate government agency.

10.4.3 Indemnification by Contractor for Hazardous Material Caused by Contractor

In the event the hazardous materials on the Project Site is caused by the Contractor, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the District for any additional costs incurred as a result of Contractor's generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless District and its agents, officers,

and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Project Site.

10.4.4 Terms of Hazardous Material Provision

The terms of this Hazardous Material provision shall survive the completion of the Work and/or any termination of this Contract.

ARTICLE 11
INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 Insurance Requirements

Before the commencement of the Work, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California with a financial rating of at least an A-VIII status as rated in the most recent edition of Best's Insurance Reports or as amended by the Supplementary General Conditions, such insurance as will protect the District from claims set forth below, which may arise out of or result from the Contractor's Work under the Contract and for which the Contractor may be legally liable, whether such Work are by the Contractor, by a Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Any required insurance shall not contain any exclusion that applies to the type of work performed by the Contractor under the Contract Documents.

a. Claims for damages because of bodily injury, sickness, disease, or death of any person District would require indemnification and coverage for employee claim;

b. Claims for damages insured by usual personal injury liability coverage, which are sustained by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor or by another person;

c. Claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents;

d. Claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work;

e. Claims involving contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and

f. Claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

g. Claims involving sudden or accidental discharge of contaminants or pollutants.

11.1.2 Specific Insurance Requirements

Contractor shall take out and maintain and shall require all Subcontractors, if any, whether primary or secondary, to take out and maintain:

Comprehensive General Liability Insurance with a combined single limit per occurrence of not less than $2,000,000.00 or Commercial General Liability Insurance which provides limits of not less than:

(a)	Per occurrence (combined single limit)	$2,000,000.00
(b)	Project Specific Aggregate (for this Project only)	$2,000,000.00
(c)	Products and Completed Operations (aggregate)	$2,000,000.00
(d)	Personal and Advertising Injury Limit	$1,000,000.00

Insurance Covering Special Hazards

The following Special hazards shall be covered by riders or riders to above mentioned public liability insurance or property damage insurance policy or policies of insurance, in amounts as follows:

(a)	Automotive and truck where operated in amounts	$1,000,000.00
(b)	Material Hoist where used in amounts	$1,000,000.00
(c)	Explosion, Collapse and Underground (XCU-coverage)	$1,000,000.00
(d)	Hazardous Materials	$1,000,000.00

In addition, provide Excess Liability Insurance coverage in the amount of Four Million Dollars ($4,000,000.00).

11.1.3 Subcontractor Insurance Requirements

The Contractor shall require its Subcontractors to take out and maintain public liability insurance and property damage insurance required under Article 11.1 in like amounts. A "claims made" or modified "occurrence" policy shall not satisfy the requirements of Article 11.1 without prior written approval of the District.

11.1.4 Additional Insured Endorsement Requirements

The Contractor shall name, on any policy of insurance required under Article 11.1, the District, CM, Architect, Inspector, the State of California, their officers, employees, agents, volunteers and independent contractors as additional insureds. Subcontractors shall name the Contractor, the District, Architect, Inspector, the State of California, their officers, employees, agents, volunteers and independent contractors as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall be an ISO CG 20 10 (04/13), or an ISO CG 20 38 (04/13), or their equivalent as determined by the District in its sole discretion, and must state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis. The insurance provided by the Contractor pursuant to 11.1 must be designated in the

policy as primary to any insurance obtained by the District. The amount of the insurer's liability shall not be reduced by the existence of such other insurance.

11.2 WORKERS' COMPENSATION INSURANCE

During the term of this Contract, the Contractor shall provide workers' compensation and employer's liability insurance for all of the Contractor's employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor's Work is subcontracted, the Contractor shall require the Subcontractor to provide workers' compensation insurance for all the Subcontractor's employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers' Compensation laws, the Contractor shall provide or cause a Subcontractor to provide insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the District certificates of insurance as required under Article 11.6 and in compliance with Labor Code § 3700.

Workers' compensation limits as required by the Labor Code, but not less than $1,000,000 and employers' liability limits of $1,000,000 per accident for bodily injury or disease.

11.3 BUILDER'S RISK/ "ALL RISK" INSURANCE

11.3.1 Course-of-Construction Insurance Requirements

The Contractor, during the progress of the Work and until final acceptance of the Work by District upon completion of the entire Contract, shall maintain Builder's Risk, Course of Construction or similar first party property coverage issued on a replacement cost value basis consistent with the total replacement cost of all insurable Work and the Project included within the Contract Documents. Coverage is to insure against all risks of accidental direct physical loss, and must include, by the basic grant of coverage or by endorsement, the perils of vandalism, malicious mischief (both without any limitation regarding vacancy or occupancy), fire, sprinkler leakage, civil authority, sonic boom, earthquake, flood, collapse, wind, lightning, smoke and riot. The coverage must include debris removal, demolition, increased costs due to enforcement of building ordinance and law in the repair and replacement of damage and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project which is the subject of the Contract Documents, including completed Work and Work in progress, to the full insurable value thereof. Such insurance shall include the District and the Architect as additional named insureds, and any other person with an insurable interest as designated by the District.

The Contractor shall submit to the District for its approval all items deemed to be uninsurable. The risk of the damage to the Work due to the perils covered by the "Builder's Risk/All Risk" Insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the Surety, and no Claims for such loss or damage shall be recognized by the District nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.

11.4 FIRE INSURANCE

Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work subject to loss or damage by fire. The amount of fire insurance shall be sufficient to protect the Project against loss or damage in full until

the Work is accepted by the District. This requirement may be waived upon confirmation by the District that such coverage is provided under the Builder's Risk Insurance being provided.

11.5 AUTOMOBILE LIABILITY

11.5.1 The District, Architect and Construction Manager, Inspectors, their directors, officers, employees, agents and volunteers shall be covered as additional insureds with respect to the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by the Contractor or for which the Contractor is responsible. Such insurance coverage shall be primary and non-contributory insurance as respects the District, Architect, Construction Manager, Project Inspector, their directors, officers, employees, agents and volunteers, or if excess, shall stand in an unbroken chain of coverage excess of the Contractor's scheduled underlying coverage. Any insurance or self-insurance maintained by the District, Architect, Construction Manager, Project Inspector, their directors, officers, employees, agents and volunteers shall be excess of the Contractor's insurance and shall not be called upon to contribute with it. The insurer shall agree to waive all rights of subrogation against the District, Architect, Construction Manager, Project Inspector, their directors, officers, employees, agents and volunteers for losses paid under the terms of the insurance policy that arise from Work performed by the Contractor.

11.5.2 Insurance Services Office Business Auto Coverage Form Number CA 0001, Code 1 (any auto) is required. Comprehensive Automobile Liability insurance to include all autos, owned, non-owned, and hired, with limits of $1,000,000 per accident for bodily injury and property damage.

11.6 OTHER INSURANCE

The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

11.7 PROOF OF INSURANCE

The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance and certificates have been obtained and delivered in duplicate to the District for approval subject to the following requirements:

a. Certificates and insurance policies shall include the following clause:

> "This policy and any coverage shall not be suspended, voided, non-renewed, canceled, or reduced in required limits of liability or amounts of insurance or coverage until notice has been mailed via certified mail to the District. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice."

b. Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.

c. Certificates of insurance shall clearly state that the District and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by District.

d. The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the District.

11.8 COMPLIANCE

In the event of the failure of Contractor to furnish and maintain any insurance required by this Article 11, the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates or policies evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the District and the Architect.

11.9 WAIVER OF SUBROGATION

Contractor waives (to the extent permitted by law) any right to recover against the District for damages to the Work, any part thereof, or any and all claims arising by reason of any of the foregoing, but only to the extent that such damages and/or claims are covered by property insurance and only to the extent of such coverage (which shall exclude deductible amounts) by insurance actually carried by the District.

The provisions of this Article are intended to restrict each party to recovery against insurance carriers only to the extent of such coverage and waive fully and for the benefit of each, any rights and/or claims which might give rise to a right of subrogation in any insurance carrier. The District and the Contractor shall each obtain in all policies of insurance carried by either of them, a waiver by the insurance companies thereunder of all rights of recovery by way of subrogation for any damages or claims covered by the insurance.

11.10 PERFORMANCE AND PAYMENT BONDS

11.10.1 Bond Requirements

Unless otherwise specified in the Supplemental Conditions, prior to commencing any portion of the Work, the Contractor shall furnish separate Payment and Performance Bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate Surety authorized and admitted to transact business in California as sureties.

To the extent, if any, that the Contract Price is increased in accordance with the Contract Documents, the Contractor shall, upon request of the District, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the District. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Price, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the Surety. If the Contractor fails to furnish the required bonds, the District may terminate the Contract for cause.

11.10.2 Surety Qualification

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure § 995.120 shall be accepted. Surety must be a California-admitted Surety and listed by the U.S. Treasury with a bonding capacity in excess of the Project cost.

11.10.3 Alternate Surety Qualifications

If a California-admitted Surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with § 995.660 of the California Code of Civil Procedure and proof of such is provided to the District.

ARTICLE 12
UNCOVERING AND CORRECTION OF WORK

12.1 COMPLIANCE WITH TITLE 24 INSTALLATION REQUIREMENTS

Contractor is aware of the requirements governing Contractor's Work under title 24 Section 4-343 which provides, in pertinent part:

4-343. Duties of the Contractor.

(a) **Responsibilities**. It is the duty of the contractor to complete the Work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the architect, engineer, Inspector or DSA in the performance of such duties.

(b) **Performance of the Work.** The contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time. If at any time it is discovered that Work is being done which is not in accordance with the approved Plans and Specifications, the contractor shall correct the Work immediately. All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the Inspector, for interpretation or correction. In no case, however, shall the instruction of the architect or registered engineer be construed to cause Work to be done which is not in conformity with the approved Plans, Specifications, and Change Orders. The contractor must notify the Project Inspector, in advance, of the commencement of construction of each and every aspect of the Work.

12.1.1 Issuance of Notices of Non-Compliance

The Inspector may issue a Notice of Non-Compliance on the Project indicating deviation from Plans and Specifications. It is Contractor's responsibility to correct all deviations from the approved Plans and Specifications unless the District has issued an Immediate Change Directive. In such case, the Contractor shall proceed with the Work with the understandings of the District as set forth in the ICD and as specifically noted in Article 7.3.

12.2 SPECIAL NOTICE OF AMERICAN'S WITH DISABILITIES ACT

Some of the requirements in the Plans and Specifications are meant to comply with the Americans with Disabilities Act ("ADA"). The requirements of the ADA are technical in nature and may appear to be minor in nature (i.e. whether a walkway or ramp has a 2% cross-slope). Contractor is warned that even the slightest deviation from the specific requirements from the ADA is considered a Civil Rights violation and subjects the District to fines of three times actual damages sustained by a handicap individual or up to $4,000 per violation and attorney's fees required to enforce the ADA violation. As a result of the significant liability and exposure associated with ADA aspects of the Contract, Contractor shall take special care to meet all ADA requirements detailed in the Plans and Specifications. Failure to comply with ADA rules that results in a Notice of Non-Compliance shall be repaired to meet ADA requirements promptly. In addition, any ADA violations that are not identified by Inspector or Architect that are later identified shall be repaired and charged back to the Contractor through a Deductive Change Order.

12.2.1 Indemnification of ADA Claims

Contractor shall indemnify, hold harmless and defend the District from ADA claims arising from the failure to comply with the Plans and Specifications. Further, any withholdings for ADA violations under Article 9.6 shall include potential redesign costs and an accelerated repair costs due to the potential for ADA claims arising from DSA posting of ADA violations on the Project.

12.3 UNCOVERING OF WORK

12.3.1 Uncovering Work for Required Inspections

Work shall not be covered without the Inspector's review and the Architect's knowledge that the Work conforms with the requirements of the approved Plans and Specifications (except in the case of an ICD under Article 7.3). Inspector must be timely notified of inspections and of new areas so Work can be inspected at least 48 hours before opening a new area (For example, see DSA Form 156 for Commencement/Completion of Work Notification which requires "at least 48 hour" advance notification of a new area). An Inspector must comply with DSA protocols for signing each category or phase of Work under DSA Form 152 (in compliance with the Form 152 Manual) or a Notice of Deviation (DSA Form 154) will be issued requiring the Work that was not inspected be uncovered for inspection. Thus, if a portion of the Work is covered without inspection or Architect approval, is subject to a Notice of Non-Compliance for being undertaken without inspection, or otherwise not in compliance with the Contract Documents, after issuance of a Written Notice of Non-Compliance (Form 154) or a written notice to uncover Work, Contractor shall promptly uncover all Work (which includes furnishing all necessary facilities, labor, and material) for the Inspector's or the Architect's observation and such Work shall be replaced at the Contractor's expense without change in the Contract Sum or Time.

12.3.2 Costs for Inspections Not Required

If a portion of the Work has been covered is believed to be Non-Conforming to the Plans and Specifications, even if the Form 152 for the category of Work has been signed by the Inspector, the Inspector or the Architect may request to see such Work, and it shall be promptly uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order and shall, be charged to the District. If such Work is not in accordance with Contract Documents, the Contractor shall be responsible for all costs to uncover the Work, delays incurred to uncover the Work, and Contractor shall pay all costs to correct the Non-Conforming construction condition unless the condition was caused by the District or a separate contractor, in which event the District shall be responsible for payment of such costs to the Contractor.

12.4 CORRECTION OF WORK

12.4.1 Correction of Rejected Work

The Contractor shall promptly correct the Work rejected by the Inspector or the District upon recommendation of the Architect as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not Fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including cost for delays that may be incurred by Contractor or Subcontractors, the cost for additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby (including costs for preparing a CCD, DSA CCD review fees, and additional inspection and special inspection costs).

12.4.2 One-Year Warranty Corrections

If, within one (1) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established under Article 9.9.1, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so unless the District has previously given the Contractor a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation under this Article 12.4.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

12.4.3 District's Rights if Contractor Fails to Correct

If the Contractor fails to correct nonconforming Work within a reasonable time, the District may correct the Work and seek a Deductive Change Order, pursuant to Article 9.6 or Article 2.2.

ARTICLE 13
MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

The District and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and Obligations Cumulative

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.4.2 No Waiver

No action or failure to act by the Inspector, the District, or the Architect shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Division 1, Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory

The District will select and pay an independent testing laboratory to conduct all tests and inspections. Selection of the materials required to be tested shall be made by the laboratory or the District's representative and not by the Contractor. See Articles 3.13.1 and 4.3.6 regarding costs or expenses of inspection or testing outside of the Project Site.

13.5.3 Advance Notice to Inspector

The Contractor shall notify the Inspector a sufficient time in advance of its readiness for required observation or inspection so that the Inspector may arrange for same. The Contractor shall notify the Inspector a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection

If the Inspector, the Architect, the District, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under Article 13.5.1, the Inspector will, upon written authorization from the District, make arrangements for such additional testing, inspection, or approval. The District shall bear such costs except as provided in Articles 13.5.6 and 13.5.7.

13.5.6 Costs for Retesting

If such procedures for testing, inspection, or approval under Articles 13.5.1 and 13.5.2reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the District, invoiced to the Contractor, and deducted from the next Progress Payment.

13.5.7 Costs for Premature Test

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the District for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Inspector's and Architect's fees and expenses, and the amount of the invoice shall be deducted from the next Progress Payment.

13.6 TRENCH EXCAVATION

13.6.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Price exceeds $25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of

excavation, submit to the District or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.6.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

13.6.3 No Tort Liability of District

Pursuant to Labor Code § 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

13.6.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

13.7 WAGE RATES, TRAVEL, AND SUBSISTENCE

13.7.1 Wage Rates

Pursuant to the provisions of Article 2 (commencing at § 1720), Chapter 1, Part 7, Division 2, of the Labor Code, the District has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public works project is to be performed for each craft, classification, or type of worker needed for this Project from the Director of the Department of Industrial Relations ("Director"). These rates are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

Any worker employed to perform Work on the Project, but such Work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

13.7.2 Holiday and Overtime Pay

Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

13.7.3 Wage Rates Not Affected by Subcontracts

The Contractor shall pay and shall cause to be paid each worker engaged in the execution of the Work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

13.7.4 Per Diem Wages

The Contractor shall pay and shall cause to be paid to each worker needed to execute the Work on the Project per diem wages including, but not limited to, employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided for in Labor Code §1773.1.

13.7.5 Forfeiture and Payments

Pursuant to Labor Code §1775, the Contractor shall forfeit to the District, not more than Two Hundred Dollars ($200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing wages rates as determined by the Director of the Department of Industrial Relations, for the work or craft in which the worker is employed for any Work done under the Agreement by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on consideration of: (1) whether the Contractor or Subcontractor's failure to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily correct upon being brought to the attention of the Contractor or Subcontractor; and (2) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations.

13.7.6 Monitoring and Enforcement by Labor Commissioner

Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE). The Contractor and all subcontractors shall be required to furnish, at least monthly, certified payroll records directly to the Labor Commissioner in accordance with Labor Code section 1771.4. All payroll records shall be furnished in a format required by the Labor Commissioner. The Contractor and all subcontractors must sign up for, and utilize, the Labor Commissioner's electronic certified payroll records submission system. The District will have direct and immediate access to all CPRs for the Project that are submitted through the Labor Commissioner's system. The District can use this information for any appropriate purpose, including monitoring compliance, identifying suspected violations, and responding to Public Records Act requests.

The Labor Commissioner/ DLSE may conduct various compliance monitoring and enforcement activities including, but not limited to, confirming the accuracy of payroll records, conducting worker interviews, conducting audits, requiring submission of itemized statements prepared in accordance with Labor Code section 226, and conducting random in-person inspections of the Project site ("On-Site Visits"). On-Site Visits may include inspections of records, inspections of the Work site and observation of work activities, interviews of workers and others involved with the Project, and any other activities deemed necessary by the Labor Commissioner/DLSE to ensure compliance with prevailing wage requirements. The Labor Commissioner/DLSE shall have free access to any construction site or other place of labor and may obtain any information or statistics pertaining to the lawful duties of the Labor Commissioner/DLSE.

Any lawful activities conducted or any requests made by the Labor Commissioner/DLSE shall not be the basis for any delays, claims, costs, damages or liability of any kind against the District by the Contractor. Contractor and all subcontractors shall cooperate and comply with any lawful requests by

the Labor Commissioner/ DLSE. The failure of the Labor Commissioner, DLSE, or any other entity related to the Department of Industrial Relations to comply with any requirement imposed by the California Code of Regulations, Title 8, Chapter 8 shall not of itself constitute a defense to the failure to pay prevailing wages or to comply with any other obligation imposed by Division 2, Part 7, Chapter 1 of the Labor Code.

Prior to commencing any Work on the Project, the Contractor shall post the required notice/poster required under the California Code of Regulations and Labor Code section 1771.4 in both English and Spanish at a conspicuous, weatherproof area at the Project site. The required notice/poster is available on the Labor Commissioner's website.

13.8 RECORDS OF WAGES PAID

13.8.1 Payroll Records

a. Pursuant to §1776 of the Labor Code, the Contractor and each Subcontractor shall keep an accurate payroll record showing the name, address, social security number, work classification and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by him or her in connection with the Project.

All payroll records as specified in Labor Code §1776 of the Contractor and all Subcontractors shall be certified and furnished directly to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3) on a monthly basis (or more frequently if required by the District or the Labor Commissioner) and in a format prescribed by the Labor Commissioner. Payroll records as specified in Labor Code §1776 shall be certified and submitted to the District with each application for payment. All payroll records shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of District, the Division of Labor Standards Enforcement or the Division of Apprenticeship Standards of the Department of Industrial Relations.

3. A certified copy of all payroll records shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Paragraph (2) above, the requesting party shall, prior to being provided the records, reimburse the costs, according to law for the preparation by the Contractor, Subcontractor(s), and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.

b. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the Division of Labor Standards Enforcement.

c. The Contractor or Subcontractor(s) shall file a certified copy of all payroll records with the entity that requested such records within 10 calendar days after receipt of a written request.

d. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor awarded the Contract or the Subcontractor(s) performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (Section 175a of Title 29 of the United States Code) shall be marked or obliterated only to prevent disclosure of an individual's name and social security number. Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided non-redacted copies of certified payroll records.

e. The Contractor shall inform the District of the location of all payroll records, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

f. The Contractor or Subcontractor(s) shall have 10 calendar days in which to comply subsequent to receipt of a written notice requesting payroll records. In the event that the Contractor or Subcontractor(s) fails to comply within the 10-day period, the Contractor or Subcontractor(s) shall, as a penalty to the District, forfeit One Hundred Dollars ($100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

Responsibility for compliance with this Article shall rest upon the Contractor.

13.8.2 Withholding of Contract Payments & Penalties

The District may withhold or delay contract payments to the Contractor and/or any Subcontractor if:

a. The required prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations is not paid to all workers employed on the Project; or

b. The Contractor or Subcontractor(s) fail to submit all required certified payroll records with each application for payment, but not less than once per month; or

c. The Contractor or Subcontractor(s) submit incomplete or inadequate payroll records; or

d. The Contractor or Subcontractor(s) fail to comply with the Labor Code requirements concerning apprentices; or

e. The Contractor or Subcontractor(s) fail to comply with any applicable state laws governing workers on public works projects.

13.9 APPRENTICES

13.9.1 Apprentice Wages and Definitions

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which he or she is employed, and as determined by the Director of the Department of Industrial Relations, and shall be employed only at the craft or trade to which he or she is registered. Only apprentices, as defined in §3077 of the Labor Code, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprenticeship agreements under Chapter 4 (commencing with §3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training, or in accordance with the rules and regulations of the California Apprenticeship Council.

13.9.2 Employment of Apprentices

Contractor agrees to comply with the requirements of Labor Code §1777.5. The Contractor awarded the Project, or any Subcontractor under him or her, when performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall employ apprentices in the ratio set forth in Labor Code §1777.5. The Contractor or any Subcontractor must apply to any apprenticeship program in the craft or trade that can provide apprentices to the Project site for a certificate approving the contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor upon the Contractor's or Subcontractor's request. "Apprenticeable craft or trade" as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The ratio of work performed by apprentices to journeyman employed in a particular craft or trade on the Project shall be in accordance with Labor Code §1777.5.

13.9.3 Submission of Contract Information

Prior to commencing Work on the Project, the Contractor and Subcontractors shall submit contract award information to the applicable apprenticeship program(s) that can supply apprentices to the Project and make the request for the dispatch of apprentices in accordance with the Labor Code. The

information submitted shall include an estimate of journeyman hours to be performed under the Contact, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the District if requested. Within 60 days after concluding Work on the Project, the Contractor and Subcontractors shall submit to the District, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the Project.

13.9.4 Apprentice Fund

The Contractor or any Subcontractor under him or her, who, in performing any of the Work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the Director determines is the prevailing amount of apprenticeship training contributions in the area of the Project. The Contractor and Subcontractors may take as a credit for payments to the California Apprenticeship Council any amounts paid by the Contractor or Subcontractor to an approved apprenticeship program that can supply apprentices to the Project. The Contractor and Subcontractors may add the amount of the contributions in computing his or her bid for the Contract.

13.9.5 Prime Contractor Compliance

The responsibility of compliance with Article 13 and §1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor. Any Contractor or Subcontractor that knowingly violates the provisions of this Article or Labor Code §1777.5 shall be subject to the penalties set forth in Labor Code §1777.7.

13.10 ASSIGNMENT OF ANTITRUST CLAIMS

13.10.1 Application

Pursuant to Government Code § 4551, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the District all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders Retention Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.10.2 Assignment of Claim

Upon demand in writing by the assignor, the District shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the District has not been injured thereby or the District declines to file a court action for the cause of action.

13.11 STATE AND DISTRICT CONDUCTED AUDITS

Pursuant to and in accordance with the provisions of Government Code § 10532, or any amendments thereto, all books, records, and files of the District, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars ($10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of five (5) years after Retention Payment is made or a Notice of Completion is Recorded, whichever occurs first. Contractor shall preserve and cause to be preserved such books, records, hard drives, electronic media, and files for the audit period.

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees the District shall have the right to review and audit, upon reasonable notice, the books and records of the Contractor concerning any monies associated with the Project. The purpose of this "Audit" is to quickly and efficiently resolve Disputes or Claims based on the actual costs incurred and to reduce the uncertainty in resolving Disputes or Claims with limited information. The District shall perform any audits at its own cost and any such audit shall be performed by an independent auditor, having no direct or indirect relationship with the functions or activities being audited or with the business conducted by the Contractor or District. In the event the independent auditor determines that Change Orders, response to Request for Proposals, Disputes, Claims, or other requests for payment are in error, or have has any other concerns or questions, the Auditor shall report the results of the Audit findings to the District and provide a copy to the Contractor after giving the District Board the opportunity for at least 10 days review. If the Contractor disputes the findings of the independent auditor, such dispute shall be handled in the manner set forth under Article 4.6.2.

If Contractor having agreed to the terms of this Contract fails to produce books or records requested by Auditor, such failure to produce books or records that were required to be preserved for audit, it shall be presumed that the information contained in the withheld books or records were unfavorable to the Contractor and the Auditor shall note this refusal in the results of the Audit findings for further evaluation by the District and the District's Board. The refusal to release records that are concerning monies associated with the Project may be used as a grounds to debar the Contractor under Article 15 for failure to preserve records under Article 13.11 and the failure to produce required audit records may also be used as a grounds for a negative finding against the Contractor depending on the significance of the records that are withheld by Contractor. Failure to produce job cost data tied to job cost categories and budgets shall be presumed an intentional failure to produce key audit records. Similarly, failure to produce Daily Reports (prepared at or near the time of the Work actually took place (See Article 3.16) shall be presumed an intentional failure to produce key audited records.

If Contractor is seeking costs for inefficiency, home office overhead, or unanticipated increased costs due to delays or acceleration, Contractor shall also produce copies of the original bid tabulation utilized in submitting Contractor's bid for the Project. This document shall be considered confidential and shall not be subject to disclosure through a Public Records Act and shall not be distributed to anyone other than the District and the District's counsel. This bid tabulation shall only be used in litigation, arbitration, evaluation of Claims or Disputes, Audit, and trial. If the records for the bid tabulation are kept on a computer, the Contractor shall also produce all metadata (in native format) that accompanies the bid tabulation for inspection to prove the authenticity of the underlying bid tabulation. Failure to produce the bid tabulation for review of inefficiency, home office overhead, or unanticipated increased costs due to delays or accelerations shall be considered material evidence that the bid tabulation was not favorable to the Contractor. This evidence shall be entered as a jury instruction for trial that the bid

tabulation was not produced and the bid tabulation information was unfavorable to the Contractor. The evidence may also be used in debarment proceedings, and noted as an exception to an Audit findings.

Upon notification of Contractor concerning the results of the audit and a reasonable time has passed for Contractor to respond to the Audit findings and if either there is no Dispute of the Audit findings under Article 4.6 or if the result after utilizing the Disputes Clause confirms the Audit findings, the District may seek reimbursement for overstated Disputes, Claims, or Change Orders and may also undertake debarment proceedings under Article 15 of these General Conditions.

13.12 STORM WATER POLLUTION PREVENTION

13.12.1 Application

This Section addresses the preparation, implementation and monitoring of a Storm Water Pollution Prevention Plan (SWPPP) for the purpose of preventing the discharge of pollutants from the construction site. This includes the elimination of pollution discharges such as improper dumping, spills or leakage from storage tanks or transfer areas. The District will not issue a Notice to Proceed until Contractor has prepared by a qualified individual and obtained approval of the Permit Registration Documents ("PRDs") that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents from all applicable Local Governing Agencies including the Regional Water Quality Control Board. The Contractor shall also secure a certification that the Project has met all of the conditions of the General Construction Activity Storm Water Permit (GCASP) and comply with all applicable local, state and federal regulations governing storm water pollution prevention.

13.12.2 References and Materials

- California Stormwater Quality Association New Development and Redevelopment Best Management Practice Handbook
- 2009 California Stormwater Quality Association Construction BMP Handbook
- State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. Available on-line at:
- http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.- Use materials of a class, grade and type needed to meet the performance described in the BMP Handbook.

13.12.3 Preparation and Approval

The Contractor shall prepare by a qualified individual the PRDs that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents. The Contractor's Qualified SWPPP Developer ("QSD") shall prepare the Storm Water Pollution Prevention Plan (SWPPP) as required to comply with storm water pollution regulations for project sites with storm water discharges associated with construction activity such as clearing or demolition, grading, excavation and other land disturbances. The SWPPP shall apply to all areas that are directly related to construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads.

13.12.3.1 The Contractor shall prepare and submit to the Local Governing Agencies and the District the SWPPP for review and approval if the project sites, new or existing, with land disturbance of 1 or more acres (or less than 1 acres if part of a common plan of development); the construction activity that results in land surface disturbances of less than one acre is part of a larger common plan of development or sale of one or more acres of disturbed land surface; or the construction activity associated with Linear Underground/Overhead Projects ("LUPs") including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

13.12.3.2 The Contractor shall also pay annual renewal fee(s) until the contract is completed and make all such checks payable to the State Water Resources Control Board. The Notice of Intent must be submitted at least two weeks prior to the commencement of construction activities.

13.12.3.3 The Contractor shall prepare the SWPPP by following the format in Sections 2, 3, 4 and Appendices A through F of the California Stormwater BMP Handbook - Construction, January 2009 edition, published by the California Stormwater Quality Association. The publication is available from:

California Stormwater
Quality Association
P.O. Box 2105
Menlo Park, CA 94026-2105
Phone: (650) 366-1042
E-mail: info@casqa.org

or

https://www.casqa.org/store/products/tabid/154/p-167-construction-handbookportal-initial-subscription.aspx

13.12.3.4 Where land disturbance is less than 1 acre, any BMPs indicated in the BMP Handbook needed to prevent or minimize storm water pollution shall be implemented at no extra cost to the District.

13.12.3.5 Within two weeks after Award of Contract by the District, the Contractor shall submit to the District's Civil Engineer one copy of the PRDs including the SWPPP for review. After the District's approval, the Contractor shall provide approved copies of the SWPPP as follows: one copy each to the Project Inspector, Construction Manager, Architect, Commissioned Architect and District's Civil Engineer.

13.12.4 Implementation

The Contractor shall implement the Storm Water Pollution Prevention Plan by doing the following:

a. Obtain a Waste Discharger Identification (WDID) number from the SWRCB before beginning construction. This number will be issued once your PRDs are administratively accepted and fee is received.

b. Keep the SWPPP, REAPs, monitoring data on the construction site.

c. Employ a Qualified SWPPP Practitioner (QSP) to implement the SWPPP during construction and develop Rain Event Action Plans ("REAPs").

d. Install, inspect, maintain and monitor BMPs required by the General Permit.

e. Install perimeter controls prior to starting other construction work at the site.

f. Contain on-site storm water at the jobsite. Do not drain on-site water directly into the storm drain.

g. Implement the SWPPP.

h. Provide SWPPP and BMP implementation training for those responsible for implementing the SWPPP.

i. Designate trained personnel for the proper implementation of the SWPPP.

j. Conduct monitoring, as required, and assess compliance with the Numeric Action Levels (NALs) or Numeric Effluent Limitations (NELs) appropriate to your project.

k. Report monitoring data:

    1. Maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed.

    2. Have a QSD revise the SWPPP as needed to reflect the phases of construction and to suit changing site conditions and instances when properly installed systems are ineffective.

    3. Assist the District with entering any necessary data or information into the Stormwater Multi-Application and Reporting System (“SMARTS”) system.

l. At the end of Construction Contract:

    1. Submit Notice of Termination (NOT) into the SMARTS when construction is complete and conditions of termination listed in the NOT have been satisfied. A copy of the NOT can be found at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

2. Leave in place storm water pollution prevention controls needed for post-construction storm water management and remove those that are not needed as determined by the District. Thereafter, left-in-place controls will be maintained by the District.

3. Provide Site Monitoring Reports, SWPPP revisions, Compliance Certifications and related documents to the District. Post-construction storm water operation and management plan as mentioned in the compliance certifications are considered to be in place at the end of the Construction Contract.

13.12.5 Monitoring

The Contractor shall conduct examination of storm water pollution prevention controls as required by the State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. This includes properly qualified personnel performing all required monitoring, testing, inspections and monitoring. The Contractor shall also conduct examination of storm water pollution prevention controls, as well as before and after each storm event in compliance with the State Water Resources Control Board Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (General Permit) (SWRCB, 2009).and at least once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. All maintenance related to a storm event should be completed within 48 hours of the storm event. The Contactor shall also prepare and maintain, at the jobsite, a log of each inspection using Site Monitoring Report forms.

13.12.6 Liabilities and Penalties

a. Review of the SWPPP and inspection logs by the District shall not relieve the Contractor from liabilities arising from non-compliance with storm water pollution regulations.

b. Payment of penalties for non-compliance by the Contractor shall be the sole responsibility of the Contractor and will not be reimbursed by the District.

c. Compliance with the Clean Water Act pertaining to construction activity is the sole responsibility of the Contractor. For any fine(s) levied against the District due to non-compliance by the Contractor, the District will deduct from the final payment due the Contractor the total amount of the fine(s) levied on the District, plus legal and associated costs.

d. The Contractor shall submit to the District a completed NOI for change of information (Construction Site Information and Material Handling/Management Practices).

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

14.1.1 Grounds for Termination

The Contractor may terminate the Contract if the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, for only the following reasons:

a. Issuance of an order of a court or other public authority having jurisdiction; or

b. An act of the United State or California government, such as a declaration of national emergency.

14.1.2 Notice of Termination

If one of the above reasons exists, the Contractor may, upon written notice of seven (7) additional days to the District, terminate the Contract and recover from the District payment for Work executed and for reasonable costs verified by the Architect with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages.

14.2 TERMINATION BY THE DISTRICT FOR CAUSE

14.2.1 Grounds for Termination

The District may terminate the Contractor and/or this Contract for the following reasons:

a. Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

b. Persistently or repeatedly is absent, without excuse, from the job site;

c. Fails to make payment to Subcontractors, suppliers, materialmen, etc.;

d. Persistently disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;

e. Fails to provide a schedule or fails or refuses to update schedules required under the Contract;

f. Falls behind on the Project and refuses or fails to undertake a Recovery Schedule;

g. If the Contractor has been debarred from performing Work

h. Becomes bankrupt or insolvent, including the filing of a general assignment for the benefit of creditors; or

i. Makes a material misrepresentation to the District or engages in fraud or deceit in connection with Contractor's performance under this Contract; or

j. Bullies, intimidates, threatens or uses coercion in dealings with the Owner or the Owner's consultants; or

k. Otherwise is in substantial breach of a provision of the Contract Documents.

14.2.2 Notification of Termination

When any of the above reasons exist, the District may, without prejudice to any other rights or remedies of the District and after giving the Contractor and the Contractor's Surety written notice of seven (7) days, terminate the Contractor and/or this Contract and may, subject to any prior rights of the Surety:

a. Take possession of the Project and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

b. Accept assignment of Subcontracts. Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept;

c. Complete the Work by any reasonable method the District may deem expedient, including contracting with a replacement contractor or contractors; and,

d. Agree to accept a takeover and completion arrangement with Surety that is acceptable to the District Board.

14.2.3 Takeover and Completion of Work after Termination for Cause

A Termination for Cause is an urgent matter which requires immediate remediation since Project Work is open and incomplete, the site is subject to vandalism and theft, the Project site is considered a public nuisance, and there is a possibility of injury and deterioration of the Project Work and materials. Thus, the District shall be entitled to enter a takeover contract to either remediate the unfinished condition or complete the Work for this Project.

14.2.4 Payments Withheld

If the District terminates the Contract for one of the reasons stated in Article 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is complete. All costs associated with the termination and completion of the Project shall be the responsibility of the Contractor and/or its Surety.

14.2.5 Payments upon Completion

If the unpaid balance of the Contract Sum exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor and its Surety shall pay the difference to the District. The amount to be paid to the Contractor, or District, as the case may be, shall be

certified by the Architect upon application. This payment obligation shall survive completion of the Contract.

14.3 TERMINATION OF CONTRACT BY DISTRICT (CONTRACTOR NOT AT FAULT)

14.3.1 Termination for Convenience

District may terminate the Contract upon fifteen (15) calendar days of written notice to the Contractor and use any reasonable method the District deems expedient to complete the Project, including contracting with replacement contractor or contractors, if it is found that reasons beyond the control of either the District or Contractor make it impossible or against the District's interest to complete the Project. In such a case, the Contractor shall have no Claims against the District except for: (1) the actual cost for approved labor, materials, and services performed in accordance with the Contract Documents which have not otherwise been previously paid for and which are supported and documented through timesheets, invoices, receipts, or otherwise; and (2) profit and overhead of ten percent (10%) of the approved costs in item (1); and (3) termination cost of five percent (5%) of the approved costs in item (1). Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept.

14.3.2 Non-Appropriation of Funds/ Insufficient Funds

In the event that sufficient funds are not appropriated to complete the Project or the District determines that sufficient funds are not available to complete the Project, District may terminate or suspend the completion of the Project at any time by giving written notice to the Contractor. In the event that the District exercises this option, the District shall pay for any and all work and materials completed or delivered onto the site for which value is received, and the value of any and all work then in progress and orders actually placed which cannot be canceled up to the date of notice of termination. The value of work and materials not otherwise already paid for by the District up to the time of termination under this Paragraph shall include a factor of fifteen percent (15%) for the Contractor's overhead and profit and there shall be no other costs or expenses paid to Contractor. All work, materials and orders paid for pursuant to this provision shall become the property of the District. District may, without cause, order Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as District may determine. Adjustment shall be made for increases in the cost of performance of the Agreement caused by suspense, delay or interruption.

14.4 REMEDIES OTHER THAN TERMINATION

If a default occurs, the District may, without prejudice to any other right or remedy, including, without limitation, its right to terminate the Contract pursuant to Article 14.2, do any of the following:

a. Permit the Contractor to continue under this Contract, but make good such deficiencies or complete the Contract by whatever method the District may deem expedient, and the cost and expense thereof shall be deducted from the Contract Price or paid by the Contractor to the District on demand;

b. If the workmanship performed by the Contractor is faulty or defective materials are provided, erected or installed, then the District may order the Contractor to remove the faulty workmanship or defective materials and to replace the same with work or materials that conform to the Contract Documents, in which event the Contractor, at its sole costs

and expense, shall proceed in accordance with the District's order and complete the same within the time period given by the District in its notice to the Contractor; or

c. Initiate procedures to declare the Contractor a non-responsible bidder for a period of two (2) to five (5) years thereafter.

All amounts expended by the District in connection with the exercise of its rights hereunder shall accrue interest from the date expended until paid to the District at the maximum legal rate. The District may retain or withhold any such amounts from the Contract Price. If the Contractor is ordered to replace any faulty workmanship or defective materials pursuant to Paragraph (b) above, the Contractor shall replace the same with new work or materials approved by the Architect and the District, and, at its own cost, shall repair or replace, in a manner and to the extent the Architect and the District shall direct, all Work or material that is damaged, injured or destroyed by the removal of said faulty workmanship or defective material, or by the replacement of the same with acceptable work or materials. In no event shall anything in this Article be deemed to constitute a waiver by the District of any other rights or remedies that it may have at law or in equity, it being acknowledged and agreed by the Contractor that the remedies set forth in this Article are in addition to, and not in lieu of, any other rights or remedies that the District may have at law or in equity.

ARTICLE 15
DEBARMENT

15.1 DEBARMENT MEANS THERE HAS BEEN A FINDING THAT THE CONTRACTOR IS NOT RESPONSIBLE.

During the course of the Project, or if it is determined through Change Orders, Claims, or Audit that a Contractor is not responsible, the District may, in addition to other remedies provided in the Contract, debar the Contractor from bidding or proposing on, or being awarded, and/or performing work on District contracts for a specified period of time, which generally will not exceed five (5) years, but may exceed five (5) years or be permanent if the circumstances warrant such debarment. In addition to the debarment proceeding, a finding that a Contractor is to be debarred shall result in the termination of any or all existing Contracts the Contractor may have with the District.

15.2 BOARD FINDING

The District may debar a Contractor if the Board, or the Board's delegatee, in its discretion, finds the Contractor has done any of the following:

15.2.1 Intentionally or with reckless disregard, violated any term of the Contract with the District

15.2.2 Committed an acts or omission which reflects on the Contractor's quality, fitness or capacity to perform Work for the District;

15.2.3 Committed an act or offense which indicates a lack of business integrity or business honesty; or,

15.2.4 Made or submitted a false claim against the District or any other public entity.

15.3 HEARING AND PRESENTATION OF EVIDENCE

If there is evidence that the Contractor may be subject to debarment, the District shall notify the Contractor in writing of the evidence which is the basis for the proposed debarment and shall advice the Contractor of the scheduled date for a debarment hearing before the District Board or its delegated designee.

The District Board, or designee, shall conduct a hearing where evidence on the proposed debarment is presented. The Contractor or the Contractor's representative shall be given an opportunity to submit evidence at the hearing. The Contractor shall be provided an adequate amount of time to prepare and object to evidence presented. A tentative proposed decision shall be issued as a tentative decision and the District shall be entitled to modify, deny or adopt the proposed decision. The proposed decision shall contain a recommendation regarding whether the Contractor should be debarred, and, if so, the appropriate length of time of the debarment. The Contractor and the District shall be provided an opportunity to object to the tentative proposed decision for a period of 15 days. If additional evidence is presented, the District shall evaluate this evidence and either issue an amended ruling, issue the same ruling, or call a further hearing.

If a Contractor has been debarred for a period of longer than five (5) years, that Contractor may after the debarment has been in effect for at least five (5) years, submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The District may,

in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Contractor has adequately demonstrated one or more of the following: (1) elimination of the grounds for which the debarment was imposed; (2) a bona fide change in ownership or management; (3) material evidence discovered after debarment was imposed; or (4) any other reason that is in the best interests of the District.

The District will consider a request for review of a debarment determination only where: (1) the Contractor has been debarred for a period longer than five (5) years; (2) the debarment has been in effect for at least five (5) years; and (3) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment, and includes supporting documentation. Upon receiving an appropriate request, the District will provide notice of the hearing on the request. At the hearing, the District shall review evidence on the proposed reduction of debarment period. This hearing shall be conducted and the request for review decided by the District pursuant to the same procedures as for a debarment hearing.

The District's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment.

The terms shall also apply to Subcontractors of Contractor.

SUPPLEMENTARY GENERAL CONDITIONS

PROJECT MANAGER: Please delete the red text after you have finished editing AND BEFORE SUBMITTING TO PURCHASING BRANCH.

PROJECT MANAGER NOTES: THIS SECTION IS INTENDED TO BE USED TO:

- **VOID/REVISE ANY ITEMS IN THE GENERAL CONDITIONS – DO NOT DIRECTLY MODIFY THE GENERAL CONDITIONS!**
- **ADD ANY ADDITIONAL REQUIREMENTS TO THE GENERAL CONDITIONS**
- **PROVIDE SPECIFIC REQUIREMENTS TO THE CONTRACTOR**

The following supplements modify the General Conditions. Where a portion of the General Conditions is modified and or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

ARTICLE 3 – THE CONTRACTOR

3.9.5.2 Contractor shall provide all submittals electronically, as a minimum. Unless specifically requested, prints are not required. Where required by individual sections of the specifications, physical samples, color selections, etc., may be required, which shall be delivered to the Architect.

ARTICLE 4 – ADMINISTRATION OF THE CONTRACT AND CLAIMS

4.3.4 The District is providing Inspector's Facilities in the Industrial Arts building, adjacent to the Ali Avenue extension. Construction meetings may also be held at this location.

ARTICLE 8 – TIME

Article 8 Schedule Inclusion Requirements –The Baseline Schedule shall include the following Milestone Schedule:

September 13, 2019: Project Completion

Note: Sheet A0.1 of the Drawings ("Phasing Plan") defines Contractor's obligations to keep defined areas and pathways within and near the areas of work open during specific periods of time.

Article 8.2.2 Performance During Working Hours – delete this Article and replace with the following:

8.2.2 Where a single shift is worked, eight (8) consecutive hours between 7 a.m. and 10 p.m. shall constitute a work day at the applicable prevailing wage rate(s).

8.2.3 During the following dates and times, no motorized, mechanized, or vehicular construction activity is allowed (paving demolition, compaction, removal of materials, delivery of materials). During these periods, hand labor with limited noise-producing capabilities will be allowed:

(Note: At this time, the District doesn't foresee any student testing that will conflict with construction activities. If we later determine there are some conflicts, the District will request the Contractor's assistance in minimizing potential disruption).

SUPPLEMENTARY GENERAL CONDITIONS

Article 8.4.1 Liquidated Damages – Contractor will be liable to the District for Liquidated Damages pursuant to Article 8.4 for each calendar day of delay in the amount set forth in the Agreement Form.

ARTICLE 9.3 PROGRESS PAYMENTS

9.3.1 Payments to Contractor – This project is **not** designated as substantially complex.

ARTICLE 11 – INSURANCE AND BONDS

Article 11.10 Performance and Payment Bonds – The number of executed copies of the Performance Bond and the Payment Bond required is one (1).

SECTION 13.12 – STORM WATER POLLUTION PREVENTION

A Storm Water Pollution Prevention Plan (SWPPP) and associated Notice of Intent (NOI) Discharge Permit with State Water Board is not applicable to this project because the grading disturbance area is less than one acre.

Contractor shall submit a Water Pollution Control Plan (WPCP) to the District for review and written approval prior to the start of construction. The WPCP shall comply with California Stormwater Quality Association (CASQA) BMP Handbook for Construction or Caltrans Construction Site Best Management Practices Manual. Contractor is required to prevent potential discharges and to reduce water pollution to the maximum extent practicable by implementing best management practices (BMPs). Minimum Required Standard Construction Stormwater BMPs are provided in Table 1-1 of the Caltrans Construction Site Best Management Practices Manual. Contractor shall install, monitor, maintain, or revise the selected BMPs to ensure their effectiveness."

See also specification Section 31 20 00, Earth Moving.

SUPPLEMENTARY GENERAL CONDITIONS

Division 1 Forms

IMMEDIATE CONSTRUCTION CHANGE DIRECTIVE NO.

PROJECT: _____

TO: _____

You are hereby directed to provide the extra work necessary to comply with this ICD.

DESCRIPTION OF CHANGE: _____

_____

COST (This cost shall not be exceeded): _____

TIME FOR COMPLETION: _____

NOTE:

Pursuant to Article 7.3.1.2 An Immediate Change Directive is a written order to the Contractor prepared by the Architect and signed by the District (and CM if there is a CM on the Project) and the Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The District may by ICD, without invalidating the Contract, direct immediate changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions within. If applicable, the Contract Sum and Contract Time will be adjusted accordingly. CONTRACTOR SHALL PROCEED WITH WORK SET FORTH IN THIS ICD IMMEDIATELY UPON RECEIPT OR THE DISTRICT MAY EITHER HOLD THE CONTRACTOR IN EITHER PARTIAL DEFAULT PURSUANT TO ARTICLE 2.2 OR TOTAL DEFAULT PURSUANT TO ARTICLE 14.

_____

Architect

_____

District

SECTION 012000 SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY OF THE WORK:

A. The Work under this Contract necessary for and incidental to the execution and completion of all Work indicated in the Contract Documents for construction of:

Nevada Union High School Site Improvements / Paving, Increment 2

B. Owner:

Nevada Union High School District
11645 Ridge Rd.
Grass Valley, California 95945

C. Architect:

Siteline Architecture
644 Zion Street
Nevada City, California 95959

1.2 GENERAL DESCRIPTION OF WORK:

A. Removal and Replacement of existing paving. Installation of utilities, lighting, ramps, stairs, walks, fencing, gates, bus shelter structure, landscape and irrigation.

B. The Work under this Contract includes the furnishing of all labor, materials, services and transportation, except as specifically excluded, which is required for the completion of the Project in accordance with the requirements of the Contract Documents.

1.3 REQUIREMENTS OF REGULATORY AGENCIES:

A. Construction shall be in conformance with the California Code of Regulations (CCR), as follows:

1. 2016 CALIFORNIA ADMINISTRATIVE CODE (CAC)
2. 2016 CALIFORNIA BUILDING CODE (CBC)
3. 2015 STATE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 2012 EDITION (THE GREENBOOK)
4. 2016 CALIFORNIA MECHANICAL CODE (CMC)
5. 2016 CALIFORNIA ELECTRICAL CODE (CEC)
6. 2016 CALIFORNIA ENERGY CODE (CEC T-24)
7. 2016 CALIFORNIA PLUMBING CODE (CPC)
8. 2016 CALIFORNIA FIRE CODE (CFC)

9. 2016 CALIFORNIA GREEN BUILDING CODE

10. 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN

11. 2016 NFPA 24

12. ALL LOCAL CODES AND ORDINANCES

13. NFPA - Installation of Sprinkler Systems, as Amended by California

14. NFPA - Installation of Standpipe & Hose Systems

15. NFPA - Dry Chemical Extinguishing Systems

16. NFPA - Wet Chemical Extinguishing Systems

17. NFPA - Installation of Stationary Pumps for Fire Protection

18. NFPA - Water Tanks for Private Fire Protection

19. NFPA - Installation of Private Fire Service Mains and Their Appurtenances

20. NFPA - Inspection, Testing, Maintenance of Water-Based Fire Protection Systems, as Amended by California

21. NFPA 72 - National Fire Alarm Code, as Amended by California

B. A copy of CCR Title 24 Parts 1 and 2 shall be kept at the Project site during construction.

C. Accessibility Requirements: Construction shall be in conformance with the ADA Accessibility Guidelines for Buildings and Facilities, dated June 26, 1991 as amended thru the date of the start of construction.

1.4 OCCUPATIONAL SAFETY AND HEALTH ACT REQUIREMENTS:

A. During the entire construction period, it shall be the responsibility of the Contractor to maintain conditions at the Project site so as to meet in all respects the requirements of the California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Div. of Industrial Safety.

B. Asbestos Free Materials: Materials containing asbestos shall not be used. Comply with requirements of the Environmental Protection Agency (EPA), 16 CFR 1305 dated 1978, and other governmental agencies having jurisdiction.

1.5 COORDINATION OF PHYSICAL SPACE:

A. Coordinate use of physical space and sequence of installation of mechanical work, specifically ductwork, electrical work, and plumbing which is indicated diagrammatically on the Drawings. Follow routing indicated as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Coordinate work of the various trades to assure efficient and orderly utilization of space available.

B. The Contractor's attention is directed to the need of special coordination and efficient use of the available physical space to circulate pedestrian and vehicle traffic around work areas in a safe manner.

C. In finished areas, except as indicated otherwise, conceal pipes, ducts, and conduits in the construction. Coordinate location of fixtures and outlets with finish elements.

1.6 COORDINATION OF SITE UTILITIES AND FACILITIES:

A. Coordinate the work and sequence of installation of the various utilities and facilities. Coordinate connection of utility systems with public agencies and other trades. Comply with requirements of governing agencies and regulations. Notify Architect of any conflict and make modifications as directed by Architect.

1.7 WORK INDICATED AS NIC:

A. The term "NIC" shall be construed to mean that construction work not to be furnished, installed or performed by the Contractor. The term shall mean "Not in this Contract" or "Not a Part of the Work to be performed by the Contractor" except that coordination and installation of certain NIC items specified shall be the Contractor's responsibility.

B. "NIC" work is indicated on the Drawings and specified herein as an aid to the Contractor in scheduling the amount of time and materials necessary for the completion of the Contract.

1.8 OWNER-FURNISHED CONTRACTOR-INSTALLED PRODUCTS (OFCI):

A. Owner's Responsibilities: The Owner will arrange and pay for product delivery to the site in accordance with the construction schedule. The Owner and the Contractor shall jointly inspect the deliveries for shortages and damaged or defective items. The Owner will arrange for replacement of damaged, defective or missing items.

B. Contractor's Responsibilities: The Contractor shall unload, uncrate, and store the products at the site and shall protect them from exposure to the elements and other damage. Items damaged after acceptance by the Contractor shall be replaced at the Contractor's expense. The products shall be installed, connected, adjusted and finished in accordance with the applicable section of these Specifications.

1.9 WORK SEQUENCE:

A. Construct the Work in stages as required to accommodate the Owner's use of the premises during the construction period. Coordinate the construction schedule and operations with the Owner.

B. Do not close off the Owner's use of facilities in subsequent stages until construction in the previous stage will provide alternative facilities for the Owner's use.

C. In preparing the construction schedule specified in General Conditions, the Contractor shall indicate phasing and other scheduling required to accommodate the Owner's operations. Upon completion of this schedule, the Contractor shall meet with the Owner and the Architect to discuss, and obtain approval of, such phasing.

1.10 CONTRACTOR'S USE OF THE PREMISES:

A. The Contractor shall limit his use of the premises for construction activities and for storage, to allow for Owner occupancy or for construction activities by other contractors.

B. The Contractor shall be responsible for the following:

1. Coordinate the use of the premises under the direction of the Owner.

2. Assume full responsibility for the protection and safekeeping of products under this Contract that are stored at the site.

3. Move stored products that are under the Contractor's control, which interfere with operations of the Owner or the other contractors.

4. Obtain and pay for the use of additional storage or construction areas needed for operations.

5. The Contractor shall make provisions to insure the security of the buildings. The Contractor shall coordinate its operations with the Owner to determine if any scheduled work could potentially compromise existing campus security.

1.11 OWNER OCCUPANCY:

A. The Owner will occupy the premises during the entire period of construction for the conduct of his normal operations. Cooperate with the Owner in all construction operations including the following to minimize conflict and to facilitate Owner usage.

B. If and when it should be necessary for the Contractor to impact the day-to-day operations of Owner's functions in order to pursue the Work, the Contractor shall furnish adequate notice to the Owner and coordinate the means and timing to avoid, minimize, or circumvent such impacts. The Owner reserves the right to assess and anticipate such impacts and the right to stop or postpone the Work until a mutually satisfactory time and means can be agreed upon. Costs incurred due to delays caused by such impacts on Owner's functions will be negotiated at the time of the occurrence of such delay. Typical impacts shall include, but not be limited to, the following:

1. Interruption of utility service serving the existing buildings, areas, or functions.

2. Blockage of or inhibiting access to existing entries, exits, delivery or pickup points, driveways, fire hydrants. Particular care shall be taken to maintain access for delivery of supplies, entry and egress of students, visitors and employees.

3. Noise, dust, dirt, water, fumes or other objectionable, hazardous, or disruptive conditions.

4. Interruption of heating, air conditioning, and ventilating systems.

5. Interruption of internal systems such as gas supplies, communications, fire sprinklers, fire alarms, internal deliveries, other systems.

C. The Contractor shall strongly emphasize to all members of the construction team that the Owner expects a zero tolerance policy for contact with students.

1.12 DIVISION AND IDENTIFICATION OF DRAWINGS AND SPECIFICATIONS:

A. The drawings and specifications are divided in sections and titled, as set forth in the drawing sheet index and the specification table of contents, for convenience of ready reference only, and the Contractor shall not construe such as establishing the scope of work of the various trades. The Contractor shall be responsible for dividing the work among

various subcontractors. The Architect assumes no responsibility to act as arbiter to establish subcontract limits of work. The Contractor shall be responsible for providing items, devices or parts of work regardless of where they are indicated in the drawings or specifications.

END OF SECTION

1/25/07

SECTION 01 31 13 ADDITIONAL REQUIREMENTS FOR DSA REVIEWED PROJECTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Additional requirements for projects reviewed by the Division of the State Architect (DSA).

B. DSA Forms: See attached forms at the end of this Section.

1. DSA-6 – Verified Report.
2. DSA-103 – Statement of Structural Tests and Inspections.

1.2 RELATED SECTIONS

A. Division 01 – Quality Requirements: Testing and Inspection.

B. Division 01 – Execution and Closeout Requirements: Project closeout requirements.

1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only.

B. Unless otherwise noted, standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes as of the date of issue of this Project Manual.

C. California Code of Regulations (CCR).

1. Title 8, Division 1, Chapter 3.2 – California Occupational Safety and Health Regulations (Cal/OSHA).
2. Title 8, Division 1, Chapter 4, Sub-Chapter 4 – Construction Safety Orders.
3. Title 8, Division 1, Chapter 4, Sub-Chapter 7 – General Industrial Safety Orders.
4. Title 19, Division 1 –State Fire Marshal (SFM).
5. California Administrative Code, California Code of Regulations, Title 24, Part 1: Refer to Chapter 4, Group 1, Safety of Construction of Public Schools.

D. Division of the State Architect Interpretation of Regulations Manual (DSA IR)

1. DSA IR A-6 – Change Order and Field Change Approval Processes.
2. DSA IR A-7 – Project Inspector Certification and Approval.
3. DSA IR A-8 – Project Inspector and Assistant Inspector Duties and Performance.
4. DSA IR A-12 – Assistant Inspector Approval.

E. Division of the State Architect Website: www.dsa.dgs.ca.gov

1.4 GENERAL REQUIREMENTS

A. Contractor's Duties:

1. Comply with California Administrative Code, Chapter 4, Article 6, Paragraph 4-343, "Duties of the Contractor" in addition to the duties described in the Contract Documents.

2. Comply with CCR Title 8, Division 1, Chapter 3.2, California Occupational Safety and Health Regulations (Cal/OSHA).
3. Comply with CCR Title 8, Division 1, Chapter 4, Sub-Chapter 4, Construction Safety Orders.
4. Comply with requirements of CCR Title 19, Division 1, State Fire Marshal (SFM).

B. Architect's and Architect's Consultants' Duties: Comply with requirements of California Administrative Code, Chapter 4, Article 6, Paragraph 4-341, "Duties of the Architect, Structural Engineer or Professional Engineer" and Paragraph 4-344, "Duties of Mechanical and Electrical Engineers," in addition to the duties described in the Contract Documents.

C. Arbitration: DSA is not subject to arbitration proceedings.

D. The intent of Drawings and Specifications is to comply with Title 24, CCR for alteration, rehabilitation, or reconstruction work. Should any deterioration or non-complying existing conditions, not part of the Work covered by the Contract Documents, be discovered and cause non-compliance with Title 24, CCR requirements, a Change Order (CO) shall be submitted to DSA for approval, prior to proceeding with remedial work.

1.5 REGULATORY REQUIREMENTS

A. Perform all work in accordance with applicable laws, codes, ordinances, rules, and regulations including, without limitation, Parts 1 through 5, Part 9, and Part 12, Title 24, CCR. Maintain a copy of these documents at the project site at all times.

B. Codes adopted by the City, County, State, and Federal agencies govern minimum project requirements. Comply with the latest edition of applicable regulatory requirements and standards unless otherwise indicated or specified.

C. Work as described in Drawings and Specifications shall not be construed as to permit work not in accordance with applicable laws, codes, ordinances, rules, and regulations.

1.6 INSPECTION AND SUPERVISION

A. Supervision by DSA shall be in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-334.

B. Owner will select and pay for the services of a Project Inspector, certified and approved by DSA in accordance with DSA IR A-7.

1. When required, Owner will select and pay for the services of additional full-time Assistant Project Inspector(s) certified and approved by DSA in accordance with DSA IR A-12

C. Project Inspector shall inspect construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(b), "Inspection by Project Inspector," and Article 6, Paragraph 4-342, "Duties of the Project Inspector" ; and DSA IR A-8.

1. Project Inspector performance rating by DSA shall be in accordance with DSA IR A-8, Section 2, "DSA's Rating of the Inspector's Performance."

D. Reports: Project Inspector shall submit the following in accordance with DSA IR A-7.

1. Notice of Start of Construction: Notify DSA of start of construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-331.
2. Semi-Monthly Reports: Comply with California Administrative Code, Chapter 4, Article 5,

Paragraph 4-337.

3. Verified Reports: Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-336.

E. Special Inspection Requirements:

1. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(c), “Special Inspection.”
2. Special inspection costs to be paid by Owner.
3. Conduct special inspection in accordance with DSA-103, Statement of Structural Tests and Inspections.

1.7 TESTING AGENCY REQUIREMENTS

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-335, “Tests.”

B. Owner will select the Testing Agency, acceptable to DSA, with the advice of Architect and Structural Engineer.

C. Sampling and testing shall be performed by properly qualified persons in accordance with applicable American Society for Testing and Materials (ASTM) standards.

D. Conduct tests in accordance with DSA-103, Statement of Structural Tests and Inspections.

E. Submit one copy of test reports to DSA.

1.8 SUBSTITUTIONS AND REQUESTS FOR INFORMATION

A. Substitutions and Requests for Information (RFIs) that affect structural safety, fire and life safety, access compliance or energy (as applicable) shall be submitted to DSA with CCD for review and approval prior to fabrication and installation on the project.

1.9 ADDENDA AND CHANGE ORDERS

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-338, “Addenda and Change Orders.”

B. Comply with DSA IR A-6.

C. Obtain DSA approval for changes to Code-regulated construction and inspection/testing functions prior to start of that Work. Code-regulated construction refers to Work that is regulated by Code provisions applicable to public school construction, including those adopted by Division of the State Architect-Structural Safety Section (DSA/SS), Division of the State Architect-Access Compliance Section (DSA/AC), and Division of the State Architect-Fire and Life Safety Section (DSA/FLS).

D. Changes can be approved by DSA through Field Change Document (FCD) Approval Process or Change Order (CO) Process, as applicable. Comply with DSA IR A-6, Article 3, Section 3.1, “Field Change Document (FCD) Approval Process,” and DSA IR A-6, Article 3, Section 3.2, “Change Order (CO) Approval Process.”

E. Do not begin any work under addendum or change order until required DSA written approval is obtained.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

DSA

6-C

CONTRACTOR VERIFIED REPORT

This form shall be completed by each contractor having a contract with the owner, in accordance with California Code of Regulations, Title 24, Part 1, Sections 4-343 or 4-220. The completed form shall be submitted to the Design Professional in General Responsible Charge, DSA, the project inspector and the school board.

School District/Owner:		DSA File #: -
Project Name/School:		DSA App. #: -
Date of Report:	Number of Attached Pages: (*If none, enter zero.*)	DSA 152 Card #(s):
Note that ***DSA-approved*** construction documents, referred to below, are those portions of the construction documents, duly approved by DSA, that contain information related to and affecting the Structural Safety, Fire/Life Safety, and Accessibility portions of the project.		*List all inspection card numbers for which this verified report applies.*

COMPLETE SECTIONS 1, 2, 3 & 4 AND PROVIDE ALL REQUIRED DOCUMENTATION

1. CONTRACTOR INFORMATION *(Enter name and check applicable box.)*

	Name of Contractor (Company/Firm) Submitting this Report:
☐	Operating as general contractor responsible for all work shown in the *DSA-approved* construction documents.
☐	Operating as contractor responsible for part of the work shown in the *DSA-approved* construction documents. (*Describe scope of work in the contract. Attach additional pages, using form DSA 211, if necessary):*

2. REASON FOR FILING THIS VERIFIED REPORT *(Check applicable box.)*

☐	**Final Verified Report:** Construction of all work shown in the *DSA-approved* construction documents that is part of my contract is complete.
☐	**Termination of contract** prior to completion of all work in the contract *(Provide last date of work)*:
☐	**DSA Request** dated:

3. DEFERRED SUBMITTALS *(Check applicable box.)*

☐	This project does not require deferred submittals within the scope of my contract.
☐	All deferred submittals within the scope of my contract are approved by DSA.
☐	The following deferred submittals, within the scope of my contract, are **not approved** by DSA *(Provide list. Attach additional pages, using form DSA 211, if necessary.)*:

4. DEVIATIONS AS OF THE DATE OF THIS REPORT *(Check applicable box.)*

☐	There are no outstanding or unresolved deviation notices pertinent to my contract and related to work shown in the *DSA-approved* construction documents.
☐	There are unresolved deviation notices pertinent to my contract and related to work shown in the *DSA-approved* construction documents. They are documented by the following form DSA 154 Notice of Deviations *(provide list of DSA 154 Notice numbers and attach copies).*
☐	There is work pertinent to my contract that is not completed in compliance with the *DSA-approved* construction documents. *(Briefly describe. Attach additional pages, using form DSA 211, if necessary.)*

I attest that based on my own personal knowledge (as defined in California Code of Regulations, Title 24, Part 1, Sections 4-336 and 4-214) that, except as marked in Sections 3 and 4, as of the date of this report, the work has been performed and materials have been used and installed, in every material respect, in compliance with the *DSA-approved* construction documents. I declare under penalty of perjury that I prepared this report and that all statements are true.

Contractor Signature: _____ Date: _____

Print Name: _____ Contractor's License No.: _____

Submit completed form to the DSA Regional Office with construction oversight authority for the project.

DSA DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA-103 Issued 9/1/2017

List of Required Structural Tests & Special Inspections - 2016 CBC

INCREMENT # | DSA File No.: | Application No.: | Date Submitted: | Revised: | Revised:

School Name		District	

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.
NOTE: This form is also available for projects submitted for review under the 2007, 2010, and 2013 CBC.

INSTRUCTIONS: Click a plus sign (+) before any category or subcategory to reveal additional tests and special inspections. A shaded box indicates a test or special inspection that may be required, depending on the scope of the construction and other issues. A shaded box can be clicked indicating your selection of that test. **Note:** A minus (-) on a category or subcategory heading indicates that it can be collapsed. However, any selections you may have made will be cleared. Click on the "COMPILE" button to show only the tests and inspections finally selected. **For more information on use of this form, see DSA-103.INSTR.**

Note: References are to the 2016 edition of the California Building Code (CBC) unless otherwise noted.

REQUIRED	TEST OR SPECIAL INSPECTION	TYPE[1]	PERFORMED BY[2]	CODE REFERENCE AND NOTES
+	**SOILS**			
+	**CONCRETE**			Table 1705A.3, ACI 318-14 Sections 26.12 & 26.13
+	**MASONRY**			TMS 402-13/ACI 530-13/ASCE 5-13 Table 3.1.3 & TMS 602-13/ACI 530.1-13/ASCE 6-13 Table 5
+	**STEEL, ALUMINUM**			Table 1705A.2.1, AISC 303-10, AISC 360-10, AISC 341-10, AISC 358-10, AISI S100-07/S2-10
+	**WOOD**			
+	**OTHER**			

List of required verified report(s):

KEY to Columns

1 Type -	2 Performed By -
Continuous – Indicates that a continuous special inspection is required	**GE** – Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative
Periodic – Indicates that a periodic special inspection is required	**LOR** – Indicates that the test or inspection is to be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See section 4-335, 2013 CCR Title 24, Part 1.
Test – Indicates that a test is required	**SI** – Indicates that the special inspection is to be performed by a special inspector

Name of Architect or Engineer in general responsible charge

Name of Structural Engineer (When structural design has been delegated)

Signature of Architect or Structural Engineer date

IDENTIFICATION STAMP
DIV OF THE STATE ARCHITECT
APP. #

AC__**N/A**____ F/LS__**N/A**___ SS_____

DATE_____

Appendix: Work Exempt from DSA Requirements for Special Inspection or Structural Testing

Exempt items given in IR A-22 or the 2016 CBC (including DSA amendments) and those items identified below with an "X" by the design professional are NOT subject to DSA requirements for the structural tests or special inspections noted. Items marked as exempt shall be identified by either: 1) listing specific details/sheets noted in the spaces provided below OR 2) on the approved construction documents. The project inspector shall verify all construction complies with the approved construction documents.

Exempted by Design Prof.		Exempted by Design Prof.	
	Soils:		**Welding:**

+ In the CODE REFERENCE AND NOTES column indicates DSA-SS/CC sections that may be used by community colleges, per 2016 CBC Sec. 1.9.2.2.

DSA DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA-103 Issued 9/1/2017

List of Required Structural Tests & Special Inspections - 2016 CBC

INCREMENT # | DSA File No.: | Application No.: | Date Submitted: | Revised: | Revised:

X	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per 2016 CBC Table 1806A.2 and having no geotechnical report for the following types of structures: free standing sign, scrolling message sign, scoreboard, covered walkway or shade structure with dead load less than 5 psf and other light-weight structures of which the apex is less than 8' above the highest adjacent grade.
X	2. Shallow foundations meeting the exception item #1 criteria specified in 2016 CBC Section 1803A.2.
(Optional) List details for applicable exempt items:	
	Concrete/Masonry:
X	1. Post-installed anchors for the following: 1) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see item 7 for "Welding") given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) or 2) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding."
X	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.
X	3. Masonry retaining walls less than 4'-0" above the top of foundation not supporting a surcharge and free standing nonbearing non-shear masonry walls up to 6'-0" above adjacent grade do not require grout, mortar or masonry core testing or DSA special inspection.
X	4. Epoxy shear dowels in site flatwork.
(Optional) List details for applicable exempt items:	

X	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
X	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds cannot be ground flush.
X	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
X	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 of listing above).
X	7. Any support for exempt non-structural components given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) meeting the following: 1) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) <= 4' above supporting floor/roof, 2) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.
(Optional) List details for applicable exempt items:	

+ In the CODE REFERENCE AND NOTES column indicates DSA-SS/CC sections that may be used by community colleges, per 2016 CBC Sec. 1.9.2.2.

INSTRUCTIONS: FORM 103

LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (T & I LIST)

The DSA 103: Listing of Structural Tests & Special Inspections may be referred to as the "T & I worksheet." When completely filled out, the printed form may be referred to as the "T & I list." The T & I list summarizes structural test and special inspection requirements for a project. It also lists test and special inspection verified report requirements.

Summary

Each row on the T & I worksheet corresponds to one or more structural tests or special inspections.

The first column of the T & I worksheet contains +/- symbols to allow expansion or collapse of categories. Once appropriate categories are expanded, the appropriate rows are marked to indicate which specific tests and special inspections are required for the project.

The second column provides a brief description of the applicable tests or inspections.

The third column indicates whether the item is a test, a periodic special inspection, or a continuous special inspection.

The fourth column indicates whether the task is to be carried out by a geotechnical engineer, a testing laboratory, a special inspector, or the project inspector.

The fifth column includes code references and special notes. (A section number followed by a + indicates alternative Division of the State Architect-Structural Safety/Community College (DSA-SS/CC) sections that community colleges may use, per 2013 California Building Code (CBC) Section 1.9.2.2.)

Creating the T & I List

The T & I worksheet is to be completed by the architect or engineer in charge of the project or by the structural engineer delegated responsibility for the structural portion of the project (when such delegation is made on form DSA 1). Upon completion, the T & I worksheet will generate the T & I list.

The T & I worksheet is expandable. When the worksheet is first opened, only six main categories are shown (soils, concrete, masonry, steel, wood, and other). Depending on the scope of the project, the designer expands the appropriate categories. Clicking on the plus (+) sign before any category expands to show subcategories; clicking it again collapses it. Categories that do not apply to a project shall remain collapsed. For example, the masonry category for a project with no masonry or veneer construction must be collapsed.

Once a main category is expanded, a list of subcategories is available. For example, sub-categories in the concrete category are "cast-in-place," "prestressed," "precast," "shotcrete," "post installed anchors," and "other." Depending on the scope of the project, the designer expands the applicable subcategories.

Expanding the appropriate subcategory reveals specific test and special inspection requirements. Some requirements are mandatory and already marked as "required" with an "X" in the left column. Other requirements are optional, or are dependent on project scope. These optional cells are yellow.

For example, when the cast-in-place subcategory of the concrete category is expanded, item 7a (verify use of required design mix) is already marked because it is always required. Item 7b (test reinforcing steel) is usually required, but CBC Section 1913A.2 (1913.2.6+) describes conditions when reinforcing steel tests may not be required. The designer must determine whether these

conditions are met, and mark the yellow colored box when reinforcing steel testing is required.

Additional space is provided on the worksheet at the end of each main category to indicate any additional testing or inspection that may be required. To identify tests or special inspections that are not listed on the worksheet choose the "other" subcategory at the bottom of the appropriate category and type in the name of the test or inspection. (Note: there is also an "other" category at the bottom of the worksheet which may be used for tests or inspections that don't fit into any of the categories). Fill in appropriate information in the "type" and "performed by" columns. Provide a reference in the "code reference and notes" column to applicable details or specification sections in the approved documents that describe the specific requirements for the test or inspection.

The worksheet automatically generates a list of the verified reports that will be required based on the categories expanded and items checked. (Exception: the worksheet will not automatically generate any verified report requirements for items added in any of the "other" categories. Additional verified report requirements shall be added manually.)

After all appropriate categories and subcategories are expanded, and appropriate test and inspection choices are marked, click on the "COMPILE" button at the top of the worksheet to generate the T & I list for the project. The T & I list includes only categories, subcategories and rows applicable to the project. All inapplicable worksheet rows are hidden so that the T & I list is clear and concise.

In order to print the completed and compiled T & I list, click on the red "PRINT" button located at the bottom of the work sheet.

Note: If a category or subcategory is collapsed and expanded again, all of the optional tests will be deselected.

It is essential that detailed test and special inspection requirements are described in the project specifications or on the drawings. The T&I list alone does not describe the specific requirements adequately to assure appropriate implementation of the testing and special inspection program.

DSA Review and Approval of the T & I List

A properly completed T&I list is to be included in the initial submittal to DSA. As part of the plan review process, DSA reviews and approves the T&I list along with the drawings and specifications. Any errors or omissions on the T&I list will be marked for correction. Once all corrections have been made, the T & I list will be approved along with the drawings and specifications.

Approval of Changes to the T & I List

All changes to the testing and inspection requirements for a project must be reflected on a revised T & I list and approved by DSA prior to implementation. See IR A-6 for details on obtaining approval for changes to DSA-approved documents.

Interpreting the T & I List

General

Testing laboratories and special inspectors must be aware that, although code references are provided on the T & I list, the project plans and specifications must be carefully reviewed to properly interpret and implement the testing and special inspection requirements. Note that additional tests and/or inspections may be required, common test procedures may be modified, or unusual acceptance criteria may be specified on the plans or specifications that are not reflected on the T & I list.

Column 2 (C) – Test or Inspection: Includes a brief description of the test(s) or special inspection(s) required. See plans, specifications, codes and standards for a complete description of the scope of testing or special inspection required.

Column 3 (D) – Type: Indicates whether the item is considered a test or a special inspection:

- "Test" indicates the item is a test.

LISTING OF STRUCTURAL TESTS AND SPECIAL INSPECTIONS (T & I LIST)

- "Periodic" indicates that the item is a periodic special inspection.
- "Continuous" indicates that the item is a continuous special inspection.
- "n/a" indicates a one-time verification by the inspector.
- "*" (asterisk) indicates an unusual entry explained in the notes (column 4).

Column 4 (E) – Performed By: Indicates the entity responsible for performing the task:

- "GE" indicates tests or special inspections to be performed under the supervision of the geotechnical engineer responsible for construction observation for the project.
- "Lab" indicates tests to be performed by a testing laboratory accepted by the DSA Laboratory Evaluation and Acceptance Program.
- "SI" indicates special inspections to be performed by an appropriately qualified/approved special inspector.
- "Project" indicates special inspections to be performed by the project inspector.
- "*" (asterisk) indicates an unusual entry explained in the notes (column 4).

Column 5 (F) – Code Reference and Notes: Includes reference to the following:

- Pertinent code sections from the 2013 California Building Code in **bold** text.
- Referenced standards.
- Other notes.

Appendix: Work Exempt from DSA Requirements for Special Inspection or Structural Testing

The design professional may identify items exempt from DSA requirements for special inspection and structural testing. The default status for all items will be exempt, identified with an "X." Any one of these items can be unchecked, thereby requiring special inspection for those items, at the discretion of the design professional. Specific applicable details can be listed at the discretion of the design professional for exempt items to provide explicit direction to the project inspector, laboratory of record, and other construction/field stakeholders.

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - EXECUTION

1.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work or spillage.

1. Provide temporary barricades and/or barriers to protect and exclude the public from areas where alteration work is being performed.

2. Provide directional signage to protect and exclude the public from areas where alteration work is being performed.

3. Provide covers over walkways to protect and exclude the public from areas where alteration work is being performed.
4. Erect temporary barriers to form and maintain fire-egress routes.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
8. Collect and dispose of runoff in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

B. Protect existing materials, including floors along hauling routes, with temporary protections and construction.

1. Use covering materials and masking agents that will not stain or leave residue on surfaces. When no longer needed, promptly remove protective materials.

C. Comply with each product manufacturer's written instructions for protections and precautions.

D. Utility and Communications Services: Notify Owner; Architect; authorities having jurisdiction; and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations. Disconnect and cap pipes and services as required by authorities having jurisdiction, and provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, verify that drainage system is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work until the drainage system is functioning properly.

1. Prevent solids or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked from alteration work.

1.2 PROTECTION FROM FIRE

A. Comply with NFPA 241 requirements unless otherwise indicated.

B. Fire-Control Devices: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids.

1.3 GENERAL ALTERATION WORK

A. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

B. Notify Architect of visible changes in the integrity of material or components, including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

B. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Architect for a decision.

C. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.

D. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, notices, receipts for fee payments, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

F. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

G. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.

H. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

I. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

J. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction.

PART 2 - EXECUTION

2.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

B. Abbreviations and Acronyms: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
2. AF&PA - American Forest & Paper Association; www.afandpa.org.
3. ALSC – American Lumber Standard Committee; www.alsc.org.
4. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
5. ANSI - American National Standards Institute; www.ansi.org.
6. ASCE - American Society of Civil Engineers; www.asce.org.
7. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
8. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
9. AWI - Architectural Woodwork Institute; www.awinet.org.
10. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
11. CABO – Council Of American Building Officials
12. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
13. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
14. DHI - Door and Hardware Institute; www.dhi.org.
15. DOC – Department of Commerce; www.commerce.gov.
16. EPA – The Environmental Protection Agency; www.epa.gov.
17. FSC - Forest Stewardship Council U.S.; www.fscus.org.
18. ICBO - International Conference of Building Officials; (See ICC).
19. ICC - International Code Council; www.iccsafe.org.
20. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
21. MPI - Master Painters Institute; www.paintinfo.com.
22. NECA - National Electrical Contractors Association; www.necanet.org.
23. NEMA - National Electrical Manufacturers Association; www.nema.org.
24. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
25. NRCA - National Roofing Contractors Association; www.nrca.net.
26. SDI - Steel Door Institute; www.steeldoor.org.
27. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
28. UL - Underwriters Laboratories Inc.; www.ul.com.
29. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
30. WDMA - Window & Door Manufacturers Association; www.wdma.com.

31. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
32. WWPA - Western Wood Products Association; www.wwpa.org.

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - PRODUCTS

1.1 TEMPORARY FACILITIES

A. Provide field offices, storage and fabrication sheds, and other support facilities as necessary for construction operations. Store combustible materials apart from building.

1.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 2 - EXECUTION

2.1 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

C. Heating and Cooling: Provide temporary heating and cooling required for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

D. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

2.2 SUPPORT FACILITIES INSTALLATION

A. Install project identification and other signs in locations approved by Owner to inform the public and persons seeking entrance to Project.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

2.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways.

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. Furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

F. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

G. Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

H. Install and maintain temporary fire-protection facilities. Comply with NFPA 241.

2.4 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion.

C. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

B. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced.

1. Show compliance with requirements for comparable product requests.
2. Architect will review the proposed product and notify Contractor of its acceptance or rejection.

C. Basis-of-Design Product Specification Submittal: Show compliance with requirements.

D. Compatibility of Options: If Contractor is given option of selecting between two or more products, select product compatible with products previously selected.

E. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Deliver products to Project site in manufacturer's original sealed container or packaging, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
4. Store materials in a manner that will not endanger Project structure.
5. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

F. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. Provide products that comply with the Contract Documents, are undamaged, and, unless otherwise indicated, are new at the time of installation.

1. Provide products complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.
2. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Where the following headings are used to list products or manufacturers, the Contractor's options for product selection are as follows:

1. Products:

   a. Where requirements include "one of the following," provide one of the products listed that complies with requirements.
   b. Where requirements do not include "one of the following," provide one of the products listed that complies with requirements or a comparable product.

2. Manufacturers:

   a. Where requirements include "one of the following," provide a product that complies with requirements by one of the listed manufacturers.
   b. Where requirements do not include "one of the following," provide a product that complies with requirements by one of the listed manufacturers or another manufacturer.

3. Basis-of-Design Product: Provide the product named, or indicated on the Drawings, or a comparable product by one of the listed manufacturers.

C. Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

D. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Architect will consider Contractor's request for comparable product when the following conditions are satisfied:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications.
3. List of similar installations for completed projects, if requested.
4. Samples, if requested.

PRODUCT REQUIREMENTS

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 EXECUTION REQUIREMENTS

A. Cutting and Patching:

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.2 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit one copy.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

1. Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other sections, including project record documents, operation and maintenance manuals, warranties and similar documents.
3. Submit maintenance material submittals specified in other sections, including tools, spare parts, extra materials, and similar items.
4. Submit test/adjust/balance records.
5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

B. Procedures Prior to Substantial Completion: Before requesting Substantial Completion inspection, complete the following:

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner.
3. Complete startup and testing of systems and equipment.
4. Remove temporary facilities and controls.
5. Complete final cleaning requirements, including touchup painting.

6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

B. Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Verify compatibility with and suitability of substrates.
2. Examine roughing-in for mechanical and electrical systems.
3. Examine walls, floors, and roofs for suitable conditions.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Take field measurements as required to fit the Work properly. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.

E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

F. Surface and Substrate Preparation: Comply with manufacturer's written recommendations for preparation of substrates to receive subsequent work.

3.2 CONSTRUCTION LAYOUT AND FIELD ENGINEERING

A. Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks.

B. Engage a land surveyor to lay out the Work using accepted surveying practices.

3.3 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations.

C. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

D. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

E. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

F. Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Provide temporary support of work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

D. Cutting: Cut in-place construction using methods least likely to damage elements retained or adjoining construction.

1. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

E. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in a manner that will minimize evidence of patching and refinishing.
2. Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.

3. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

3.5 CLEANING

A. Clean Project site and work areas daily, including common areas. Dispose of materials lawfully.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Remove debris from concealed spaces before enclosing the space.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
2. Sweep paved areas broom clean. Remove spills, stains, and other foreign deposits.
3. Remove labels that are not permanent.
4. Clean transparent materials, including mirrors. Remove excess glazing compounds.
5. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Sweep concrete floors broom clean.
6. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and foreign substances. Clean plumbing fixtures. Clean light fixtures, lamps, globes, and reflectors.

3.6 OPERATION AND MAINTENANCE MANUAL PREPARATION

A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are unavailable and where the information is necessary for proper operation and maintenance of equipment or systems.

C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams.

3.7 DEMONSTRATION AND TRAINING

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Include a detailed review of the following:

1. Include instruction for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

END OF SECTION 017000

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Items indicated to be removed and salvaged remain Owner's property. Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner. Include fasteners or brackets needed for reattachment elsewhere.

B. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with EPA regulations and with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 DEMOLITION

A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the building.

B. Locate, identify, shut off, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

C. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

D. Protect walls, ceilings, floors, and other existing finish work that are to remain. Erect and maintain dustproof partitions. Cover and protect furniture, furnishings, and equipment that have not been removed.

E. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

F. Provide temporary weather protection to prevent water leakage and damage to structure and interior areas.

G. Requirements for Building Reuse:

1. Maintain existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.
2. Maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not indicated to be demolished; do not demolish such existing construction beyond indicated limits.

H. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.

I. Remove demolition waste materials from Project site. Do not burn demolished materials.

J. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

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HAZARDOUS MATERIALS SURVEY
FINAL REPORT

CLIENT

Nevada Joint Union High School District

CONTACT

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SURVEY ADDRESS

Nevada Union High School
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AREA SURVEYED

Nevada Union High School Parking Lot Phase 2 and Ramp Upgrade

PREPARED BY

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Entek Project #18-4962

November 19, 2018

ENTEK

TABLE OF CONTENTS

Executive Summary

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

This inspection report was requested by Mr. Paul Palmer, Director of Facilities with Nevada Joint Union High School District.

The purpose of the inspection was to comply with US EPA NESHAP requirements and the California Air Resource Board (CARB) which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during the upcoming Nevada Union High School Parking Phase 2 and Ramp Upgrades Project that will occur at Nevada Union High School in Grass Valley, California.

The attached drawing shows approximate sample locations. Materials are classified in the table of this report as regulated asbestos containing material (RACM), Category I (CAT-1) or Category II (CAT-II) ACM, or asbestos containing construction material (ACCM), which included collecting multiple samples of some materials.

This is a summary of the report. The report must be read in its entirety, and the reader must review all the detailed information provided in the body of the report prior to making any interpretations, or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On November 8, 2018 Entek conducted a survey specific to the Nevada Union High Parking Phase 2 and Ramp Upgrades project area as indicated by Mr. Paul Palmer. The designated areas will be renovated as part of the Nevada Union High School Parking Lot Renovation Project. The results of testing for asbestos during this survey indicated asbestos is not present in any of the sampled suspect materials. Specifics pertaining to individual materials can be found in later sections of this report.

Lead

Entek investigated existing paints in an effort to determine if lead was present in these materials. The red paint on concrete curbing was determined to contain more than 5,000 ppm or 1.0 mg/cm^2 lead and is classified as a lead-based paint (LBP). If more than 100 square feet of these paints, coatings, or glazed ceramic tiles are impacted by a “trigger task”, prior notification to Cal/OSHA will be required.

The blue paint over red paint was determined to contain lead in amounts less than 5,000 ppm and is classified as a lead containing paint (LCP). Any work designated by California Occupational Safety Health Administration (Cal/OSHA) as a “trigger task” which will impact

these paints, coatings, or materials must be done by properly trained personnel, in compliance with all lead related Cal/OSHA regulations and requirements.

The yellow paint on the stair treads near the ramp did not contain lead above the analysis method detection limit of 50 ppm. Lead related construction work practices will not be required for work impacting these materials.

Introduction

This report presents results of an asbestos and lead survey performed by Entek which included areas specific to those anticipated to be impacted by the upcoming Phase 2 Parking Lot and Ramp Upgrade Project located in Grass Valley, California.

Mr. Andy Roed conducted this survey on November 8, 2018. Mr. Roed is a Cal/OSHA California Asbestos Consultant (CAC) and a State of California Department of Public Health (CDPH) Certified Lead Inspector Assessor.

Parking Lot Description

The Nevada Union High School Parking Lot Phase 2 Project area consists of the roadway located on the south side of the campus traveling in an east to west direction. The roadway was comprised of asphalt, while the curbing, sidewalks, and ramp/stairways were made up of concrete.

Asbestos Inspection and Sample Collection Protocols

Entek included only the areas specific to this project as indicated by Mr. Paul Palmer in this report. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the “Bulk Asbestos Material Analysis Request Form for Entek”, which served as the chain of custody for the samples, and on the building diagrams attached to this report

Asbestos Bulk Sample Results

There were several materials observed which are considered “suspect” under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM,

all "suspect" materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Carmichael, California. These samples were subsequently analyzed by polarized light microscopy (PLM) with dispersion staining. Asbestech is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for this analysis.

US EPA NESHAP uses the terms RACM, CAT-I, & CAT-II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in 8 CCR Part 1529.

A total of three (3) bulk samples were collected of all the materials considered to be "suspect," observed during this investigation that may be impacted during the upcoming renovations. Results of the analysis are listed in the following table:

Suspect Materials Found NOT TO Contain Asbestos				
Sample ID#'s	**Suspect Material**	**EPA AHERA "Suspected" ACBM**	**Asbestos Content**	**Location**
01A	Concrete	Miscellaneous	NONE DETECTED	Sidewalk Curbing
02A	Asphalt	Miscellaneous	NONE DETECTED	Roadway
03A	Concrete	Miscellaneous	NONE DETECTED	Ramp

NOTE: All sample numbers are preceded by ECG-18-4962

US EPA AHERA uses three terms when determining the classification of a material for the purpose of sampling. These terms include miscellaneous, surfacing, and thermal system insulation (TSI).

Miscellaneous materials are building materials on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or TSI.

The information provided in the tables of this report are for use by the owner in determining where asbestos containing materials are located, and whether or not any future work may impact those materials. The information is also provided for use by any contractor who may perform work in areas impacting the materials listed in this report.

Any building materials which are considered "suspect" for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected for containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, wood, metal, plastic, rubber, or glass. All other types of building materials

or coatings on the materials listed above are commonly listed as “suspect” and must be tested prior to impact. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Nevada County. The California Air Resource Board (CARB) has been given authority for enforcement of the NESHAP regulations by means of their own rules in this area.

Ten day advance written notification to the CARB is required prior to the performance of any demolition project regardless of asbestos being present or not. A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else.

Since no asbestos containing materials were found to be present in the project area, 10 day advance notification to the CARB will not be required for asbestos purposes. Notification would still be required in the event of a demolition activity.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations in 8 CCR Part 1529 apply during any disturbance of asbestos, regardless of the percentage, by a person while in the employ of another. These requirements apply even for materials found to contain <1% asbestos.

Since no asbestos containing materials were discovered during this survey, a licensed asbestos contractor, certified by the State of California, and registered with Cal/OSHA will not be required as part of this project.

Transite Pipe

Based on previous work in this area, it is possible that during the removal of the asphalt parking lot asbestos cement pipe could potentially be uncovered. If the contractor performing the removal of the asphalt does uncover the asbestos cement pipe or any other asbestos containing material (ACM) they must stop work immediately. If it is determined that the asbestos cement pipe or any other ACM material that has been uncovered will need to be removed, a registered asbestos abatement contractor will be required to complete the work. Entek recommends the use of a registered asbestos abatement contractor regardless of quantity or method of removal for all district projects that will encounter asbestos containing construction material.

Lead Inspection, Sampling, & Results

A total of three (3) bulk samples of painted surfaces were collected and submitted to Asbestech laboratory. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Asbestech is accredited by the California Department of Public Health's Environmental Laboratory Accreditation Program Branch to perform this analysis. Results are listed in the following table:

Paints/Coatings/ Materials Determined to be Lead Based Paint (LBP)			
Paint/Coating Color or Material	**Condition of Paint Sampled**	**Lead Content (ppm)**	**Component/Location**
Red Paint	Good	10,000	Concrete Curbing

Paints/Coatings/ Materials Determined to be Lead Containing Paint (LCP)		
Paint/Coating Color or Material	**Lead Content (ppm)**	**Component/Location**
Blue Paint	1,200	Blue Paint on Curbing

LCP - Materials/coatings/paints which contain measurable amounts of lead. The disturbance of these materials/coatings/paints is regulated by Cal/OSHA.

Paints/Coatings/Materials Determined NOT TO Contain Lead (≤ Reporting Limit, 50 ppm)	
Paint/Coating Color or Material	**Component/ Location**
Yellow Paint	Concrete Stair Treads

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces, but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered "lead related construction work".

Lead related construction work does not fit the classification of a "lead abatement project" under CDPH Title 17 regulations. "*Abatement*" is defined in 17 CCR, Division 1, Chapter 8, Article 1 as "any set of measures designed to reduce or eliminate lead hazards or LBP for public and residential buildings, but does not include containment or cleaning." A *lead hazard* is defined in 17 CCR, Division 1, Chapter 8, Article 1 as "deteriorated LBP, lead contaminated dust, lead contaminated soil, disturbing LBP or presumed LBP without containment, or any other nuisance which may result in persistent and quantifiable lead exposure."

Lead related construction work means any "construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup, that, by using or disturbing lead-containing material or soil, may result in significant exposure of adults or children to lead". (17 CCR, Division 1, Chapter 8, Article 1). Currently, Cal/OSHA has not established a definition for LBP, nor have they established minimum concentrations where their regulations do not apply. Cal/OSHA regulates all construction activities involving materials containing lead, including LBP. These regulations are found in 8 CCR, Part 1532.1, Lead in Construction.

Since Cal/OSHA has not established a concentration of lead in a product where their regulations do not apply, any disturbance to products containing lead come under the jurisdiction of Cal/OSHA and their regulations. Disturbance of paints/coatings or materials determined to be LBP may trigger a pre-work notification to Cal/OSHA if "trigger tasks" disturb 100 square feet or more of those paints/coatings or materials. Trigger tasks are described in 8 CCR Part 1532.1 and include: manual demolition, power tool cleaning without dust collection systems, abrasive blasting, welding, cutting, and torch burning.

Limitations

Entek inspected only the those areas to be impacted by the Nevada Union High School Parking Lot Phase 2 Project area as indicated by you. This survey is specific to the areas scheduled to be impacted as part of the upcoming Nevada Union High School Parking Lot Renovation Project.

As a result, the information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos in this report are discovered, the new material must be assumed to contain asbestos until properly inspected and tested for asbestos content.

Entek's policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3 year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per Nevada JUHSD Engineering policies.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by: 

Andy Roed
Senior Project Manager
Cal/OSHA CAC #18-4962
CDPH I/A Certification #29001

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documentation

APPENDIX A

ASBESTOS RELATED DOCUMENTS

- Bulk Asbestos Material Analysis Report Form for Entek
- Bulk Asbestos Analysis Report From Asbestech
- Bulk Asbestos Material Analysis Request Form for Entek
- Asbestos Bulk Sample Location Drawing

ENTEK

BULK ASBESTOS MATERIAL *Analysis Report*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: November 8, 2018 **Lab:** Asbestech

Job Number: 18-4962 **Collected by:** Andy Roed

Client Name: Nevada JUHSD

Site Address: Nevada UHS
11761 Ridge Road
Grass Valley, CA 95945

SAMPLE #	RESULTS	MATERIAL DESCRIPTION/LOCATION
ECG-18-4962-01	NONE DETECTED	Concrete / Sidewalk
ECG-18-4962-02	NONE DETECTED	Asphalt / Roadway
ECG-18-4962-03	NONE DETECTED	Concrete / Wheelchair Ramp

\\SERVER\Entek\Clients\Nevada JUHSD\18-4962 Nevada UHS - Parking Phase 2 & Ramp Upgrade - Pre-Reno Asb & Pb\Bulk Sample Asb\Bulk Report 11-8-18.wpd

ASBESTECH
6825 Fair Oaks Blvd., Suite 103
Carmichael, California 95608
Tel.(916) 481-8902 Fax (916) 481-3975

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
18-4962 NJUSD
11761 Ridge Rd.
Grass Valley, CA

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 66023
Date/Time Collected: 11/8/18
Date Received: 11/10/18

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 11/12/18

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-18-4962-01	Gray concrete sidewalk	NONE DETECTED	Granular Mins.
02	Black asphalt roadway	NONE DETECTED	Granular Mins. Tar Binder
03	Gray concrete wheelchair ramp	NONE DETECTED	Granular Mins.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: TOM CONLON

66623

ENTEK

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 11-8-2018

Job Number: 18-4962

Client Name: NJUSD

Site Address: 11761 Ridge Road
Grass Valley, Ca 95945

Lab: Asbestech

Collected by: Andy Roed

Turnaround Time: Day: Wed
Date: 11 / 14 / 18 Time: 3 PM

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-18-4962-01	Concrete / Sidewalk
ECG-18-4962-02	Asphalt / Roadway
ECG-18-4962-03	Concrete / Wheelchair Ramp

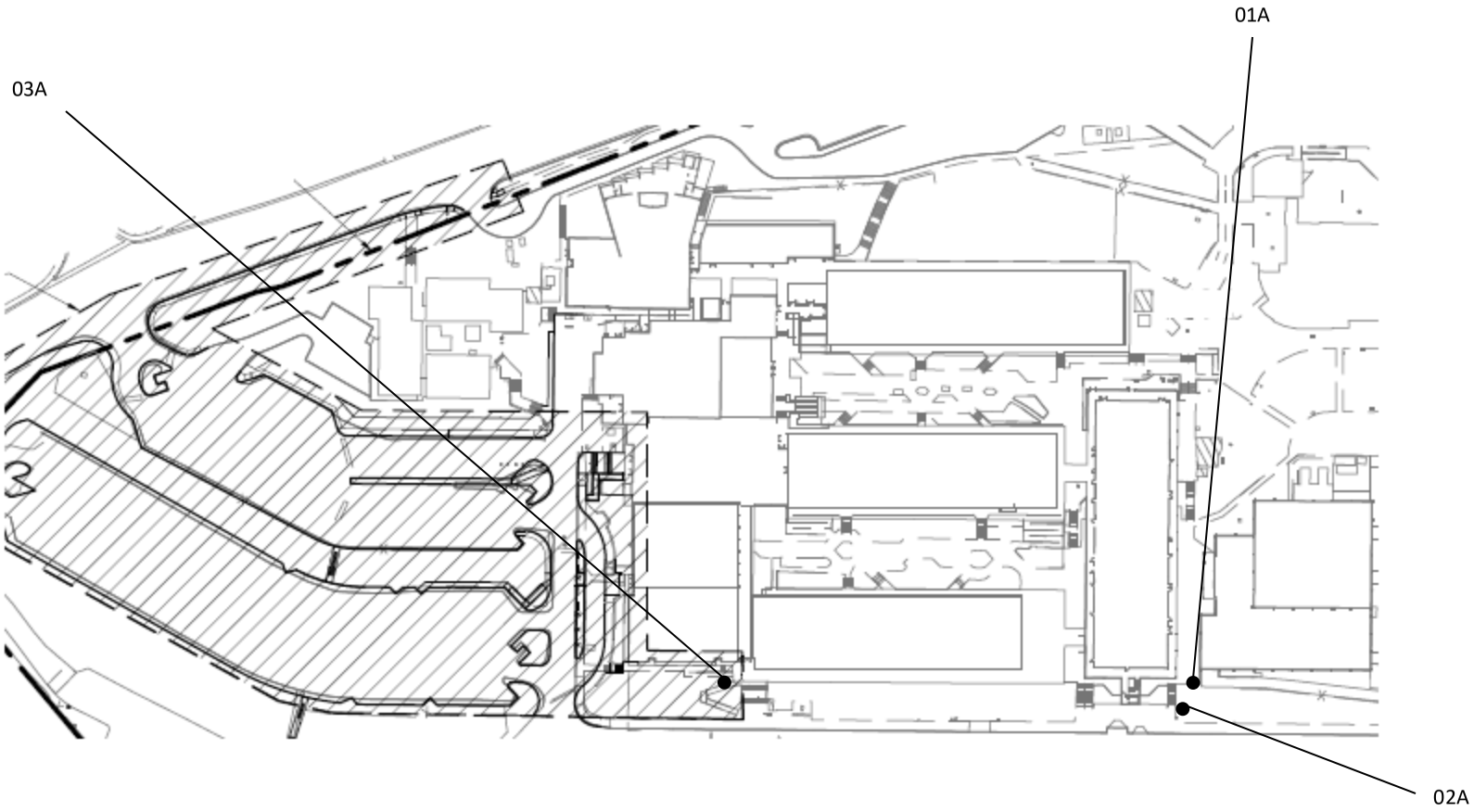
C:\Users\andy\Desktop\Bulk Request NJUSD Parking Phase 2.wpd

Delivered by: _____ **Date:** 11 / 10 / 18 **Time:** 9 AM/PM

Received by: _____ **Date:** 11 / 10 / 18 **Time:** 9:5 AM/PM

N

Nevada Union High School



Nevada Joint Union High School District
Nevada Union High School
11761 Ridge Road
Grass Valley, CA

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677
Map Not to Scale
Z: Clients/ Client Name / Project Number / Drawing / etc.

Asbestos Bulk Sample Locations
Collected by Andy Roed
On November 8, 2018
Project Number 18-4962

APPENDIX B

LEAD RELATED DOCUMENTS

- Bulk Lead Material Analysis Report Form for Entek
- Lead in Paint Samples Analysis Report From Asbestech
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawing
- Lead Hazard Evaluation Report (CDPH 8552)

ENTEK

BULK LEAD MATERIAL *Analysis Report*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: November 8, 2018 **Lab:** Asbestech

Job Number: 18-4962 **Collected by:** Andy Roed

Client Name: Nevada JUHSD

Site Address: Nevada UHS
11761 Ridge Road
Grass Valley, CA 95945

SAMPLE #	LEAD RESULT (PPM)	RESULT IN WT%	MATERIAL DESCRIPTION/LOCATION
ECG-18-4962-01PB	10,000	1.0	Red Paint on Concrete Curbing
ECG-18-4962-02PB	1,200	0.12	Blue Paint over Red Paint on Concrete Curbing
ECG-18-4962-03PB	<50	<0.0050	Yellow Paint on Concrete Stairs

\\SERVER\Entek\Clients\Nevada JUHSD\18-4962 Nevada UHS - Parking Phase 2 & Ramp Upgrade - Pre-Reno Asb & Pb\Bulk Sample Pb\Bulk Report Pb 11-8-18.wpd

ASBESTECH
6825 Fair Oaks Blvd., Suite 103
Carmichael, California 95608
Tel (916) 481-8902
Fax (916) 481-3975

FLAME ATOMIC ABSORPTION SPECTROMETRY
LEAD (Pb) IN PAINT SAMPLES
METHOD SW846-3050B-7420

CLIENT:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

CDPH ELAP#1153
ELPAT#101801

JOB I.D: 18-4962, Nevada JUHSD,
11761 Ridge Rd.,
Grass Valley , Ca

DATE RECEIVED: 11/10/18

DATE ANALYZED: 11/14/18

LAB JOB NO: 11575

DATE REPORTED: 11/14/18

SAMPLE DATE	SAMPLE NUMBER	DESCRIPTION	PPM	RESULT IN WT%	RL	Q.C. BATCH
11/8/18	ECG-18-4962-01Pb	Red paint on concrete curbing	10000	1.0	0.0050%	148
11/8/18	ECG-18-4962-02Pb	Blue over red paint on concrete curbing	1200	0.12	0.0050%	148
11/8/18	ECG-18-4962-03Pb	Yellow paint on concrete stairs	<50	<0.0050	0.0050%	148

LABORATORY DIRECTOR: TOM CONLON

ANALYST: JIM JUNGLES

ENTEK

11575

BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 11-8-18

Lab: Asbestech

Job Number: 18-4962

Collected by: Andy Roed

Client Name: Nevada JUHSD

Turnaround Time: Day: Wed
Date: 11 / 14 / 18 Time: 3 PM

Site Address: 11761 Ridge Road
Grass Valley, CA 95945

ANALYSIS REQUESTED: Lead AA

$175

SAMPLE #	MATERIAL DESCRIPTION/LOCATION	
ECG-18-4962-01PB	Red Paint on Concrete Curbing	10000 / 1.0
ECG-18-4962-02PB	Blue Paint over Red Paint on Concrete Curbing	1200 / 1.2
ECG-18-4962-03PB	Yellow Paint on Concrete Stairs	<

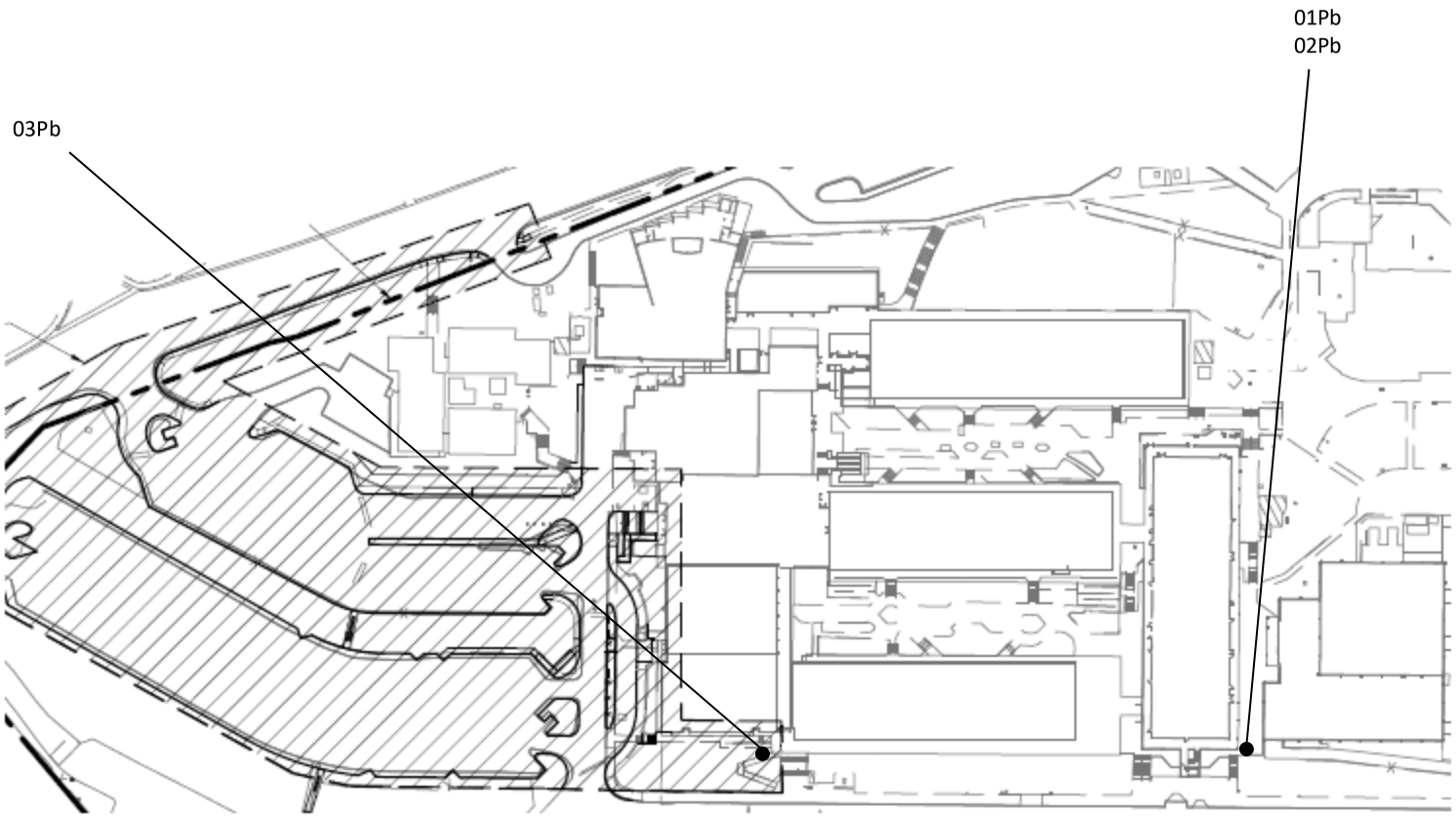
C:\Users\andy\Desktop\Bulk Request NJUSD Parking Phase 2 Lead.wpd

11/10/18 9 AM

Rec'd: 11/1/18 9:50 AM

N

Nevada Union High School



Nevada Joint Union High School District
Nevada Union High School
11761 Ridge Road
Grass Valley, CA

Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677
Map Not to Scale
Z: Clients/ Client Name / Project Number / Drawing / etc.

Lead Bulk Sample Locations
Collected by Andy Roed
On November 8, 2018
Project Number 18-4962

LEAD HAZARD EVALUATION REPORT

Section 1 – Date of Lead Hazard Evaluation 11-8-2018

Section 2 – Type of Lead Hazard Evaluation (Check one box only)

❒ Lead Inspection ❒ Risk Assessment ❒ Clearance Inspection ■ Other (specify) See Attached Letter dated April 21, 2015

Section 3–Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
11761 Ridge Road	Grass Valley	Nevada	95945

Construction date (year) of structure	Type of structure	Children living in structure?
Unknown	❒ Multi-unit building ■ School or daycare ❒ Single family dwelling ■ Other (specify) Parking Lot	❒ Yes ■ No ❒ Don't Know

Section 4–Owner of Structure (If business/agency, list contact person)

Name	Telephone Number
	(916)

Address [number, street, apartment (if applicable)]	City	State	Zip Code
	Sacramento	California	

Section 5–Results of Lead Hazard Evaluation (Check all that apply)

❒ No lead-based paint detected ■ Intact lead-based paint detected. ❒ Deteriorated lead-based paint detected

❒ No lead hazards detected ❒ Lead-contaminated dust found ❒ Lead contaminated soil found ❒ Other _____

Section 6–Individual Conducting Lead Hazard Evaluation

Name	Telephone Number
Entek Consulting Group, Inc. - Andy Roed	(916) 632-6800

Address [number, street, apartment (if applicable)]	City	State	Zip Code
4200 Rocklin Road, Suite 7	Rocklin	CA	95677

CDPH certification number	Signature	Date
29001		11-19-18

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

N/A

Section 7–Attachments

A. A foundation diagram or sketch of the structure indicating the specific locations of each lead hazard or presence of lead-based paint;

B. Each testing method, device, and sampling procedure used;

C. All data collected, including quality control data, laboratory results, indicating laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

ENTEK
CONSULTING GROUP, INC.
4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Telephone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

April 21, 2015

State of California
Health and Human Services Agency
California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Parkway, Building P, Third Floor
Richmond, CA 94804-6403

RE: Lead Hazard Evaluation Report (CDPH 8552 - 6/07)

To Whom it May Concern:

In a memorandum issued to all "California Department of Health Services Certified Inspector/Assessors and Project Monitors", by the State of California - Health and Human Services Agency, Department of Health Services (CDPH), dated June 5, 2006, and signed by Mr. Paul Fitzmaurice, Chief, Lead Hazard Reduction Section, Childhood Lead Poisoning Prevention Branch, it was made clear that"... the on-site investigation, for compensation, of lead-based paint or lead hazards..." includes"... conducting testing and/or sampling activities as part of a non-'abatement' project (e.g. painting remodeling, etc.)."

As a result of this directive, Entek Consulting Group, Inc. (Entek) is providing you with the current CDPH Form 8552 (06/07) documenting an inspection/assessment performed by Entek.

The investigation results being reported on the attached CDPH Form 8552 do not reflect a "Lead Inspection/Assessment" as defined in Title 17. As a result the "Other" box, in "Section 2 - Type of Lead Hazard Evaluation", is checked. This is being done to make it clear this investigation does not meet the definition of a "Lead Inspection/Assessment", and submission of the attached CDPH Form 8552 is not meant to reflect that it does.

CDPH Form 8552, Section 5 - Results of Lead Hazard Evaluation, does not allow for an appropriate option pertaining to the results of the investigation/assessment performed and being reported (i.e. for the purpose of compliance with Cal/OSHA, Title 8 1532.1 Lead), or an assessment being performed in an unregulated structure. While one of or more of the four boxes is checked to reflect the results of the inspection/assessment. The lead inspection/assessment was not required under Title 17.

This letter is not intended to disagree whether a CDPH Form 8552 must be submitted, but is for clarification as to the information included on the CDPH Form 8552, and its intended purpose, namely to reflect the goal of the services performed by Entek.

Sincerely,

Richard A. Beall, CIH, CSP
President

Z:\Lead\Lead Hazard Evaluation Report CDPH 8552 Ltr 4-21-15.wpd

APPENDIX C

BACK UP DOCUMENTATION

- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos and Lead Analysis

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Andrew R Roed
Name

Certification No. **16-5695**

Expires on **08/17/19**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

State of California Department of Public Health

Lead-Related Construction Certificate

Certificate Type

Inspector/Assessor

Expiration Date

09/06/2019

Andrew R. Roed

ID #: 29001

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101442-0

ASBESTECH

Carmichael, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2018-07-01 through 2019-06-30

Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

ASBESTECH
6825 Fair Oaks Blvd., Suite 103
Carmichael, CA 95608
Mr. Tommy Conlon
Phone: 916-481-8902 Fax: 916-481-3975
Email: asbestech@sbcglobal.net
http://www.asbestechlab.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 101442-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	*Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

Laboratory: Asbestech

6825 Fair Oaks Boulevard

Carmichael, CA 95608

Scope of the certificate is limited to the
"Fields of Testing"
which accompany this Certificate.

Continued accredited status depends on successful completion of on-site inspection, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1153**

Expiration Date: **3/31/2020**

Effective Date: **4/1/2018**

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Chief
Environmental Laboratory Accreditation Program

CALIFORNIA STATE
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

Asbestech

6825 Fair Oaks Boulevard
Carmichael, CA 95608
Phone: (916) 481-8902

Certificate No. 1153
Expiration Date 3/31/2020

Field of Testing: 114 - Inorganic Chemistry of Hazardous Waste			
114.130	001	Lead	EPA 7420
Field of Testing: 115 - Extraction Test of Hazardous Waste			
115.020	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311 (TCLP)
115.030	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
Field of Testing: 121 - Bulk Asbestos Analysis of Hazardous Waste			
121.010	001	Bulk Asbestos	EPA 600/M4-82-020

As of 10/23/2018 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

PAT PROGRAMS
AIHA PROFICIENCY ANALYTICAL TESTING PROGRAMS

3141 Fairview Park Drive, Suite 777, Falls Church, VA 22042 USA
main 1+ 703-846-0757 fax 1+ 703-207-8558
email info.patllc@aiha.org *web* http://www.aihapat.org

Environmental Lead Round 103
Proficiency Testing Performance for Participant ID: PAT-101801

Report Issue Date: 06/15/2018

Asbestech
6825 Fair Oaks Blvd Ste 103
Carmichael, CA 95608-3836

This report contains your organization's Environmental Lead Proficiency Analytical Testing results for **ELPAT Round 103**. It is the participant's responsibility to thoroughly review the information in this final report and to immediately contact the AIHA Proficiency Analytical Testing Programs, in writing, if any errors are found.

Environmental Lead Proficiency Analytical Testing Results
The final report is comprised of two sections relating to ELPAT Round 103. The first section contains your organization's results listed per analyte, per sample. The second section contains your current performance and performance from the two previous rounds, respectively (where applicable). Summary results for all participants for ELPAT Round 103 are located in a separate report.

Testing Results for ELPAT Round 103
This part of the report contains your organization's results listed per analyte, per sample.

Contaminant	Unit	#	Result	Ref. Value	Lower Limit	Upper Limit	z-Score	Rating
Paint Chips (PAINT)	%	1	1.77	1.74	1.4	2.08	0.3	A
	%	2	0.612	0.632	0.503	0.76	-0.5	A
	%	3	3.09	3.02	2.46	3.59	0.4	A
	%	4	0.0563	0.054	0.0408	0.0671	0.5	A

Statistical Analysis Interpretation Note:
Reference value is the mean of the reference group.
Lower limit = reference value - 3 standard deviations; Upper limit = reference value + 3 standard deviations
z-Score = (reported result - reference value)/standard deviation. Note: z-Scores indicate how far a particular score is away from the mean.
A - Acceptable* Analysis; U - Unacceptable Analysis
Both the assigned values and acceptance limits are based on consensus of the reference group.
*The acceptability of reported results is based on upper and lower acceptance limits. This is why a reported result may appear unacceptable according to z-Score, but be identified as acceptable.
Any non-participation or non-reporting of PAT data will result in unacceptable results (see PAT Programs Participation Policies, Section 2.1.6.2.).
Technical Comment: No remarkable observations.

Overall Performance Summary Concluding with ELPAT Round 103

The following table contains your organization's current and two previous test rounds performance respectively (where applicable). For more information in regard to the determination of proficiency, please visit: www.aihapat.org.

Analyte Class	Round	Round Score	Round Performance	Proficiency Status - Four Round Score
Paint	100	3/4	PASS	
	101	4/4	PASS	
	102	4/4	PASS	
	103	4/4	PASS	PROFICIENT

Interpretation Notes:

The denominators represent the total number of samples analyzed.
The numerators represent the number of acceptable results.
P - Proficient; NP - Non-proficient; I - Indeterminate (not enough rounds to determine proficiency)
A participant is rated proficient for the applicable ELPAT matrix if the participant's performance meets any of the following:(1) In the last two rounds, all samples are analyzed and the results are 100% acceptable; or (2) three fourths (75%) or more of the accumulated results over four (4) rounds are acceptable. A participant is rated non-proficient for the applicable matrix if the participant's performance does not meet either of the proficiency categories mentioned above.

Additional information on the following items are available in the Environmental Lead Scheme Plan:
Procedures used to statistically analyze the data, establish the assigned value and standard deviation for proficiency assessment, or other criteria for evaluation; details of the metrological traceability and measurement uncertainty of the assigned value; information about design and implementation of PT scheme. The Environmental Lead Scheme Plan is available in the PAT Portal. Measurement uncertainty of any assigned value is also available on the respective certificate of analysis for the round.

Participants shall not describe their proficiency status in a manner that implies accreditation, certification or variations thereof. PAT results pertain only to the participant organization at the location listed on this results report. AIHA PAT Programs makes every effort to ensure that individual participant results are kept confidential and are not made public. Round results are only released to the participant and those entities requiring this information for accreditation, regulatory and contract purposes. New participants are made aware of the arrangement in advance of participation and consent is sought prior to the release of records for participants. PAT reports may not be reproduced or distributed unless copied in its entirety.

ELPAT samples are generated, verified, packaged, and shipped by RTI International under contract with AIHA Proficiency Analytical Testing Programs. Unless otherwise noted, sample homogeneity and stability criteria were satisfied for all samples.

Authorized by:
David Clawson
Technical and Quality Program Manager
AIHA PAT Programs
dclawson@aiha.org

ENTEK
CONSULTING GROUP, INC.
4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Telephone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

Asbestos Cement "Transite" Pipe Removal Specifications
Nevada Joint Union High School District
Nevada Union High School

During the upcoming Nevada Union High School Parking Lot Renovation Project it is possible that during the removal of the asphalt parking lot asbestos cement pipe could potentially be uncovered. If the contractor performing the removal of the asphalt does uncover the asbestos cement pipe or any other asbestos containing material (ACM) they must stop work immediately. If it is determined that the asbestos cement pipe or any other ACM material that has been uncovered will need to be removed, a registered asbestos abatement contractor will be required to complete the work. Entek recommends the use of a registered asbestos abatement contractor regardless of quantity or method of removal for all district projects that will encounter asbestos containing construction material. Where transite pipe or any other ACM material is uncovered the following procedures shall be enforced:

Procedures

1. All requirements of Cal/OSHA Section 1529 and US EPA AHERA regulations apply as they pertain to training, work practices, and air monitoring of workers and waste disposal of asbestos material.

2. Personal air monitoring shall be performed in accordance with Cal/OSHA Section 1529 to ensure no worker is exposed over the permissible exposure limit (PEL) for asbestos.

3. Establishment of a work area restricting access to those personnel involved in the work, and posting of the work area is required.

4. An appropriately sized drop cloth of 6-10 mil poly sheeting sufficient in size to contain any debris generated during the removal shall be placed directly under the area to be worked to collect any fallen debris generated during the work.

5. Half-masks with HEPA filtration and disposable suits (at a minimum) shall be used during this work until air monitoring has shown no exposure over the PEL and a negative exposure assessment has been obtained.

6. A HEPA filtered vacuum must be in the immediate area ready for use.

7. Where the pipe must be cut the contractor may use any method applicable to performing the work. Entek recommends the use of a chain snap cut method to cleanly break the pipe into manageable sections. Any use of hand or mechanical saws, or other method which will produce dust and will require the use of the HEPA vacuum and engineering controls which will collect any and all dust generated during the sawing process. Entek does not recommend the use of removal methods which will produce dust.

8. The Contractor shall apply a sufficient amount of amended water to all pipe surfaces to be impacted during the work to keep them adequately wet.

9. All of the Contractor's materials, including poly sheeting, tools, etc. shall be properly decontaminated of visible dust and pipe debris utilizing wet cleaning methods and HEPA vacuuming prior to being removed at the completion of the work performed. Disposable materials must be properly disposed.

10. Transite waste generated may be disposed as non-hazardous asbestos waste, in a landfill permitted to accept non-friable, non-hazardous asbestos material. If the transite material is currently friable, or becomes friable during its removal, it shall be labeled as friable hazardous asbestos waste and disposed of in a landfill permitted to accept such waste.

    It is acceptable to dispose of non-friable transite waste after placing it into two 6 mil thick polyethylene bags or wrapped in larger 6 mil sheets which are properly sealed and marked to meet current OSHA asbestos disposal requirements.

11. The Contractor is required to provide to Owner's Agent a copy of the "trip ticket" indicating the actual weight of waste material and the landfill accepting the waste.

Notes on training requirements and worker protection:

Workers must at minimum receive a 4 hour material specific transite pipe handling and removal course to perform the related removal work. Supervisors must receive additional training. Courses such as the AHERA accredited 32 hour worker course or 40 hour supervisor course are recommended by Entek for all personnel performing removal of asbestos material.

All workers utilizing a HEPA filtered respirator must receive a respirator fit test administered by a competent person. Any workers utilizing a respirator or performing work on asbestos related material for more than 30 days in a calendar year must receive an annual medical evaluation.

Requirements for removal:

Owners are not required to remove abandoned or disused transite piping systems that will not be impacted by construction activities. Location of all such systems should be recorded and marked where possible. Hazard communication training would be required for all workers that could potential impact such systems. Any work which does not disturb the "matrix" of the transite material will not require adherence to Cal/OSHA asbestos regulations.

Lead Paint Removal Specifications
Nevada Joint Union High School District
Nevada Union High School

During the upcoming Nevada Union High School Parking Lot Renovation Project green lead based paint on the north side of the parking lot and lead containing yellow paint striping throughout the parking lot will be removed.

Procedures

1. All workers who will impact lead containing materials on this project shall have "hazard communication," or "lead awareness" training. This is usually done in less than an hour depending on the work the employee will conduct. Workers must be informed of the type and location of lead containing material.

2. These work practices are prohibited during this project:

   a. Open-flame burning or torching.

   b Machine sanding or grinding of lead materials or surfaces coated with lead unless the machine is equipped with a HEPA-filtered-vacuum recovery system.

   c. Un-contained hydro-blasting or high-pressure washing.

   d. The use of power washing to remove loose and peeling paint.

   e. Abrasive blasting or sandblasting without a HEPA-filtered-vacuum recovery system or done outside of a negative pressure enclosure.

   f. Heat guns operating above 1,100 °F.

   g. Dry scraping, except for limited areas where electrical hazards create a higher risk than lead.

   h. Use of methylene chloride based paint strippers.

3. All waste must be properly tested and disposed of by the Contractor. The Contractor must create separate waste streams as necessary. This particularly includes the separation of any loose paint chips from other construction debris. All waste streams must be identified by the Contractor before the work begins and separated during the course of the project to minimize costs of disposal.

4. Tests should include a Total Threshold Limit Concentration (TTLC) and if necessary further analysis by Solubility Threshold Limit Concentration (STLC) for lead.

5. Any facility that will receive waste for recycling purposes must be informed of the presence of lead in the material.

Specifications Created by:
Andy Roed
Senior Project Manager
Entek Consulting Group, Inc.
November 19, 2018

Project No. 3408.03
January 8, 2018

Nevada Joint Union High School District
C/O Siteline Architecture
David S. Tallitsch
644 Zion Street
Nevada City, CA 95959

Attention: Jordon Kohler, Director of Facilities and Construction

Reference: **Site Improvements and Paving Phase II**
Nevada Union High School (NUHS)
APN 035-250-001
11761 Ridge Road
Grass Valley, California

Subject: **Geotechnical Engineering Report Update and Applicability**

Dear Mr. Kohler,

Holdrege & Kull, An NV5 Company (H&K/NV5) prepared this letter to update the findings of our previous geotechnical engineering report for Nevada Union High School (NUHS) located at 11761 Ridge Road in Grass Valley, California. The subject property encompasses Nevada County Assessor's Parcel Number (APN) 035-250-001. The purpose of this letter is to confirm that the findings of our geotechnical engineering report are still valid for the subject property, and to verify that the recommendations of our geotechnical engineering report are applicable to the new proposed site improvements and paving (Phase II). This letter should be used in conjunction with our previously prepared *Geotechnical Engineering Report for Nevada Union High School Improvements* dated October 23, 2007.

REPORT UPDATE

It is our opinion that our geotechnical engineering report is still valid for the subject property, with the exception of seismic design criteria. The following section contains updated design criteria. This update was performed so that the report complies with current code requirements.

SEISMIC DESIGN CRITERIA

The paragraphs and table below supersede Section 5.2 of the geotechnical engineering report (H&K, 2007).

H&K/NV5 developed the code-based seismic design parameters in accordance with Section 1613 of the 2016 CBC and the California Office of Statewide Health Planning and Development (OSHPD) seismic design maps, formerly facilitated by the USGS, *U.S. Seismic "DesignMaps" Web Application, Version 3.1.0.* The internet based application (https://seismicmaps.org/) is used for determining seismic design values from the 2016 ASCE-7 Standard, and the 2015 International Building Code (2015 IBC) in accordance with the 2016 CBC.

Table 5.2.1 below summarizes seismic design criteria. Based on our field observations and laboratory tests, we classified the on-site soil as clayey sand (SC) for design purposes.

Table 5.2.1 - Seismic Design Parameters

Description	Value	Reference
Latitude North (degree)	39.2400	Google Earth
Longitude West (degree)	-121.0549	Google Earth
Site Coefficient, F_A	1.160	*2016 CBC, Table 1613A.3.3(1), OSHPD, ASCE 7-16*
Site Coefficient, F_V	1.559	*2016 CBC, Table 1613A.3.3(2), OSHPD, ASCE 7-16*
Site Class	C = Very Dense Soil and Soft Rock	*ASCE 7-10 Chapter 20, Table 20.3-1*
Short (0.2 sec) Spectral Response, S_S (g)	0.600	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Long (1.0 sec) Spectral Response, S_1 *(g)*	0.241	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Short (0.2 sec) MCE Spectral Response, S_{MS} *(g)*	0.696	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Long (1.0 sec) MCE Spectral Response, S_{M1} *(g)*	0.376	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Short (0.2 sec) Design Spectral Response, S_{DS} *(g)*	0.464	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Long (1.0 sec) Design Spectral Response, S_{D1} *(g)*	0.251	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Seismic Design Category (Risk Category I, II or II)	III	*ASCE 7-10, Section 11.4.3, OSHPD, ASCE 7-16*
Geometric Mean Peak Ground Acceleration (PGA_M) (g)	0.266	*ASCE 7-10, Section 11.8.3, OSHPD, ASCE 7-16*

deg = degrees
sec = second
g = gravitational acceleration (9.81 meters per second^2 = 32.2 feet per second^2)

CBC = California Building Code
MCE = *Maximum Considered Earthquake*
OSHPD = *California Office of Statewide Health Planning and Development seismic design maps.*
USGS = United States Geological Survey

NEW PROPOSED IMPROVEMENTS AND REPORT APPLICABILITY

The geotechnical engineering report (H&K, 2007) focused on the renovation and expansion of the existing multi-purpose room located at NUHS. Based on our discussions with the project architect and review of a partial site plan provided by Siteline Architecture, we understand that new proposed improvements will likely include paving, flatwork, and construction of a new shade structure in the area of the Math/Arts Building.

In our opinion, the geotechnical engineering report (H&K, 2007), used in conjunction with this letter, is applicable to the new proposed improvements.

H&K/NV5 should be retained to review the final project plans prior to construction to confirm our understanding of the project to determine whether our recommendations have been implemented, and to provide additional and/or modified recommendations, if necessary.

LIMITATIONS

The limitations outlined in the *Geotechnical Engineering Report for Nevada Union High School Improvements* dated October 23, 2007, are applicable to this letter. Accordingly, the recommendations presented in this letter should not be relied upon after a period of two years from the issue date without our review. We have prepared this letter for your exclusive use in accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our services. No warranty, express or implied, is intended.

We appreciate the opportunity to provide geotechnical engineering services for your project. If you have any questions regarding this letter or the geotechnical engineering report, please contact the undersigned.

Sincerely,

Holdrege & Kull, An NV5 Company

Prepared by:

Janina S. Smith
Staff Engineer

Reviewed by:

Chuck R. Kull, G.E. 2359
Principal Engineer

copies: PDF to Jordan Kohler, JKohler@NJUHSD.com
PDF to Siteline Architecture/ Attn: David Tallitsch, dst@sitelinearch.com

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GEOTECHNICAL ENGINEERING REPORT
for
NEVADA UNION HIGH SCHOOL
IMPROVEMENTS
11761 Ridge Road
Nevada County, California

Prepared for:
Nevada Joint Union High School District
11645 Ridge Road
Grass Valley, California 95945-7906

Prepared by:
Holdrege & Kull
792 Searls Avenue
Nevada City, California 95959

Project No. 3408-01
October 23, 2007

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 3408-01
October 23, 2007

Paul Palmer
Nevada Joint Union High School District
11645 Ridge Road
Grass Valley, California 95945

Reference: ***Proposed Multi-Purpose Room Renovation / Student Commons***
Nevada Joint Union High School
11761 Ridge Road
Nevada County, California

Subject: ***Geotechnical Engineering Report***

Dear Mr. Palmer:

This report presents the results of our geotechnical engineering investigation for site improvements at the existing Nevada Union High School, located at 11761 Ridge Road in Nevada County, California. As proposed, the project is to include renovation and expansion of the existing multi-purpose room.

The findings presented in this report are based on our subsurface investigation, laboratory test results, and our experience with subsurface conditions in the area. Our opinion is that the project can be completed as proposed, provided the recommendations presented in this report are implemented. Our primary concerns, from a geotechnical engineering standpoint, include the presence of existing fill, and the proximity of the proposed improvements to existing structures and underground utilities. Recommendations for mitigating soil disturbed by demolition activities and existing fill are provided in this report.

Please contact us if you have any questions regarding our observations or the recommendations presented in this report.

Sincerely,

HOLDREGE & KULL

Prepared by:

Nadine Langley, P.G. 7954
Project Geologist

Reviewed by:

Rob Fingerson, G.E. 2699
Senior Engineer

copies: 4 to Deems Lewis McKinley / Attn: Chris Ramm
1 to Nevada Union High School / Attn: Paul Palmer

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TABLE OF CONTENTS

1 INTRODUCTION

At the request of Paul Palmer of the Nevada Joint Union High School District, Holdrege & Kull (H&K) performed a geotechnical investigation at the Nevada Union High School site in Nevada County, California. The geotechnical investigation was performed in general accordance with our August 21, 2007 proposal for the project, a copy of which is included as Appendix A of this report. For your review, Appendix B contains a document prepared by ASFE entitled *Important Information About Your Geotechnical Engineering Report,* which summarizes the general limitations, responsibilities, and use of geotechnical reports.

1.1 SITE DESCRIPTION

The existing Nevada Union High School site is located on the south side of Ridge Road in Nevada County, California. The project area is presently occupied by a multi-purpose room that includes a cafeteria and a covered student commons patio. The school site is bordered by residential properties to the north and east, the Sierra College Grass Valley campus to the south, and by a church to the west. The high school campus slopes toward the south, and existing structures are situated at multiple levels with elevations decreasing toward the south.

The existing theater and music room are located adjacent to, and at a similar or slightly lower elevation than Ridge Road. The existing multi-purpose room and classroom wing are slightly lower than the theater and music rooms, and the administration and classroom wing is situated at a lower elevation than the multi-purpose room.

1.2 PROPOSED IMPROVEMENTS

Based on our discussions with the project architect and review of a March 2007 conceptual site plan for the project provided by Deems Lewis McKinley, Architecture, we understand that the proposed improvements will likely include renovation and expansion of the existing multi-purpose room and cafeteria. We anticipate that the renovation will include demolition of a portion of the existing multi-purpose room and patio, overexcavation of existing fill, and excavation and grading for building pads and underground utilities.

1.3 PURPOSE

The purpose of the design-level geotechnical investigation is to provide grading and drainage recommendations, and foundation, retaining wall, and slab-on-grade

design criteria for the project. A geologic hazards and seismic evaluation is provided under separate cover. The geologic hazards report is intended to identify potential hazards and provide ground motion parameters and seismic design criteria.

1.4 SCOPE-OF-SERVICES

To prepare this report, we performed the following scope of services:

- We performed a site investigation, including a literature review and a subsurface investigation.
- We collected relatively undisturbed soil samples and bulk soil samples from selected exploratory borings.
- We performed laboratory tests on select soil samples obtained during our subsurface investigation to determine their engineering material properties.
- Based on observations made during our subsurface investigation and the results of laboratory testing, we performed engineering calculations to provide geotechnical engineering recommendations for earthwork and structural improvements.
- We performed a geologic hazards investigation in accordance with California Geological Survey Note 48. The investigation included evaluation of seismic hazards and calculation of ground motion parameters. The geologic hazard report is to be issued as a separate report.

Our scope of services did not include a groundwater flow analysis or an evaluation of the site for the presence of hazardous materials, mold, or historic mining features.

2 SITE INVESTIGATION

We performed a site investigation to characterize the existing surface conditions and shallow subsurface soil/rock conditions. Our site investigation included a literature review and field investigation as described below.

2.1 LITERATURE REVIEW

We reviewed geologic maps and literature pertaining to the project site. A list of references is included in Section 6. The following sections summarize our findings.

2.1.1 Previous Site Investigations

We reviewed the following reports for information about site conditions and site seismicity.

Wallace-Kuhl & Associates, Inc (WKA), May 8, 2000, *Update of Geologic Hazards Study for Nevada Union High School Relocatable Classrooms.* The update report provided seismic design criteria for relocatable classrooms.

Wallace-Kuhl & Associates, Inc (WKA), August 11, 1994, *Geologic Hazards Report for Nevada Union High School Additions*. The WKA investigation focused on site improvements that included a new science wing, classrooms and lecture room, additional parking, new open-air amphitheaters near the science wing/cafeteria, relocatable classrooms, and gymnasium additions.

2.1.2 Soil Survey

As part of our study, we reviewed the on-line version of the *Soil Survey of Nevada County, California* (USDA Soil Conservation Service, 2007). According to the soil survey, the site is primarily underlain by Aiken loam on 9 to 30 percent slopes, and cut and fill land.

Cut and fill land refers to previously graded areas. The properties of cut and fill land depend on the soil used during grading. Cut and fill soil properties would likely be similar to the native soil properties, unless the previously graded soil was imported from a different source.

Aiken soil is typically derived from weathering of andesitic tuff and conglomerate. A typical Aiken soil profile consists of 0 to 29 inches of loam and clay loam, underlain from 29 to 52 inches by clay loam and clay. From 52 to 64 inches the soil consists of clay loam, and bedrock is typically encountered between 64 and 68 inches. According to the on-line data, the Aiken soil exhibits a moderate corrosion potential, and moderate to high hazard of erosion.

2.1.3 Geologic Setting

Our understanding of site and regional geology is primarily based on a review of geologic maps and documents, including the *Geologic Map of Western Nevada County* (California Division of Mines and Geology, 1990) and the *Geologic Map of the Colfax - Grass Valley Area* (Tuminas, 1981).

The property is located in the Sierra Nevada Foothills, on the western side of the Sierra Nevada geomorphic province. The Sierra Nevada province is an elongate, north-west trending structural block that is tilted upward to form a steep scarp above the adjacent Basin and Range province to the east. The western slope of the Sierra Nevada dips gently westward, and extends beneath sediment of the Great Valley province. Continual uplift and erosion of the Sierra Nevada contributes to sediment within the Great Valley.

According to the 1:48,000-scale, *Geologic Map of Nevada County, California* (1990, California Division of Mines and Geology), the site is underlain by Miocene to Pliocene age volcanic deposits designated as Mehrten formation. The Miocene age Mehrten formation consists of a breccia unit and a conglomerate unit. The conglomerate unit represents channel deposits typically composed of beds of rounded andesitic cobbles and boulders interbedded with sand, silt, and clay. The conglomerate unit was not encountered during our site investigations. The Miocene epoch represents a period of time from approximately 24 to 5 million years before present (MYBP), and the Pliocene epoch represents the period between approximately 5 to 2 MYBP.

Major faulting and uplift of the Sierra Nevada tectonic block during the Miocene epoch initiated volcanic activity in the Sierra Nevada region, precipitated stream and channel incision, and increased sedimentation on the gentle western slopes of the Sierra Nevada. During periods of volcanic activity, volcanic ash mixed with mud and water within alluvial channels on the western slopes of the ancestral Sierra Nevada. The mud and ash flows, called “lahars”, moved as relatively cool masses that incorporated rocks, wood, and debris. The lahars solidified into a well cemented, tuffaceous matrix with gravel to boulder-sized volcanic rock fragments that formed a resistant cap over underlying rock units.

Exploratory borings excavated as part of the geotechnical engineering investigation revealed variable sandy silt and silt-clay soil mixtures typical of residual soil derived from weathering of Mehrten breccia. The soil exhibited remnant volcanic mudflow rock texture and contained severely to completely weathered fragments of cemented volcanic tuff, rhyolite, and andesite.

Because of the porosity and texture of the Mehrten breccia, soil derived from weathering the breccia appears less dense than compacted soil or native soil derived from more consolidated metamorphic rock.

2.1.4 Site Seismicity

The Uniform Building Code (UBC) Seismic Zone Map of the United States, designates zones of relative earthquake hazard from 1 to 4, with 4 being the greatest hazard. The 2001 edition of the California Building Code (CBC) Seismic Zone Map of California is used for seismic analysis for California state-owned buildings, schools and hospitals. According to the CBC, all sites in California are rated as either Zone 3 or Zone 4, and there are no areas in California where seismic hazards are considered non-existent. The project site is located within Seismic Zone 3.

We reviewed California Division of Mines and Geology Open File Report OFR96-08, *Probabilistic Seismic Hazard Assessment for the State of California*, and the on-line revisions and the California Geological Survey updates to the report, *2003 California Fault Parameters*. The documents categorize faults as Class A, B, or C. Class A faults are capable of producing large magnitude events, and have a high rate of slip. Class C faults are not capable of producing large magnitude earthquakes, and have a relatively low slip rate. Class B faults are all other type faults. The report indicates only B and C type faults are within 100 kilometers of the subject site.

The 1997 version of Special Publication 43, *Fault Rupture Hazard Zones in California*, describes active faults and fault zones (activity within 11,000 years), as part of the Alquist-Priolo Earthquake Fault Zoning Act. The document and the 1999 on-line update indicate the site is not located within an Alquist-Priolo active fault zone.

2.2 FIELD INVESTIGATION

We performed our field investigation on September 7, 2007. During our field investigation, we observed the local topography and surface conditions and performed a limited subsurface investigation. Existing structures and subsurface utilities limited access to the area of improvements, so our exploratory borings were located approximately 20 feet west of the proposed improvements. Shallow hand auger borings were advanced to the east of the improvement area to confirm that soil conditions were similar. The following sections summarize surface and subsurface conditions observed during our field investigation.

Our subsurface investigation included the excavation of 2 exploratory borings approximately 10 to 20 feet east of the existing cafeteria and kitchen area, and two shallow hand auger borings at the west side of the existing patio area. We drilled

our exploratory borings to depths ranging between 17 and 51.5 feet below the ground surface (bgs) using a truck-mounted CME 45 with 8-inch hollow stem augers and a 140-pound auto hammer. The hand auger borings were advanced to depths ranging between 4.5 and 7 feet bgs.

A geologist from our firm logged blow counts and soil conditions revealed in the exploratory borings and collected relatively undisturbed and bulk soil samples for laboratory testing. We obtained relatively undisturbed samples using California Modified split spoon samplers with 2.5-inch (ID) liners. Figure 3 shows the approximate exploratory boring locations.

2.2.1 Surface Conditions

As noted above, the project site is occupied by existing structures and improvements. We anticipate that site demolition and clearing will reveal variable on-site soil conditions.

2.2.2 Subsurface Soil Conditions

The soil conditions described in the following paragraphs are generalized, based on our observations of the soil and weathered rock revealed in our 2 hollow-stem auger exploratory borings and our two hand-auger borings. The exploratory borings revealed similar conditions across the site. More detailed information can be found in the borings logs in Appendix C.

Borings B-1 and B-2 were advanced through a surface section that consisted of 6 inches of asphalt concrete (AC), and 8 inches of aggregate base rock (AB). The surface layer was generally underlain by brown, damp, medium dense silty sand with gravel to approximately 5 feet bgs. The silty sand with gravel was underlain by sandy silt with clay that exhibited remnant rock texture and contained weathered rock fragments to depths of approximately 12 feet in boring B-1 and 14.5 feet in boring B-2. The sandy silt graded to silty sand with trace clay and gravel that extended to the bottom of boring B-1 at 17 feet bgs, and to approximately 30 feet in boring B-2. Water was encountered at 24 feet bgs in boring B-2.

From approximately 30 feet to 40 feet boring B-2 revealed clayey sand with fine gravel. From 40 feet to 44 feet, boring B-2 revealed brown silty sand with gravel and water was encountered again at 44 feet. At 44 feet the boring revealed severely to completely weathered Mehrten breccia that appeared massive, friable to medium strong, and granular with sand to gravel-sized rock fragments. The

breccia drilled as wet, dense, non-plastic, silty sand with gravel. Boring B-2 was terminated at a depth of 51.5 feet bgs.

Hand-auger boring HA-1 revealed fill composed of silty sand with gravel composed of weathered volcanic tuff and andesite rock fragments. Hand-auger boring HA-1 was terminated at a depth of 4.5 feet bgs at hand auger refusal.

Hand-auger boring HA-2 was advanced through landscape fill composed of grayish brown silty sand to a depth of 3.5 feet bgs. The fill contained minor fragments of plastic, paper, and quartz gravel. The surface layer was underlain by mottled yellowish brown sandy silt that contained gravel-sized tuffaceous andesite fragments. The boring was terminated at a depth of 7 feet at hand auger refusal.

2.2.3 Ground Water Conditions

During our site investigation, we encountered water at a depth of 24 feet and again at 44 feet bgs. Our observations of groundwater conditions were made in September 2007 following a period of dry weather. Our experience has shown that seepage may be encountered in excavations that reveal the soil/weathered rock transition, particularly during or after the rainy season.

3 LABORATORY TESTING

We performed laboratory tests on selected soil samples collected from our subsurface exploratory borings to determine their engineering material properties. These engineering material properties were used to develop geotechnical engineering design recommendations for earthwork and structural improvements. We performed the following laboratory tests:

- Moisture Content, (ASTM D2216),
- Density (unit weight), (ASTM D2937),
- Expansion Index (ASTM D4829),
- Atterberg Limits (ASTM D4318),
- Particle Size (ASTM D422),
- Direct Shear Strength (ASTM D3080),
- Minimum Soil Resistivity (Caltrans 643), and
- Sulfate and Chloride (Caltrans 417 and 422).

Table 3.1 summarizes moisture/density and direct shear test results. Appendix D presents graphical direct shear, Atterberg limits, expansion index, and particle size distribution test results.

Table 3.1 – Summary of Moisture/Density and Direct Shear Testing						
Boring Number	Sample Number	Depth (feet)	Dry Density (pcf)	Moisture Content (%)	Shear Friction Angle (degrees)	Shear Cohesion (psf)
B-1	T1-2-1	6.0	64.1	34.0	---	---
B-1	T1-3-1	8.0	60.2	58.7	36	320
B-1	T1-6-1	15.0	64.3	49.9	---	---
B-2	T2-9-2	25.0	52.2	69.0	---	---
B-2	T2-11-1	36.0	59.9	60.3	---	---

We performed a particle size determination on sample T2-4-1, described as dark yellowish brown sandy silt collected from 11 feet below ground surface (bgs) in boring B-2. The test revealed the sample consisted of approximately 50 percent sand and 50 percent silt and clay.

We performed an Atterberg limits determination on composite sample CPB1&2, described as dark yellowish brown sandy silt obtained from depths of 8 to 11 feet bgs in borings B-1 and B-2. The Atterberg limits determination revealed that the portion of the sample passing the No. 40 sieve had a liquid limit of 53 and a plastic limit of 48, resulting in a plasticity index of 5. Based on the Atterberg limits determination and the particle size determination, we classified the soil as silt (MH).

We also performed expansion index testing on a portion of sample CPB1&2. A portion of the sample was remolded in a 1.0-inch-high ring and submerged in water under an applied loading of 144 pounds per square foot (psf). We observed the loaded sample for a minimum of 24 hours. During that time we measured the swell (or settlement) with a dial micrometer. Expansion index test results indicate the sample exhibited negligible expansion potential, as classified by UBC guidelines.

We performed resistivity testing on a portion of composite sample CT1&2, obtained from depths of 6.5 to 11 feet bgs in exploratory borings B-1 and B-2. The soil sample was described as dark yellowish brown sandy silt. The sample exhibited pH of 4.6, and minimum resistivity of 34,840 ohms per centimeter (ohms/cm). The sample was also tested for the presence of sulfate and chloride. The tests indicated concentrations of 0.5 parts per million (ppm) sulfate and 26.1 ppm chloride.

According to the Caltrans Corrosion Guidelines (Caltrans, 2003), soil with resistivity greater than 2,000 ohms/cm is considered to have low corrosion potential.

Additionally, soil with sulfate concentration less than 2000 ppm and chloride concentration less than 600 ppm is considered to be non-corrosive.

4 CONCLUSIONS

The following conclusions are based on our field observations, laboratory test results, and our experience in the area.

1. Our opinion is that the site is suitable for the proposed improvements, provided the geotechnical engineering recommendations and design criteria presented in this report are incorporated into the project plans.
2. We encountered existing fill in our exploratory borings and observed existing fill near the proposed improvement areas. We anticipate that fill and disturbed soil will be encountered during site grading. Existing fill should not be relied upon to support proposed improvements. Recommendations for excavation and replacement of existing fill are provided in Section 5.1.2.
3. Although we did not observe shallow groundwater or seepage during our site investigation, areas of seepage may be encountered during grading onsite, particularly during the rainy season and/or in excavations that reveal the surface soil/weathered rock contact. Recommendations addressing moisture conditioning, fill placement, drainage, and construction dewatering are presented in Section 5.1.
4. Prior to grading and construction, we should be retained to review the proposed grading plan and structural improvements to confirm our recommendations.

5 RECOMMENDATIONS

The following geotechnical engineering recommendations are based on our understanding of the project as currently proposed, our field observations, results of our laboratory testing, engineering analysis, seismic hazards assessment, and our experience in the area.

5.1 GRADING

The following sections present our grading recommendations. The grading recommendations address clearing and grubbing, soil preparation, cut slope grading, fill placement, fill slope grading, erosion control, subsurface drainage, surface water drainage, construction dewatering, underground utility trenches, soil corrosion potential, plan review, and construction monitoring.

5.1.1 Site Preparation

Following demolition of existing structures, the areas to be graded should be cleared and grubbed to remove construction debris, organic debris, and other deleterious materials as described below.

1. Strip and remove debris from clearing operations and the top 1 to 2 inches of soil containing organic material, roots and other deleterious materials. Organic topsoil can be stockpiled onsite and used in landscape areas but is not suitable for use as fill. The project geotechnical engineer should approve any proposed use of the spoil generated from stripping prior to placement.
2. We anticipate that demolition of existing structures may result in disturbed soil. Overexcavate any relatively loose debris and soil that is encountered in our exploratory trenches or any other onsite excavations to underlying, competent material. Possible excavations include exploratory trenches excavated by others, mantles or soil test pits, or holes resulting from tree stump or boulder removal.
3. Overexcavate loose, untested fill a minimum of 5 feet beyond the areas of proposed improvements. Replace and recompact in accordance with recommendations in Section 5.1.5.
4. Overexcavate any encountered leach lines, abandoned sewer, water, and fuel lines, and loose soil in abandoned subsurface utility line trenches within the proposed improvement areas to underlying competent soil, as determined by a representative of H&K.
5. If encountered, remove rocks greater than 8 inches in greatest dimension (oversized rock) from native soil by scarifying to a depth of 12 inches below finish grade in areas to support pavement, slabs-on-grade or other flatwork. Oversized rock may be used in landscape areas, rock landscape walls, or removed from the site. Oversized rock can be stockpiled onsite and used to construct fills, but must be placed at or near the bottom of deep fills and must be placed in windrows to avoid nesting. No oversized rock should be placed in the upper 3 feet of any structural fill. The project geotechnical engineer should approve the use of oversized rock prior to constructing fill.
6. Fine grained, potentially expansive soil, as determined by H&K, that is encountered during grading should be mixed with granular soil, or overexcavated and stockpiled for removal from the project site or for use in landscape areas. A typical mixing ratio for granular to expansive soil is 4 to 1. The actual mixing ratio should be determined by H&K.

7. Vegetation, deleterious materials, structural debris, and oversized rocks not used in landscape areas, drainage channels, or other non-structural uses should be removed from the site.

5.1.2 Existing Fill Conditions

Areas of existing, untested fill should not be relied on to support the proposed improvements. Per the grading requirements of the California Building Code, fill must be compacted to a minimum relative compaction of 90 percent, based on the ASTM D1557 maximum dry density.

We recommend that existing fill be overexcavated to reveal competent native soil or weathered rock conditions. The fill should be replaced and compacted in accordance with the recommendations presented in Section 5.1.5 of this report. H&K should be retained to confirm the extent of the fill, and observe overexcavation and compaction during grading.

5.1.3 Cut Slope Grading

Based on our understanding of the project, we anticipate that existing slope configurations will be re-graded to accommodate the site improvements. Permanent cut slopes should not be steeper than 2:1, horizontal to vertical (H:V).

Temporary cut slopes may be constructed to facilitate retaining wall construction, if proposed. We anticipate that subsurface conditions will be favorable for construction of temporary cut slopes no steeper than ½:1, H:V, for a maximum height of approximately 8 feet. To reduce the likelihood of sloughing or failure, temporary cut slopes should not remain over the winter.

A representative of H&K must observe temporary cut slopes steeper than 2:1, H:V, during grading to confirm the soil and rock conditions encountered. We recommend that personnel not be allowed between the cut slope and retaining structures (if proposed), form work, grading equipment, or parked vehicles during construction, unless the stability of the slope has been reviewed by H&K or the slope has been confirmed to meet OSHA excavation standards.

5.1.4 Soil Preparation for Fill Placement

Where fill placement is proposed, the surface soil exposed by site clearing and grubbing should be prepared as described below.

1. The surface soil should be scarified to a minimum depth of 8 inches below the existing ground surface, or to resistant rock, whichever is shallower. Following scarification, the soil should be uniformly moisture conditioned to within approximately 3 percentage points of the ASTM D1557 optimum moisture content.
2. The scarified and moisture conditioned soil should then be compacted to achieve a minimum relative compaction of 90 percent based on ASTM D1557 maximum dry density. The surface soil type, moisture content, density, and relative percent compaction should be verified by a representative of H&K.

5.1.5 Fill Placement

Soil fill placement proposed for the project should incorporate the following recommendations:

1. Soil used for fill should consist of uncontaminated, predominantly granular, non-expansive native soil or approved import soil. If encountered, rock used in fill should be broken into pieces no larger than 8 inches in diameter. Rocks larger than 8 inches are considered oversized material and should be stockpiled for offhaul or later use in landscape areas and drainage channels.
2. Import soil should be predominantly granular, non-expansive and free of deleterious material. Import material that is proposed for use onsite should be submitted to H&K for approval and possible laboratory testing at least 72 hours prior to transport to the site.
3. Cohesive, predominantly fine grained, or potentially expansive soil, if encountered during grading, should be stockpiled for removal, mixed with granular soil, or used in landscape areas. A typical mixing ratio for granular to expansive soil is 4 to 1. The actual mixing ratio should be determined by H&K.

   As an option, cohesive fine grained, or potentially expansive soil can often be placed in the deeper portions of proposed fill (e.g., depths greater than 3 feet below subgrade in building footprints). However, this option would have to be evaluated on a case-by-case basis with consideration of the fill depth and proposed loading.
4. Soil used to construct fill should be uniformly moisture conditioned to within approximately 3 percentage points of the ASTM D1557 optimum moisture content. Wet soil may need to be air dried or mixed with drier material to facilitate placement and compaction, particularly during or following the wet season.

5. Fill should be constructed by placing uniformly moisture conditioned soil in maximum 8-inch-thick loose, horizontal lifts (layers) prior to compacting.
6. All granular fill should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. The upper 8 inches of fill in paved areas, and beneath proposed slabs-on-grade should be compacted to a minimum of 95 percent relative compaction.
7. The moisture content, density and relative percent compaction of fill should be confirmed by a representative of H&K during construction. The earthwork contractor should assist our representative by excavating test pads with onsite earth moving equipment.

5.1.6 Differential Fill Depth

The recommendations presented in this section are intended to reduce the magnitude of differential settlement-induced structural distress associated with variable fill depth beneath structures.

1. Site grading should be performed so that cut-fill transition lines do not occur directly beneath any structures. The cut portion of the cut-fill building pads utilizing slabs-on-grades, if proposed, should be scarified to a minimum depth of 8 inches, and recompacted to 95 percent relative compaction.
2. Differential fill depths beneath structures should not exceed 5 feet. For example, if the maximum fill depth is 8 feet across a building pad, the minimum fill depth beneath that pad should not be less than 3 feet. If a cut-fill building pad is used in this example, the cut portion would need to be overexcavated 3 feet and rebuilt with compacted fill.

5.1.7 Fill Slope Grading

We understand that no permanent fill slopes are proposed for the project. Permanent fill slopes created onsite should be no steeper than 2:1, H:V. H&K should review fill slope configurations greater than approximately 10 feet in height, if proposed, prior to fill placement. Compaction and fill slope grading must be confirmed by H&K in the field.

Steeper fill slopes may be feasible with the use of geotextile reinforcement and/or rock facing. We can provide reinforced or buttressed fill slope design for the project, if requested.

Fill should be placed in horizontal lifts to the lines and grades shown on the project plans. Slopes should be constructed by overbuilding the slope face and then cutting it back to the design slope gradient. Fill slopes should not be constructed or extended horizontally by placing soil on an existing slope face and/or compacted by track-walking.

5.1.8 Erosion Control

Graded portions of the site should be seeded as soon as possible to allow vegetation to become established prior to and during the rainy season. In addition, grading that results in greater than one acre of soil disturbance or in sensitive areas may require the preparation of a site-specific storm water pollution prevention plan. As a minimum, the following controls should be installed prior to and during grading to reduce erosion.

1. Prior to commencement of site work, fiber rolls should be installed down slope of the proposed area of disturbance to reduce migration of sediment from the site. Fiber rolls on slopes are intended to reduce sediment discharge from disturbed areas, reduce the velocity of water flow, and aid in the overall stability of slopes. The fiber rolls should remain in place until construction activity is complete and vegetation becomes established.
2. All soil exposed in permanent slope faces should be hydroseeded or hand seeded/strawed with an appropriate seed mixture compatible with the soil and climate conditions of the site as recommended by the local Resource Conservation District.
3. Following seeding, jute netting or erosion control blankets should be placed and secured over the slopes steeper than 2:1, H.V.
4. Surface water drainage ditches should be established as necessary to intercept and redirect concentrated surface water away from cut and fill slope faces. Under no circumstances should concentrated surface water be directed over slope faces. The intercepted water should be discharged into natural drainage courses or into other collection and disposal structures.

5.1.9 Underground Utility Trenches

Underground utility trenches should be excavated and backfilled as described below.

1. Based on subsurface conditions observed in our exploratory borings, we anticipate that resistant rock at shallow depths may limit utility trench

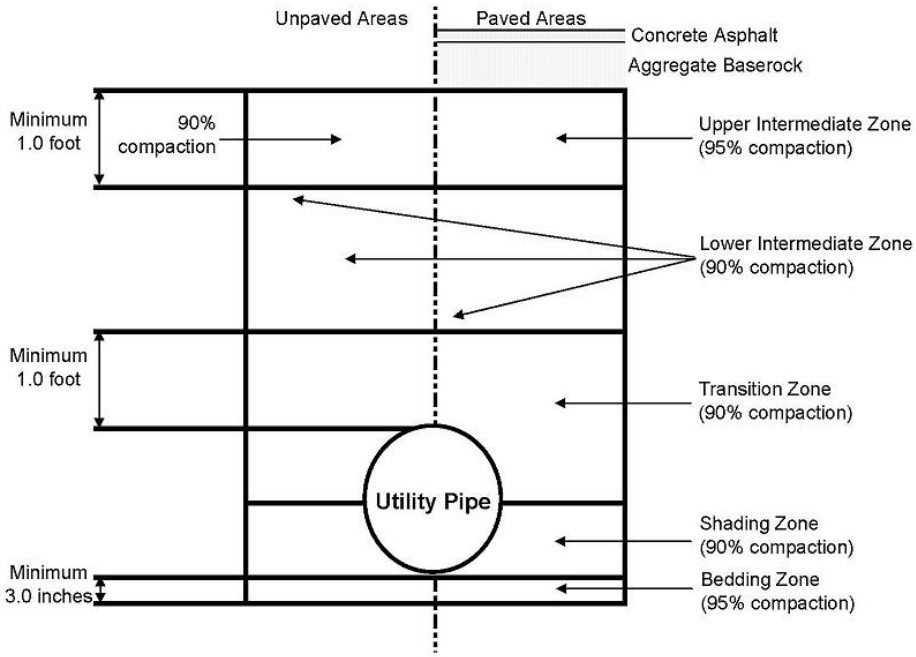
excavations. Pre-ripping of the trench alignment, blasting, or splitting may be required, particularly if utility trench excavations are deeper than five feet.

2. The California Occupational Safety and Health Administration (OSHA) requires all utility trenches deeper than 4 feet bgs be shored with bracing equipment prior to being entered by any individuals, whether or not they are associated with the project.

3. We anticipate that shallow subsurface seepage may be encountered, particularly if utility trenches are excavated during the winter, spring, or early summer. The earthwork contractor may need to employ dewatering methods as discussed in the Construction Dewatering section on page 17 to excavate, place and compact the trench backfill materials.

4. Trench backfill used within the bedding zone, shading zone, and transition zones, as shown on the following figure, should consist of ¾-inch minus crushed rock.

TRENCH BACKFILL



5. Soil used as trench backfill within the lower and upper intermediate zones, as shown on the above figure, should consist of non-expansive soil with a plasticity index of less than or equal to 15 (based on ASTM D4318) and should not contain rocks greater than ½-inch in greatest dimension.

6. Soil used to construct trench backfill should be uniformly moisture conditioned to within 3 percentage points of the ASTM D1557 optimum moisture content.
7. Trench backfill should be constructed by placing uniformly moisture conditioned soil in maximum 8-inch loose lifts (layers) and compacting. Thinner lifts may be necessary to achieve the specified minimum relative compaction if relatively light-weight compaction equipment such as hand operated or vibratory compactors are used.
8. Pipe bedding zone: Trench backfill placed in the pipe bedding zone (beneath the utilities) should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.
9. Pipe shading zone: Trench backfill placed within the pipe shading zone (above the bedding zone and to a height of one pipe radius above the pipe spring line) should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.
10. Pipe transition zone: Trench backfill placed within the pipe transition zone (above the pipe shading zone to one foot over the pipe top surface) should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.
11. Lower intermediate zone: Trench backfill placed within the lower intermediate zone (above the pipe transition zone to 1 foot below the finished subgrade surface) should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.
12. Upper intermediate zone (unpaved areas): Trench backfill placed within the upper intermediate zone (above the lower intermediate zone to the finished subgrade surface) in unpaved (non-road and non-parking lot) areas should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.
13. Upper intermediate zone (paved areas): Trench backfill placed within the upper intermediate zone (above the lower intermediate zone to the finished subgrade surface) in paved (road and parking lot) areas should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.
14. The loose lift thickness, moisture, density and relative compaction of the trench backfill soil should be verified by a representative of H&K.
15. Construction quality assurance tests should be performed at a frequency determined by the project geotechnical engineer.

16. The earthwork contractor should assist the quality control representative by excavating test pads with onsite earth moving equipment.

5.1.10 Construction Dewatering

Seepage may be encountered during grading, particularly in deeper excavations made during site preparation. The earthwork contractor should be prepared to dewater excavations if seepage is encountered during grading. Seepage may be encountered if grading is performed during or immediately after the rainy season. In addition, perched groundwater may be encountered on low permeability soil or weathered rock layers even during the summer months.

Subdrains may be necessary, if subsurface seepage or groundwater conditions are encountered which prevent or restrict fill placement or construction of the proposed improvements. If groundwater or saturated soil conditions are encountered during grading, we should be retained to observe the conditions and provide site specific subsurface drainage recommendations. The following typical measures can be employed to mitigate the presence of seepage in excavations.

1. We anticipate that dewatering of utility trenches can be performed by constructing sumps to depths below the trench bottom and removing the water with sump pumps.
2. Additional sump excavations and pumps should be added as necessary to keep the excavation bottom free of standing water and relatively dry when placing and compacting the trench backfill material.
3. If groundwater enters the trench faster than it can be removed by the dewatering system, the underlying compacted soil may become unstable while compacting successive soil lifts. If this occurs, the unstable soil may need to be removed and replaced with free draining open graded drain rock. If drain rock is used, it should meet or exceed the following gradation specifications: 100 percent passing the ¾-inch sieve, 95 to 100 percent passing the ½-inch sieve, 70 to 100 percent passing the ⅜-inch sieve, 0 to 55 percent passing the No. 4 sieve, 0 to 10 percent passing the No. 8 sieve, and 0 to 3 percent passing the No. 200 sieve. Other approved backfill materials can again be used after placing the drain rock to an elevation that is higher than the groundwater.
4. We recommend that the utility trench excavations be performed as late in the summer months as possible to allow the groundwater table to reach its lowest seasonal elevation.

5.1.11 Soil Corrosion Potential

The onsite soil was tested for corrosion potential as part of the geotechnical engineering investigation. Laboratory tests indicated the soil exhibited relatively high acidity. However, the soil exhibited high resistivity values, and sulfate and chloride concentrations that were within the non-corrosive range.

5.1.12 Surface Water Drainage

Proper surface water drainage is important to the successful development of the project. We recommend the following measures to help mitigate surface water drainage problems:

1. Slope final grades in structural areas so that surface water drains away from building pad finish subgrade at a minimum 2 percent slope for a minimum distance of 10 feet. For structures utilizing slab-on-grade interior floor systems we recommend increasing the slope to 4 percent.
2. To reduce surface water infiltration, compact and slope all soil placed adjacent to building foundations such that water is not allowed to pond. Backfill should be free of deleterious materials.
3. Direct downspouts to positive drainage or a closed collector pipe that discharges flow to positive drainage.
4. Construct V-ditches at the top of cut and fill slopes where necessary to reduce concentrated surface water flow over slope faces. Typically, V-ditches should be 3 feet wide and at least 6 inches deep. Surface water collected in V-ditches should be directed away and downslope from proposed building pads and driveways into a drainage channel.

5.1.13 Grading Plan Review and Construction Monitoring

Construction quality assurance includes review of plans and specifications and performing construction monitoring as described below.

1. H&K should be retained to review the final grading plans prior to construction to confirm our understanding of the project at the time of our investigation, to determine whether our recommendations have been implemented, and to provide additional and/or modified recommendations, if necessary.
2. H&K should be retained to perform construction quality assurance (CQA) monitoring of all earthwork grading performed by the contractor to determine

whether our recommendations have been implemented, and if necessary, provide additional and/or modified recommendations.

5.2 SEISMIC DESIGN PARAMETERS

We reviewed Chapters 16 and 18 of the 2001 California Building Code, and used UBCSEIS to determine seismic design parameters and near-source factors. The site is mapped in Seismic Zone 3 on the CBC Seismic Zone Map. We classified the on-site soil as S_C. Seismic design parameters are provided in Table 5.2.1, below.

Additional near source factors do not apply to the site because the site is located outside the designated ICBO area of known active fault near source zones, and because no Class A or Class B faults are located within 15 km of the site.

Table 5.2.1 - Seismic Design Values

DESCRIPTION	DESIGN VALUE	SOURCE
Seismic Zone	3	2001 CBC, Figure 16A-2
Seismic Zone Factor	0.3	2001 CBC, Table 16-I
Soil Profile	S_C	2001 CBC, Table 16-J
Seismic Source	B, C	2001 CBC, Table 16-U
Near Source Factor, Na	1.0	2001 CBC, Table 16-S
Near Source Factor, Nv	1.0	2001 CBC, Table 16-T
Seismic Coefficient, Ca	0.33	2001 CBC, Table 16-Q
Seismic Coefficient, Cv	0.45	2001 CBC, Table 16-R
Spectral Coefficient, Ts	0.55	2001 CBC, Figure 16-3
Spectral Coefficient, To	0.11	2001 CBC, Figure 16-3

5.3 STRUCTURAL IMPROVEMENT DESIGN CRITERIA

The following sections present our structural improvement design criteria and recommendations. The recommendations address foundations, concrete slabs-on-grade, and retaining walls.

5.3.1 Foundations

Provided that the grading for the project is performed in accordance with the recommendations presented in this report, our opinion is that the site will be suitable for the use of conventional perimeter foundations, isolated interior footings, and interior slabs-on-grade. Following are our recommendations for foundations constructed on compacted and tested fill or competent native soil:

1. Footings for single-story structures should be a minimum of 12 inches wide and trenched through any loose surface material, potentially expansive soil, or untested fill, and a minimum of 12 inches into competent native soil, weathered rock or compacted fill. Footings for two-story structures, if proposed, should be a minimum of 18 inches wide and trenched a minimum of 18 inches into competent native soil, weathered rock or compacted fill. If clay is encountered at the base of footing excavations for permanent structures, the footing should be deepened through the clay lens into underlying granular material or weathered rock, as determined in the field by H&K.
2. Footing trenches should be cleaned of all loose soil and construction debris prior to placing concrete. A representative from H&K should observe the footing excavations prior to concrete placement.
3. As a minimum, the footings should be designed with two No. 4 rebar reinforcement, one near the top of the footing and one near the bottom. A minimum of 3 inches of concrete coverage should surround the bars.
4. In an effort to reduce the likelihood of settlement-induced distress to the proposed structures, we recommend that strip and isolated footings with a minimum embedment depth of 12 inches in competent soil be sized for an allowable bearing capacity of 2,500 psf for dead plus live loads. This value can be increased by 250 psf for each additional foot of embedment up to a limiting value of 3,000 psf. Allowable bearing may be increased by 33 percent for additional transient loading, such as wind or seismic loads.
5. A triangularly-distributed lateral resistance (passive soil resistance) of 250d psf, where d is footing depth, may be used for footings. This value may be increased by 33 percent for wind and seismic. As an alternate to the passive soil resistance described above, a coefficient of friction for resistance to sliding of 0.35 may be used.
6. Footing excavations should be saturated prior to placing concrete to reduce the risk of problems caused by wicking of moisture from curing concrete.

However, concrete should not be placed through standing water in the footing excavations.

7. Total settlement of individual foundations will vary depending on the plan dimensions of the foundation and actual structural loading. Based on anticipated foundation dimensions and loads, we estimate that total post-construction settlement of footings designed and constructed in accordance with our recommendations will be on the order of one-half inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than one-quarter inch, provided footings are founded on similar materials (e.g., all on structural fill, native soil or rock). Differential settlement between adjacent footings founded on dissimilar materials (e.g., one footing on soil and an adjacent footing on rock) may approach the maximum anticipated total settlement. Settlement of foundations is expected to occur rapidly and should be essentially complete shortly after initial application of loads.

5.3.2 Slab-on-Grade Floor Systems

Our opinion is that interior concrete slab-on-grade floors may be used in conjunction with perimeter concrete foundations for the proposed improvements. The project structural engineer should design slabs-on-grade with regard to the anticipated loading. We make the following recommendations regarding slabs-on-grade:

1. The slab-on-grade should be a minimum of 4 inches thick. If floor loads higher than 250 psf or intermittent live loads are anticipated, a structural engineer should determine the slab thickness and steel reinforcing schedule.
2. The subgrade soil around the slabs-on-grade should be sloped away from the proposed building a minimum of 4 percent for a distance of 10 feet as discussed in the Surface Water Drainage section of this report. A representative from H&K should observe pad and subgrade elevations prior to forming the slab footings.
3. As a minimum, No. 3 rebar on 24-inch centers or flat sheets of 6x6, W4.0xW4.0 welded wire mesh (WWM) should be used as slab reinforcement. We do not recommend using rolls of WWM because vertically centered placement of rolled mesh within the slab is difficult to achieve. All rebar and sheets of WWM should be placed in the center of the slab and supported on concrete "dobies". We do not recommend "hooking and pulling" of steel during concrete placement.
4. Prior to placing the vapor retarder and concrete, slab subgrade soil must be moisture conditioned to between 75 and 90 percent saturation to a depth of 24 inches. Moisture conditioning should be performed for a minimum of 24 hours

prior to concrete placement. Clayey soil may take up to 72 hours to reach this required degree of saturation. If the soil is not moisture conditioned prior to placing concrete, moisture will be wicked out of the concrete, possibly contributing to shrinkage cracks. Additionally, our opinion is that moisture conditioning the soil prior to placing concrete will reduce the likelihood of soil swell or heave following construction at locations where fine grained, potentially expansive soil is encountered. To facilitate slab-on-grade construction, we recommend that the slab subgrade soil be moisture conditioned following rock placement. Following moisture conditioning, the vapor retarder should be placed.

5. Slabs should be underlain by 4 inches of crushed, washed rock. The rock should be uniformly graded so that 100% passes the 1-inch sieve, with 0% to 5% passing the No. 4 sieve. Following rock placement, the subgrade soil should be moisture conditioned for 24 hours. The rock should then be overlain by a vapor retarder at least 15 mils thick. All penetrations through the vapor retarder should be taped or sealed to reduce vapor. Laps in the vapor retarder should be taped. If requested, H&K can provide observation of the vapor retarder prior to placing concrete. The vapor retarder may be omitted in areas that do not have moisture sensitive floor coverings (i.e., exterior parking areas).
6. Regardless of the type of vapor retarder used, moisture can wick up through a concrete slab. Excessive moisture transmission through a slab can cause adhesion loss, warping and peeling of resilient floor coverings, deterioration of adhesive, seam separation, formation of air pockets, mineral deposition beneath flooring, odor and fungi growth. Slabs can be tested for water transmissivity in areas that are moisture sensitive. Commercial sealants, entrained air, fly ash and a reduced water to cement ratio can be incorporated into the concrete to reduce slab permeability. A waterproofing consultant should be contacted if moisture sensitive flooring is proposed.
7. Expansion joints should be provided between the slab and perimeter footings. Control joints should bisect the length and width of the slab at intervals specified by the American Concrete Institute (ACI) or Portland Concrete Association (PCA).
8. Exterior slabs-on-grade, such as sidewalks, may be placed directly on compacted fill without the use of a baserock section. For exterior slabs, the native soil should be ripped, moisture conditioned and recompacted to an 8-inch depth per the grading recommendations presented in this report.
9. All deleterious material must be removed prior to placing concrete.

10. We recommend that concrete have a water/cement ratio no greater than 0.45. Pozzolans or other additives may be added to increase workability.
11. Exposed concrete slabs should be moisture cured for at least seven days after placement. Excessive curling of the slab may occur if moisture conditioning is not performed. This is especially critical for slabs that are cast during the warm summer months.
12. Concrete slabs impart a relatively small load on the subgrade (approximately 50 psf). Therefore, some vertical movement should be anticipated from possible expansion or differential loading.

5.3.3 Retaining Wall Design Criteria

The following active and passive pressures are for retaining walls in cut native soil or backfilled with granular onsite soil. If import soil is used, a representative from our firm should be retained to observe and test the soil to determine its strength properties. The pressures exerted against retaining walls may be assumed to be equal to a fluid of equivalent unit weight.

Table 5.3.3.1 presents equivalent fluid unit weights for cut native soil and onsite fill compacted per the grading recommendations presented in this report. For the horizontal backfill condition, we assume that the retained fill surface will be no steeper than 10% for a minimum distance of the wall height from the back of the retaining wall. If surcharge loads (such as adjacent building foundations) or live loads will be applied within a distance of the wall height from the back of the wall, we should be retained to review the loading conditions and revise our recommendations, if necessary.

Table 5.3.3.1 - Equivalent Fluid Unit Weights [(1)]

Loading Condition	Retained Cut or Compacted Fill (approximately horizontal backfill)	Retained Cut or Compacted Fill (retained slope up to 2:1, H:V)
Active Pressure (pcf)	30	45
Passive Pressure (pcf)	250	250
At-Rest Pressure (pcf)	45	60
Coefficient of Friction	0.35	0.35

Note: (1) The equivalent fluid unit weights presented are ultimate values and do not include a factor of safety. The passive pressures provided assume footings are founded in competent native soil or engineered fill.

Please note that the use of the tabulated active pressure unit weight requires that the wall design accommodate sufficient deflection for mobilization of the retained soil to occur. Typically, a wall yield of less than 1 percent of the wall height is sufficient to mobilize active conditions in granular soil. However, if the walls are rigid or restrained to prevent rotation, at-rest conditions should be used for design.

Recommendations for design and construction of retaining walls are listed below:

1. Compaction equipment should not be used directly adjacent to retaining walls unless the wall is designed or braced to resist the additional lateral pressures.
2. If any surface loads are closer to the top of the retaining wall than its height, H&K should review the loads and loading configuration. We should be retained to review wall details and plans for any wall over 10 feet in height.
3. All retaining walls must be well drained to reduce hydrostatic pressures. Walls should be provided with a drainage blanket to reduce additional lateral forces and minimize saturation of the backfill soil. Drainage blankets may consist of graded rock drains or geosynthetic blankets.
4. Rock drains should consist of a minimum 12-inch wide, Caltrans Class II, permeable drainage blanket, placed directly behind the wall; or crushed washed rock enveloped in a non-woven geotextile filter fabric such as Amoco 4546™ or equivalent. Drains should have a minimum 4-inch diameter, perforated, schedule 40, PVC pipe placed at the base of the wall, inside the drainrock, with the perforations placed down. The PVC pipe should be sloped so that water is directed away from the wall by gravity. A geosynthetic drainage blanket such as Enkadrain™ or equivalent may be substituted for the rock drain, provided the collected water is channeled away from the wall. If a geosynthetic blanket is used, backfill must be compacted carefully so that equipment or soil does not tear or crush the drainage blanket.
5. Adequate drainage and waterproofing for retaining walls associated with finished interior spaces are essential to reduce the likelihood of seepage and vapor transmission into the living space. We recommend that an appropriate waterproofing sealant be applied to the exterior surface of such retaining walls. A waterproofing consultant may be contacted to further review seepage and vapor transmission.
6. Additional lateral loading on retaining structures due to seismic accelerations may be considered at the designer's option. For an earthquake producing a design horizontal acceleration of 0.2g, we recommend that the resulting additional lateral force applied to unrestrained (cantilevered) retaining

structures with drained level backfill onsite be estimated as $P_{ae}=9H^2$ pounds, where H is the height of the wall in feet. The additional seismic force may be assumed to be applied at a height of 0.6H above the base of the wall. This seismic loading is for a drained, level backfill condition only; H&K should be consulted for values of seismic loading due to non-level or non-drained backfill conditions.

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7 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

1. Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. This warranty is in lieu of all other warranties, either expressed or implied.
2. These services were performed consistent with our agreement with our client. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.
3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid. Only our firm can determine the validity of the conclusions and recommendations presented in this report. Therefore, we should be retained to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. However, we may require additional fieldwork and laboratory testing to develop any modifications to our recommendations. Costs to review project changes and perform additional fieldwork and laboratory testing necessary to modify our recommendations are beyond the scope of services presented in this report. Any additional work will be performed only after receipt of an approved scope of services, budget, and written authorization to proceed.

4. The analyses, conclusions and recommendations presented in this report are based on site conditions as they existed at the time we performed our surface and subsurface field investigations. We have assumed that the subsurface soil and groundwater conditions encountered at the location of our exploratory borings are generally representative of the subsurface conditions throughout the entire project site. However, the actual subsurface conditions at locations between and beyond our exploratory borings may differ. Therefore, if the subsurface conditions encountered during construction are different than those described in this report, then we should be notified immediately so that we can review these differences and, if necessary, modify our recommendations.

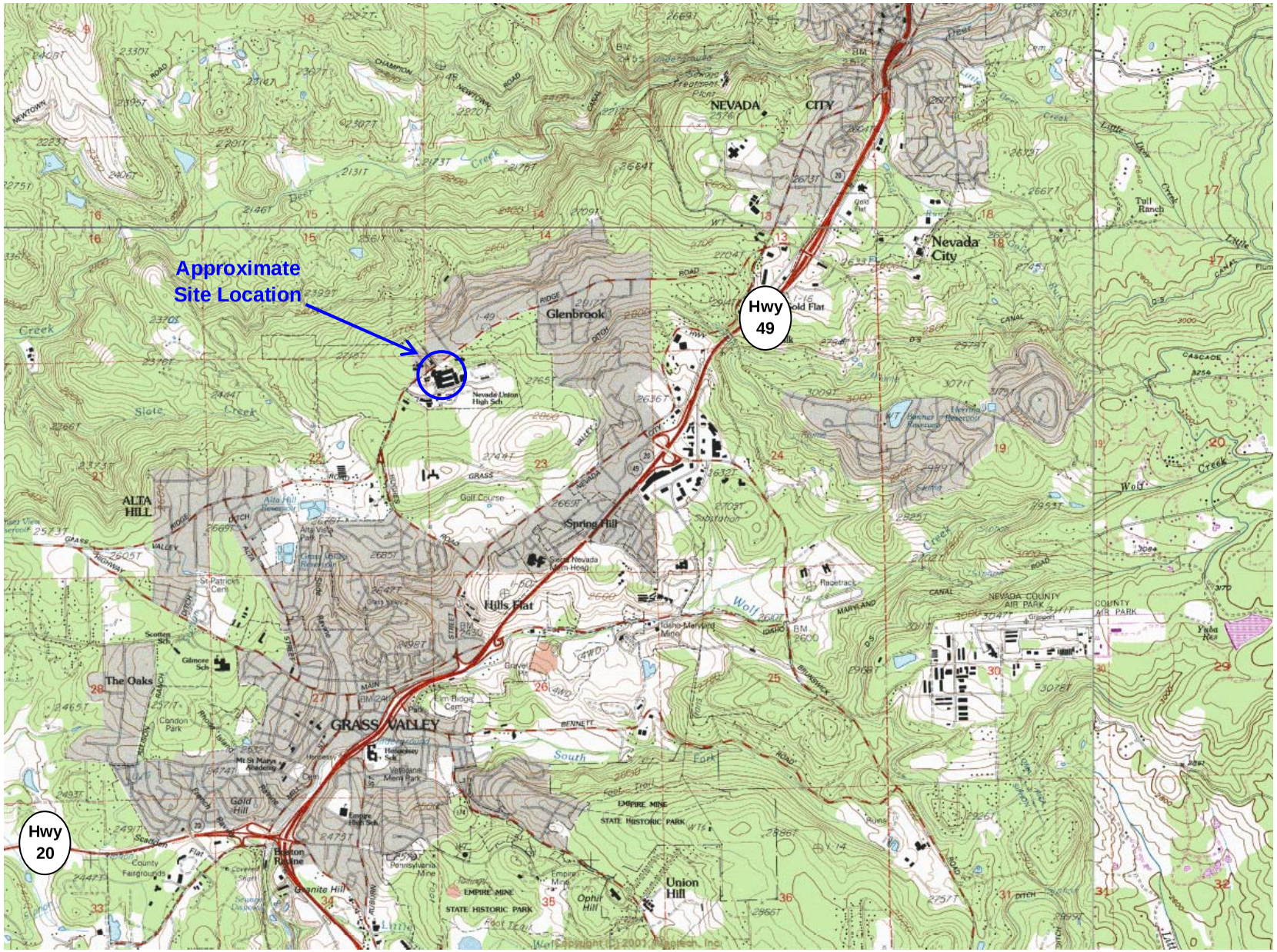
5. The elevation or depth to groundwater underlying the project site may differ with time and location.

6. The project site map shows approximate exploratory boring locations as determined by pacing distances from identifiable site features. Therefore, the boring locations should not be relied upon as being exact nor located with surveying methods.

7. Our geotechnical investigation scope of services did not include evaluating the project site for the presence of historic mining operations or hazardous materials. Although we did not observe evidence of historic mining activity or hazardous materials within the proposed building area at the time of our field investigation, all project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction. Possible historic mining excavation not detected during our investigation may impact the proposed improvements.

8. The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

FIGURES



No Scale

SOURCE: MAPTECH, Terrain Navigator Pro, ver. 6.0 - USGS 7.5 minute topographic map, Grass Valley, California quadrangle, 1992.

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(530) 478-1305 • FAX (530) 478-1019

TOPOGRAPHIC VICINITY MAP

NEVADA UNION HIGH SCHOOL

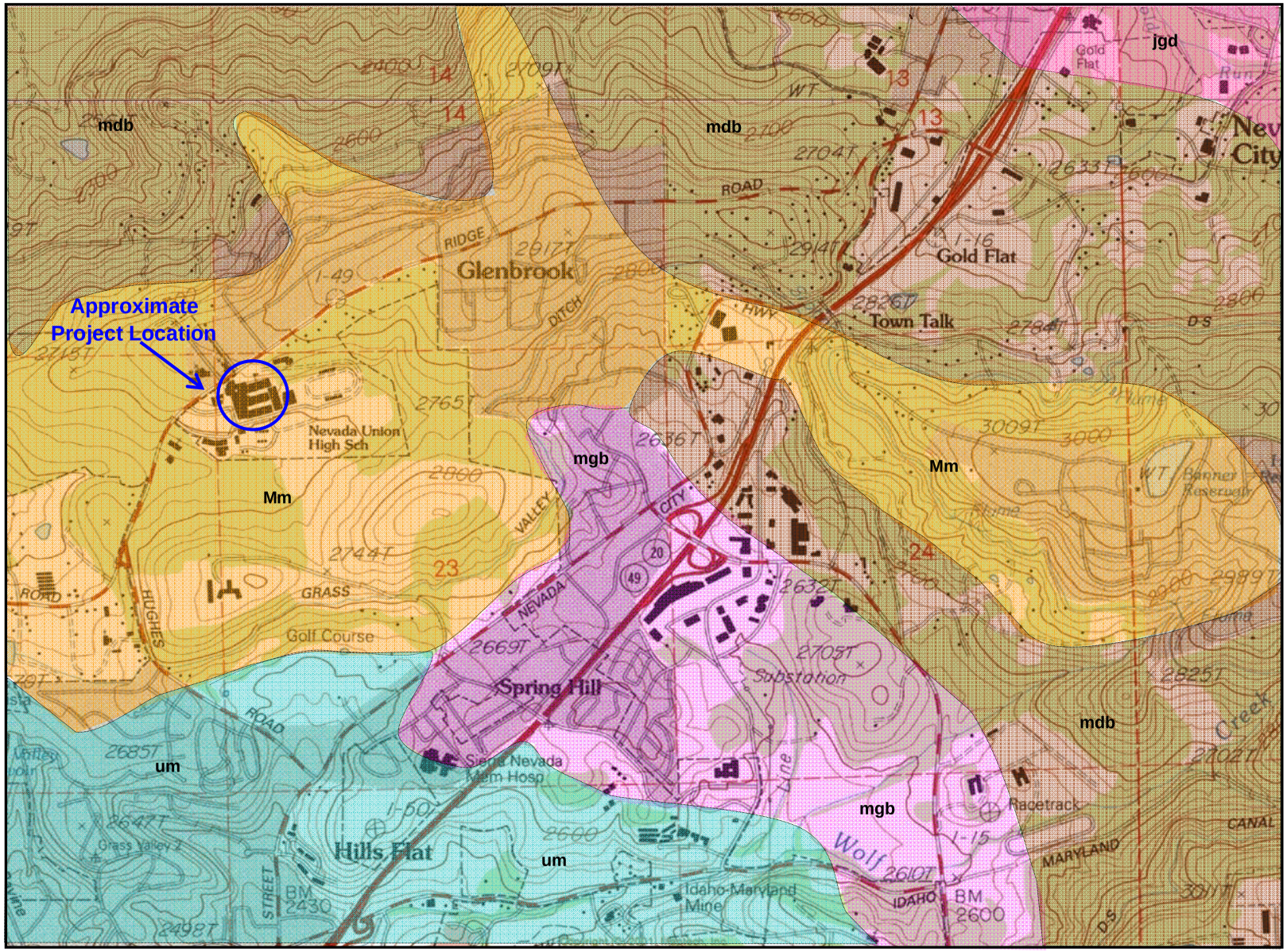
11761 Ridge Road, California

Latitude / Longitude: 39.2400 / 121.0550

PROJECT NO. 3408-01

FIGURE 1

OCTOBER 2007



SOURCE: Tuminas, A., 1983, Structural and stratigraphic relations in the Grass Valley - Colfax area, and Loyd, R, and Clinkenbeard, J., 1990, Geologic Map of Western Nevada County, California
BASE: MAPTECH, Terrain Navigator Pro, ver. 6.0 - USGS 7.5 minute topographic map, Grass Valley, California quadrangle, 1992.

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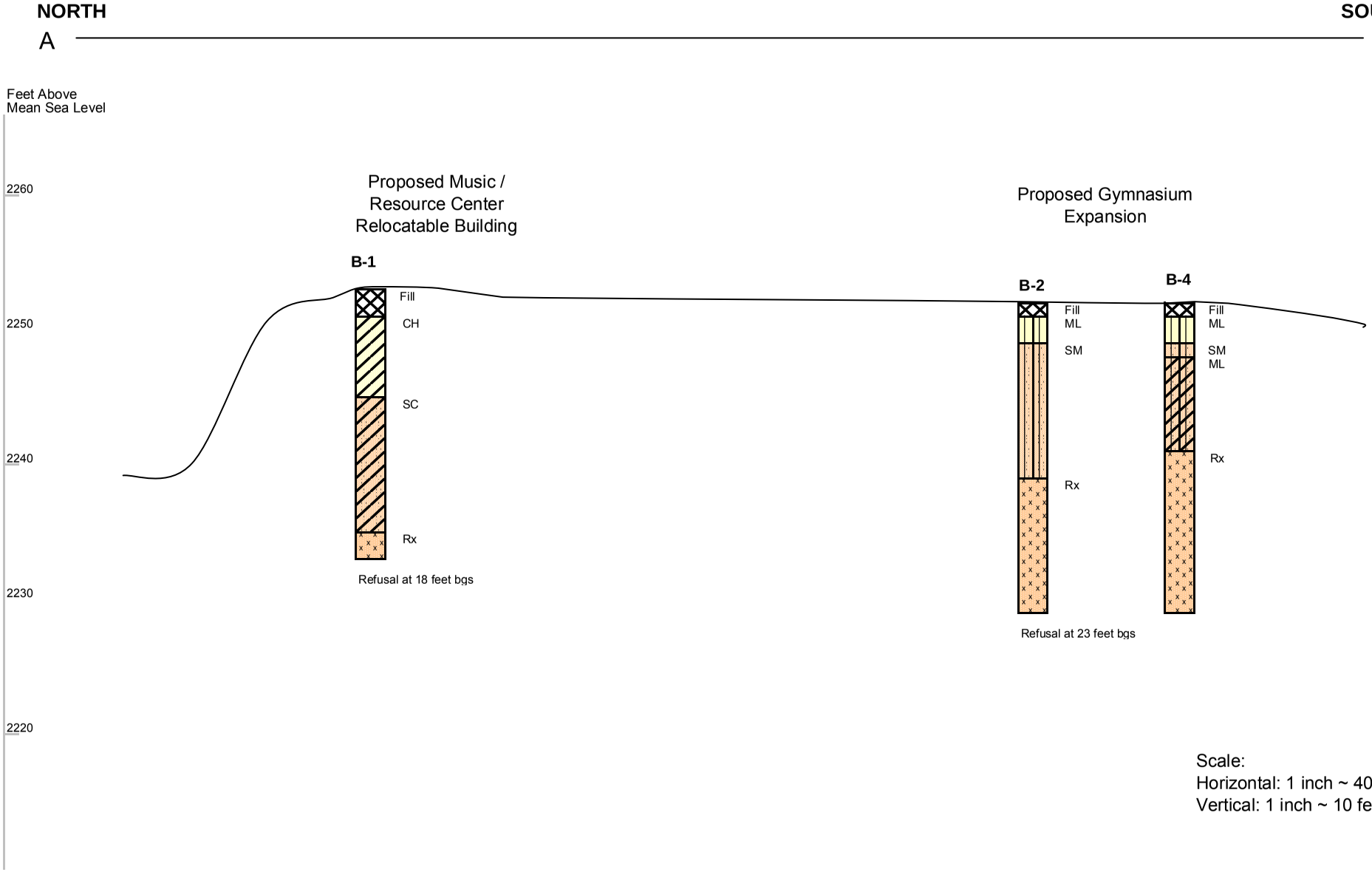
REGIONAL GEOLOGY MAP
NEVADA UNION HIGH SCHOOL
11761 Ridge Road, Nevada County, California
Latitude / Longitude: 39.2400 / 121.0550

PROJECT NO. 3408-01
FIGURE 2
OCTOBER 2007



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CROSS SECTION A - A'

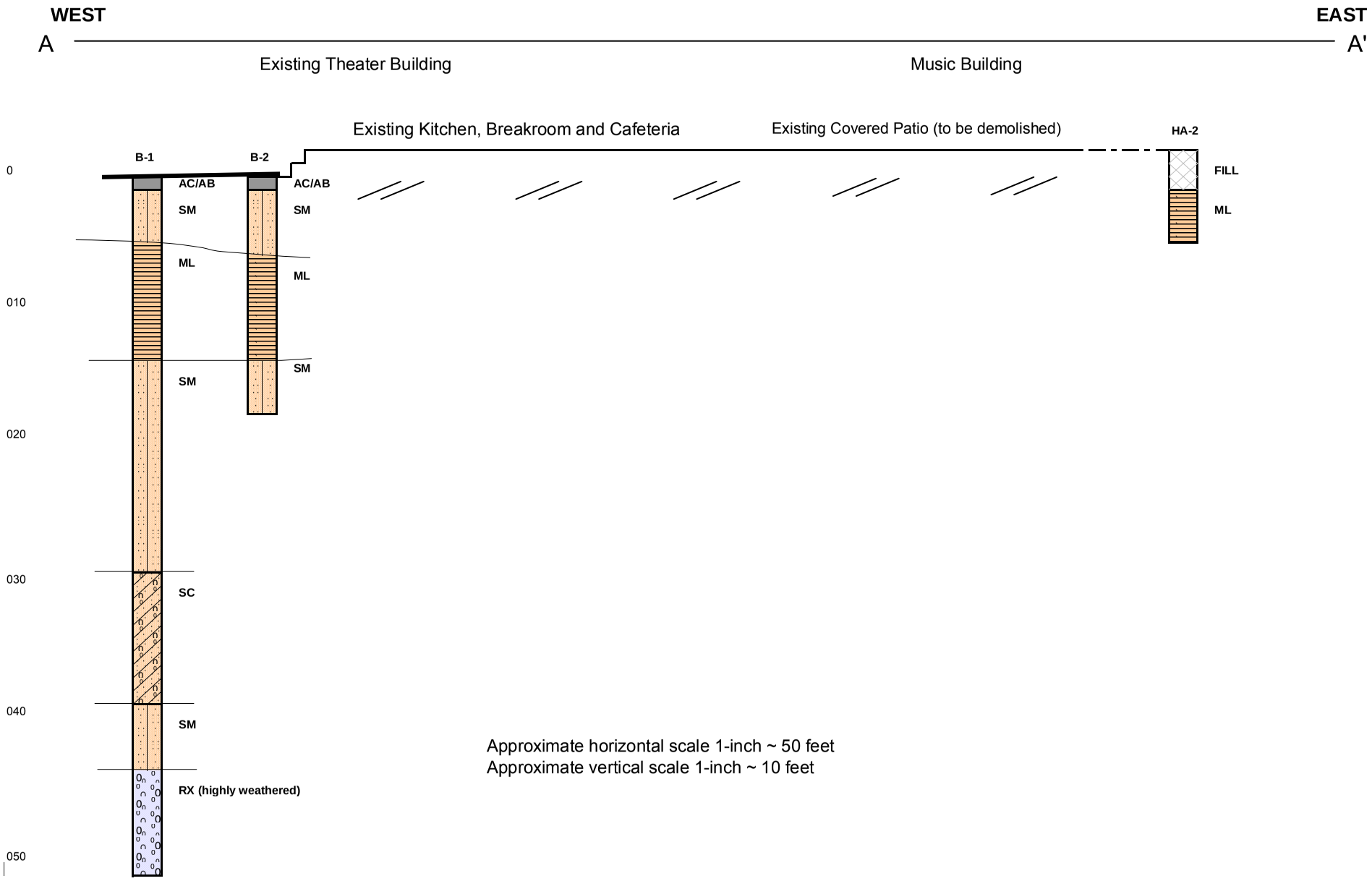
PROPOSED CHICAGO PARK SCHOOL IMPROVEMENTS

Grass Valley, California

PROJECT NO. 3345-01

JULY 2007

FIGURE 3



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CROSS SECTION A - A'

NEVADA UNION HIGH SCHOOL - MULTI-PURPOSE ROOM IMPROVEMENTS

Nevada County, California

PROJECT NO. 3408-01

OCTOBER 2007

FIGURE 4

APPENDIX A PROPOSAL

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Proposal No. PN07244
August 21, 2007

Paul Palmer
Nevada Joint Union High School District
11761 Ridge Road
Grass Valley, California 95945

Reference: ***Proposed Site Improvements***
Nevada Union High School
11761 Ridge Road
Grass Valley, California

Subject: ***Proposal to Provide Geotechnical Engineering Services and Limited Geologic Hazards Evaluation***

Dear Mr. Palmer:

At the request of Chris Ramm of Deems Lewis McKinley Architecture, we prepared this proposal to provide geotechnical engineering services for proposed improvements at Nevada Union High School in Grass Valley, California. The purpose of our services will be to evaluate subsurface soil conditions for expansion of the existing multi-purpose room, and to update an existing geologic hazards report. To prepare this proposal, we reviewed preliminary site plans provided by Lewis McKinley Architecture and previous reports prepared by Wallace Kuhl and Associates, visited the site, and discussed the project with personnel from the California Geological Survey and the Division of the State Architect.

We understand the project will include demolition of existing structures, construction of a music room, and enclosure of an existing patio. Based on our understanding of the project, we propose to perform a design-level geotechnical investigation and updated geologic hazards evaluation for the project. We would perform the investigation in general accordance with Title 24 of the California Code of Regulations and Volume 2 of the California Building Code (CBC), and California Geological Survey Note 48.

SCOPE OF SERVICES

Based on our understanding of the project, we propose the following scope of services.

Geotechnical Investigation

H&K will perform a review of maps and documents including available previous reports, geologic literature, and regulatory documents pertinent to the site.

H&K will perform a field investigation to characterize soil, rock, and groundwater conditions encountered at the surface and beneath the site to the maximum depths explored. Site access is limited by existing structures and underground utilities. However, we will attempt to advance one to two borings near the area of proposed improvements using a truck-mounted CME 45 drill rig. One boring would extend to 50 feet below ground surface (bgs), if feasible. Because of limited access in the area of proposed improvements, our subsurface investigation will also include two hand auger borings within landscaped areas near the proposed improvements. The hand auger borings will be used to determine the presence and depth of fill, and to confirm the conditions encountered in the drilled borings.

An engineer or geologist from our firm will log soil conditions and blow counts, and collect relatively undisturbed and bulk soil samples from each exploratory boring. Relatively undisturbed soil samples will be collected from the exploratory borings using a split-spoon barrel sampler equipped with brass liner tubes.

Collection of soil samples and the sample intervals will depend upon the soil conditions encountered. The soil samples will be labeled, sealed, and transported to our laboratory where selected samples will be tested to determine their engineering material properties. If groundwater is encountered, the depth to groundwater below the existing ground surface will be measured.

Laboratory Testing

H&K will perform laboratory tests on selected soil samples to determine their engineering material properties. All laboratory tests will be performed using American Society for Testing and Materials (ASTM) and Caltrans methods as guidelines. The soil characterization tests may include:

D2216, Moisture Content
D2487, Unified Soil Classification System
D2488, Soil Description Visual Manual Method
D2937, Density
D3080, Direct Shear Strength
D4318, Atterberg Limits (if appropriate)
D4829, Expansion Index (if appropriate)
Caltrans Method C 634, Resistivity
Caltrans Method 417 and 422, Sulfate and Chloride

The actual tests performed may vary, depending on the subsurface conditions encountered.

Geologic Hazards Evaluation

H&K will perform a limited geohazards and seismic hazards evaluation of the site in accordance with Title 24 of the California Code of Regulations and Division of State Architect document IR-4. We would review existing available reports for the site. The geologic and seismic hazards evaluation will include the following:

1. Site plan showing pertinent site geologic features.
2. Description of surface soil conditions and site geology.
3. Discussion of geologic hazards and site seismicity, including ground shaking, slope stability, lurching, liquefaction, fault rupture, and other potential geologic hazards.
4. Distance to known active faults in the area, and regional seismic hazard zone designation.
5. Anticipated ground acceleration at the site due to seismic events.
6. General statements regarding secondary seismic hazards.

Data Analysis and Engineering Design

Data will be analyzed and engineering calculations will be performed to determine the following:

1. Cut and fill slope gradients.
2. Soil bearing capacity for shallow and deep foundations.
3. Lateral earth pressures for retaining wall design.
4. Soil-concrete friction coefficients.

5. Soil shear strength.
6. Soil plasticity indices (if appropriate).
7. Soil expansion and swell potential (if appropriate).
8. Building and surcharge loads.
9. Groundwater seepage and drainage controls.

H&K will develop geotechnical engineering design recommendations for earthwork and structural improvements and provide applicable recommendations. The geotechnical engineering design recommendations will include but not be limited to the following.

Earthwork Improvement Recommendations

1. Site clearing and soil subgrade preparation.
2. Cut slope and fill slope grading.
3. Exclusion of oversized rock in fill.
4. Depth to refusal in granodiorite rock.
5. Fill moisture conditioning and compaction requirements.
6. Fill loose lift (layer) thickness requirements.
7. Fill replacement and recompaction (if appropriate).
8. Utility trench backfill material placement and compaction requirements.
9. Exploratory trench backfill removal and replacement with compacted soil.
10. Retaining wall backfill material specifications.
11. Retaining wall drainage.
12. Surface water drainage.
13. Expansive soil mitigation (if present).
14. Pipe and trench excavation requirements.

Structural Improvements

1. Shallow foundation types, dimensions and embedment depths.
2. Shallow foundation allowable soil bearing capacity.
3. Allowable skin friction for shallow foundations for uplift.
4. Foundation soil sliding friction coefficients.
5. Rock bolting for foundations and retaining walls, in shallow bedrock areas (if appropriate).
6. Lateral earth pressures.
7. Concrete slab-on-grade floors.

8. Cantilever retaining wall lateral earth pressure coefficients, including effects of surcharge and seismic loading.
9. Cantilever retaining wall foundation dimensions and embedment depths.
10. Recommended design for exterior slabs-on-grade, including exterior walkways and patios.
11. Corrosion potential.
12. Liquefaction potential.
13. Estimated total and differential settlement, both long and short term.
14. Modulus of subgrade reaction.
15. Seismic (earthquake shaking) design parameters.

Report Preparation

We will prepare a design-level geotechnical engineering report that will present our findings, conclusions, and recommendations. The report will include descriptions of site conditions, our field investigation, laboratory testing, and geotechnical engineering design recommendations for the proposed earthwork and structural improvements. The report will include a geologic and seismic hazards section, including estimates of peak ground acceleration (PGA) and spectral acceleration (SA) based on probabilistic seismic hazard assessment. The report will also include a site plan showing the approximate locations of the exploratory borings and proposed structure. The report appendices will present the exploratory boring logs and laboratory test data.

ASSUMPTIONS AND CLIENT RESPONSIBILITIES

The proposed scope of services are based on the following assumptions:

- The client will provide H&K with the authorization to access the site, and physical access to boring locations. Although we will attempt to reduce the impacts of exploratory equipment, the client understands that landscaping and unmarked underground utilities may be damaged by exploratory drilling equipment. The client will provide a written right of entry authorization, if requested.
- The client will identify and clearly mark existing on-site utilities.
- The client is responsible for providing an accurate map delineating the proposed improvements.
- Six copies of the report will be delivered to the client and/or the client's engineers and architects.

- Client meetings and revisions are not included in this estimate, and will be billed separately on a time and materials basis.
- This proposal and our associated fee are based on the use of the attached terms and conditions.

FEES

Our fee to perform the outlined scope of services will be $8,800. The fee may be adjusted as noted below:

- Deduct $700 if the drilling can be combined with drilling at a nearby site.
- The above fee assumes work would be accomplished on weekdays when students are not in classes such as in-service days or other periods when school is not in session. Add $1,000 if field work must be accomplished when classes are in session or on weekends.

Billing would be monthly on a percent complete basis. If this proposal is acceptable, please sign the attached terms and conditions as our authorization to proceed.

We appreciate the opportunity to provide you with this proposal. If you have any questions, please feel free to contact our office.

Sincerely,

HOLDREGE & KULL

Prepared by:

Nadine Langley

Nadine Langley, P.G.
Project Geologist

Reviewed by:

Rob Fingerson, G.E.
Principal

attached: Terms and Conditions

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APPENDIX B ***IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT*** *(Included with permission of ASFE, Copyright 2004)*

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.

ASFE
The Best People on Earth

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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APPENDIX C EXPLORATORY BORING LOGS

BORING B–1

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	1 OF 1	B-1

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA, 2.5-INCH SS, SPT	NONE	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					FILL	6 INCHES ASPHALT CONCRETE, 8 INCHES AGGREGATE BASE
				1		MOTTLED BROWN (7.5YR 5/6) SILTY SAND AND GRAVEL, DAMP, MEDIUM DENSE, SLIGHTLY PLASTIC
				2		STRONG BROWN (7.5YR 5/6)
				3	SM	
PB1-1						
T1-1-1		*17	9/12	4		
						ROCK AT 4.5 FEET BGS, DRILLED THROUGH
				5		MOTTLED YELLOWISH BROWN (10YR 5/8) SANDY SILT WITH CLAY, DAMP, STIFF, SLIGHTLY PLASTIC REMNANT ROCK TEXTURE
PB1-2						
T1-2-1	3.0	*15	9/12	6		
				7		FRAGMENTS OF WEATHERED MEHRTEN FLOW ROCK
PB1-3						
T1-3-1		*13	10/12	8	ML	
				9		
						FRAGMENTS OF MEHRTEN MUDFLOW TUFF, MANGANESE COATING ON FRACTURE FACES
				10		
PB1-4						
T1-4-1		*8	10/12	11		
				12		
						DARK YELLOWISH BROWN (10YR 4/4) SILTY FINE SAND, MEDIUM DENSE TO DENSE, SLIGHTLY PLASTIC, SOME GRINDING THROUGH RESISTANT ROCK (APPROX 10 TO 12 INCHES)
PB1-5				13		
T1-5-1		*31	12/12	14		
					SM	
				15		
PB1-6						
T1-6-1		*63	2/12	16		
						GRINDING, HARD DRILLING (RESISTANT ROCK OR BOULDER)
				17		BORING TERMINATED AT 17 FEET BGS AT REFUSAL
				18		
				19		
				20		

HOLDREGE & KULL

*= SPT VALUE CONVERTED FROM 2.5 SS BLOW COUNTS

= SPT SAMPLER

= 2.5 SS SAMPLER

BORING B–2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	1 OF 3	B-2

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA, 2.5-INCH SS, SPT	24 FEET BGS	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					FILL	6 INCHES ASPHALT CONCRETE, 8 INCHES AGGREGATE BASE
				1		
						MOTTLED BROWN (7.5YR 5/6) SILTY SAND WITH CLAY AND FINE GRAVEL, DAMP, MEDIUM DENSE, SLIGHTLY PLASTIC, MANGANESE COATING ON ROCK FRAGMENTS
				2		
T2-1-2						
T2-1-1		*27	10/12	3	SM	ROCK AT APPROXIMATELY 3 FEET BGS NOTE: MOVED BORING 2.5 FEET WEST
				4		
				5		
T2-2-2						
T2-2-1	3.5	*14	11/12	6		STRONG BROWN (7.5YR 5/8) SANDY SILT WITH CLAY, DAMP, SLIGHTLY PLASTIC, WEATHERED VOLCANIC ROCK FRAGMENTS, FRIABLE, REMNANT ROCK TEXTURE, STIFF
				7		
					ML	
PB2-3						SLIGHT INCREASE IN SAND CONTENT
T2-3-1		*16	9/12	8		
				9		
				10		DARK YELLOWISH BROWN (10YR 4/4) SANDY SILT WITH CLAY AND FINE GRAVEL, MOIST, STIFF, SLIGHTLY PLASTIC, REMNANT ROCK TEXTURE AND SLIGHTLY TO MODERATELY WEATHERED FRAGMENTS
T2-4-2				11		
T2-4-1	3.0	*14	12			
				12	ML	
PB2-5						
T2-5-2						
T2-5-1		*11	11/12	13		
				14		
				15		MOTTLED YELLOWISH BROWN (10YR 5/6) SILTY SAND WITH TRACE CLAY AND FINE GRAVEL, DAMP, MEDIUM DENSE, REMNANT ROCK TEXTURE AND SLIGHTLY TO MODERATELY PLASTIC VOLCANIC ROCK FRAGMENTS
PB2-6						
T2-6-2						
T2-6-1		*13	10/12	16		
				17		
PB2-7					SM	MOIST AT 17 FEET BGS
T2-7-2						
T2-7-1		*7	12/12	18		
				19		
				20		

HOLDREGE & KULL

*= SPT VALUE CONVERTED FROM 2.5 SS BLOW COUNTS

= SPT SAMPLER

= 2.5 SS SAMPLER

BORING B–2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	2 OF 3	B-2

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA, 2.5-INCH SS, SPT	24 FEET BGS	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
						MOTTLED YELLOWISH BROWN (10YR 5/6) SILTY SAND WITH TRACE CLAY AND FINE GRAVEL, DAMP, MEDIUM DENSE, REMNANT ROCK TEXTURE AND SLIGHTLY TO MODERATELY PLASTIC VOLCANIC ROCK FRAGMENTS
T2-8-1				21		
PB2-8		*9	10/12			~1–INCH VOID IN SAMPLE
				22		
				23		
				24		GROUNDWATER ENCOUNTERED AT 24 FEET BGS
				25	SM	
T2-9-2				26		
T2-9-1		*6	12/12			
				27		
				28		
				29		
				30		
PB2-10						
T2-10-2				31		MOTTLED LIGHT OLIVE BROWN (2.5YR 5/4) CLAYEY SAND WITH FINE GRAVEL, MOIST, LOOSE, SLIGHTLY PLASTIC
T2-10-1		*9	10/12			
				32		
				33		
				34		
				35	SC	
T2-11-1				36		
PB2-11		*14	11/12			
				37		
				38		
				39		
				40		

HOLDREGE & KULL

*= SPT VALUE CONVERTED FROM 2.5 SS BLOW COUNTS

= SPT SAMPLER

= 2.5 SS SAMPLER

BORING B–2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	3 OF 3	B-2

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA, 2.5-INCH SS, SPT	24 FEET BGS	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				41	SM	BROWN (7.5YR 5/2) SILTY SAND WITH FINE GRAVEL, MOIST TO WET, MEDIUM DENSE, NON TO SLIGHTLY PLASTIC, (COMPLETELY WEATHERED MEHRTEN BRECCIA, INTACT ROCK, MASSIVE, GRANULAR WITH TUFF MATRIX)
PB2-12		–				
T2-12-1		*17	10/12	42		
				43		
				44		WATER ENCOUNTERED (SECOND OCCURRENCE)
				45	RX	SEVERELY TO COMPLETELY WEATHERED MEHRTEN BRECCIA (VOLCANIC MUDFLOW ROCK), MASSIVE, FRIABLE TO MEDIUM STRONG, GRANULAR WITH ROCK FRAGMENTS, IRON OXIDE AND MANGANESE COATING ON FRACTURE SURFACES, POORLY INDURATED
PB2-13				46		
T2-13-1		*32	9/12	47		
				48		DRILLS AS SILTY SAND WITH GRAVEL, WET, DENSE, NON PLASTIC
				49		
				50		
				51		
PB2-14		46	15/18	52		BORING TERMINATED AT 51.5 FEET BGS
				53		
				54		
				55		
				56		
				57		
				58		
				59		
				60		

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*= SPT VALUE CONVERTED FROM 2.5 SS BLOW COUNTS

= SPT SAMPLER

= 2.5 SS SAMPLER

BORING HA–1

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	1 OF 1	B-HA1

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA	NONE	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				1	FILL	BROWN (10YR 5/3) SILTY SAND WITH FINE GRAVEL AND AREAS OF CLAYEY FINE SAND, DAMP, LOOSE, SLIGHTLY PLASTIC
PBHA1-1@1	–	–	–	2		MORE SAND CONTENT BELOW 2 FEET
PBHA1-2	–	–	–	3		FINE WEATHERED MEHRTEN VOLCANIC TUFF AND ANDESITE ROCK FRAGMENTS
				4		
				5		BORING TERMINATED AT 4.5 FEET BGS AT HAND AUGER REFUSAL ON ROCK
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

BORING B–HA2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	BORING NO.
3408-01	NEVADA UNION HIGH SCHOOL	---	09/07/2007	1 OF 1	B-HA2

DRILLING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CME45 WITH 140LB AUTO HAMMER	8-INCH HSA	NONE	NONE

SAMPLE NO.	POCKET PENETRO–METER(tsf)	BLOW COUNTS (N)	SAMPLE RECOVERY (in/in)	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
						GRAYISH BROWN (10YR 5/2) SILTY SAND, DRY, LOOSE, SLIGHTLY PLASTIC
PBHA2-1				1		
					FILL	PLASTIC, PAPER, QUARTZ GRAVEL FRAGMENTS
				2		
				3		
PBHA2-2						
				4		MOTTLED YELLOWISH BROWN (10YR 5/6 SANDY SILT, DAMP, MEDIUM DENSE, SLIGHTLY PLASTIC. GRAVEL–SIZED TUFF AND ANDESITE FRAGMENTS, MANGANESE STAINING ON FRACTURE FACES
PBHA2-3				5	ML	
				6		COLOR CHANGE TO BROWNISH YELLOW (10YR 6/6)
				7		BORING TERMINATED AT 7 FEET BGS AT HAND AUGER REFUSAL
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

APPENDIX D LABORATORY TEST DATA

Atterberg Indices

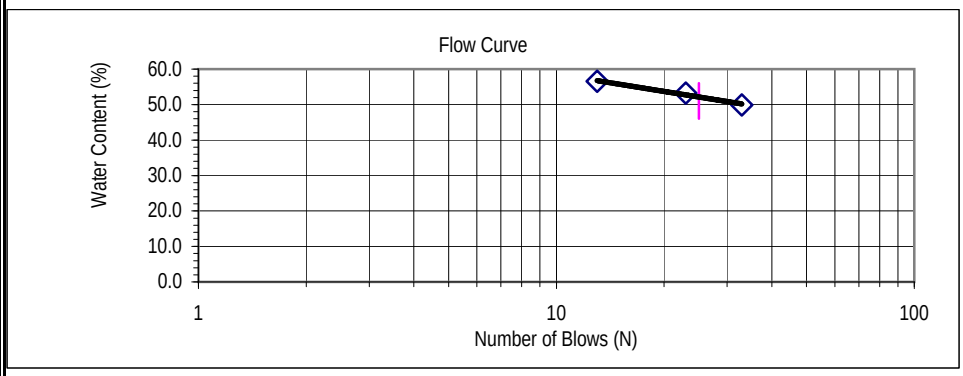
ASTM D4318

Project No.:	**3408-01**	Project Name:	**NUHS**	Date:	**9/17/2007**
Sample No.:	**CPB1&2**	Boring/Trench:	**B1&2**	Depth, (ft.): **8-11**	Tested By: **BLP/RES**
Description:	**Dark Yellowish Brown (10YR 4/4) Sandy Elastic Silt**			Checked By:	**JHA**
Sample Location:				Lab. No.:	**7-759**

Estimated % of Sample Retained on No. 40 Sieve: <30% Sample Air Dried: yes

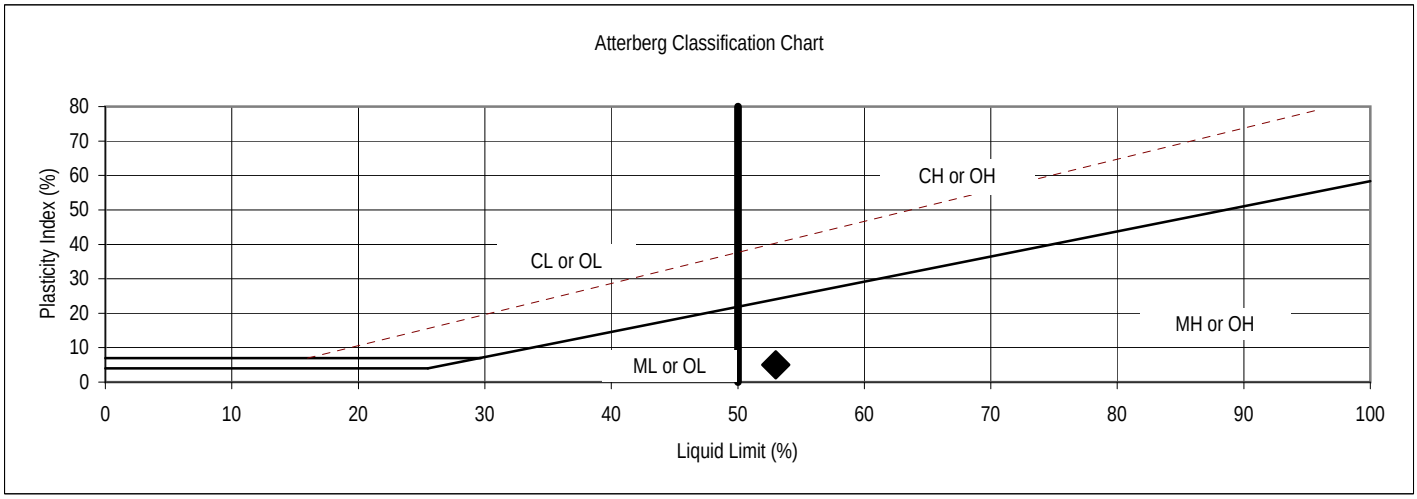
Test Method A or B: A

	LIQUID LIMIT:					PLASTIC LIMIT:		
Sample No.:	1	2	3	4	5	1	2	3
Pan ID:	MBE	ZD	AT			TJJ	BB	
Wt. Pan (gr)	15.25	15.40	15.30			50.42	11.16	
Wt. Wet Soil + Pan (gr)	21.59	23.89	26.33			55.42	15.44	
Wt. Dry Soil + Pan (gr)	19.30	20.94	22.66			53.80	14.06	
Wt. Water (gr)	2.29	2.95	3.67			1.62	1.38	
Wt. Dry Soil (gr)	4.05	5.54	7.36			3.38	2.90	
Water Content (%)	56.5	53.2	49.9			47.9	47.6	
Number of Blows, N	13	23	33					
				LIQUID LIMIT =	53	PLASTIC LIMIT =		48



Plasticity Index = 5

Group Symbol = MH



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Expansion Index/Swell

ASTM D4829/UBC 18.2

Project No.:	3408-01	Project Name:	NUHS	Date:	9/17/2007
Sample No.:	CPB 1&2	Boring/Trench No.:	B1&2	Depth (ft.) 8-11	Tested By: BLP/RES
Soil Description:	Dark Yellowish Brown (10YR 4/4) Sandy Elastic Silt				Checked By: JHA
Estimated % of sample retained on #4:					Lab. No.: 7-759

Specimen Type:	Undisturbed:		Disturbed:		Remolded to:		ASTM Guidelines
Tube Dia. (Inch) =		Ring Dia. (Inch) =	4	Ring Height (Inch) =	1.00		

FIELD DATA Tube Sample Moisture & Density			LAB DATA	Test wt. Initial	144 Final	Test wt. Initial	Final	Test wt. Initial	Final
Tare Tube Number			Tare Number	CA					
Tare Weight	(gr)		Tare Ring Weight (gr)	200.53	200.53				
Wet Soil + Tare	(gr)		Tare Pan Weight (gr)	0.00	156.19				
Dry Soil + Tare	(gr)		Wet Soil + Tare (gr)	470.54	689.62				
Weight of Water	(gr)	0.00	Dry Soil + Tare (gr)	419.37	575.56	0.00		0.00	
Dry Soil Weight	(gr)	0.00	Weight of Water (gr)	51.17	114.06	0.00	0.00	0.00	0.00
Moisture Content	(%)	0.00	Dry Soil Weight (gr)	218.84	218.84	0.00	0.00	0.00	0.00
Soil Height	(In.)		Moisture Content (%)	23.38	52.12	0.00	0.00	0.00	0.00
Wet Unit Weight	(pcf)		Wet Unit Weight (pcf)	81.86	101.01				
Dry Unit Weight	(pcf)		Dry Unit Weight (pcf)	66.35	66.40				
			Sample Height (Inches)	1.00	0.999				
Specific Gravity		2.7	Percent Saturation	41.01	91.54				

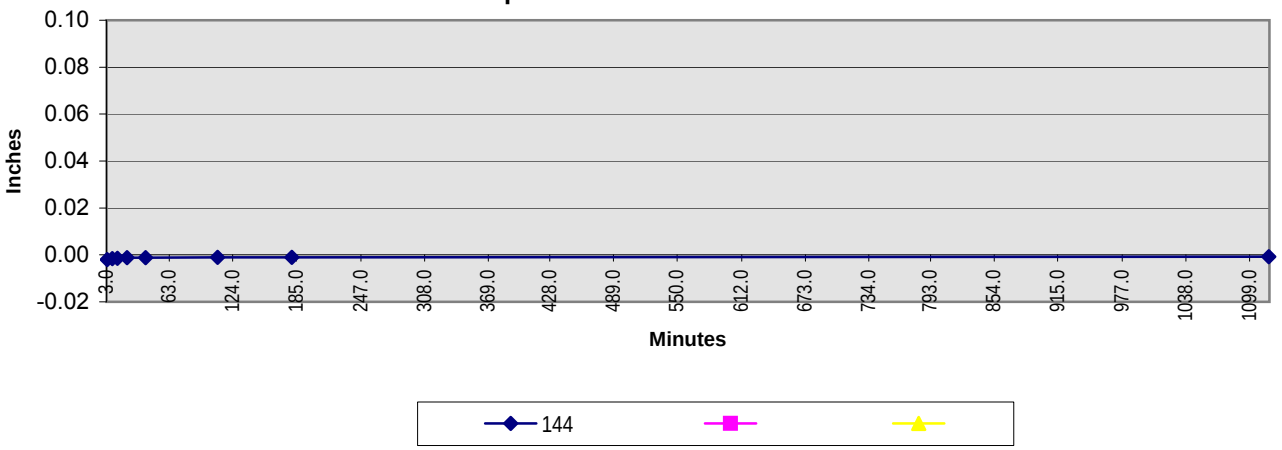
Expansion Index Number

Surcharge (psf)	Uncorrected	Corrected to 50% Saturation
Test wt. 144	-1	-4
Test wt.		
Test wt.		

Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)
3.0	-0.0020				
8.0	-0.0016				
13.0	-0.0015				
22.0	-0.0012				
40.0	-0.0012				
109.0	-0.0010				
180.0	-0.0010				
1117.0	-0.0008				

Expansion Index Values and Descriptions	
Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Expansion Versus Time



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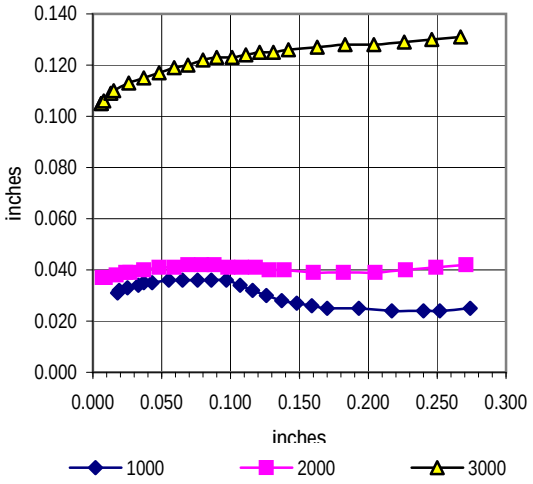
DIRECT SHEAR

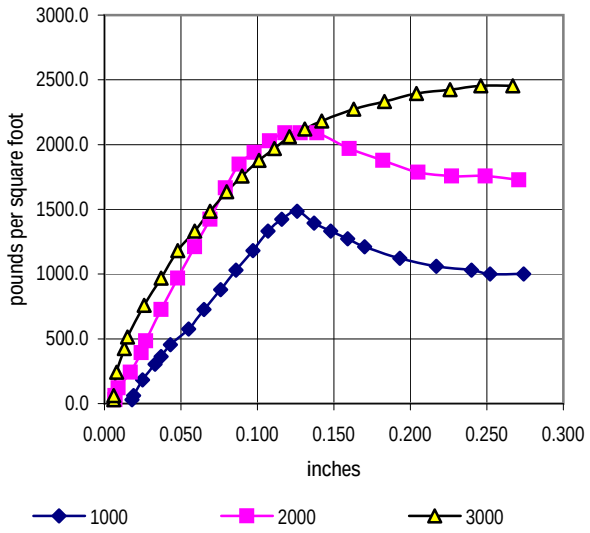
TEST RESULTS

Shear Strain vs. Normal Strain



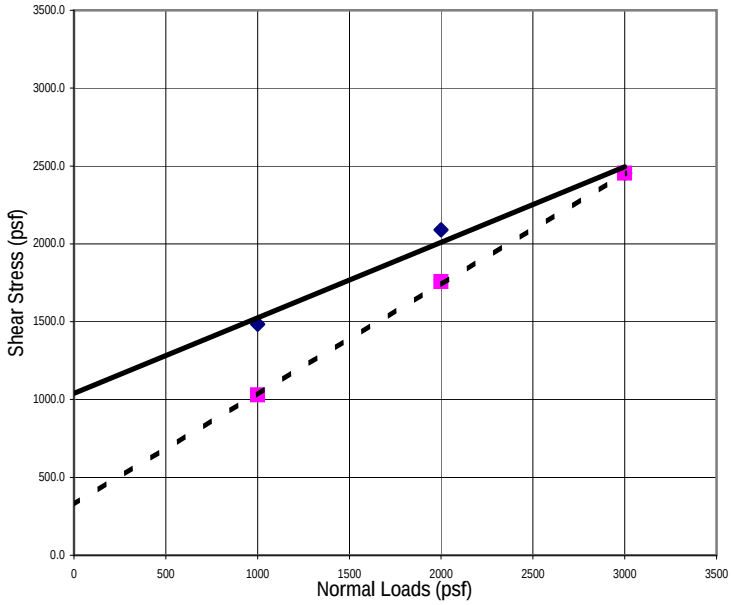
Normal Load (psf)

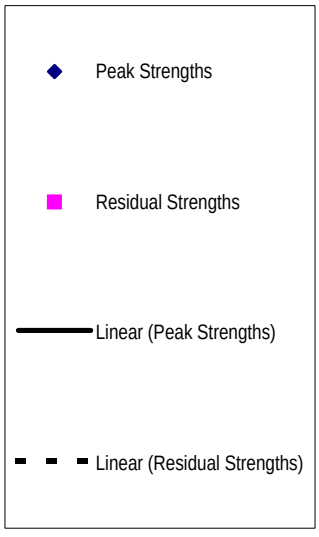
Shear Strain vs. Shear Stress



Normal Load (psf)

Mohr-Coulomb Failure Envelope





SHEAR STRENGTH TEST RESULTS		
PARAMETERS	PEAK STRENGTH:	RESIDUAL STRENGTH:
FRICTION ANGLE, (Degree)	25.9	35.5
COHESION, (psf)	1040.0	323.0

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CONSULTING ENGINEERS • GEOLOGISTS
792 SEARLS AVENUE
NEVADA CITY, CA 95959
(530) 478-1305 FAX 478-1019

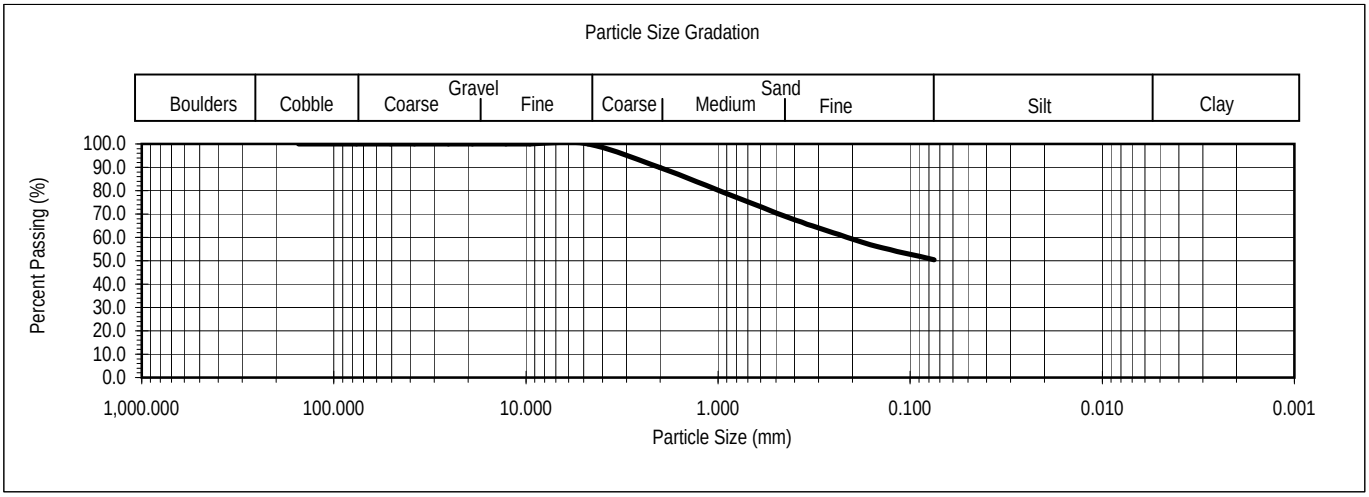
PROJECT NAME: NUHS
PROJECT NO.: 3408-01 DATE: 9/17/2007
BORING / TRENCH NO.: B-1 **LAB NO.:** 7-759
SAMPLE NO.: T1-3-1 **SAMPLE DEPTH (ft.):** 8
DESCRIPTION: Yellowish Brown (10YR 5/6) Sandy Elastic Silt

Particle Size Distribution

ASTM D422

Project No.: **3408-01** Project Name: **NUHS** Date: **9/17/2007**
Sample No.: **T2-4-1** Boring/Trench: **B-2** Depth, (ft.): **11** Tested By: **BLP/RES**
Description: **Dark Yellowish Brown (10YR 4/4) Sandy Elastic Silt** Checked By: **JHA**
Sample Location: Lab. No.: **7-759**

Sieve Size	Particle Diameter		Dry Weight on Sieve			Percent
	Inches	Millimeter	Retained On Sieve	Accumulated On Sieve	Passing Sieve	Passing
(U.S. Standard)	(in.)	(mm)	(gm)	(gm)	(gm)	(%)
6 Inch	6.0000	152.4	0.00	0.0	486.3	100.0
3 Inch	3.0000	76.2	0.00	0.0	486.3	100.0
2 Inch	2.0000	50.8	0.00	0.0	486.3	100.0
1.5 Inch	1.5000	38.1	0.00	0.0	486.3	100.0
1.0 Inch	1.0000	25.4	0.00	0.0	486.3	100.0
3/4 Inch	0.7500	19.1	0.00	0.0	486.3	100.0
1/2 Inch	0.5000	12.7	0.00	0.0	486.3	100.0
3/8 Inch	0.3750	9.5	0.00	0.0	486.3	100.0
#4	0.1870	4.7500	0.00	0.0	486.3	100.0
#10	0.0787	2.0000	48.97	49.0	437.4	89.9
#20	0.0335	0.8500	58.11	107.1	379.3	78.0
#40	0.0167	0.4250	46.60	153.7	332.7	68.4
#60	0.0098	0.2500	31.53	185.2	301.1	61.9
#100	0.0059	0.1500	28.19	213.4	273.0	56.1
#200	0.0030	0.0750	27.60	241.0	245.4	50.4
Hydrometer						



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GEOLOGIC HAZARDS REPORT
for
NEVADA UNION HIGH SCHOOL
IMPROVEMENTS
11761 Ridge Road
Nevada County, California

Prepared for:
Nevada Joint Union High School District
11645 Ridge Road
Grass Valley, California 95945-7906

Prepared by:
Holdrege & Kull
792 Searls Avenue
Nevada City, California 95959

Project No. 3408-01
October 31, 2007

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 3408-01
October 31, 2007

Paul Palmer
Nevada Joint Union High School District
11645 Ridge Road
Grass Valley, California 95945

Reference: ***Proposed Multi-Purpose Room Renovation***
Nevada Joint Union High School
11761 Ridge Road
Nevada County, California

Subject: ***Geologic and Seismic Hazards Report***

Dear Mr. Palmer:

This report presents the results of our geologic hazards evaluation for site improvements at the existing Nevada Union High School, located at 11761 Ridge Road in Nevada County, California. As proposed, the project is to include reconstruction and expansion of the existing multi-purpose room.

Holdrege & Kull previously prepared a design-level geotechnical engineering report for the project. The findings presented in this geologic hazards report are based on our observation of surface and subsurface conditions, review of previous reports, including the geotechnical engineering report for the project by Holdrege & Kull dated October 23, 2007, review of published maps and literature, and probabilistic seismic hazard analysis of the site.

Our opinion is that the project can be completed as proposed, provided the recommendations presented in the geotechnical engineering report are implemented.

We appreciate the opportunity to provide our services on this project. Please contact us if you have any questions regarding our observations or the recommendations presented in this report.

Sincerely,

HOLDREGE & KULL

Prepared by:

Nadine Langley, P.G. 7954
Project Geologist

Reviewed by:

Tom Holdrege, C.E.G. 1809
Principal

copies: 5 to Deems Lewis McKinley / Attn: Chris Ramm
1 to Nevada Union High School / Attn: Paul Palmer

f:\1 projects\3408 nuhs expansion\3408 ghzrpt.doc

TABLE OF CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

At the request of Paul Palmer of the Nevada Joint Union High School District, Holdrege & Kull (H&K) performed a geotechnical and geologic hazard investigation at the Nevada Union High School site in Nevada County, California. The investigation was performed in general accordance with our August 21, 2007 proposal for the project. The geotechnical engineering report, dated October 23, 2007, was provided as a separate document.

The existing Nevada Union High School site is located on the south side of Ridge Road in Nevada County, California. The project area is presently occupied by a multi-purpose room that includes a cafeteria and a covered student commons patio. The school site is bordered by residential properties to the north and east, the Sierra College Grass Valley campus to the south, and by a church to the west. The high school campus slopes toward the south, and existing structures are situated at multiple levels with elevations decreasing toward the south.

The existing theater and music room are located adjacent to, and at a similar or slightly lower elevation than Ridge Road. The existing multi-purpose room and classroom wing are slightly lower than the theater and music rooms, and the administration and classroom wing is situated at a lower elevation than the multi-purpose room.

1.1 PROPOSED IMPROVEMENTS

Based on our discussions with the project architect and review of a March 2007 conceptual site plan for the project provided by Deems Lewis McKinley Architecture, we understand that the proposed improvements will likely include renovation and expansion of the existing multi-purpose room and cafeteria. We anticipate that the renovation will include demolition of a portion of the existing multi-purpose room and patio, overexcavation of existing fill, and excavation and grading for building pads and underground utilities.

1.2 PURPOSE

The purpose of the geologic and seismic hazards evaluation is to identify potential hazards at the site, and to provide ground motion parameters and seismic design criteria. A design-level geotechnical report for the project is provided under separate cover.

1.3 SCOPE-OF-SERVICES

To prepare this report, we performed the following scope of services:

- We performed a geotechnical engineering investigation, including a literature review and a subsurface investigation. The geotechnical investigation included site reconnaissance and excavation of exploratory borings, laboratory testing, engineering calculations, and recommendations for earthwork and structural improvements. The geotechnical report, dated October 23, 2007, was provided under separate cover.
- We performed a geologic hazards investigation in accordance with California Geological Survey Note 48. The investigation included evaluation of seismic hazards and calculation of ground motion parameters.
- We characterized the on-site soil based on conditions described in the geotechnical engineering report, including observation within exploratory borings, standard penetration (SPT) blow counts, and laboratory test results.
- We performed probabilistic seismic hazard analyses to estimate potential ground motion at the site, and provide seismic design criteria for the improvements.

Our scope of services did not include a groundwater flow analysis or an evaluation of the site for the presence of hazardous materials, mold, or historic mining features.

2 GEOLOGIC HAZARDS INVESTIGATION

Our evaluation of geologic hazards was based on review of geologic maps and literature, review of regional aerial photographs, site reconnaissance, and analysis of geotechnical exploration data from our geotechnical engineering investigation.

2.1 AERIAL PHOTOGRAPHS

We reviewed the following historic aerial photographs of the project site and surrounding areas:

1962 – 1:12,000, Nev2-11, Nev 2-12, Nev 2-13
1971 – 1:12,000, 2942-08-204
1980 – 1:24,000, 80118-79
1989 – 1:24,000, 89189-5-33, 6-32
1992 – 1:24,000, 92000-4 1-3, 1-4, 2-4
1998 – 1:1,200, USGS on-line metadata
2004 – 1:24,000, Sac-04, 18-56, 18-57

The 1962 photograph depicts the high school in a rural setting surrounded by undeveloped land or agricultural land. The campus appeared to consist of a main wing in the location of the proposed improvements, and classroom wings and parking areas. The photograph shows few residential structures along Ridge Road.

Subsequent photographs reveal period expansion of the campus and increased development in the area. The 1971 photographs depicted additional classroom wings and an oval track at the site. A soccer field and additional structures appeared in each of the subsequent photographs. From 1971 to 2004, the photographs revealed increasing residential density near the campus, construction of the Highway 49/20 freeway to the west, construction of Sierra College from 1992 and 1998, and improvement of Sierra College Drive in 2004. No geologic hazards were evident in the photographs we reviewed from 1962 to 2004.

2.2 LITERATURE REVIEW

We reviewed geologic maps and literature pertaining to the project site. A list of references is included in Section 3. The following sections summarize our findings.

2.2.1 Soil Survey

As part of our study, we reviewed the on-line version of the *Soil Survey of Nevada County, California* (USDA Soil Conservation Service, 2007). According to the soil survey, the site is primarily underlain by Aiken loam on 9 to 30 percent slopes, and cut and fill land.

Cut and fill land refers to previously graded areas. The properties of cut and fill land depend on the soil used during grading. Cut and fill soil properties would likely be similar to the native soil properties, unless the previously graded soil was imported from a different source.

Aiken soil is typically derived from weathering of andesitic tuff and conglomerate. A typical Aiken soil profile consists of 0 to 29 inches of loam and clay loam, underlain from 29 to 52 inches by clay loam and clay. From 52 to 64 inches the soil consists of clay loam, and bedrock is typically encountered between 64 and 68 inches. According to the on-line data, the Aiken soil exhibits a moderate corrosion potential, and moderate to high hazard of erosion.

2.2.2 Geologic Setting

Our understanding of site and regional geology is primarily based on a review of geologic maps and documents, including the *Geologic Map of Western Nevada County* (California Division of Mines and Geology, 1990) and the *Geologic Map of the Colfax - Grass Valley Area* (Tuminas, 1981).

The property is located in the Sierra Nevada Foothills, on the western side of the Sierra Nevada geomorphic province. The Sierra Nevada province is an elongate, north-west trending structural block that is tilted upward to form a steep scarp above the adjacent Basin and Range province to the east. The western slope of the Sierra Nevada dips gently westward, and extends beneath sediment of the Great Valley province. Continual uplift and erosion of the Sierra Nevada contributes to sediment within the Great Valley.

According to the 1:48,000-scale, *Geologic Map of Nevada County, California* (1990, California Division of Mines and Geology), the site is underlain by Miocene to Pliocene age volcanic deposits designated as Mehrten formation. The Miocene age Mehrten formation consists of a breccia unit and a conglomerate unit. The conglomerate unit represents channel deposits typically composed of rounded andesitic cobbles and boulders interbedded with sand, silt, and clay. The conglomerate unit was not encountered during our site investigations. The Miocene epoch represents a period of time from approximately 24 to 5 million years before present (MYBP), and the Pliocene epoch represents the period between approximately 5 to 2 MYBP.

Major faulting and uplift of the Sierra Nevada tectonic block during the Miocene epoch initiated volcanic activity in the Sierra Nevada region, precipitated stream and channel incision, and increased sedimentation on the gentle western slopes of the Sierra Nevada. During periods of volcanic activity, volcanic ash mixed with mud and water within alluvial channels on the western slopes of the ancestral Sierra Nevada. The mud and ash flows, called "lahars", moved as relatively cool masses that incorporated rocks, wood, and debris. The lahars solidified into a well cemented, tuffaceous matrix with gravel to boulder-sized volcanic rock fragments that formed a resistant cap over underlying rock units.

Exploratory borings excavated as part of the geotechnical engineering investigation revealed variable sandy silt and silt-clay soil mixtures typical of residual soil derived from weathering of Mehrten breccia. The soil exhibited remnant volcanic mudflow

rock texture and contained severely to completely weathered fragments of cemented volcanic tuff, rhyolite, and andesite.

Because of the porous texture of the Mehrten breccia, residually weathered soil associated with the breccia generally appears less dense than compacted soil or soil derived from metamorphic or igneous rock.

2.3 SITE SEISMICITY

The Uniform Building Code (UBC) Seismic Zone Map of the United States designates zones of relative earthquake hazard from 1 to 4, with 4 being the greatest hazard. The 2001 edition of the California Building Code (CBC) Seismic Zone Map of California is used for seismic analysis for California state-owned buildings, schools and hospitals. According to the CBC, all sites in California are rated as either Zone 3 or Zone 4, and there are no areas in California where seismic hazards are considered non-existent. The project site is located within Seismic Zone 3.

2.3.1 Alquist-Priolo Fault Zones

The 1997 version of Special Publication 43, *Fault Rupture Hazard Zones in California*, describes active faults and fault zones (activity within 11,000 years), as part of the Alquist-Priolo Earthquake Fault Zoning Act. The document and the 1999 on-line update indicate the site is not located within an Alquist-Priolo active fault zone.

2.3.2 Regional Seismic Sources

We reviewed California Division of Mines and Geology Open File Report OFR96-08, *Probabilistic Seismic Hazard Assessment for the State of California*, and the on-line revisions and the California Geological Survey updates to the report, *2003 California Fault Parameters*. The documents categorize faults as Class A, B, or C. Class A faults are capable of producing large magnitude events, and have a high rate of slip. Class C faults are not capable of producing large magnitude earthquakes, and have a relatively low slip rate. Class B faults are all other type faults. The report indicates only B and C type faults are within 100 kilometers of the subject site.

Foothills Fault System

According to the *California Geological Survey Fault Parameters Map* (2002), the project site is located within the Foothills Fault System, in the western foothills of

the Sierra Nevada. The 2002 California Geological Survey earthquake catalog categorizes the Foothills Fault System as an approximately 150-mile-long poorly constrained system of strike slip and normal faults with the hazard derived from an areal source, rather than from a single fault. The Foothills Fault System is designated as a Class C fault zone, with low seismicity and a low rate of recurrence. The Foothills Fault system is capable of producing an earthquake with a maximum magnitude 6.5.

Other Seismic Sources

The California Geological Survey earthquake catalog (2002) identifies other potential seismic sources including the faults noted below. The faults are shown on the Fault Parameters Map included as Figure 5.

The Western Nevada Fault Zones 1 through 3 are located in the eastern portion of California and western portion of Nevada between 55 and 96 miles east of the site. The Western Nevada zone is designated as a Class C areal zone that accommodates dextral shear from the Walker Zone, with the hazard distributed over the area of the zone. The Western Nevada Zone is capable of producing earthquakes of magnitude 7.1.

Mohawk-Honey Lake Fault Zones 3, 4, and 5 are located between 48 and 98 miles northeast of the site, north of the Western Nevada Zone. The Mohawk-Honey Lake Fault Zone is designated as a Class C dextral shear zone capable of producing magnitude 7.3 earthquakes

The following table provides information about fault sources within 100 km of the site including distance, slip rate, maximum magnitude, and peak ground acceleration.

Table 2.3.2.1 - Regional Seismic Sources

FAULT NAME and GEOMETRY[1]	FAULT CLASS[1]	SLIP RATE[1] (mm/yr)	MAGNITUDE[1] (Mmax)	DISTANCE[2, 3]		CALCULATED PEAK GROUND ACCELERATION[4] (g)
				(km)	(mi)	
Foothills Fault System 3 n-rl-o, 75 E	C	0.05	6.5	5.9	3.7	0.29
Foothills Fault System 2 n-rl-o, 75 E	C	0.05	6.5	10.9	6.8	0.21
Foothills Fault System 4 n-rl-o, 75 E	C	0.05	6.5	22.0	13.8	0.13
Foothills Fault System 1 n-rl-o, 75 E	C	0.05	6.5	27.6	17.3	0.11

Table 2.3.2.1 - Regional Seismic Sources

FAULT NAME and GEOMETRY[1]	FAULT CLASS[1]	SLIP RATE[1] (mm/yr)	MAGNITUDE[1] (Mmax)	DISTANCE[2, 3]		CALCULATED PEAK GROUND ACCELERATION[4] (g)
				(km)	(mi)	
Mohawk - Honey Lake Zone 5 rl-ss	C	2.0	7.3	48.4	30.3	0.10
Western Nevada Zone 1 rl-ss	C	4.0	7.3	55.9	34.9	0.09
Mohawk - Honey Lake Zone 4 rl-ss	C	2.0	7.3	71.8	44.9	0.08
Western Nevada Zone 2 rl-ss	C	4.0	7.3	77.3	48.3	0.07
Western Nevada Zone 3 rl-ss	C	4.0	7.3	96.1	60.1	0.06
Mohawk - Honey Lake Zone 3 rl-ss	C	2.0	7.3	98.7	61.7	0.06

[1] *California Geological Survey, 2002, California Fault Parameters, on-line document and map, http://www.consrv.ca.gov/CGS/rghm/psha/fault_parameters/pdf/2003_CA_Hazard_Maps.pdf*

[2] *Blake, T.F., 2004, FRISKSP, Probabilistic Estimation of Peak Horizontal Acceleration and Uniform Hazard Spectra using 3-D Faults as Earthquake Sources*

[3] *Distance based on closest projection of surface area.*

[4] *Boore, et al, 1997, Equations for Estimating Horizontal Response Spectra and Peak Acceleration from Western North American Earthquakes: A Summary of Recent Work, in Seismological Research Letters: 68 (1), 128-153.*

2.3.3 Historic Seismicity

Several earthquakes have occurred since 1850 which have produced noticeable ground shaking in the vicinity. We used EQSEARCH (Blake, 2004) to search for earthquakes greater than magnitude 5 within a 100-km radius of the site. Additionally, we reviewed documents for information about local effects. The EQSEARCH output data is included as Appendix A. Some of the earthquakes felt in the area include:

- In 1867, an earthquake with estimated 5.0 magnitude occurred approximately 18 miles east of the site. No details about the earthquake were available.

- An earthquake with magnitude 6.0 on the Dog Valley fault, located near Stampede Reservoir approximately 70 miles northeast of the site, produced noticeable shaking and ground rupture in 1966.

- In 1975, a magnitude 6.2 earthquake occurred on the Cleveland Hill fault, located within the Foothills Fault System approximately 36 miles west of the site. The event was strongly felt in the Grass Valley/Nevada City area; however, no major damage or injuries were reported.

2.4 EARTHQUAKE GROUND MOTION

Earthquake ground motion is described in terms of acceleration as a percentage of gravity (g). Peak ground acceleration (PGA) is defined as the largest acceleration recorded by a particular station during an earthquake. Spectral acceleration (SA) is approximately what is experienced by a building, as modeled by a particle on a massless vertical rod having the same natural period of vibration as the building.

2.4.1 Probabilistic Seismic Hazard Analysis (PSHA)

The California Geological Survey defines the upper bound earthquake (UBE) as the motion having a 10 percent probability of being exceeded in a 100-year period, with a statistical return of 949 years, and defines the design basis earthquake (DBE) as the motion with a 10 percent probability of being exceeded in 50 years, with a return period of 475 years.

The site is primarily underlain by granular to fine-grained soil derived from weathering of the underlying Mehrten volcanic tuff breccia. Blow counts recorded during our subsurface investigation indicated dense to very dense soil and rock was present in the subsurface. We used soil profile S_C and attenuation relationship NEHRP C (Boore, et. al., 1997) for the ground motion analysis.

We used probabilistic seismic hazard analysis (PSHA) methods and FRISKSP (Version 4, 2004) software to determine UBE and DBE values of peak ground acceleration (PGA) and spectral acceleration (SA) for the proposed campus site. The FRISKSP analyses provided ground motion of values of PGA and SA included in Table 2.4.1.2, below.

Table 2.4.1.2 - Probabilistic Seismic Hazard Analysis

DESIGN TYPE	EXCEEDANCE PROBABILITY	RETURN PERIOD (years)	Peak Ground Acceleration (g)	Spectral Acceleration (g)
			S_C	S_C
Upper Bound Earthquake	10 percent in 100 years	949	0.11	0.23
Design Basis Earthquake	10 percent in 50 years	475	0.08	0.17

2.4.2 Seismic Design Parameters

We reviewed Chapters 16 and 18 of the 2001 California Building Code, and used UBCSEIS to determine seismic design parameters and near-source factors. The

site is mapped in Seismic Zone 3 on the CBC Seismic Zone Map. Seismic design parameters are provided in Table 2.4.2.1, below.

Table 2.4.2.1 - Seismic Design Values

DESCRIPTION	DESIGN VALUE	SOURCE
Seismic Zone	3	2001 CBC, Figure 16A-2
Seismic Zone Factor	0.3	2001 CBC, Table 16-I
Soil Profile	S_C	2001 CBC, Table 16-J
Seismic Source	B, C	2001 CBC, Table 16-U
Near Source Factor, Na	1.0	2001 CBC, Table 16-S
Near Source Factor, Nv	1.0	2001 CBC, Table 16-T
Seismic Coefficient, Ca	0.33	2001 CBC, Table 16-Q
Seismic Coefficient, Cv	0.45	2001 CBC, Table 16-R
Spectral Coefficient, Ts	0.55	2001 CBC, Figure 16-3
Spectral Coefficient, To	0.11	2001 CBC, Figure 16-3

Additional near source factors do not apply to the site because the site is located outside the designated ICBO area of known active fault near source zones, and because no Class A or Class B faults are located within 15 km of the site.

2.5 GEOLOGIC HAZARDS

Based on our site surface and subsurface investigations, and review of aerial photographs and published documents, we considered the following potential geological hazards for the site.

2.5.1 Flooding

We reviewed Flood Insurance Rate Map 0602100606C, dated February 1997, prepared by the Federal Emergency Management Agency (FEMA) for the Nevada Union High School area. The maps indicated the project site was not situated within a designated flood zone. The project site is situated at similar elevations or topographically above surrounding properties, and there is a very low hazard of flooding at the site.

2.5.2 Landslides

Adjacent properties are at similar or lower elevations, and there is no landslide hazard from adjacent properties. The multi-level, gently to moderately sloping site generally slopes toward the south. The majority of the site is underlain by existing structures, concrete, or asphalt pavement. We observed no evidence of past sliding, although we did observe localized erosion in landscaped slopes. Our opinion is that the landslide hazard at the site is very low.

2.5.3 Slumps or Land Subsidence

The area proposed for improvement is presently covered with structures, concrete or asphalt pavement, or landscaping. We did not observe slumps or hummocky surface feature depressions that indicate land subsidence. The site is primarily underlain by residual fine-grained to granular stiff soil that represents severely to completely weathered rock. Our opinion is that the hazard of slumps or subsidence is low.

2.5.4 Expansive Soil

We performed expansion index testing on sandy elastic silt encountered during our site investigation. The expansion index testing indicated the soil tested was not expansive. However, based on the variable nature of the residual soil, it is possible that potentially expansive soil could be encountered during site grading. If fine-grained, clayey soil is encountered within proposed building footprints, it should be evaluated by H&K for expansive potential so that mitigation recommendations can be provided.

2.5.5 Soil Corrosion

The onsite soil was tested for corrosion potential as part of the geotechnical engineering investigation. Laboratory tests indicated the soil exhibited relatively high acidity. However, the soil also exhibited only trace amounts of sulfate and chloride and high resistivity values that were within the non-corrosive range.

2.5.6 Volcanic Hazards

According to the US Geological Survey Map of Potential Areas of Volcanic Hazards (Miller, 1989), the property is not within a recognized active volcanic area. The nearest known active volcanic zone is the Mt. Lassen area, located approximately 80 miles northwest of the site.

2.5.7 Naturally Occurring Asbestos

Naturally occurring asbestos commonly occurs in geologic settings dominated by ultramafic rock and serpentinite. Ultramafic rock and serpentinite are mapped approximately 1 mile south and 1.5 miles west of the site. During our site investigation, we did not observe ultramafic rock or serpentinite. The underlying Mehrten formation rock and Aiken soil are not associated with naturally occurring asbestos. Our opinion is that the likelihood of encountering naturally occurring asbestos at the site is negligible.

2.5.8 Secondary Seismic Hazards

The primary hazard in an earthquake event is ground rupture or surface faulting. Ground motions may initiate secondary events such as differential compaction, liquefaction, seismically induced flooding, landslides, or seiches within large bodies of water. The likelihood of secondary seismic hazard impacts would be reduced if site grading is performed in accordance with the recommendations of our geotechnical engineering report and the California Building Code.

Differential Compaction

Major seismic shaking of loose, non-uniform soil can initiate differential soil compaction. The majority of the site is underlain by dense soil and weathered rock, and the potential hazard of differential compaction in a large earthquake is low. To avoid creating an environment for differential compaction, site grading should be performed in accordance with the recommendations of the geotechnical report. Over-excavation and replacement of loose soil, and creation of cut and fill pads should be performed in accordance with the recommendations of the geotechnical report to avoid significant cut and fill differential conditions.

Liquefaction

Soil liquefaction results from loss of bond strength during cyclic loading, such as imposed by earthquakes. Soil most susceptible to liquefaction is generally clean, loose, uniformly graded sandy soil, although gravelly soil, and some clay-rich soil may be prone to liquefaction under certain conditions. The on-site soil is residual soil derived from weathering of volcanic mudflow rock and volcanic tuff. The residual nature of the soil results in varying thicknesses of clayey silt, sandy silt, or silty sand soil. Additionally, the soil contains less weathered fragments of volcanic rock and tuff.

We encountered water approximately 24 feet bgs in exploratory boring B-2. We recorded SPT blow counts less than 30 below the water surface at depths between 24 and 45 feet bgs. However, the borings revealed SPT blow counts greater than 30, and more resistant, less weathered Mehrten breccia below 45 feet. Based on the presence of remnant rock textures and tuff breccia fragments, the fines content noted in the particle size distribution, and the presence of stiff clay soil beneath the silty sand, our opinion is that the risk of liquefaction at the site is minimal.

Seismically Induced Flooding

As noted in the Flooding section above, the campus is not located within a flood hazard zone. The site is separated from potential open water sources by distance and topography. Our opinion is that the hazard of seismically induced flooding is negligible.

Seismically Induced Landslides

The multi-level school site was constructed on gentle to moderate slopes, and the majority of the site is covered by buildings, concrete, or asphalt pavement. We observed no evidence of previous landslides, or conditions that would be prone to seismically induced landslides. Our opinion is that the hazard of seismically induced landslides is low.

2.5.9 Unusual or Exceptional Conditions

We did not observe site conditions that would indicate the presence of unusual or exceptional hazards such as petroleum-related toxins, radon, asbestos, onsite septic systems, high nitrate concentrations, or hydro-collapse of alluvial soil. Therefore, those conditions were not addressed as part of this investigation. If unusual or exceptional conditions are encountered during site development, further investigation may be appropriate.

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4 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

1. Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. This warranty is in lieu of all other warranties, either expressed or implied.
2. These services were performed consistent with our agreement with our client. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.
3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid. Only our firm can determine the validity of the conclusions and recommendations presented in this report. Therefore, we should be retained to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. However, we may require additional fieldwork and laboratory testing to develop any modifications to our recommendations. Costs to review project changes and perform additional fieldwork and laboratory testing necessary to modify our recommendations are beyond the scope of services presented in this report. Any additional work will be performed only after receipt of an approved scope of services, budget, and written authorization to proceed.
4. The analyses, conclusions and recommendations presented in this report are based on site conditions as they existed at the time we performed our surface and subsurface field investigations. We have assumed that the subsurface soil and groundwater conditions encountered at the location of our exploratory borings are generally representative of the subsurface conditions throughout the entire project site. However, the actual subsurface conditions at locations between and beyond our exploratory borings may differ. Therefore, if the subsurface conditions encountered during construction are different than those described in this report, then we should be notified immediately so that we can review these differences and, if necessary, modify our recommendations.

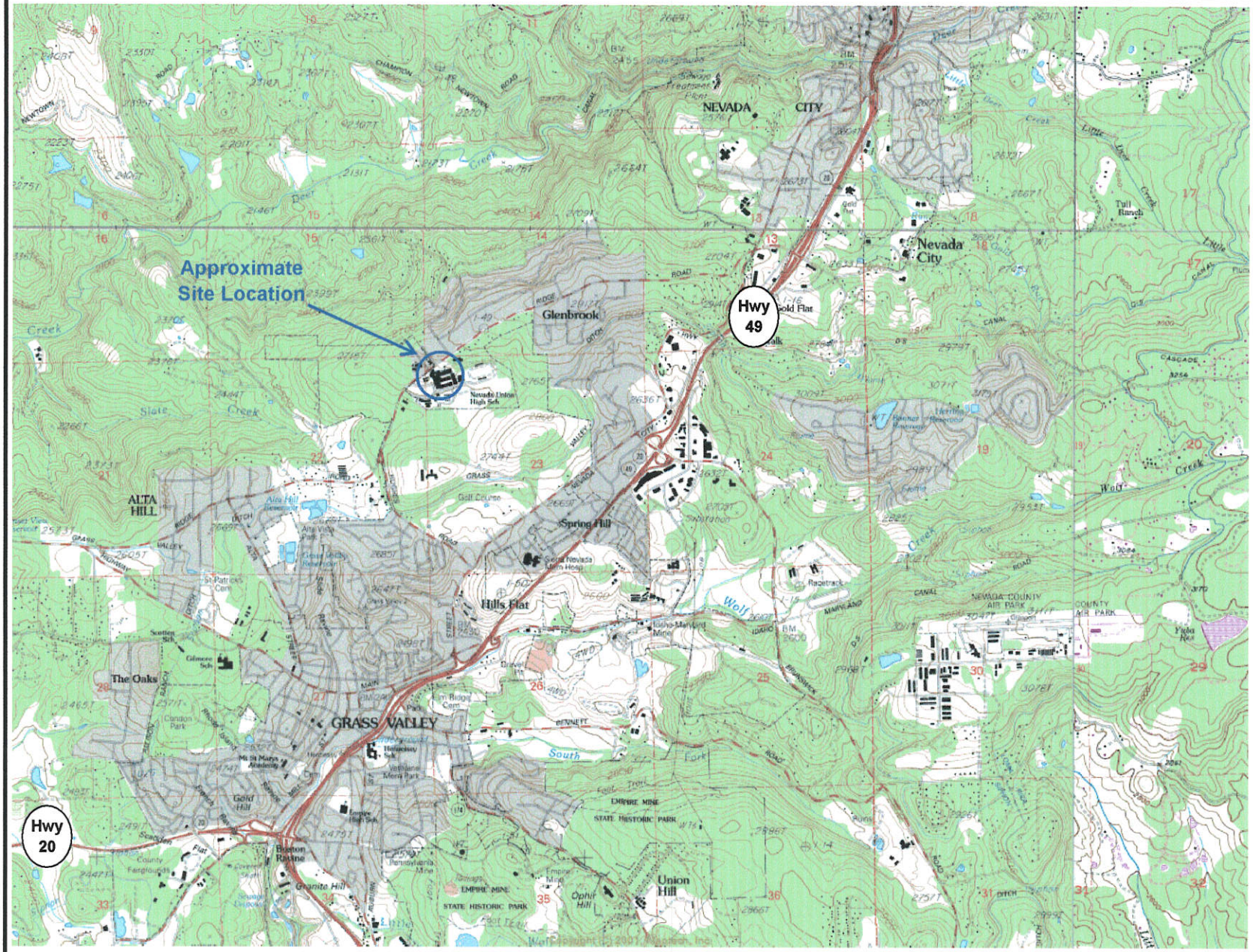
5. The elevation or depth to groundwater underlying the project site may differ with time and location.

6. The project site map shows approximate exploratory boring locations as determined by pacing distances from identifiable site features. Therefore, the boring locations should not be relied upon as being exact nor located with surveying methods.

7. Our geotechnical investigation scope of services did not include evaluating the project site for the presence of historic mining operations or hazardous materials. Although we did not observe evidence of historic mining activity or hazardous materials within the proposed building area at the time of our field investigation, all project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction. Possible historic mining excavation not detected during our investigation may impact the proposed improvements.

8. The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

FIGURES



No Scale

SOURCE: MAPTECH, Terrain Navigator Pro, ver. 6.0 - USGS 7.5 minute topographic map, Grass Valley, California quadrangle, 1992.

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TOPOGRAPHIC VICINITY MAP

NEVADA UNION HIGH SCHOOL

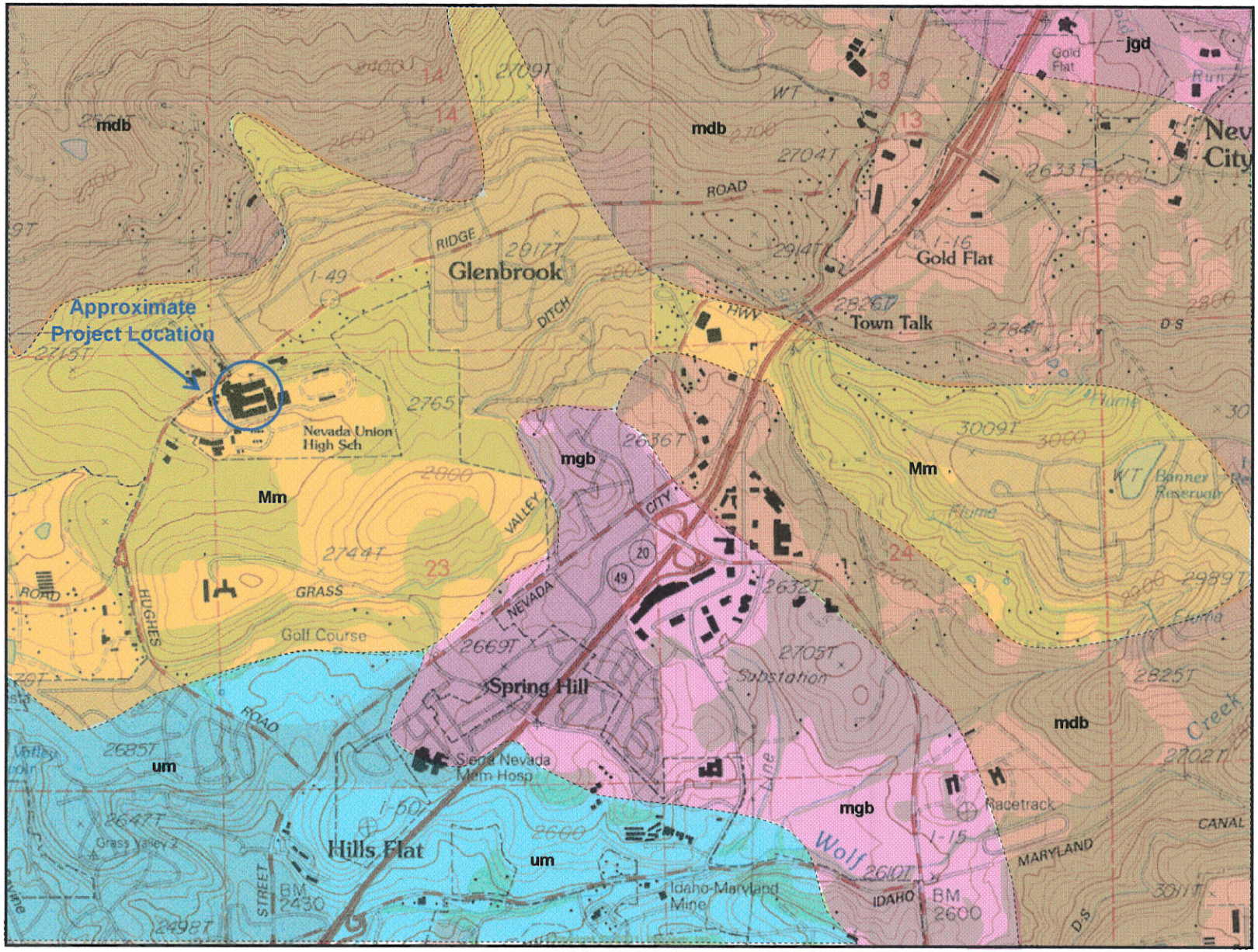
11761 Ridge Road, California

Latitude / Longitude: 39.2400 / 121.0550

PROJECT NO. 3408-01

FIGURE 1

OCTOBER 2007



LEGEND

- jgd — Granodiorite
- mdb — Massive Diabase
- Mm — Mehrten Formation (volcanic mudflow)
- mgb — Gabbro
- um — Ultramafic rock (includes serpentinite)

No Scale

SOURCE: Tuminas, A., 1983, Structural and stratigraphic relations in the Grass Valley - Colfax area, and Loyd, R, and Clinkenbeard, J., 1990, Geologic Map of Western Nevada County, California

BASE: MAPTECH, Terrain Navigator Pro, ver. 6.0 - USGS 7.5 minute topographic map, Grass Valley, California quadrangle, 1992.

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REGIONAL GEOLOGY MAP

NEVADA UNION HIGH SCHOOL

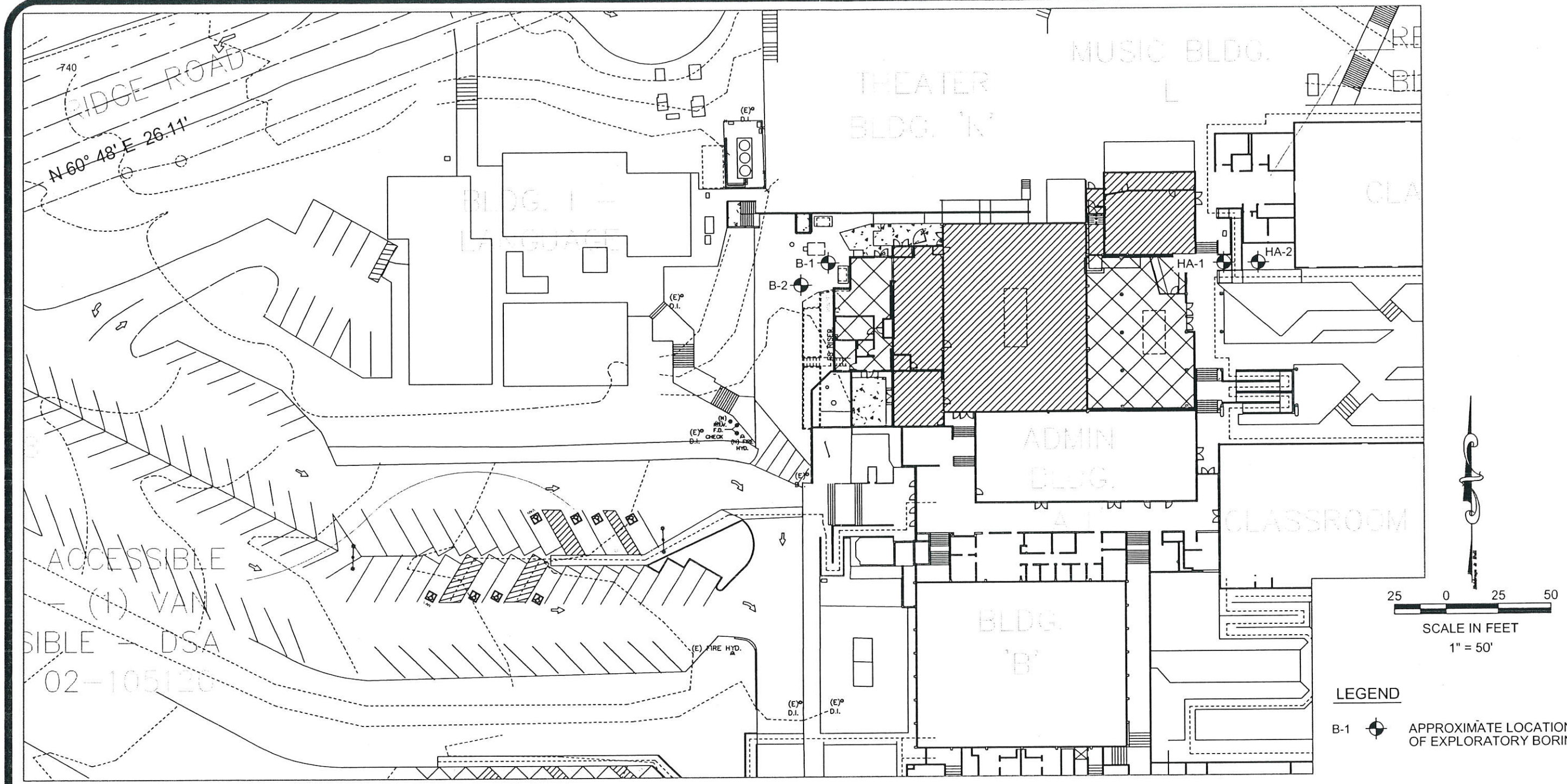
11761 Ridge Road, Nevada County, California

Latitude / Longitude: 39.2400 / 121.0550

PROJECT NO. 3408-01

FIGURE 2

OCTOBER 2007



3408-01-FIG2

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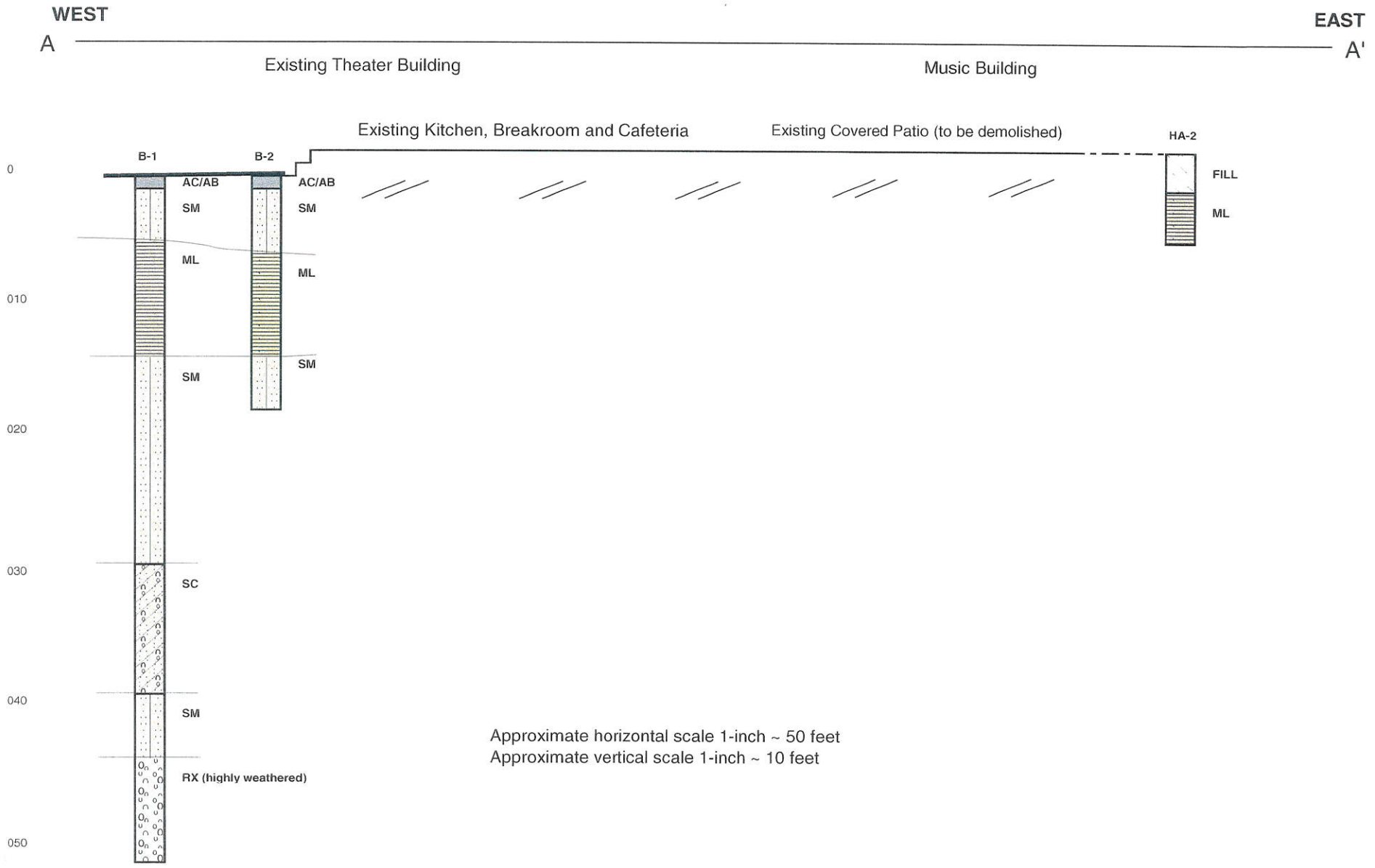
EXPLORATORY BORING LOCATION MAP

NEVADA UNION HIGH SCHOOL

NEVADA COUNTY, CALIFORNIA

DRAWN BY: DFD	CHECKED BY: NLL
PROJECT NO.: 3408-01	
DATE: OCTOBER 2007	
FIGURE NO.: 3	



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CROSS SECTION A - A'

NEVADA UNION HIGH SCHOOL - MULTI-PURPOSE ROOM IMPROVEMENTS

Nevada County, California

PROJECT NO. 3408-01

OCTOBER 2007

FIGURE 4

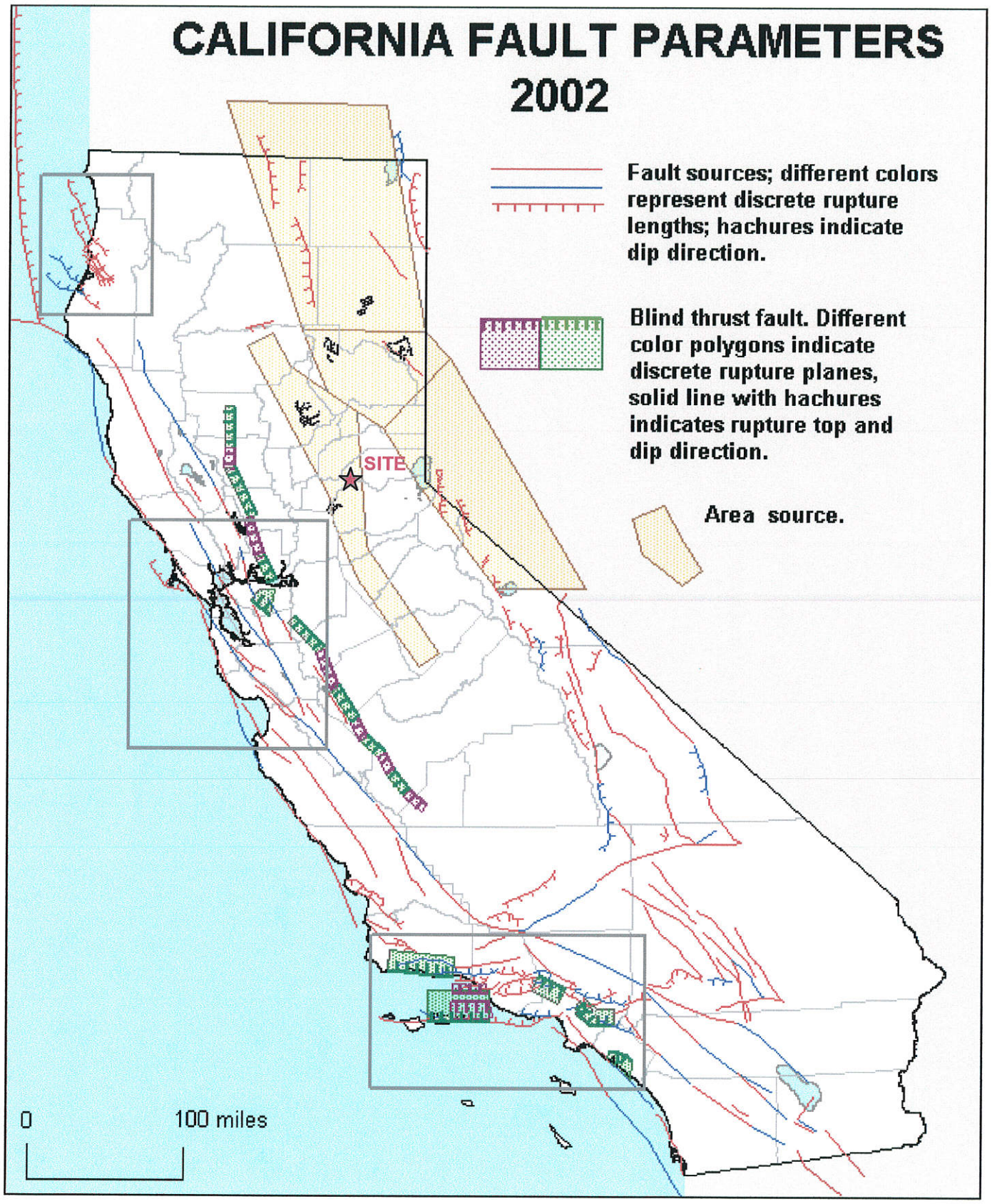

FIGURE 5 Regional Fault Map

California Geological Survey, 2002, Interactive Fault Parameters Map

http://www.consrv.ca.gov/CGS/rghm/psha/fault_parameters/htm/index.htm

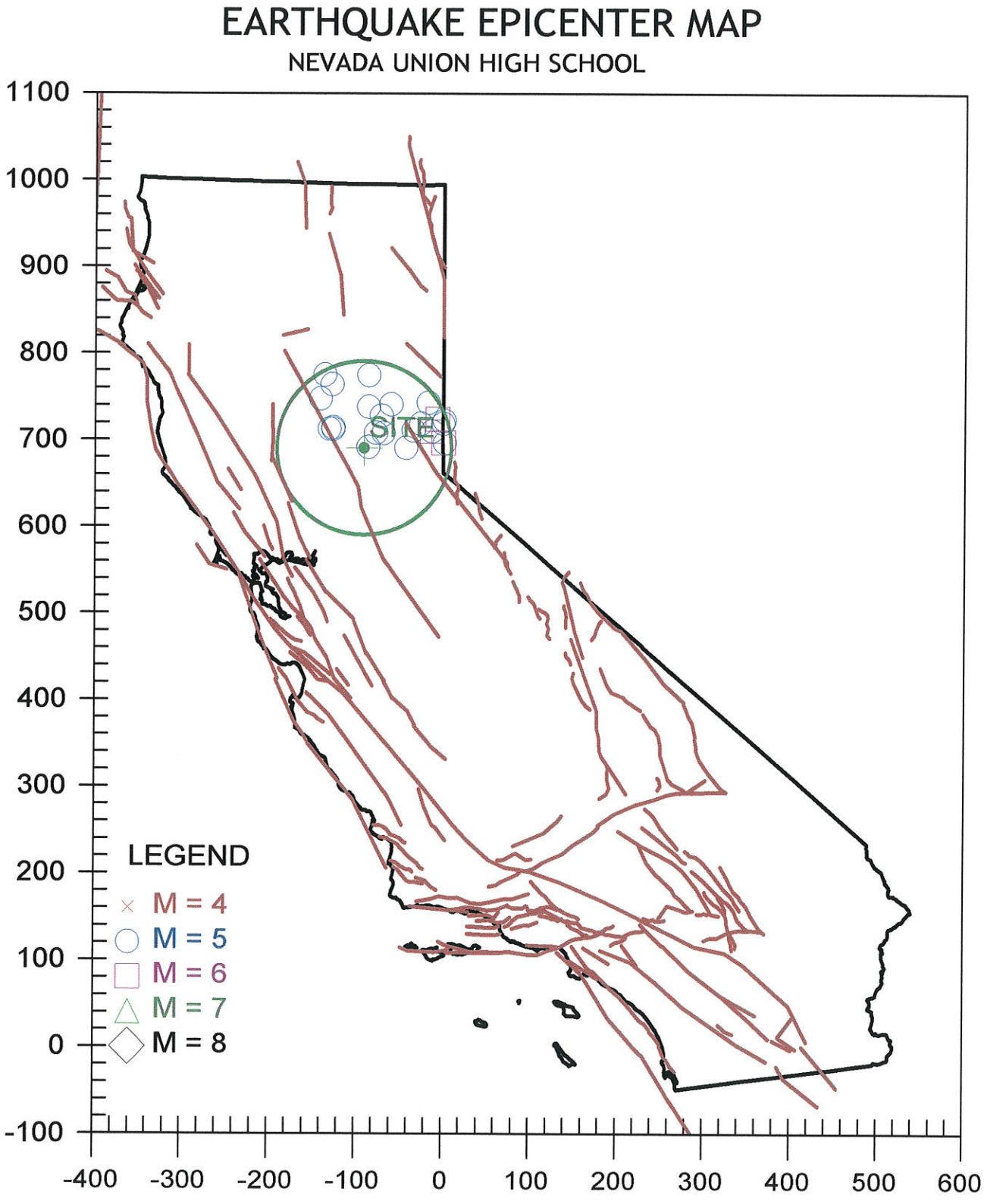

Figure 6: Earthquakes within 62.5 miles (100 kilometers) of the Site
Blake, 2004, EQSEARCH 3.0b for Windows

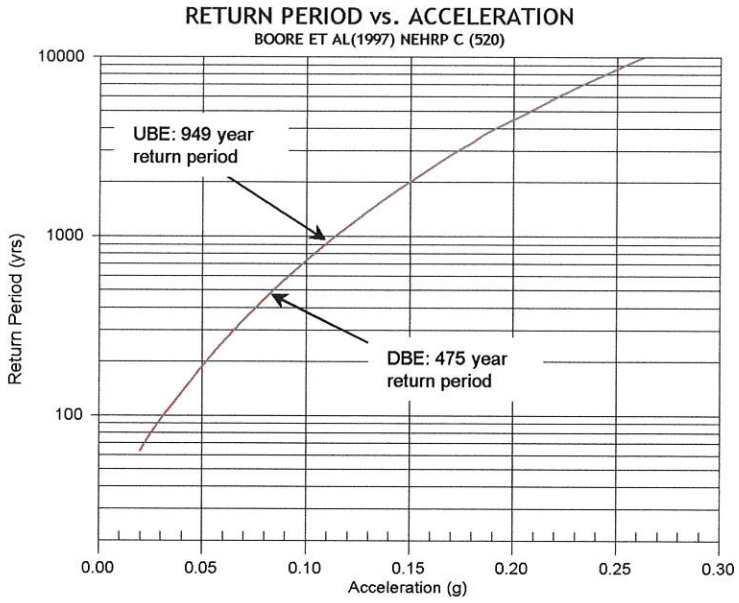

Figure 7: Return Period vs Peak Ground Acceleration
Blake, 2004, FRISKSP 4.0 for Windows

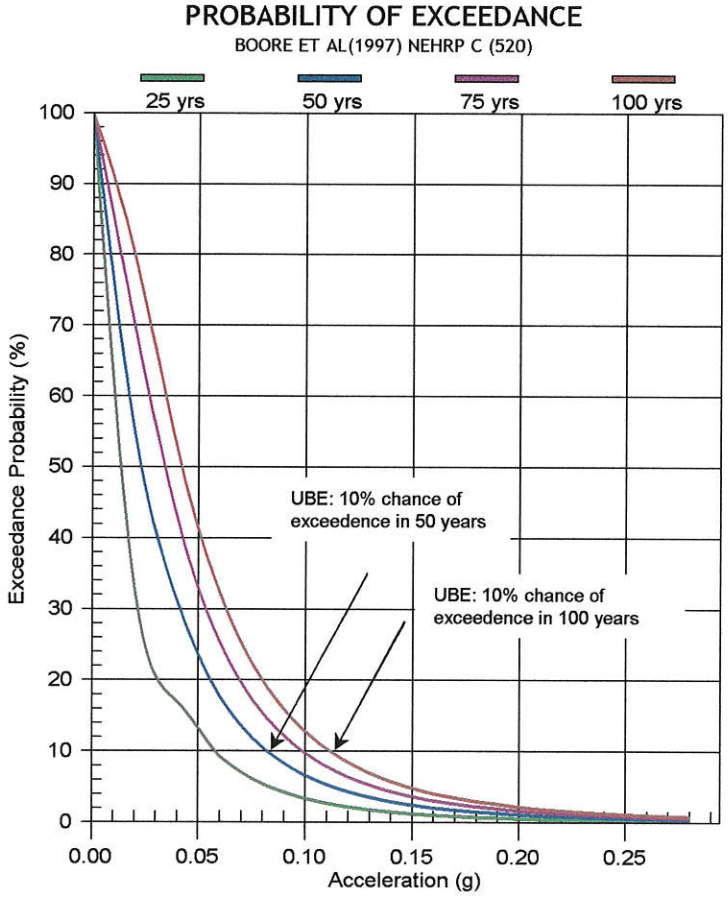

Figure 8: Peak Ground Acceleration vs Exceedence Probability
Blake, 2004, FRISKSP 4.0 for Windows

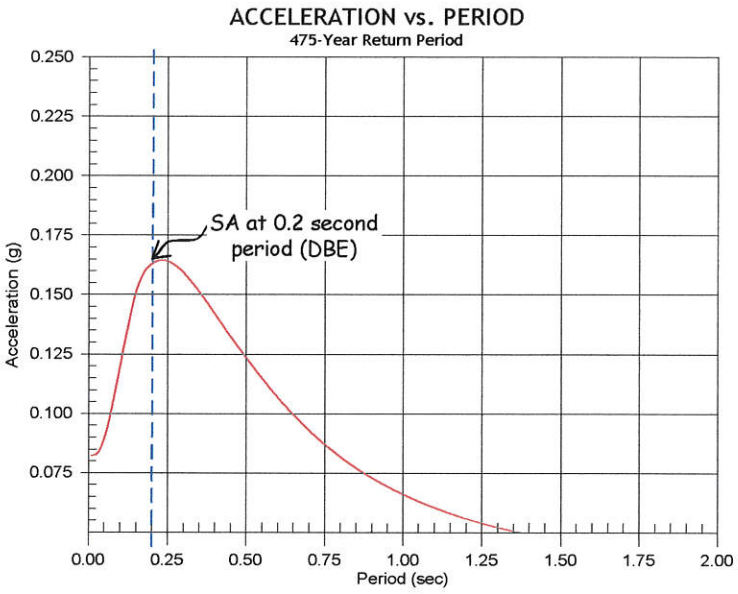

Figure 9: Spectral Acceleration at 0.2 second period (Design Basis Earthquake)
Blake, 2004, FRISKSP 4.0 for Windows

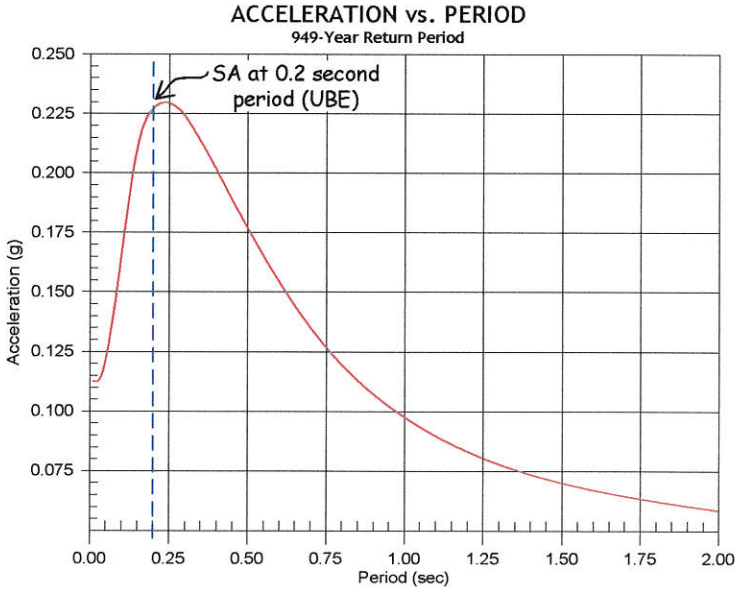

Figure 10: Spectral Acceleration at 0.2 second period (Upper Bound Earthquake)
Blake, 2004, FRISKSP 4.0 for Windows

APPENDIX A EQSEARCH OUTPUT DATA

```
**************************
*                        *
*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
**************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 0042-0000 DATE: 10-13-2007

JOB NAME: NUHS

EARTHQUAKE-CATALOG-FILE NAME: C:\Program Files\EQSEARCH\2004EarthquakeCatalogUpdate\ALLQUAKE.DAT

MAGNITUDE RANGE:
MINIMUM MAGNITUDE: 5.00
MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
SITE LATITUDE: 39.2400
SITE LONGITUDE: 121.0550

SEARCH DATES:
START DATE: 1800
END DATE: 2000

SEARCH RADIUS:
62.5 mi
100.6 km

ATTENUATION RELATION: 8) Boore et al. (1997) Horiz. - Vs = 500 m/s
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
SCOND: 0 Depth Source: A
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
T-A	39.2500	121.0000	12/01/1867	712 0.0	0.0	5.00	0.162	VIII	3.0(4.9)
DMG	39.4000	120.9000	03/03/1909	12 0 0.0	0.0	5.00	0.067	VI	13.8(22.2)
DMG	39.4000	120.8000	06/23/1909	724 0.0	0.0	5.50	0.073	VII	17.5(28.2)
USG	39.4330	121.4750	08/02/1975	2059 0.0	5.1	5.20	0.046	VI	26.1(42.0)
MGI	39.5800	120.8300	03/12/1918	1030 0.0	0.0	5.70	0.060	VI	26.4(42.4)
USG	39.4490	121.4730	08/02/1975	202216.2	4.1	5.20	0.046	VI	26.6(42.8)
USG	39.4360	121.5230	08/01/1975	202012.0	8.8	5.70	0.056	VI	28.4(45.7)
T-A	39.6700	121.0000	07/03/1862	1 0 0.0	0.0	5.00	0.038	V	29.8(48.0)
UNR	39.2450	120.4960	11/28/1980	182112.4	1.5	5.20	0.042	VI	29.9(48.1)
DMG	39.7000	120.7000	04/29/1888	448 0.0	0.0	5.90	0.051	VI	37.0(59.5)
DMG	39.4300	120.4000	03/30/1943	21 728.0	0.0	5.30	0.037	V	37.4(60.1)
DMG	39.5000	120.3000	01/25/1855	6 0 0.0	0.0	5.50	0.036	V	44.1(71.0)
MGI	39.7500	121.6500	04/20/1945	53610.0	0.0	5.00	0.026	V	47.4(76.2)
DMG	39.4200	120.1500	09/12/1966	172011.0	0.0	5.30	0.030	V	49.9(80.3)
DMG	39.4200	120.1500	09/12/1966	1641 1.9	0.0	6.00	0.043	VI	49.9(80.3)
MGI	39.9000	121.5000	11/18/1942	2035 0.0	0.0	5.00	0.025	V	51.4(82.6)
MGI	39.9000	121.5000	11/18/1942	2020 0.0	0.0	5.00	0.025	V	51.4(82.6)
MGI	40.0000	121.0000	07/19/1935	122 0.0	0.0	5.00	0.024	V	52.6(84.6)
DMG	39.5500	120.0800	12/29/1948	125328.0	0.0	6.00	0.039	V	56.3(90.5)
DMG	39.7200	120.2000	04/01/1959	181830.0	0.0	5.60	0.032	V	56.3(90.7)
DMG	39.3000	120.0000	09/03/1857	3 5 0.0	0.0	6.00	0.039	V	56.5(91.0)
GSB	39.3000	119.9800	10/30/1998	095330.0	10.0	5.30	0.027	V	57.6(92.7)
MGI	39.5000	120.0000	02/20/1914	10 0 0.0	0.0	5.00	0.022	IV	59.1(95.1)
DMG	40.0000	121.6000	02/08/1940	8 559.0	0.0	5.70	0.032	V	59.9(96.5)
DMG	39.5300	119.9800	09/26/1953	33429.0	0.0	5.30	0.025	V	60.8(97.8)

****

-END OF SEARCH- 25 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2001 LENGTH OF SEARCH TIME: 201 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 3.0 MILES (4.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 6.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.162 g

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
5.0	25	0.12438
5.5	10	0.04975
6.0	3	0.01493

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:

a-value= 1.071

b-value= 0.448

beta-value= 1.031

APPENDIX B FRISKSP OUTPUT DATA

```
*****************************************
*                                       *
*        FRISKSP - IBM-PC VERSION       *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*             - 1988-2000 -             *
*                                       *
*              VERSION 4.00             *
*             (Visual Fortran)          *
*****************************************
```

TITLE: NUHS Peak Ground Acceleration
IPR_FILE 0
IPLOT 0
SITE CONDITION 0.00
BASEMENT DEPTH (km) 5.00
RHGA FACTOR RHGA DIST (km)
1.000 0.000

NFLT	NSITE	NPROB	NATT	LCD
10	1	2	6	1

RISKS SPECIFIED:
5 0.013900 0.010000 0.005000 0.002105 0.001054

SITE COORDINATES:
1 -121.0550 39.2400

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	FOOTHILLS FAULT SYSTEM 3	5.9	5.9	5.9	5.9	6.3	6.4	km
2	FOOTHILLS FAULT SYSTEM 2	10.9	7.7	10.6	10.6	9.4	10.6	km
3	FOOTHILLS FAULT SYSTEM 4	22.0	22.0	22.0	22.0	22.3	22.4	km
4	FOOTHILLS FAULT SYSTEM 1	27.6	24.4	26.7	26.7	25.9	26.7	km
5	MOHWAK-HONEY LAKE ZONE 5	48.4	48.4	48.4	48.4	48.4	48.5	km
6	WESTERN NEVADA ZONE 1	55.9	55.9	55.9	55.9	55.9	55.9	km
7	MOHWAK-HONEY LAKE ZONE 4	71.8	71.8	71.8	71.8	71.8	71.8	km
8	WESTERN NEVADA ZONE 2	77.3	77.3	77.3	77.3	77.3	77.3	km
9	MOHWAK-HONEY LAKE ZONE 3	96.1	96.1	96.1	96.1	96.1	96.2	km
10	WESTERN NEVADA ZONE 3	98.7	98.7	98.7	98.7	98.7	98.7	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

```
 FAULT  1:  FOOTHILLS FAULT SYSTEM 3

 NFP     NRL    ATTENUATION CODES:
  5      10       2  4
 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1  0.0500  1.842   6.900   2.000   0.140
 NMAX AMMAX   PMAX
  1     6.50   1.00
   dmchar ampchar dmpchar
     0.50     6.00     1.00
 Slip Rate (  0.0500 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2          0.330E+12
 Input Fault Area    - cm**2         0.166E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00163   0.00078   0.00085
IND_RL             2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240
 FAULT SEGMENT COORDINATES
  1     -119.8000   37.4100
  2     -120.7000   38.3900
  3     -120.7900   39.0000
  4     -121.6000   40.0500
  5     -121.8400   40.3900
 NDP     2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        3.2200   12.0000

 Computed Total Fault Area = 0.47E+04

 ------------------------------------------------------------------------------

 FAULT  2   FOOTHILLS FAULT SYSTEM 2

 NFP     NRL    ATTENUATION CODES:
  4      10       2  4
 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1  0.0500  1.842  18.800   2.000   0.390
 NMAX AMMAX   PMAX
  1     6.50   1.00
   dmchar ampchar dmpchar
     0.50     6.00     1.00
 Slip Rate (  0.0500 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2          0.330E+12
 Input Fault Area    - cm**2         0.450E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00441   0.00210   0.00230
 IND_RL             2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240
 FAULT SEGMENT COORDINATES
  1     -119.9400   37.3400
  2     -120.7900   38.3800
  3     -120.9500   38.9000
  4     -122.0000   40.3200
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        3.2200   12.0000

 Computed Total Fault Area = 0.47E+04
 ------------------------------------------------------------------------------
```

```
 FAULT 3:  FOOTHILLS FAULT SYSTEM 4

 NFP    NRL   ATTENUATION CODES:
  2     10      2  4
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.0500  1.842  3.500  2.000  0.070
 NMAX AMMAX  PMAX
  1    6.50  1.00
   dmchar ampchar dmpchar
     0.50    6.00    1.00
 Slip Rate (  0.0500 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.840E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00082   0.00039   0.00043
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -120.8100   39.3100
  2    -121.2000   39.8000
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.2200   12.0000
 Computed Total Fault Area = 0.80E+03

 ------------------------------------------------------------------------------

 FAULT 4:  FOOTHILLS FAULT SYSTEM 1

 NFP    NRL   ATTENUATION CODES:
  5     10      2  4
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.0500  1.842 19.000  2.000  0.400
 NMAX AMMAX  PMAX
  1    6.50  1.00
   dmchar ampchar dmpchar
     0.50    6.00    1.00
 Slip Rate (  0.0500 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.456E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00447   0.00213   0.00233
   IND_RL      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -120.0500   37.2750
  2    -120.7800   38.0800
  3    -121.0850   38.6200
  4    -121.1300   38.8400
  5    -122.1600   40.2400
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.2200   12.0000

 Computed Total Fault Area = 0.47E+04

 ------------------------------------------------------------------------------
```

```
 FAULT  5:  MOHWAK-HONEY LAKE ZONE 5

 NFP    NRL   ATTENUATION CODES:
  3     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.0000  1.842  7.000  2.000  0.287
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.210E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01510   0.01239   0.00271
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -121.5000   40.4000
  2    -121.2000   39.8000
  3    -120.5000   39.5000
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.21E+04

 ------------------------------------------------------------------------------

 FAULT  6:  WESTERN NEVADA ZONE 1

 NFP    NRL   ATTENUATION CODES:
  3     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  4.0000  1.842 12.300  2.000  0.200
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.132E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01898   0.01557   0.00341
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -119.1500   38.0000
  2    -120.1000   39.0000
  3    -120.5000   39.5000
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.31E+04
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```
 FAULT  7:  MOHWAK-HONEY LAKE ZONE 4

 NFP    NRL   ATTENUATION CODES:
  3     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.0000  1.842  6.000  2.000  0.246
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.180E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01294   0.01062   0.00232
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -121.1250   40.4000
  2    -120.9000   39.9500
  3    -120.2980   39.6130
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.18E+04

 ------------------------------------------------------------------------------

 FAULT  8:  WESTERN NEVADA ZONE 2

 NFP    NRL   ATTENUATION CODES:
  2     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  4.0000  1.842 12.300  2.000  0.200
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.132E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01898   0.01557   0.00341
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -118.9130   38.0000
  2    -120.2980   39.6130
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.32E+04

 ------------------------------------------------------------------------------
```

```
 FAULT  9:  MOHWAK-HONEY LAKE ZONE 3

 NFP    NRL   ATTENUATION CODES:
  3     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.0000  1.842  4.900  2.000  0.199
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.146E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01050   0.00861   0.00189
 IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -120.7500   40.4000
  2    -120.6000   40.1000
  3    -120.0950   39.7250
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.14E+04

 ------------------------------------------------------------------------------

 FAULT 10:  WESTERN NEVADA ZONE 3

 NFP    NRL   ATTENUATION CODES:
  2     10      1  3
 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  4.0000  1.842 12.300  2.000  0.200
 NMAX AMMAX  PMAX
  1    7.30  1.00
   dmchar ampchar dmpchar
     0.50    6.80    1.00
 Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2   0.330E+12
 Input Fault Area    - cm**2  0.132E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.01898   0.01557   0.00341
IND_RL      2
 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240
 FAULT SEGMENT COORDINATES
  1    -118.6750   38.0000
  2    -120.0950   39.7250
 NDP   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.34E+04

--------------------------------------------------------------------------------
```

PROBLEM DATA:

BOORE ET AL(1997) NEHRP C (520) AMPLITUDES:

15	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.180	0.200	0.220	0.240	0.260	0.280

MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00

BOORE ET AL(1997) NEHRP C (520) AMPLITUDES:

15	0.020	0.040	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.180	0.200	0.220	0.240	0.260	0.280

MAGNITUDE WEIGHTING FACTORS: MWF: 3 MWF MAGNITUDE: 7.50

RISKS SPECIFIED:

5	0.013900	0.010000	0.005000	0.002105	0.001054

SITE COORDINATES:

1	-121.0550	39.2400

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
1	-0.3130	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
2	-0.1170	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
3	-0.3130	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
4	-0.1170	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
5	0.2880	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
6	0.2880	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	520.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5200	35	0

SITE 1 COORDINATES: -121.0550 39.2400

BOORE ET AL(1997) NEHRP C (520)

AMPLITUDES (g):	0.2000E-01	0.4000E-01	0.6000E-01	0.8000E-01	0.1000E+00	0.1200E+00	0.1400E+00	0.1600E+00	0.1800E+00	0.1800E+00
LN (AMPLITUDE):	-3.91	-3.22	-2.81	-2.53	-2.30	-2.12	-1.97	-1.83	-1.71	-1.71
FAULT 1 E(NO/YR)	0.1816E-03	0.1134E-03	0.7571E-04	0.5458E-04	0.4157E-04	0.3285E-04	0.2661E-04	0.2193E-04	0.1828E-04	0.1828E-04
FAULT 2 E(NO/YR)	0.1351E-02	0.8291E-03	0.5482E-03	0.3922E-03	0.2962E-03	0.2317E-03	0.1856E-03	0.1510E-03	0.1243E-03	0.1243E-03
FAULT 3 E(NO/YR)	0.5645E-04	0.4843E-04	0.3751E-04	0.2773E-04	0.2009E-04	0.1444E-04	0.1037E-04	0.7471E-05	0.5405E-05	0.5405E-05
FAULT 4 E(NO/YR)	0.1383E-02	0.8054E-03	0.4855E-03	0.3064E-03	0.1997E-03	0.1332E-03	0.9046E-04	0.6232E-04	0.4348E-04	0.4348E-04
FAULT 5 E(NO/YR)	0.3362E-02	0.1802E-02	0.1001E-02	0.5903E-03	0.3617E-03	0.2271E-03	0.1451E-03	0.9418E-04	0.6196E-04	0.6196E-04
FAULT 6 E(NO/YR)	0.2254E-02	0.9825E-03	0.4801E-03	0.2538E-03	0.1410E-03	0.8113E-04	0.4801E-04	0.2909E-04	0.1800E-04	0.1800E-04
FAULT 7 E(NO/YR)	0.2271E-02	0.1027E-02	0.4990E-03	0.2600E-03	0.1410E-03	0.7877E-04	0.4510E-04	0.2640E-04	0.1578E-04	0.1578E-04
FAULT 8 E(NO/YR)	0.1995E-02	0.7501E-03	0.3255E-03	0.1537E-03	0.7654E-04	0.3974E-04	0.2137E-04	0.1186E-04	0.6760E-05	0.6760E-05
FAULT 9 E(NO/YR)	0.1308E-02	0.5014E-03	0.2143E-03	0.9871E-04	0.4774E-04	0.2400E-04	0.1249E-04	0.6702E-05	0.3701E-05	0.3701E-05
FAULT 10 E(NO/YR)	0.1763E-02	0.5867E-03	0.2297E-03	0.9825E-04	0.4464E-04	0.2131E-04	0.1061E-04	0.5490E-05	0.2937E-05	0.2937E-05
TOTAL E(NO/YR)	0.1592E-01	0.7446E-02	0.3896E-02	0.2236E-02	0.1370E-02	0.8843E-03	0.5957E-03	0.4165E-03	0.3006E-03	0.3006E-03
TOTAL RISK	0.1580E-01	0.7418E-02	0.3889E-02	0.2233E-02	0.1369E-02	0.8839E-03	0.5956E-03	0.4164E-03	0.3005E-03	0.3005E-03

AMPLITUDES (g):	0.2000E+00	0.2200E+00	0.2400E+00	0.2600E+00	0.2800E+00
LN (AMPLITUDE):	-1.61	-1.51	-1.43	-1.35	-1.27
FAULT 1 E(NO/YR)	0.1538E-04	0.1301E-04	0.1107E-04	0.9446E-05	0.8088E-05
FAULT 2 E(NO/YR)	0.1031E-03	0.8601E-04	0.7210E-04	0.6067E-04	0.5121E-04
FAULT 3 E(NO/YR)	0.3932E-05	0.2878E-05	0.2120E-05	0.1572E-05	0.1173E-05
FAULT 4 E(NO/YR)	0.3068E-04	0.2187E-04	0.1575E-04	0.1144E-04	0.8378E-05
FAULT 5 E(NO/YR)	0.4129E-04	0.2785E-04	0.1900E-04	0.1311E-04	0.9135E-05
FAULT 6 E(NO/YR)	0.1136E-04	0.7288E-05	0.4752E-05	0.3144E-05	0.2109E-05
FAULT 7 E(NO/YR)	0.9620E-05	0.5971E-05	0.3769E-05	0.2417E-05	0.1573E-05
FAULT 8 E(NO/YR)	0.3952E-05	0.2363E-05	0.1442E-05	0.8972E-06	0.5678E-06
FAULT 9 E(NO/YR)	0.2098E-05	0.1218E-05	0.7224E-06	0.4372E-06	0.2696E-06
FAULT 10 E(NO/YR)	0.1619E-05	0.9168E-06	0.5320E-06	0.3157E-06	0.1912E-06
TOTAL E(NO/YR)	0.2230E-03	0.1694E-03	0.1313E-03	0.1034E-03	0.8270E-04
TOTAL RISK	0.2230E-03	0.1694E-03	0.1312E-03	0.1034E-03	0.8270E-04

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054
ESTIMATED LN AMP. :	-3.795	-3.493	-2.971	-2.499	-2.193
ESTIMATED AMP. (g):	0.02249	0.03042	0.05124	0.08218	0.11153

AMPLITUDES (g):	0.2000E-01	0.4000E-01	0.6000E-01	0.8000E-01	0.1000E+00	0.1200E+00	0.1400E+00	0.1600E+00	0.1800E+00	0.1800E+00
LN (AMPLITUDE):	-3.91	-3.22	-2.81	-2.53	-2.30	-2.12	-1.97	-1.83	-1.71	-1.71
FAULT 1 E(NO/YR)	0.1423E-03	0.7716E-04	0.4872E-04	0.3396E-04	0.2510E-04	0.1923E-04	0.1507E-04	0.1199E-04	0.9635E-05	0.9635E-05
FAULT 2 E(NO/YR)	0.1049E-02	0.5593E-03	0.3490E-03	0.2401E-03	0.1749E-03	0.1318E-03	0.1015E-03	0.7934E-04	0.6261E-04	0.6261E-04
FAULT 3 E(NO/YR)	0.5235E-04	0.3681E-04	0.2399E-04	0.1537E-04	0.9835E-05	0.6335E-05	0.4120E-05	0.2709E-05	0.1803E-05	0.1803E-05
FAULT 4 E(NO/YR)	0.1050E-02	0.4990E-03	0.2630E-03	0.1484E-03	0.8732E-04	0.5296E-04	0.3288E-04	0.2083E-04	0.1343E-04	0.1343E-04
FAULT 5 E(NO/YR)	0.2339E-02	0.1077E-02	0.6220E-03	0.3823E-03	0.2385E-03	0.1499E-03	0.9511E-04	0.6098E-04	0.3955E-04	0.3955E-04
FAULT 6 E(NO/YR)	0.1440E-02	0.5991E-03	0.3061E-03	0.1657E-03	0.9242E-04	0.5280E-04	0.3085E-04	0.1842E-04	0.1122E-04	0.1122E-04
FAULT 7 E(NO/YR)	0.1449E-02	0.6041E-03	0.3128E-03	0.1674E-03	0.9080E-04	0.5008E-04	0.2816E-04	0.1618E-04	0.9485E-05	0.9485E-05
FAULT 8 E(NO/YR)	0.1209E-02	0.4614E-03	0.2098E-03	0.9985E-04	0.4923E-04	0.2512E-04	0.1324E-04	0.7201E-05	0.4028E-05	0.4028E-05
FAULT 9 E(NO/YR)	0.7822E-03	0.2969E-03	0.1342E-03	0.6238E-04	0.2977E-04	0.1465E-04	0.7452E-05	0.3910E-05	0.2113E-05	0.2113E-05
FAULT 10 E(NO/YR)	0.1039E-02	0.3653E-03	0.1482E-03	0.6302E-04	0.2807E-04	0.1309E-04	0.6366E-05	0.3219E-05	0.1686E-05	0.1686E-05
TOTAL E(NO/YR)	0.1055E-01	0.4576E-02	0.2418E-02	0.1378E-02	0.8259E-03	0.5160E-03	0.3348E-03	0.2248E-03	0.1556E-03	0.1556E-03
TOTAL RISK	0.1050E-01	0.4565E-02	0.2415E-02	0.1378E-02	0.8255E-03	0.5158E-03	0.3347E-03	0.2247E-03	0.1556E-03	0.1556E-03

AMPLITUDES (g):	0.2000E+00	0.2200E+00	0.2400E+00	0.2600E+00	0.2800E+00
LN (AMPLITUDE):	-1.61	-1.51	-1.43	-1.35	-1.27
FAULT 1 E(NO/YR)	0.7801E-05	0.6353E-05	0.5197E-05	0.4268E-05	0.3517E-05
FAULT 2 E(NO/YR)	0.4977E-04	0.3978E-04	0.3195E-04	0.2576E-04	0.2085E-04
FAULT 3 E(NO/YR)	0.1214E-05	0.8269E-06	0.5696E-06	0.3966E-06	0.2789E-06
FAULT 4 E(NO/YR)	0.8804E-05	0.5857E-05	0.3949E-05	0.2697E-05	0.1864E-05
FAULT 5 E(NO/YR)	0.2597E-04	0.1725E-04	0.1160E-04	0.7888E-05	0.5423E-05
FAULT 6 E(NO/YR)	0.6970E-05	0.4405E-05	0.2830E-05	0.1846E-05	0.1222E-05
FAULT 7 E(NO/YR)	0.5674E-05	0.3460E-05	0.2148E-05	0.1355E-05	0.8690E-06
FAULT 8 E(NO/YR)	0.2312E-05	0.1359E-05	0.8161E-06	0.4999E-06	0.3119E-06
FAULT 9 E(NO/YR)	0.1174E-05	0.6687E-06	0.3898E-06	0.2321E-06	0.1409E-06
FAULT 10 E(NO/YR)	0.9113E-06	0.5068E-06	0.2892E-06	0.1689E-06	0.1008E-06
TOTAL E(NO/YR)	0.1106E-03	0.8047E-04	0.5974E-04	0.4511E-04	0.3457E-04
TOTAL RISK	0.1106E-03	0.8047E-04	0.5974E-04	0.4511E-04	0.3457E-04

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054
ESTIMATED LN AMP. :	*********	-3.872	-3.295	-2.743	-2.409
ESTIMATED AMP. (g):	*********	0.02082	0.03708	0.06437	0.08991

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*****************************************
*                                       *
*        FRISKSP - IBM-PC VERSION       *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*              - 1988-2000 -            *
*                                       *
*              VERSION 4.00             *
*             (Visual Fortran)          *
*****************************************
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TITLE: NUHS Spectral Acceleration

IPR_FILE 0
IPLOT 0
SITE CONDITION 0.00
BASEMENT DEPTH (km) 5.00
RHGA FACTOR RHGA DIST (km) 1.000 0.000

NFLT	NSITE	NPROB	NATT	LCD
10	1	12	24	1

RISKS SPECIFIED:

5	0.013900	0.010000	0.005000	0.002105	0.001054

SITE COORDINATES:

1	-121.0550	39.2400

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	FOOTHILLS FAULT SYSTEM 3	5.9	5.9	5.9	5.9	6.3	6.4	km
2	FOOTHILLS FAULT SYSTEM 2	10.9	7.7	10.6	10.6	9.4	10.6	km
3	FOOTHILLS FAULT SYSTEM 4	22.0	22.0	22.0	22.0	22.3	22.4	km
4	FOOTHILLS FAULT SYSTEM 1	27.6	24.4	26.7	26.7	25.9	26.7	km
5	MOHWAK-HONEY LAKE ZONE 5	48.4	48.4	48.4	48.4	48.4	48.5	km
6	WESTERN NEVADA ZONE 1	55.9	55.9	55.9	55.9	55.9	55.9	km
7	MOHWAK-HONEY LAKE ZONE 4	71.8	71.8	71.8	71.8	71.8	71.8	km
8	WESTERN NEVADA ZONE 2	77.3	77.3	77.3	77.3	77.3	77.3	km
9	MOHWAK-HONEY LAKE ZONE 3	96.1	96.1	96.1	96.1	96.1	96.2	km
10	WESTERN NEVADA ZONE 3	98.7	98.7	98.7	98.7	98.7	98.7	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

PROBLEM DATA:

MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00

RISKS SPECIFIED:
5 0.013900 0.010000 0.005000 0.002105 0.001054

SITE COORDINATES:
1 -121.0550 39.2400

BOORE (1997)Vs= 500 m/s .01 S AMPLITUDES:
13 0.001 0.001 0.003 0.005 0.007 0.009 0.011 0.013 0.015 0.017
0.021 0.023 0.025
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .03 S AMPLITUDES:
18 0.003 0.005 0.007 0.009 0.011 0.013 0.015 0.017 0.021 0.023
0.025 0.027 0.029 0.031 0.033 0.035 0.037 0.039
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .10 S AMPLITUDES:
16 0.010 0.020 0.040 0.060 0.080 0.100 0.120 0.140 0.160 0.180
0.200 0.220 0.240 0.260 0.280 0.300
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .15 S AMPLITUDES:
20 0.010 0.040 0.070 0.100 0.130 0.160 0.190 0.220 0.250 0.280
0.310 0.340 0.370 0.400 0.430 0.460 0.490 0.520 0.570 0.600
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .20 S AMPLITUDES:
20 0.010 0.040 0.070 0.100 0.130 0.160 0.190 0.220 0.250 0.280
0.310 0.340 0.370 0.400 0.430 0.460 0.490 0.520 0.570 0.600
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .30 S AMPLITUDES:
20 0.010 0.040 0.070 0.100 0.130 0.160 0.190 0.220 0.250 0.280
0.310 0.340 0.370 0.400 0.430 0.460 0.490 0.520 0.570 0.600
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .40 S AMPLITUDES:
20 0.010 0.040 0.070 0.100 0.130 0.160 0.190 0.220 0.250 0.280
0.310 0.340 0.370 0.400 0.430 0.460 0.490 0.520 0.570 0.600
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .50 S AMPLITUDES:
20 0.050 0.100 0.150 0.200 0.250 0.300 0.350 0.400 0.450 0.500
0.550 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.000
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s .75 S AMPLITUDES:
20 0.050 0.100 0.150 0.200 0.250 0.300 0.350 0.400 0.450 0.500
0.550 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.000
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s 1.0 S AMPLITUDES:
20 0.050 0.100 0.150 0.200 0.250 0.300 0.350 0.400 0.450 0.500
0.550 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.000
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s 1.5 S AMPLITUDES:
20 0.050 0.100 0.150 0.200 0.250 0.300 0.350 0.400 0.450 0.500
0.550 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.000
MAGNITUDE WEIGHTING FACTORS: MWF: 0 MWF MAGNITUDE: 0.00
BOORE (1997)Vs= 500 m/s 2.0 S AMPLITUDES:
20 0.050 0.100 0.150 0.200 0.250 0.300 0.350 0.400 0.450 0.500
0.550 0.600 0.650 0.700 0.750 0.800 0.850 0.900 0.950 1.000

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
1	-0.3130	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
1	0.5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0100	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
2	-0.3130	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
2	0.5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0300	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
3	1.0060	0.7530	-0.2260	-0.9340	-0.2120	1112.0000	6.2700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
3	0.4790	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
4	1.1280	0.7020	-0.2280	-0.9370	-0.2380	1820.0000	7.2300	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
4	0.4920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1500	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
5	0.9990	0.7110	-0.2070	-0.9240	-0.2920	2118.0000	7.0200	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
5	0.5020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
6	0.5980	0.7690	-0.1610	-0.8930	-0.4010	2133.0000	5.9400	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
6	0.5220	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
7	0.2120	0.8310	-0.1200	-0.8670	-0.4870	1954.0000	4.9100	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
7	0.5380	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
8	-0.1220	0.8840	-0.0900	-0.8460	-0.5530	1782.0000	4.1300	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
8	0.5560	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
9	-0.7370	0.9790	-0.0460	-0.8130	-0.6530	1507.0000	3.0700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
9	0.5870	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7500	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
10	-1.1330	1.0360	-0.0320	-0.7980	-0.6980	1406.0000	2.9000	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
10	0.6130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
11	-1.5520	1.0850	-0.0440	-0.7960	-0.7040	1479.0000	3.9200	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
11	0.6490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
12	-1.6990	1.0850	-0.0850	-0.8120	-0.6550	1795.0000	5.8500	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
12	0.6720	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
13	-0.1170	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
13	0.5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0100	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
14	-0.1170	0.5270	0.0000	-0.7780	-0.3710	1396.0000	5.5700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
14	0.5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0300	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
15	1.0870	0.7530	-0.2260	-0.9340	-0.2120	1112.0000	6.2700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
15	0.4790	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
16	1.2640	0.7020	-0.2280	-0.9370	-0.2380	1820.0000	7.2300	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
16	0.4920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1500	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
17	1.1700	0.7110	-0.2070	-0.9240	-0.2920	2118.0000	7.0200	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
17	0.5020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
18	0.8030	0.7690	-0.1610	-0.8930	-0.4010	2133.0000	5.9400	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
18	0.5220	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
19	0.4230	0.8310	-0.1200	-0.8670	-0.4870	1954.0000	4.9100	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
19	0.5380	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
20	0.0870	0.8840	-0.0900	-0.8460	-0.5530	1782.0000	4.1300	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
20	0.5560	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
21	-0.5620	0.9790	-0.0460	-0.8130	-0.6530	1507.0000	3.0700	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
21	0.5870	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7500	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
22	-1.0090	1.0360	-0.0320	-0.7980	-0.6980	1406.0000	2.9000	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
22	0.6130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
23	-1.5380	1.0850	-0.0440	-0.7960	-0.7040	1479.0000	3.9200	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
23	0.6490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5000	0.0000	1.0000	96	0

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
24	-1.8010	1.0850	-0.0850	-0.8120	-0.6550	1795.0000	5.8500	500.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
24	0.6720	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	1.0000	96	0

BOORE (1997)Vs= 500 m/s .01 S

AMPLITUDES (ft/sec):	0.5000E-03	0.1000E-02	0.3000E-02	0.5000E-02	0.7000E-02	0.9000E-02	0.1100E-01	0.1300E-01	0.1500E-01	0.1700E-01
LN (AMPLITUDE):	-7.60	-6.91	-5.81	-5.30	-4.96	-4.71	-4.51	-4.34	-4.20	-4.07
FAULT 1 E(NO/YR)	0.2200E-03	0.1847E-03	0.7891E-04	0.4361E-04	0.2808E-04	0.1942E-04	0.1393E-04	0.1020E-04	0.7567E-05	0.5664E-05
FAULT 2 E(NO/YR)	0.1656E-02	0.1375E-02	0.5719E-03	0.3113E-03	0.1964E-03	0.1326E-03	0.9265E-04	0.6599E-04	0.4761E-04	0.3468E-04
FAULT 3 E(NO/YR)	0.5754E-04	0.5660E-04	0.3872E-04	0.2136E-04	0.1132E-04	0.6028E-05	0.3272E-05	0.1819E-05	0.1035E-05	0.6032E-06
FAULT 4 E(NO/YR)	0.1717E-02	0.1409E-02	0.5127E-03	0.2160E-03	0.1000E-03	0.4906E-04	0.2513E-04	0.1336E-04	0.7336E-05	0.4146E-05
FAULT 5 E(NO/YR)	0.4201E-02	0.3434E-02	0.1066E-02	0.3958E-03	0.1631E-03	0.7130E-04	0.3274E-04	0.1570E-04	0.7832E-05	0.4048E-05
FAULT 6 E(NO/YR)	0.3408E-02	0.2329E-02	0.5181E-03	0.1570E-03	0.5499E-04	0.2114E-04	0.8741E-05	0.3842E-05	0.1779E-05	0.8623E-06
FAULT 7 E(NO/YR)	0.3059E-02	0.2335E-02	0.5391E-03	0.1579E-03	0.5212E-04	0.1875E-04	0.7260E-05	0.2999E-05	0.1310E-05	0.6015E-06
FAULT 8 E(NO/YR)	0.3305E-02	0.2075E-02	0.3559E-03	0.8698E-04	0.2509E-04	0.8155E-05	0.2917E-05	0.1130E-05	0.4677E-06	0.2050E-06
FAULT 9 E(NO/YR)	0.1960E-02	0.1355E-02	0.2348E-03	0.5456E-04	0.1479E-04	0.4513E-05	0.1521E-05	0.5578E-06	0.2196E-06	0.9189E-07
FAULT 10 E(NO/YR)	0.3189E-02	0.1845E-02	0.2541E-03	0.5158E-04	0.1271E-04	0.3618E-05	0.1157E-05	0.4066E-06	0.1546E-06	0.6282E-07
TOTAL E(NO/YR)	0.2277E-01	0.1640E-01	0.4170E-02	0.1496E-02	0.6586E-03	0.3346E-03	0.1893E-03	0.1160E-03	0.7531E-04	0.5097E-04
TOTAL RISK	0.2251E-01	0.1627E-01	0.4161E-02	0.1495E-02	0.6584E-03	0.3346E-03	0.1893E-03	0.1160E-03	0.7531E-04	0.5097E-04
AMPLITUDES (ft/sec):	0.2100E-01	0.2300E-01	0.2500E-01							
LN (AMPLITUDE):	-3.86	-3.77	-3.69							
FAULT 1 E(NO/YR)	0.3242E-05	0.2474E-05	0.1899E-05							
FAULT 2 E(NO/YR)	0.1883E-04	0.1402E-04	0.1050E-04							
FAULT 3 E(NO/YR)	0.2184E-06	0.1353E-06	0.8531E-07							
FAULT 4 E(NO/YR)	0.1427E-05	0.8658E-06	0.5355E-06							
FAULT 5 E(NO/YR)	0.1187E-05	0.6699E-06	0.3871E-06							
FAULT 6 E(NO/YR)	0.2270E-06	0.1223E-06	0.6779E-07							
FAULT 7 E(NO/YR)	0.1437E-06	0.7409E-07	0.3939E-07							
FAULT 8 E(NO/YR)	0.4541E-07	0.2268E-07	0.1172E-07							
FAULT 9 E(NO/YR)	0.1873E-07	0.9012E-08	0.4495E-08							
FAULT 10 E(NO/YR)	0.1221E-07	0.5762E-08	0.2824E-08							
TOTAL E(NO/YR)	0.2535E-04	0.1840E-04	0.1354E-04							
TOTAL RISK	0.2535E-04	0.1840E-04	0.1354E-04							
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-6.781	-6.516	-5.957	-5.469	-5.155					
ESTIMATED AMP. (ft/sec):	0.00114	0.00148	0.00259	0.00422	0.00577					

BOORE (1997)Vs= 500 m/s .03 S

AMPLITUDES (ft/sec):	0.3000E-02	0.5000E-02	0.7000E-02	0.9000E-02	0.1100E-01	0.1300E-01	0.1500E-01	0.1700E-01	0.2100E-01	0.2300E-01	
LN (AMPLITUDE):	-5.81	-5.30	-4.96	-4.71	-4.51	-4.34	-4.20	-4.07	-3.86	-3.77	
FAULT 1 E(NO/YR)	0.1847E-03	0.1362E-03	0.1019E-03	0.7891E-04	0.6316E-04	0.5193E-04	0.4361E-04	0.3722E-04	0.2808E-04	0.2469E-04	
FAULT 2 E(NO/YR)	0.1375E-02	0.1001E-02	0.7427E-03	0.5719E-03	0.4555E-03	0.3727E-03	0.3113E-03	0.2641E-03	0.1964E-03	0.1714E-03	
FAULT 3 E(NO/YR)	0.5660E-04	0.5232E-04	0.4579E-04	0.3872E-04	0.3209E-04	0.2627E-04	0.2136E-04	0.1731E-04	0.1132E-04	0.9160E-05	
FAULT 4 E(NO/YR)	0.1409E-02	0.9978E-03	0.7079E-03	0.5127E-03	0.3788E-03	0.2843E-03	0.2160E-03	0.1658E-03	0.1000E-03	0.7845E-04	
FAULT 5 E(NO/YR)	0.3434E-02	0.2315E-02	0.1550E-02	0.1066E-02	0.7525E-03	0.5419E-03	0.3958E-03	0.2921E-03	0.1631E-03	0.1230E-03	
FAULT 6 E(NO/YR)	0.2329E-02	0.1346E-02	0.8162E-03	0.5181E-03	0.3402E-03	0.2290E-03	0.1570E-03	0.1093E-03	0.5499E-04	0.3962E-04	
FAULT 7 E(NO/YR)	0.2335E-02	0.1403E-02	0.8526E-03	0.5391E-03	0.3513E-03	0.2337E-03	0.1579E-03	0.1080E-03	0.5212E-04	0.3674E-04	
FAULT 8 E(NO/YR)	0.2075E-02	0.1083E-02	0.6046E-03	0.3559E-03	0.2172E-03	0.1360E-03	0.8698E-04	0.5661E-04	0.2509E-04	0.1705E-04	
FAULT 9 E(NO/YR)	0.1355E-02	0.7253E-03	0.4031E-03	0.2348E-03	0.1413E-03	0.8697E-04	0.5456E-04	0.3480E-04	0.1479E-04	0.9835E-05	
FAULT 10 E(NO/YR)	0.1845E-02	0.8847E-03	0.4609E-03	0.2541E-03	0.1454E-03	0.8558E-04	0.5158E-04	0.3175E-04	0.1271E-04	0.8239E-05	
TOTAL E(NO/YR)	0.1640E-01	0.9945E-02	0.6285E-02	0.4170E-02	0.2877E-02	0.2048E-02	0.1496E-02	0.1117E-02	0.6586E-03	0.5183E-03	
TOTAL RISK	0.1627E-01	0.9896E-02	0.6266E-02	0.4161E-02	0.2873E-02	0.2046E-02	0.1495E-02	0.1116E-02	0.6584E-03	0.5181E-03	

BOORE (1997)Vs= 500 m/s .03 S

AMPLITUDES (ft/sec):	0.2500E-01	0.2700E-01	0.2900E-01	0.3100E-01	0.3300E-01	0.3500E-01	0.3700E-01	0.3900E-01	
LN (AMPLITUDE):	-3.69	-3.61	-3.54	-3.47	-3.41	-3.35	-3.30	-3.24	
FAULT 1 E(NO/YR)	0.2185E-04	0.1942E-04	0.1734E-04	0.1552E-04	0.1393E-04	0.1254E-04	0.1130E-04	0.1020E-04	
FAULT 2 E(NO/YR)	0.1504E-03	0.1326E-03	0.1173E-03	0.1041E-03	0.9265E-04	0.8260E-04	0.7377E-04	0.6599E-04	
FAULT 3 E(NO/YR)	0.7424E-05	0.6028E-05	0.4905E-05	0.4002E-05	0.3272E-05	0.2683E-05	0.2206E-05	0.1819E-05	
FAULT 4 E(NO/YR)	0.6188E-04	0.4906E-04	0.3908E-04	0.3127E-04	0.2513E-04	0.2028E-04	0.1643E-04	0.1336E-04	
FAULT 5 E(NO/YR)	0.9340E-04	0.7130E-04	0.5473E-04	0.4222E-04	0.3274E-04	0.2551E-04	0.1997E-04	0.1570E-04	
FAULT 6 E(NO/YR)	0.2882E-04	0.2114E-04	0.1563E-04	0.1165E-04	0.8741E-05	0.6604E-05	0.5022E-05	0.3842E-05	
FAULT 7 E(NO/YR)	0.2613E-04	0.1875E-04	0.1356E-04	0.9885E-05	0.7260E-05	0.5370E-05	0.4000E-05	0.2999E-05	
FAULT 8 E(NO/YR)	0.1172E-04	0.8155E-05	0.5733E-05	0.4070E-05	0.2917E-05	0.2109E-05	0.1537E-05	0.1130E-05	
FAULT 9 E(NO/YR)	0.6623E-05	0.4513E-05	0.3109E-05	0.2164E-05	0.1521E-05	0.1080E-05	0.7727E-06	0.5578E-06	
FAULT 10 E(NO/YR)	0.5422E-05	0.3618E-05	0.2445E-05	0.1672E-05	0.1157E-05	0.8085E-06	0.5707E-06	0.4066E-06	
TOTAL E(NO/YR)	0.4137E-03	0.3346E-03	0.2739E-03	0.2266E-03	0.1893E-03	0.1596E-03	0.1356E-03	0.1160E-03	
TOTAL RISK	0.4136E-03	0.3346E-03	0.2738E-03	0.2266E-03	0.1893E-03	0.1596E-03	0.1356E-03	0.1160E-03	
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054				
ESTIMATED LN AMP. :	-5.648	-5.309	-4.823	-4.357	-4.051				
ESTIMATED AMP. (ft/sec):	0.00353	0.00495	0.00804	0.01282	0.01740				

BOORE (1997)Vs= 500 m/s .10 S

AMPLITUDES (ft/sec):	0.1000E-01	0.2000E-01	0.4000E-01	0.6000E-01	0.8000E-01	0.1000E+00	0.1200E+00	0.1400E+00	0.1600E+00	0.1800E+00	
LN (AMPLITUDE):	-4.61	-3.91	-3.22	-2.81	-2.53	-2.30	-2.12	-1.97	-1.83	-1.71	
FAULT 1 E(NO/YR)	0.1906E-03	0.1359E-03	0.7740E-04	0.5191E-04	0.3834E-04	0.2996E-04	0.2424E-04	0.2006E-04	0.1683E-04	0.1426E-04	
FAULT 2 E(NO/YR)	0.1421E-02	0.9983E-03	0.5598E-03	0.3724E-03	0.2727E-03	0.2110E-03	0.1688E-03	0.1380E-03	0.1143E-03	0.9546E-04	
FAULT 3 E(NO/YR)	0.5702E-04	0.5243E-04	0.3914E-04	0.2781E-04	0.1930E-04	0.1320E-04	0.8959E-05	0.6065E-05	0.4111E-05	0.2797E-05	
FAULT 4 E(NO/YR)	0.1460E-02	0.9950E-03	0.5015E-03	0.2881E-03	0.1766E-03	0.1113E-03	0.7112E-04	0.4591E-04	0.2990E-04	0.1965E-04	
FAULT 5 E(NO/YR)	0.3705E-02	0.2434E-02	0.1165E-02	0.6367E-03	0.3556E-03	0.1987E-03	0.1115E-03	0.6315E-04	0.3621E-04	0.2107E-04	
FAULT 6 E(NO/YR)	0.2579E-02	0.1429E-02	0.5628E-03	0.2534E-03	0.1191E-03	0.5758E-04	0.2859E-04	0.1458E-04	0.7632E-05	0.4097E-05	
FAULT 7 E(NO/YR)	0.2573E-02	0.1479E-02	0.5982E-03	0.2633E-03	0.1159E-03	0.5162E-04	0.2356E-04	0.1107E-04	0.5358E-05	0.2672E-05	
FAULT 8 E(NO/YR)	0.2333E-02	0.1156E-02	0.3792E-03	0.1369E-03	0.5169E-04	0.2046E-04	0.8493E-05	0.3691E-05	0.1673E-05	0.7885E-06	
FAULT 9 E(NO/YR)	0.1519E-02	0.7719E-03	0.2543E-03	0.8703E-04	0.3037E-04	0.1106E-04	0.4236E-05	0.1706E-05	0.7209E-06	0.3181E-06	
FAULT 10 E(NO/YR)	0.2098E-02	0.9507E-03	0.2582E-03	0.7559E-04	0.2362E-04	0.7935E-05	0.2856E-05	0.1094E-05	0.4437E-06	0.1890E-06	
TOTAL E(NO/YR)	0.1794E-01	0.1040E-01	0.4396E-02	0.2193E-02	0.1203E-02	0.7128E-03	0.4524E-03	0.3053E-03	0.2172E-03	0.1613E-03	
TOTAL RISK	0.1778E-01	0.1035E-01	0.4386E-02	0.2191E-02	0.1202E-02	0.7126E-03	0.4523E-03	0.3053E-03	0.2172E-03	0.1613E-03	

AMPLITUDES (ft/sec):	0.2000E+00	0.2200E+00	0.2400E+00	0.2600E+00	0.2800E+00	0.3000E+00
LN (AMPLITUDE):	-1.61	-1.51	-1.43	-1.35	-1.27	-1.20
FAULT 1 E(NO/YR)	0.1215E-04	0.1039E-04	0.8897E-05	0.7632E-05	0.6552E-05	0.5628E-05
FAULT 2 E(NO/YR)	0.8008E-04	0.6735E-04	0.5672E-04	0.4780E-04	0.4029E-04	0.3398E-04
FAULT 3 E(NO/YR)	0.1913E-05	0.1317E-05	0.9125E-06	0.6369E-06	0.4478E-06	0.3171E-06
FAULT 4 E(NO/YR)	0.1303E-04	0.8725E-05	0.5895E-05	0.4020E-05	0.2766E-05	0.1919E-05
FAULT 5 E(NO/YR)	0.1244E-04	0.7460E-05	0.4541E-05	0.2804E-05	0.1756E-05	0.1114E-05
FAULT 6 E(NO/YR)	0.2253E-05	0.1266E-05	0.7267E-06	0.4252E-06	0.2534E-06	0.1535E-06
FAULT 7 E(NO/YR)	0.1371E-05	0.7219E-06	0.3897E-06	0.2152E-06	0.1214E-06	0.6986E-07
FAULT 8 E(NO/YR)	0.3848E-06	0.1939E-06	0.1006E-06	0.5358E-07	0.2924E-07	0.1632E-07
FAULT 9 E(NO/YR)	0.1461E-06	0.6951E-07	0.3418E-07	0.1731E-07	0.9013E-08	0.4809E-08
FAULT 10 E(NO/YR)	0.8419E-07	0.3902E-07	0.1874E-07	0.9292E-08	0.4745E-08	0.2488E-08
TOTAL E(NO/YR)	0.1239E-03	0.9753E-04	0.7823E-04	0.6361E-04	0.5223E-04	0.4321E-04
TOTAL RISK	0.1238E-03	0.9753E-04	0.7823E-04	0.6361E-04	0.5223E-04	0.4321E-04
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054	
ESTIMATED LN AMP. :	-4.290	-3.884	-3.325	-2.794	-2.469	
ESTIMATED AMP. (ft/sec):	0.01370	0.02056	0.03598	0.06116	0.08464	

BOORE (1997)Vs= 500 m/s .15 S

AMPLITUDES (ft/sec):	0.1000E-01	0.4000E-01	0.7000E-01	0.1000E+00	0.1300E+00	0.1600E+00	0.1900E+00	0.2200E+00	0.2500E+00	0.2800E+00
LN (AMPLITUDE):	-4.61	-3.22	-2.66	-2.30	-2.04	-1.83	-1.66	-1.51	-1.39	-1.27
FAULT 1 E(NO/YR)	0.2203E-03	0.1376E-03	0.8883E-04	0.6337E-04	0.4847E-04	0.3879E-04	0.3199E-04	0.2694E-04	0.2302E-04	0.1988E-04
FAULT 2 E(NO/YR)	0.1658E-02	0.1011E-02	0.6444E-03	0.4566E-03	0.3473E-03	0.2762E-03	0.2262E-03	0.1891E-03	0.1602E-03	0.1371E-03
FAULT 3 E(NO/YR)	0.5756E-04	0.5286E-04	0.4304E-04	0.3365E-04	0.2582E-04	0.1958E-04	0.1475E-04	0.1107E-04	0.8293E-05	0.6216E-05
FAULT 4 E(NO/YR)	0.1719E-02	0.1010E-02	0.5982E-03	0.3840E-03	0.2596E-03	0.1806E-03	0.1277E-03	0.9121E-04	0.6566E-04	0.4757E-04
FAULT 5 E(NO/YR)	0.4244E-02	0.2401E-02	0.1317E-02	0.7841E-03	0.4809E-03	0.2978E-03	0.1855E-03	0.1164E-03	0.7365E-04	0.4708E-04
FAULT 6 E(NO/YR)	0.3457E-02	0.1383E-02	0.6404E-03	0.3265E-03	0.1738E-03	0.9507E-04	0.5318E-04	0.3038E-04	0.1770E-04	0.1051E-04
FAULT 7 E(NO/YR)	0.3103E-02	0.1448E-02	0.6820E-03	0.3432E-03	0.1752E-03	0.9051E-04	0.4757E-04	0.2550E-04	0.1396E-04	0.7809E-05
FAULT 8 E(NO/YR)	0.3359E-02	0.1102E-02	0.4361E-03	0.1872E-03	0.8381E-04	0.3896E-04	0.1877E-04	0.9356E-05	0.4813E-05	0.2550E-05
FAULT 9 E(NO/YR)	0.1998E-02	0.7433E-03	0.2943E-03	0.1219E-03	0.5162E-04	0.2255E-04	0.1021E-04	0.4790E-05	0.2327E-05	0.1167E-05
FAULT 10 E(NO/YR)	0.3242E-02	0.8891E-03	0.3014E-03	0.1098E-03	0.4221E-04	0.1712E-04	0.7303E-05	0.3265E-05	0.1523E-05	0.7379E-06
TOTAL E(NO/YR)	0.2306E-01	0.1018E-01	0.5045E-02	0.2810E-02	0.1689E-02	0.1077E-02	0.7232E-03	0.5080E-03	0.3712E-03	0.2807E-03
TOTAL RISK	0.2279E-01	0.1013E-01	0.5033E-02	0.2806E-02	0.1687E-02	0.1077E-02	0.7229E-03	0.5078E-03	0.3711E-03	0.2806E-03

AMPLITUDES (ft/sec):	0.3100E+00	0.3400E+00	0.3700E+00	0.4000E+00	0.4300E+00	0.4600E+00	0.4900E+00	0.5200E+00	0.5700E+00	0.6000E+00
LN (AMPLITUDE):	-1.17	-1.08	-0.99	-0.92	-0.84	-0.78	-0.71	-0.65	-0.56	-0.51
FAULT 1 E(NO/YR)	0.1730E-04	0.1513E-04	0.1328E-04	0.1169E-04	0.1031E-04	0.9108E-05	0.8053E-05	0.7127E-05	0.5822E-05	0.5161E-05
FAULT 2 E(NO/YR)	0.1182E-03	0.1023E-03	0.8892E-04	0.7745E-04	0.6756E-04	0.5901E-04	0.5158E-04	0.4513E-04	0.3616E-04	0.3168E-04
FAULT 3 E(NO/YR)	0.4666E-05	0.3512E-05	0.2651E-05	0.2009E-05	0.1528E-05	0.1167E-05	0.8951E-06	0.6894E-06	0.4504E-06	0.3508E-06
FAULT 4 E(NO/YR)	0.3467E-04	0.2542E-04	0.1874E-04	0.1389E-04	0.1036E-04	0.7765E-05	0.5853E-05	0.4435E-05	0.2824E-05	0.2168E-05
FAULT 5 E(NO/YR)	0.3041E-04	0.1985E-04	0.1310E-04	0.8736E-05	0.5885E-05	0.4005E-05	0.2751E-05	0.1907E-05	0.1055E-05	0.7482E-06
FAULT 6 E(NO/YR)	0.6352E-05	0.3905E-05	0.2439E-05	0.1546E-05	0.9941E-06	0.6476E-06	0.4271E-06	0.2850E-06	0.1487E-06	0.1020E-06
FAULT 7 E(NO/YR)	0.4458E-05	0.2595E-05	0.1539E-05	0.9287E-06	0.5696E-06	0.3548E-06	0.2242E-06	0.1436E-06	0.7026E-07	0.4647E-07
FAULT 8 E(NO/YR)	0.1387E-05	0.7739E-06	0.4416E-06	0.2573E-06	0.1528E-06	0.9240E-07	0.5680E-07	0.3546E-07	0.1668E-07	0.1080E-07
FAULT 9 E(NO/YR)	0.6034E-06	0.3207E-06	0.1748E-06	0.9751E-07	0.5558E-07	0.3232E-07	0.1914E-07	0.1153E-07	0.5132E-08	0.3218E-08
FAULT 10 E(NO/YR)	0.3701E-06	0.1915E-06	0.1019E-06	0.5566E-07	0.3112E-07	0.1778E-07	0.1036E-07	0.6147E-08	0.2673E-08	0.1655E-08
TOTAL E(NO/YR)	0.2184E-03	0.1740E-03	0.1414E-03	0.1167E-03	0.9745E-04	0.8220E-04	0.6987E-04	0.5977E-04	0.4655E-04	0.4027E-04
TOTAL RISK	0.2184E-03	0.1740E-03	0.1414E-03	0.1167E-03	0.9745E-04	0.8220E-04	0.6987E-04	0.5977E-04	0.4655E-04	0.4027E-04
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-3.760	-3.209	-2.655	-2.154	-1.823					
ESTIMATED AMP. (ft/sec):	0.02328	0.04040	0.07028	0.11598	0.16149					

BOORE (1997)Vs= 500 m/s .20 S

AMPLITUDES (ft/sec):	0.1000E-01	0.4000E-01	0.7000E-01	0.1000E+00	0.1300E+00	0.1600E+00	0.1900E+00	0.2200E+00	0.2500E+00	0.2800E+00
LN (AMPLITUDE):	-4.61	-3.22	-2.66	-2.30	-2.04	-1.83	-1.66	-1.51	-1.39	-1.27
FAULT 1 E(NO/YR)	0.2254E-03	0.1695E-03	0.1206E-03	0.8993E-04	0.7036E-04	0.5718E-04	0.4780E-04	0.4080E-04	0.3540E-04	0.3108E-04
FAULT 2 E(NO/YR)	0.1700E-02	0.1257E-02	0.8825E-03	0.6528E-03	0.5081E-03	0.4112E-03	0.3423E-03	0.2910E-03	0.2512E-03	0.2195E-03
FAULT 3 E(NO/YR)	0.5758E-04	0.5585E-04	0.5004E-04	0.4302E-04	0.3631E-04	0.3033E-04	0.2516E-04	0.2078E-04	0.1710E-04	0.1405E-04
FAULT 4 E(NO/YR)	0.1765E-02	0.1280E-02	0.8661E-03	0.6074E-03	0.4427E-03	0.3322E-03	0.2543E-03	0.1973E-03	0.1546E-03	0.1219E-03
FAULT 5 E(NO/YR)	0.4310E-02	0.3078E-02	0.1937E-02	0.1287E-02	0.8933E-03	0.6340E-03	0.4544E-03	0.3274E-03	0.2368E-03	0.1719E-03
FAULT 6 E(NO/YR)	0.3668E-02	0.1948E-02	0.1064E-02	0.6341E-03	0.3964E-03	0.2546E-03	0.1664E-03	0.1102E-03	0.7390E-04	0.5008E-04
FAULT 7 E(NO/YR)	0.3163E-02	0.2004E-02	0.1116E-02	0.6716E-03	0.4186E-03	0.2640E-03	0.1677E-03	0.1073E-03	0.6920E-04	0.4507E-04
FAULT 8 E(NO/YR)	0.3624E-02	0.1664E-02	0.8150E-03	0.4378E-03	0.2448E-03	0.1402E-03	0.8194E-04	0.4878E-04	0.2956E-04	0.1822E-04
FAULT 9 E(NO/YR)	0.2065E-02	0.1107E-02	0.5489E-03	0.2941E-03	0.1614E-03	0.8974E-04	0.5059E-04	0.2897E-04	0.1688E-04	0.1000E-04
FAULT 10 E(NO/YR)	0.3569E-02	0.1426E-02	0.6349E-03	0.3077E-03	0.1546E-03	0.7980E-04	0.4232E-04	0.2302E-04	0.1284E-04	0.7331E-05
TOTAL E(NO/YR)	0.2415E-01	0.1399E-01	0.8034E-02	0.5025E-02	0.3327E-02	0.2293E-02	0.1633E-02	0.1196E-02	0.8974E-03	0.6891E-03
TOTAL RISK	0.2386E-01	0.1389E-01	0.8002E-02	0.5012E-02	0.3321E-02	0.2291E-02	0.1632E-02	0.1195E-02	0.8970E-03	0.6889E-03

AMPLITUDES (ft/sec):	0.3100E+00	0.3400E+00	0.3700E+00	0.4000E+00	0.4300E+00	0.4600E+00	0.4900E+00	0.5200E+00	0.5700E+00	0.6000E+00	
LN (AMPLITUDE):	-1.17	-1.08	-0.99	-0.92	-0.84	-0.78	-0.71	-0.65	-0.56	-0.51	
FAULT 1 E(NO/YR)	0.2756E-04	0.2462E-04	0.2213E-04	0.1998E-04	0.1811E-04	0.1646E-04	0.1500E-04	0.1369E-04	0.1180E-04	0.1081E-04	
FAULT 2 E(NO/YR)	0.1936E-03	0.1719E-03	0.1536E-03	0.1378E-03	0.1241E-03	0.1120E-03	0.1014E-03	0.9187E-04	0.7823E-04	0.7113E-04	
FAULT 3 E(NO/YR)	0.1152E-04	0.9451E-05	0.7753E-05	0.6364E-05	0.5229E-05	0.4302E-05	0.3545E-05	0.2926E-05	0.2135E-05	0.1771E-05	
FAULT 4 E(NO/YR)	0.9666E-04	0.7697E-04	0.6152E-04	0.4934E-04	0.3970E-04	0.3205E-04	0.2595E-04	0.2107E-04	0.1499E-04	0.1227E-04	
FAULT 5 E(NO/YR)	0.1253E-03	0.9176E-04	0.6752E-04	0.4994E-04	0.3712E-04	0.2774E-04	0.2084E-04	0.1574E-04	0.9967E-05	0.7627E-05	
FAULT 6 E(NO/YR)	0.3429E-04	0.2371E-04	0.1655E-04	0.1166E-04	0.8285E-05	0.5936E-05	0.4287E-05	0.3119E-05	0.1866E-05	0.1383E-05	
FAULT 7 E(NO/YR)	0.2964E-04	0.1970E-04	0.1322E-04	0.8966E-05	0.6140E-05	0.4244E-05	0.2960E-05	0.2083E-05	0.1181E-05	0.8490E-06	
FAULT 8 E(NO/YR)	0.1141E-04	0.7257E-05	0.4683E-05	0.3063E-05	0.2029E-05	0.1361E-05	0.9227E-06	0.6324E-06	0.3445E-06	0.2422E-06	
FAULT 9 E(NO/YR)	0.6029E-05	0.3695E-05	0.2300E-05	0.1454E-05	0.9315E-06	0.6049E-06	0.3978E-06	0.2647E-06	0.1376E-06	0.9418E-07	
FAULT 10 E(NO/YR)	0.4277E-05	0.2547E-05	0.1545E-05	0.9538E-06	0.5985E-06	0.3813E-06	0.2463E-06	0.1613E-06	0.8177E-07	0.5522E-07	
TOTAL E(NO/YR)	0.5403E-03	0.4316E-03	0.3508E-03	0.2895E-03	0.2422E-03	0.2051E-03	0.1755E-03	0.1516E-03	0.1207E-03	0.1062E-03	
TOTAL RISK	0.5401E-03	0.4315E-03	0.3507E-03	0.2895E-03	0.2422E-03	0.2051E-03	0.1755E-03	0.1515E-03	0.1207E-03	0.1062E-03	
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054						
ESTIMATED LN AMP. :	-3.221	-2.885	-2.301	-1.790	-1.458						
ESTIMATED AMP. (ft/sec):	0.03992	0.05583	0.10016	0.16700	0.23269						

BOORE (1997)Vs= 500 m/s .30 S

AMPLITUDES (ft/sec):	0.1000E-01	0.4000E-01	0.7000E-01	0.1000E+00	0.1300E+00	0.1600E+00	0.1900E+00	0.2200E+00	0.2500E+00	0.2800E+00	
LN (AMPLITUDE):	-4.61	-3.22	-2.66	-2.30	-2.04	-1.83	-1.66	-1.51	-1.39	-1.27	
FAULT 1 E(NO/YR)	0.2270E-03	0.1929E-03	0.1513E-03	0.1196E-03	0.9679E-04	0.8026E-04	0.6798E-04	0.5862E-04	0.5129E-04	0.4542E-04	
FAULT 2 E(NO/YR)	0.1713E-02	0.1440E-02	0.1117E-02	0.8758E-03	0.7046E-03	0.5816E-03	0.4908E-03	0.4218E-03	0.3678E-03	0.3246E-03	
FAULT 3 E(NO/YR)	0.5758E-04	0.5693E-04	0.5374E-04	0.4899E-04	0.4387E-04	0.3892E-04	0.3434E-04	0.3019E-04	0.2646E-04	0.2315E-04	
FAULT 4 E(NO/YR)	0.1780E-02	0.1481E-02	0.1126E-02	0.8573E-03	0.6648E-03	0.5257E-03	0.4227E-03	0.3447E-03	0.2841E-03	0.2361E-03	
FAULT 5 E(NO/YR)	0.4326E-02	0.3558E-02	0.2526E-02	0.1824E-02	0.1372E-02	0.1066E-02	0.8454E-03	0.6782E-03	0.5477E-03	0.4442E-03	
FAULT 6 E(NO/YR)	0.3749E-02	0.2461E-02	0.1539E-02	0.1034E-02	0.7313E-03	0.5336E-03	0.3969E-03	0.2991E-03	0.2274E-03	0.1742E-03	
FAULT 7 E(NO/YR)	0.3178E-02	0.2443E-02	0.1573E-02	0.1064E-02	0.7595E-03	0.5579E-03	0.4154E-03	0.3114E-03	0.2344E-03	0.1770E-03	
FAULT 8 E(NO/YR)	0.3731E-02	0.2218E-02	0.1281E-02	0.8134E-03	0.5440E-03	0.3734E-03	0.2603E-03	0.1835E-03	0.1305E-03	0.9365E-04	
FAULT 9 E(NO/YR)	0.2082E-02	0.1434E-02	0.8438E-03	0.5382E-03	0.3609E-03	0.2471E-03	0.1708E-03	0.1188E-03	0.8318E-04	0.5858E-04	
FAULT 10 E(NO/YR)	0.3708E-02	0.1995E-02	0.1083E-02	0.6540E-03	0.4134E-03	0.2670E-03	0.1749E-03	0.1160E-03	0.7779E-04	0.5276E-04	
TOTAL E(NO/YR)	0.2455E-01	0.1728E-01	0.1129E-01	0.7829E-02	0.5691E-02	0.4272E-02	0.3280E-02	0.2562E-02	0.2031E-02	0.1630E-02	
TOTAL RISK	0.2425E-01	0.1713E-01	0.1123E-01	0.7799E-02	0.5675E-02	0.4263E-02	0.3274E-02	0.2559E-02	0.2029E-02	0.1628E-02	

AMPLITUDES (ft/sec):	0.3100E+00	0.3400E+00	0.3700E+00	0.4000E+00	0.4300E+00	0.4600E+00	0.4900E+00	0.5200E+00	0.5700E+00	0.6000E+00	
LN (AMPLITUDE):	-1.17	-1.08	-0.99	-0.92	-0.84	-0.78	-0.71	-0.65	-0.56	-0.51	
FAULT 1 E(NO/YR)	0.4062E-04	0.3664E-04	0.3327E-04	0.3039E-04	0.2789E-04	0.2571E-04	0.2378E-04	0.2206E-04	0.1958E-04	0.1828E-04	
FAULT 2 E(NO/YR)	0.2894E-03	0.2600E-03	0.2352E-03	0.2140E-03	0.1957E-03	0.1796E-03	0.1654E-03	0.1528E-03	0.1345E-03	0.1250E-03	
FAULT 3 E(NO/YR)	0.2023E-04	0.1766E-04	0.1540E-04	0.1343E-04	0.1171E-04	0.1021E-04	0.8908E-05	0.7774E-05	0.6206E-05	0.5426E-05	
FAULT 4 E(NO/YR)	0.1975E-03	0.1662E-03	0.1404E-03	0.1190E-03	0.1012E-03	0.8634E-04	0.7382E-04	0.6326E-04	0.4913E-04	0.4233E-04	
FAULT 5 E(NO/YR)	0.3612E-03	0.2943E-03	0.2403E-03	0.1966E-03	0.1611E-03	0.1323E-03	0.1088E-03	0.8975E-04	0.6539E-04	0.5424E-04	
FAULT 6 E(NO/YR)	0.1342E-03	0.1040E-03	0.8105E-04	0.6345E-04	0.4990E-04	0.3943E-04	0.3129E-04	0.2493E-04	0.1723E-04	0.1387E-04	
FAULT 7 E(NO/YR)	0.1342E-03	0.1020E-03	0.7789E-04	0.5971E-04	0.4596E-04	0.3553E-04	0.2758E-04	0.2151E-04	0.1434E-04	0.1131E-04	
FAULT 8 E(NO/YR)	0.6773E-04	0.4937E-04	0.3625E-04	0.2682E-04	0.1998E-04	0.1498E-04	0.1131E-04	0.8590E-05	0.5502E-05	0.4244E-05	
FAULT 9 E(NO/YR)	0.4154E-04	0.2966E-04	0.2133E-04	0.1545E-04	0.1127E-04	0.8278E-05	0.6122E-05	0.4557E-05	0.2826E-05	0.2138E-05	
FAULT 10 E(NO/YR)	0.3617E-04	0.2506E-04	0.1754E-04	0.1239E-04	0.8839E-05	0.6361E-05	0.4616E-05	0.3376E-05	0.2039E-05	0.1521E-05	
TOTAL E(NO/YR)	0.1323E-02	0.1085E-02	0.8987E-03	0.7513E-03	0.6335E-03	0.5387E-03	0.4616E-03	0.3986E-03	0.3168E-03	0.2784E-03	
TOTAL RISK	0.1322E-02	0.1084E-02	0.8983E-03	0.7510E-03	0.6333E-03	0.5385E-03	0.4615E-03	0.3985E-03	0.3167E-03	0.2783E-03	
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054						
ESTIMATED LN AMP. :	-2.942	-2.546	-1.948	-1.407	-1.066						
ESTIMATED AMP. (ft/sec):	0.05276	0.07841	0.14251	0.24497	0.34443						

BOORE (1997)Vs= 500 m/s .40 S

AMPLITUDES (ft/sec):	0.1000E-01	0.4000E-01	0.7000E-01	0.1000E+00	0.1300E+00	0.1600E+00	0.1900E+00	0.2200E+00	0.2500E+00	0.2800E+00
LN (AMPLITUDE):	-4.61	-3.22	-2.66	-2.30	-2.04	-1.83	-1.66	-1.51	-1.39	-1.27
FAULT 1 E(NO/YR)	0.2271E-03	0.1983E-03	0.1601E-03	0.1294E-03	0.1064E-03	0.8905E-04	0.7589E-04	0.6570E-04	0.5763E-04	0.5114E-04
FAULT 2 E(NO/YR)	0.1715E-02	0.1483E-02	0.1186E-02	0.9514E-03	0.7771E-03	0.6475E-03	0.5496E-03	0.4740E-03	0.4145E-03	0.3666E-03
FAULT 3 E(NO/YR)	0.5758E-04	0.5703E-04	0.5425E-04	0.4998E-04	0.4530E-04	0.4073E-04	0.3645E-04	0.3252E-04	0.2896E-04	0.2575E-04
FAULT 4 E(NO/YR)	0.1782E-02	0.1528E-02	0.1201E-02	0.9407E-03	0.7453E-03	0.5995E-03	0.4891E-03	0.4041E-03	0.3374E-03	0.2840E-03
FAULT 5 E(NO/YR)	0.4328E-02	0.3657E-02	0.2682E-02	0.1989E-02	0.1536E-02	0.1228E-02	0.1006E-02	0.8377E-03	0.7040E-03	0.5951E-03
FAULT 6 E(NO/YR)	0.3760E-02	0.2605E-02	0.1699E-02	0.1190E-02	0.8808E-03	0.6745E-03	0.5276E-03	0.4183E-03	0.3348E-03	0.2697E-03
FAULT 7 E(NO/YR)	0.3179E-02	0.2540E-02	0.1710E-02	0.1201E-02	0.8942E-03	0.6908E-03	0.5445E-03	0.4335E-03	0.3470E-03	0.2787E-03
FAULT 8 E(NO/YR)	0.3747E-02	0.2385E-02	0.1454E-02	0.9777E-03	0.6981E-03	0.5142E-03	0.3850E-03	0.2913E-03	0.2220E-03	0.1702E-03
FAULT 9 E(NO/YR)	0.2083E-02	0.1517E-02	0.9437E-03	0.6354E-03	0.4553E-03	0.3364E-03	0.2519E-03	0.1900E-03	0.1439E-03	0.1094E-03
FAULT 10 E(NO/YR)	0.3729E-02	0.2178E-02	0.1263E-02	0.8223E-03	0.5669E-03	0.4008E-03	0.2871E-03	0.2075E-03	0.1512E-03	0.1109E-03
TOTAL E(NO/YR)	0.2461E-01	0.1815E-01	0.1235E-01	0.8888E-02	0.6705E-02	0.5221E-02	0.4154E-02	0.3355E-02	0.2741E-02	0.2262E-02
TOTAL RISK	0.2431E-01	0.1798E-01	0.1228E-01	0.8849E-02	0.6683E-02	0.5208E-02	0.4145E-02	0.3349E-02	0.2737E-02	0.2259E-02

AMPLITUDES (ft/sec):	0.3100E+00	0.3400E+00	0.3700E+00	0.4000E+00	0.4300E+00	0.4600E+00	0.4900E+00	0.5200E+00	0.5700E+00	0.6000E+00
LN (AMPLITUDE):	-1.17	-1.08	-0.99	-0.92	-0.84	-0.78	-0.71	-0.65	-0.56	-0.51
FAULT 1 E(NO/YR)	0.4581E-04	0.4138E-04	0.3763E-04	0.3443E-04	0.3167E-04	0.2926E-04	0.2713E-04	0.2525E-04	0.2253E-04	0.2112E-04
FAULT 2 E(NO/YR)	0.3273E-03	0.2946E-03	0.2671E-03	0.2435E-03	0.2232E-03	0.2054E-03	0.1898E-03	0.1759E-03	0.1559E-03	0.1455E-03
FAULT 3 E(NO/YR)	0.2288E-04	0.2031E-04	0.1802E-04	0.1598E-04	0.1418E-04	0.1257E-04	0.1116E-04	0.9903E-05	0.8127E-05	0.7224E-05
FAULT 4 E(NO/YR)	0.2408E-03	0.2053E-03	0.1759E-03	0.1513E-03	0.1306E-03	0.1131E-03	0.9817E-04	0.8542E-04	0.6808E-04	0.5957E-04
FAULT 5 E(NO/YR)	0.5049E-03	0.4294E-03	0.3658E-03	0.3121E-03	0.2666E-03	0.2280E-03	0.1952E-03	0.1674E-03	0.1299E-03	0.1118E-03
FAULT 6 E(NO/YR)	0.2184E-03	0.1777E-03	0.1452E-03	0.1190E-03	0.9791E-04	0.8081E-04	0.6690E-04	0.5556E-04	0.4103E-04	0.3433E-04
FAULT 7 E(NO/YR)	0.2243E-03	0.1810E-03	0.1463E-03	0.1185E-03	0.9625E-04	0.7836E-04	0.6396E-04	0.5235E-04	0.3771E-04	0.3109E-04
FAULT 8 E(NO/YR)	0.1313E-03	0.1018E-03	0.7932E-04	0.6212E-04	0.4888E-04	0.3865E-04	0.3069E-04	0.2449E-04	0.1696E-04	0.1368E-04
FAULT 9 E(NO/YR)	0.8348E-04	0.6396E-04	0.4920E-04	0.3801E-04	0.2950E-04	0.2300E-04	0.1801E-04	0.1416E-04	0.9579E-05	0.7620E-05
FAULT 10 E(NO/YR)	0.8195E-04	0.6097E-04	0.4567E-04	0.3444E-04	0.2613E-04	0.1995E-04	0.1533E-04	0.1184E-04	0.7800E-05	0.6114E-05
TOTAL E(NO/YR)	0.1881E-02	0.1576E-02	0.1330E-02	0.1129E-02	0.9649E-03	0.8291E-03	0.7163E-03	0.6222E-03	0.4976E-03	0.4380E-03
TOTAL RISK	0.1879E-02	0.1575E-02	0.1329E-02	0.1129E-02	0.9644E-03	0.8287E-03	0.7161E-03	0.6220E-03	0.4975E-03	0.4379E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.841	-2.436	-1.802	-1.234	-0.885					
ESTIMATED AMP. (ft/sec):	0.05835	0.08753	0.16498	0.29115	0.41288					

BOORE (1997)Vs= 500 m/s .50 S

AMPLITUDES (ft/sec):	0.5000E-01	0.1000E+00	0.1500E+00	0.2000E+00	0.2500E+00	0.3000E+00	0.3500E+00	0.4000E+00	0.4500E+00	0.5000E+00
LN (AMPLITUDE):	-3.00	-2.30	-1.90	-1.61	-1.39	-1.20	-1.05	-0.92	-0.80	-0.69
FAULT 1 E(NO/YR)	0.1856E-03	0.1313E-03	0.9638E-04	0.7409E-04	0.5921E-04	0.4878E-04	0.4115E-04	0.3536E-04	0.3083E-04	0.2720E-04
FAULT 2 E(NO/YR)	0.1384E-02	0.9665E-03	0.7029E-03	0.5365E-03	0.4261E-03	0.3491E-03	0.2928E-03	0.2501E-03	0.2168E-03	0.1900E-03
FAULT 3 E(NO/YR)	0.5618E-04	0.4961E-04	0.4191E-04	0.3495E-04	0.2899E-04	0.2398E-04	0.1982E-04	0.1637E-04	0.1353E-04	0.1119E-04
FAULT 4 E(NO/YR)	0.1419E-02	0.9566E-03	0.6614E-03	0.4747E-03	0.3516E-03	0.2666E-03	0.2057E-03	0.1609E-03	0.1271E-03	0.1013E-03
FAULT 5 E(NO/YR)	0.3299E-02	0.2007E-02	0.1358E-02	0.9987E-03	0.7663E-03	0.5998E-03	0.4739E-03	0.3764E-03	0.3000E-03	0.2398E-03
FAULT 6 E(NO/YR)	0.2262E-02	0.1235E-02	0.7920E-03	0.5480E-03	0.3926E-03	0.2867E-03	0.2121E-03	0.1584E-03	0.1193E-03	0.9049E-04
FAULT 7 E(NO/YR)	0.2228E-02	0.1231E-02	0.7959E-03	0.5583E-03	0.4034E-03	0.2949E-03	0.2168E-03	0.1603E-03	0.1190E-03	0.8891E-04
FAULT 8 E(NO/YR)	0.2030E-02	0.1035E-02	0.6349E-03	0.4157E-03	0.2795E-03	0.1910E-03	0.1322E-03	0.9251E-04	0.6547E-04	0.4683E-04
FAULT 9 E(NO/YR)	0.1297E-02	0.6646E-03	0.4095E-03	0.2694E-03	0.1808E-03	0.1226E-03	0.8384E-04	0.5785E-04	0.4028E-04	0.2832E-04
FAULT 10 E(NO/YR)	0.1829E-02	0.8893E-03	0.5212E-03	0.3223E-03	0.2038E-03	0.1311E-03	0.8560E-04	0.5674E-04	0.3816E-04	0.2601E-04
TOTAL E(NO/YR)	0.1599E-01	0.9166E-02	0.6014E-02	0.4232E-02	0.3092E-02	0.2315E-02	0.1764E-02	0.1365E-02	0.1070E-02	0.8500E-03
TOTAL RISK	0.1586E-01	0.9124E-02	0.5996E-02	0.4224E-02	0.3088E-02	0.2312E-02	0.1762E-02	0.1364E-02	0.1070E-02	0.8497E-03

BOORE (1997)Vs= 500 m/s .50 S

AMPLITUDES (ft/sec):	0.5500E+000	0.6000E+000	0.6500E+000	0.7000E+000	0.7500E+000	0.8000E+000	0.8500E+000	0.9000E+000	0.9500E+000	0.1000E+01
LN (AMPLITUDE):	-0.60	-0.51	-0.43	-0.36	-0.29	-0.22	-0.16	-0.11	-0.05	0.00
FAULT 1 E(NO/YR)	0.2422E-040	0.2172E-040	0.1961E-040	0.1778E-040	0.1620E-040	0.1481E-040	0.1357E-040	0.1247E-040	0.1148E-040	0.1059E-04
FAULT 2 E(NO/YR)	0.1681E-030	0.1498E-030	0.1342E-030	0.1208E-030	0.1092E-030	0.9901E-040	0.9001E-040	0.8201E-040	0.7486E-040	0.6844E-04
FAULT 3 E(NO/YR)	0.9276E-050	0.7700E-050	0.6405E-050	0.5340E-050	0.4462E-050	0.3738E-050	0.3140E-050	0.2643E-050	0.2231E-050	0.1888E-05
FAULT 4 E(NO/YR)	0.8124E-040	0.6559E-040	0.5324E-040	0.4344E-040	0.3560E-040	0.2930E-040	0.2421E-040	0.2008E-040	0.1671E-040	0.1396E-04
FAULT 5 E(NO/YR)	0.1922E-030	0.1545E-030	0.1246E-030	0.1008E-030	0.8185E-040	0.6665E-040	0.5445E-040	0.4463E-040	0.3670E-040	0.3028E-04
FAULT 6 E(NO/YR)	0.6915E-040	0.5321E-040	0.4120E-040	0.3209E-040	0.2515E-040	0.1982E-040	0.1570E-040	0.1250E-040	0.1000E-040	0.8039E-05
FAULT 7 E(NO/YR)	0.6678E-040	0.5046E-040	0.3835E-040	0.2932E-040	0.2255E-040	0.1744E-040	0.1356E-040	0.1060E-040	0.8332E-050	0.6580E-05
FAULT 8 E(NO/YR)	0.3383E-040	0.2467E-040	0.1816E-040	0.1348E-040	0.1009E-040	0.7608E-050	0.5780E-050	0.4421E-050	0.3404E-050	0.2637E-05
FAULT 9 E(NO/YR)	0.2011E-040	0.1441E-040	0.1042E-040	0.7598E-050	0.5589E-050	0.4144E-050	0.3096E-050	0.2331E-050	0.1766E-050	0.1347E-05
FAULT 10 E(NO/YR)	0.1797E-040	0.1256E-040	0.8883E-050	0.6350E-050	0.4586E-050	0.3343E-050	0.2459E-050	0.1824E-050	0.1364E-050	0.1027E-05
TOTAL E(NO/YR)	0.6829E-030	0.5546E-030	0.4551E-030	0.3771E-030	0.3153E-030	0.2659E-030	0.2260E-030	0.1935E-030	0.1669E-030	0.1448E-03
TOTAL RISK	0.6826E-030	0.5545E-030	0.4550E-030	0.3770E-030	0.3152E-030	0.2658E-030	0.2260E-030	0.1935E-030	0.1668E-030	0.1448E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.830	-2.417	-1.748	-1.151	-0.792					
ESTIMATED AMP. (ft/sec):	0.05900	0.08915	0.17412	0.31640	0.45316					

BOORE (1997)Vs= 500 m/s .75 S

AMPLITUDES (ft/sec):	0.5000E-010	0.1000E+000	0.1500E+000	0.2000E+000	0.2500E+000	0.3000E+000	0.3500E+000	0.4000E+000	0.4500E+000	0.5000E+00
LN (AMPLITUDE):	-3.00	-2.30	-1.90	-1.61	-1.39	-1.20	-1.05	-0.92	-0.80	-0.69
FAULT 1 E(NO/YR)	0.1787E-030	0.1244E-030	0.9063E-040	0.6928E-040	0.5508E-040	0.4516E-040	0.3793E-040	0.3247E-040	0.2821E-040	0.2480E-04
FAULT 2 E(NO/YR)	0.1332E-020	0.9155E-030	0.6607E-030	0.5011E-030	0.3957E-030	0.3223E-030	0.2690E-030	0.2287E-030	0.1974E-030	0.1723E-03
FAULT 3 E(NO/YR)	0.5519E-040	0.4705E-040	0.3881E-040	0.3183E-040	0.2607E-040	0.2135E-040	0.1751E-040	0.1438E-040	0.1183E-040	0.9760E-05
FAULT 4 E(NO/YR)	0.1362E-020	0.8985E-030	0.6142E-030	0.4371E-030	0.3213E-030	0.2420E-030	0.1857E-030	0.1445E-030	0.1138E-030	0.9042E-04
FAULT 5 E(NO/YR)	0.3128E-020	0.1889E-020	0.1308E-020	0.9911E-030	0.7852E-030	0.6351E-030	0.5189E-030	0.4263E-030	0.3515E-030	0.2906E-03
FAULT 6 E(NO/YR)	0.2154E-020	0.1202E-020	0.8045E-030	0.5825E-030	0.4365E-030	0.3331E-030	0.2571E-030	0.2002E-030	0.1570E-030	0.1240E-03
FAULT 7 E(NO/YR)	0.2100E-020	0.1176E-020	0.7912E-030	0.5807E-030	0.4402E-030	0.3380E-030	0.2613E-030	0.2029E-030	0.1582E-030	0.1239E-03
FAULT 8 E(NO/YR)	0.1937E-020	0.1030E-020	0.6702E-030	0.4664E-030	0.3333E-030	0.2416E-030	0.1770E-030	0.1310E-030	0.9782E-040	0.7368E-04
FAULT 9 E(NO/YR)	0.1224E-020	0.6497E-030	0.4238E-030	0.2969E-030	0.2128E-030	0.1541E-030	0.1124E-030	0.8262E-040	0.6115E-040	0.4560E-04
FAULT 10 E(NO/YR)	0.1757E-020	0.9056E-030	0.5714E-030	0.3812E-030	0.2599E-030	0.1798E-030	0.1259E-030	0.8921E-040	0.6395E-040	0.4635E-04
TOTAL E(NO/YR)	0.1523E-010	0.8838E-020	0.5973E-020	0.4338E-020	0.3266E-020	0.2513E-020	0.1963E-020	0.1552E-020	0.1241E-020	0.1001E-02
TOTAL RISK	0.1511E-010	0.8799E-020	0.5955E-020	0.4329E-020	0.3261E-020	0.2509E-020	0.1961E-020	0.1551E-020	0.1240E-020	0.1001E-02

AMPLITUDES (ft/sec):	0.5500E+000	0.6000E+000	0.6500E+000	0.7000E+000	0.7500E+000	0.8000E+000	0.8500E+000	0.9000E+000	0.9500E+000	0.1000E+01
LN (AMPLITUDE):	-0.60	-0.51	-0.43	-0.36	-0.29	-0.22	-0.16	-0.11	-0.05	0.00
FAULT 1 E(NO/YR)	0.2201E-040	0.1969E-040	0.1772E-040	0.1604E-040	0.1457E-040	0.1329E-040	0.1216E-040	0.1115E-040	0.1025E-040	0.9443E-05
FAULT 2 E(NO/YR)	0.1518E-030	0.1347E-030	0.1203E-030	0.1079E-030	0.9724E-040	0.8791E-040	0.7969E-040	0.7242E-040	0.6596E-040	0.6018E-04
FAULT 3 E(NO/YR)	0.8073E-050	0.6698E-050	0.5574E-050	0.4653E-050	0.3896E-050	0.3272E-050	0.2756E-050	0.2329E-050	0.1974E-050	0.1677E-05
FAULT 4 E(NO/YR)	0.7246E-040	0.5849E-040	0.4751E-040	0.3882E-040	0.3188E-040	0.2632E-040	0.2182E-040	0.1817E-040	0.1519E-040	0.1275E-04
FAULT 5 E(NO/YR)	0.2409E-030	0.2002E-030	0.1669E-030	0.1394E-030	0.1168E-030	0.9813E-040	0.8265E-040	0.6981E-040	0.5911E-040	0.5019E-04
FAULT 6 E(NO/YR)	0.9847E-040	0.7868E-040	0.6321E-040	0.5105E-040	0.4143E-040	0.3378E-040	0.2767E-040	0.2277E-040	0.1881E-040	0.1560E-04
FAULT 7 E(NO/YR)	0.9749E-040	0.7706E-040	0.6121E-040	0.4884E-040	0.3915E-040	0.3153E-040	0.2551E-040	0.2072E-040	0.1691E-040	0.1385E-04
FAULT 8 E(NO/YR)	0.5595E-040	0.4282E-040	0.3302E-040	0.2564E-040	0.2005E-040	0.1578E-040	0.1249E-040	0.9941E-050	0.7958E-050	0.6403E-05
FAULT 9 E(NO/YR)	0.3426E-040	0.2593E-040	0.1976E-040	0.1517E-040	0.1172E-040	0.9118E-050	0.7135E-050	0.5616E-050	0.4445E-050	0.3537E-05
FAULT 10 E(NO/YR)	0.3394E-040	0.2511E-040	0.1874E-040	0.1412E-040	0.1072E-040	0.8203E-050	0.6324E-050	0.4909E-050	0.3836E-050	0.3015E-05
TOTAL E(NO/YR)	0.8154E-030	0.6694E-030	0.5539E-030	0.4617E-030	0.3875E-030	0.3273E-030	0.2782E-030	0.2378E-030	0.2044E-030	0.1766E-03
TOTAL RISK	0.8150E-030	0.6692E-030	0.5538E-030	0.4616E-030	0.3874E-030	0.3273E-030	0.2782E-030	0.2378E-030	0.2044E-030	0.1766E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.889	-2.467	-1.739	-1.094	-0.718					
ESTIMATED AMP. (ft/sec):	0.05566	0.08487	0.17562	0.33482	0.48753					

BOORE (1997)Vs= 500 m/s 1.0 S

AMPLITUDES (ft/sec):	0.5000E-01	0.1000E+00	0.1500E+00	0.2000E+00	0.2500E+00	0.3000E+00	0.3500E+00	0.4000E+00	0.4500E+00	0.5000E+00
LN (AMPLITUDE):	-3.00	-2.30	-1.90	-1.61	-1.39	-1.20	-1.05	-0.92	-0.80	-0.69
FAULT 1 E(NO/YR)	0.1710E-03	0.1164E-03	0.8392E-04	0.6372E-04	0.5041E-04	0.4116E-04	0.3444E-04	0.2937E-04	0.2543E-04	0.2227E-04
FAULT 2 E(NO/YR)	0.1273E-02	0.8560E-03	0.6109E-03	0.4601E-03	0.3613E-03	0.2929E-03	0.2434E-03	0.2061E-03	0.1771E-03	0.1539E-03
FAULT 3 E(NO/YR)	0.5397E-04	0.4451E-04	0.3592E-04	0.2896E-04	0.2339E-04	0.1894E-04	0.1537E-04	0.1252E-04	0.1023E-04	0.8394E-05
FAULT 4 E(NO/YR)	0.1296E-02	0.8319E-03	0.5600E-03	0.3941E-03	0.2870E-03	0.2145E-03	0.1634E-03	0.1264E-03	0.9898E-04	0.7835E-04
FAULT 5 E(NO/YR)	0.2992E-02	0.1804E-02	0.1267E-02	0.9737E-03	0.7815E-03	0.6402E-03	0.5300E-03	0.4413E-03	0.3690E-03	0.3095E-03
FAULT 6 E(NO/YR)	0.2064E-02	0.1167E-02	0.7975E-03	0.5886E-03	0.4493E-03	0.3492E-03	0.2745E-03	0.2176E-03	0.1738E-03	0.1398E-03
FAULT 7 E(NO/YR)	0.2000E-02	0.1132E-02	0.7771E-03	0.5808E-03	0.4486E-03	0.3512E-03	0.2770E-03	0.2196E-03	0.1749E-03	0.1400E-03
FAULT 8 E(NO/YR)	0.1858E-02	0.1011E-02	0.6746E-03	0.4811E-03	0.3523E-03	0.2619E-03	0.1968E-03	0.1493E-03	0.1143E-03	0.8821E-04
FAULT 9 E(NO/YR)	0.1167E-02	0.6325E-03	0.4229E-03	0.3036E-03	0.2233E-03	0.1661E-03	0.1246E-03	0.9415E-04	0.7165E-04	0.5491E-04
FAULT 10 E(NO/YR)	0.1691E-02	0.8977E-03	0.5834E-03	0.4012E-03	0.2822E-03	0.2014E-03	0.1455E-03	0.1063E-03	0.7856E-04	0.5864E-04
TOTAL E(NO/YR)	0.1457E-01	0.8494E-02	0.5813E-02	0.4276E-02	0.3259E-02	0.2537E-02	0.2005E-02	0.1603E-02	0.1294E-02	0.1054E-02
TOTAL RISK	0.1446E-01	0.8458E-02	0.5796E-02	0.4267E-02	0.3254E-02	0.2534E-02	0.2003E-02	0.1601E-02	0.1293E-02	0.1053E-02

AMPLITUDES (ft/sec):	0.5500E+00	0.6000E+00	0.6500E+00	0.7000E+00	0.7500E+00	0.8000E+00	0.8500E+00	0.9000E+00	0.9500E+00	0.1000E+01
LN (AMPLITUDE):	-0.60	-0.51	-0.43	-0.36	-0.29	-0.22	-0.16	-0.11	-0.05	0.00
FAULT 1 E(NO/YR)	0.1970E-04	0.1755E-04	0.1574E-04	0.1419E-04	0.1284E-04	0.1167E-04	0.1064E-04	0.9721E-05	0.8904E-05	0.8173E-05
FAULT 2 E(NO/YR)	0.1350E-03	0.1193E-03	0.1061E-03	0.9475E-04	0.8499E-04	0.7651E-04	0.6907E-04	0.6252E-04	0.5673E-04	0.5157E-04
FAULT 3 E(NO/YR)	0.6913E-05	0.5716E-05	0.4745E-05	0.3954E-05	0.3307E-05	0.2776E-05	0.2338E-05	0.1977E-05	0.1676E-05	0.1426E-05
FAULT 4 E(NO/YR)	0.6258E-04	0.5039E-04	0.4086E-04	0.3335E-04	0.2738E-04	0.2260E-04	0.1875E-04	0.1563E-04	0.1308E-04	0.1100E-04
FAULT 5 E(NO/YR)	0.2604E-03	0.2196E-03	0.1858E-03	0.1575E-03	0.1340E-03	0.1142E-03	0.9762E-04	0.8365E-04	0.7187E-04	0.6190E-04
FAULT 6 E(NO/YR)	0.1130E-03	0.9195E-04	0.7519E-04	0.6179E-04	0.5102E-04	0.4231E-04	0.3524E-04	0.2947E-04	0.2475E-04	0.2085E-04
FAULT 7 E(NO/YR)	0.1125E-03	0.9083E-04	0.7366E-04	0.6001E-04	0.4910E-04	0.4034E-04	0.3328E-04	0.2756E-04	0.2292E-04	0.1913E-04
FAULT 8 E(NO/YR)	0.6861E-04	0.5376E-04	0.4241E-04	0.3369E-04	0.2692E-04	0.2164E-04	0.1749E-04	0.1422E-04	0.1161E-04	0.9527E-05
FAULT 9 E(NO/YR)	0.4238E-04	0.3294E-04	0.2576E-04	0.2028E-04	0.1607E-04	0.1280E-04	0.1025E-04	0.8260E-05	0.6686E-05	0.5439E-05
FAULT 10 E(NO/YR)	0.4419E-04	0.3361E-04	0.2578E-04	0.1993E-04	0.1553E-04	0.1218E-04	0.9624E-05	0.7650E-05	0.6117E-05	0.4918E-05
TOTAL E(NO/YR)	0.8653E-03	0.7157E-03	0.5960E-03	0.4995E-03	0.4211E-03	0.3570E-03	0.3043E-03	0.2607E-03	0.2243E-03	0.1939E-03
TOTAL RISK	0.8649E-03	0.7154E-03	0.5958E-03	0.4994E-03	0.4210E-03	0.3570E-03	0.3043E-03	0.2606E-03	0.2243E-03	0.1939E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.945	-2.519	-1.758	-1.082	-0.693					
ESTIMATED AMP. (ft/sec):	0.05262	0.08054	0.17233	0.33879	0.49995					

BOORE (1997)Vs= 500 m/s 1.5 S

AMPLITUDES (ft/sec):	0.5000E-01	0.1000E+00	0.1500E+00	0.2000E+00	0.2500E+00	0.3000E+00	0.3500E+00	0.4000E+00	0.4500E+00	0.5000E+00
LN (AMPLITUDE):	-3.00	-2.30	-1.90	-1.61	-1.39	-1.20	-1.05	-0.92	-0.80	-0.69
FAULT 1 E(NO/YR)	0.1636E-03	0.1099E-03	0.7885E-04	0.5974E-04	0.4717E-04	0.3844E-04	0.3207E-04	0.2727E-04	0.2352E-04	0.2052E-04
FAULT 2 E(NO/YR)	0.1217E-02	0.8072E-03	0.5736E-03	0.4311E-03	0.3379E-03	0.2734E-03	0.2266E-03	0.1913E-03	0.1638E-03	0.1419E-03
FAULT 3 E(NO/YR)	0.5256E-04	0.4223E-04	0.3360E-04	0.2684E-04	0.2154E-04	0.1737E-04	0.1407E-04	0.1146E-04	0.9374E-05	0.7708E-05
FAULT 4 E(NO/YR)	0.1234E-02	0.7784E-03	0.5211E-03	0.3660E-03	0.2663E-03	0.1990E-03	0.1518E-03	0.1176E-03	0.9241E-04	0.7342E-04
FAULT 5 E(NO/YR)	0.2977E-02	0.1841E-02	0.1314E-02	0.1022E-02	0.8304E-03	0.6896E-03	0.5797E-03	0.4910E-03	0.4180E-03	0.3572E-03
FAULT 6 E(NO/YR)	0.2079E-02	0.1209E-02	0.8418E-03	0.6329E-03	0.4930E-03	0.3915E-03	0.3148E-03	0.2554E-03	0.2089E-03	0.1719E-03
FAULT 7 E(NO/YR)	0.2000E-02	0.1167E-02	0.8157E-03	0.6196E-03	0.4877E-03	0.3904E-03	0.3155E-03	0.2566E-03	0.2099E-03	0.1725E-03
FAULT 8 E(NO/YR)	0.1883E-02	0.1057E-02	0.7206E-03	0.5268E-03	0.3967E-03	0.3038E-03	0.2354E-03	0.1842E-03	0.1454E-03	0.1156E-03
FAULT 9 E(NO/YR)	0.1175E-02	0.6585E-03	0.4496E-03	0.3305E-03	0.2500E-03	0.1919E-03	0.1488E-03	0.1162E-03	0.9146E-04	0.7246E-04
FAULT 10 E(NO/YR)	0.1723E-02	0.9448E-03	0.6306E-03	0.4476E-03	0.3261E-03	0.2415E-03	0.1811E-03	0.1373E-03	0.1052E-03	0.8135E-04
TOTAL E(NO/YR)	0.1450E-01	0.8615E-02	0.5980E-02	0.4463E-02	0.3457E-02	0.2737E-02	0.2200E-02	0.1788E-02	0.1468E-02	0.1215E-02
TOTAL RISK	0.1440E-01	0.8578E-02	0.5962E-02	0.4453E-02	0.3451E-02	0.2733E-02	0.2197E-02	0.1787E-02	0.1467E-02	0.1214E-02

BOORE (1997)Vs= 500 m/s 1.5 S

AMPLITUDES (ft/sec):	0.5500E+00	0.6000E+00	0.6500E+00	0.7000E+00	0.7500E+00	0.8000E+00	0.8500E+00	0.9000E+00	0.9500E+00	0.1000E+01
LN (AMPLITUDE):	-0.60	-0.51	-0.43	-0.36	-0.29	-0.22	-0.16	-0.11	-0.05	0.00
FAULT 1 E(NO/YR)	0.1806E-04	0.1602E-04	0.1430E-04	0.1283E-04	0.1156E-04	0.1046E-04	0.9492E-05	0.8637E-05	0.7880E-05	0.7204E-05
FAULT 2 E(NO/YR)	0.1240E-03	0.1091E-03	0.9662E-04	0.8600E-04	0.7686E-04	0.6896E-04	0.6206E-04	0.5601E-04	0.5068E-04	0.4596E-04
FAULT 3 E(NO/YR)	0.6370E-05	0.5288E-05	0.4410E-05	0.3694E-05	0.3108E-05	0.2625E-05	0.2225E-05	0.1893E-05	0.1617E-05	0.1385E-05
FAULT 4 E(NO/YR)	0.5890E-04	0.4766E-04	0.3886E-04	0.3190E-04	0.2636E-04	0.2190E-04	0.1829E-04	0.1536E-04	0.1295E-04	0.1097E-04
FAULT 5 E(NO/YR)	0.3063E-03	0.2634E-03	0.2272E-03	0.1965E-03	0.1704E-03	0.1481E-03	0.1290E-03	0.1127E-03	0.9864E-04	0.8654E-04
FAULT 6 E(NO/YR)	0.1423E-03	0.1185E-03	0.9910E-04	0.8329E-04	0.7031E-04	0.5960E-04	0.5071E-04	0.4331E-04	0.3712E-04	0.3192E-04
FAULT 7 E(NO/YR)	0.1424E-03	0.1180E-03	0.9826E-04	0.8214E-04	0.6893E-04	0.5806E-04	0.4908E-04	0.4164E-04	0.3545E-04	0.3027E-04
FAULT 8 E(NO/YR)	0.9263E-04	0.7471E-04	0.6065E-04	0.4952E-04	0.4066E-04	0.3356E-04	0.2784E-04	0.2320E-04	0.1942E-04	0.1633E-04
FAULT 9 E(NO/YR)	0.5778E-04	0.4636E-04	0.3742E-04	0.3037E-04	0.2479E-04	0.2033E-04	0.1676E-04	0.1388E-04	0.1154E-04	0.9643E-05
FAULT 10 E(NO/YR)	0.6346E-04	0.4991E-04	0.3955E-04	0.3157E-04	0.2537E-04	0.2051E-04	0.1668E-04	0.1364E-04	0.1121E-04	0.9262E-05
TOTAL E(NO/YR)	0.1012E-02	0.8490E-03	0.7164E-03	0.6078E-03	0.5183E-03	0.4441E-03	0.3822E-03	0.3303E-03	0.2865E-03	0.2495E-03
TOTAL RISK	0.1012E-02	0.8486E-03	0.7161E-03	0.6076E-03	0.5182E-03	0.4440E-03	0.3821E-03	0.3302E-03	0.2865E-03	0.2495E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.949	-2.508	-1.724	-1.022	-0.619					
ESTIMATED AMP. (ft/sec):	0.05242	0.08144	0.17842	0.35984	0.53843					

BOORE (1997)Vs= 500 m/s 2.0 S

AMPLITUDES (ft/sec):	0.5000E-01	0.1000E+00	0.1500E+00	0.2000E+00	0.2500E+00	0.3000E+00	0.3500E+00	0.4000E+00	0.4500E+00	0.5000E+00
LN (AMPLITUDE):	-3.00	-2.30	-1.90	-1.61	-1.39	-1.20	-1.05	-0.92	-0.80	-0.69
FAULT 1 E(NO/YR)	0.1638E-03	0.1112E-03	0.8052E-04	0.6139E-04	0.4866E-04	0.3972E-04	0.3315E-04	0.2816E-04	0.2425E-04	0.2112E-04
FAULT 2 E(NO/YR)	0.1218E-02	0.8173E-03	0.5865E-03	0.4438E-03	0.3495E-03	0.2836E-03	0.2354E-03	0.1989E-03	0.1703E-03	0.1474E-03
FAULT 3 E(NO/YR)	0.5246E-04	0.4242E-04	0.3404E-04	0.2745E-04	0.2225E-04	0.1814E-04	0.1486E-04	0.1223E-04	0.1012E-04	0.8421E-05
FAULT 4 E(NO/YR)	0.1235E-02	0.7908E-03	0.5372E-03	0.3825E-03	0.2820E-03	0.2133E-03	0.1646E-03	0.1291E-03	0.1026E-03	0.8246E-04
FAULT 5 E(NO/YR)	0.3163E-02	0.2047E-02	0.1481E-02	0.1157E-02	0.9438E-03	0.7891E-03	0.6694E-03	0.5732E-03	0.4939E-03	0.4277E-03
FAULT 6 E(NO/YR)	0.2251E-02	0.1353E-02	0.9507E-03	0.7207E-03	0.5675E-03	0.4567E-03	0.3727E-03	0.3073E-03	0.2554E-03	0.2137E-03
FAULT 7 E(NO/YR)	0.2152E-02	0.1310E-02	0.9238E-03	0.7056E-03	0.5606E-03	0.4547E-03	0.3732E-03	0.3088E-03	0.2571E-03	0.2152E-03
FAULT 8 E(NO/YR)	0.2059E-02	0.1187E-02	0.8164E-03	0.6040E-03	0.4623E-03	0.3607E-03	0.2852E-03	0.2278E-03	0.1836E-03	0.1490E-03
FAULT 9 E(NO/YR)	0.1279E-02	0.7426E-03	0.5111E-03	0.3796E-03	0.2918E-03	0.2283E-03	0.1808E-03	0.1444E-03	0.1162E-03	0.9409E-04
FAULT 10 E(NO/YR)	0.1896E-02	0.1063E-02	0.7167E-03	0.5171E-03	0.3849E-03	0.2917E-03	0.2242E-03	0.1742E-03	0.1367E-03	0.1082E-03
TOTAL E(NO/YR)	0.1547E-01	0.9464E-02	0.6638E-02	0.4999E-02	0.3913E-02	0.3136E-02	0.2553E-02	0.2104E-02	0.1750E-02	0.1467E-02
TOTAL RISK	0.1535E-01	0.9420E-02	0.6616E-02	0.4987E-02	0.3906E-02	0.3131E-02	0.2550E-02	0.2102E-02	0.1749E-02	0.1466E-02

AMPLITUDES (ft/sec):	0.5500E+00	0.6000E+00	0.6500E+00	0.7000E+00	0.7500E+00	0.8000E+00	0.8500E+00	0.9000E+00	0.9500E+00	0.1000E+01
LN (AMPLITUDE):	-0.60	-0.51	-0.43	-0.36	-0.29	-0.22	-0.16	-0.11	-0.05	0.00
FAULT 1 E(NO/YR)	0.1855E-04	0.1641E-04	0.1461E-04	0.1308E-04	0.1175E-04	0.1060E-04	0.9596E-05	0.8711E-05	0.7929E-05	0.7233E-05
FAULT 2 E(NO/YR)	0.1287E-03	0.1132E-03	0.1002E-03	0.8913E-04	0.7962E-04	0.7140E-04	0.6424E-04	0.5797E-04	0.5245E-04	0.4758E-04
FAULT 3 E(NO/YR)	0.7037E-05	0.5908E-05	0.4983E-05	0.4220E-05	0.3588E-05	0.3063E-05	0.2624E-05	0.2256E-05	0.1946E-05	0.1684E-05
FAULT 4 E(NO/YR)	0.6691E-04	0.5475E-04	0.4514E-04	0.3746E-04	0.3129E-04	0.2627E-04	0.2218E-04	0.1881E-04	0.1602E-04	0.1371E-04
FAULT 5 E(NO/YR)	0.3718E-03	0.3243E-03	0.2836E-03	0.2488E-03	0.2188E-03	0.1928E-03	0.1703E-03	0.1508E-03	0.1338E-03	0.1189E-03
FAULT 6 E(NO/YR)	0.1799E-03	0.1522E-03	0.1294E-03	0.1105E-03	0.9472E-04	0.8152E-04	0.7041E-04	0.6102E-04	0.5306E-04	0.4627E-04
FAULT 7 E(NO/YR)	0.1809E-03	0.1527E-03	0.1295E-03	0.1102E-03	0.9407E-04	0.8061E-04	0.6929E-04	0.5975E-04	0.5168E-04	0.4483E-04
FAULT 8 E(NO/YR)	0.1218E-03	0.1002E-03	0.8293E-04	0.6899E-04	0.5769E-04	0.4847E-04	0.4091E-04	0.3467E-04	0.2951E-04	0.2520E-04
FAULT 9 E(NO/YR)	0.7668E-04	0.6285E-04	0.5179E-04	0.4290E-04	0.3571E-04	0.2986E-04	0.2507E-04	0.2114E-04	0.1790E-04	0.1521E-04
FAULT 10 E(NO/YR)	0.8632E-04	0.6941E-04	0.5619E-04	0.4579E-04	0.3753E-04	0.3094E-04	0.2565E-04	0.2136E-04	0.1787E-04	0.1502E-04
TOTAL E(NO/YR)	0.1239E-02	0.1052E-02	0.8984E-03	0.7710E-03	0.6647E-03	0.5755E-03	0.5003E-03	0.4365E-03	0.3822E-03	0.3357E-03
TOTAL RISK	0.1238E-02	0.1051E-02	0.8979E-03	0.7707E-03	0.6645E-03	0.5754E-03	0.5002E-03	0.4364E-03	0.3821E-03	0.3356E-03
SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001054					
ESTIMATED LN AMP. :	-2.855	-2.387	-1.612	-0.917	-0.512					
ESTIMATED AMP. (ft/sec):	0.05756	0.09186	0.19946	0.39958	0.59934					

SECTION 03 30 53 – MISC. CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. Local jurisdictional and agency engineering and public works regulations and standards.

3. American Concrete Institute (ACI) *ACI 301, Specifications for Structural Concrete and ACI 318,* Building Code Requirements for Structural Concrete

1.3 SUMMARY

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Sections:

1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
2. Division 31 Section "Concrete Paving" for concrete pavement and walks.

C. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Action Submittal:

1. Design Mixtures: For each concrete mixture.

1.5 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Comply with the following sections of ACI 301, unless modified by requirements in the Contract Documents:

1. "General Requirements."
2. "Formwork and Formwork Accessories."
3. "Reinforcement and Reinforcement Supports."
4. "Concrete Mixtures."
5. "Handling, Placing, and Constructing."
6. "Lightweight Concrete."

C. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

A. Furnish formwork and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

A. Recycled Content: Provide steel reinforcement with an average recycled content of steel products so that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

C. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.3 CONCRETE MATERIALS

A. Class C per Sections 73 and 90, Caltrans Standard Specifications.

B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type II, low alkali per ASTM C150 and produced within the United States

    a. Fly Ash: ASTM C 618, Class C or F.
    b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregate: ASTM C 33, Table 3, Class 4M.

D. Lightweight Aggregate: ASTM C 330, 1-inch nominal maximum aggregate size.

E. Water-Cement ratio: 0.55 maximum.

F. Synthetic Fiber: fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 RELATED MATERIALS

A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.

B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick; or plastic sheet, ASTM E 1745, Class C.

C. Joint-Filler Strips: ¼ inch thick, premolded joint filler conforming to Caltrans Specifications Section 51-1.12C, “Premolded Expansion Joint Fillers”.

D. CURING MATERIALS

E. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

F. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

G. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

H. Water: Potable.

I. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

J. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.6 CONCRETE MIXTURES: Paving/flatwork/ramps/stairs:

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 3250 psi at 28 days. Strength selected for durability. Concrete is non structural and does not require special inspection.
2. Maximum Water-Cementitious Materials Ratio: 0.55 maximum.
3. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.
6. Cement Content: 560 pounds per cubic yard concrete.

2.7 CONCRETE MIXTURES: Curbing, gutters and related drainage components.:

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 2500 psi at 28 days. Strength selected for durability. Concrete is non structural and does not require special inspection.

2. Slump Limit: 4 inches, plus or minus 1 inch.

3. Cement Content: 520 pounds per cubic yard concrete.

2.8 CONCRETE MIXTURES: Exposed Aggregate Paving/flatwork:

A. Comply with ACI 301 requirements for concrete mixtures.

1. Minimum Compressive Strength: 3000 psi at 28 days. Strength selected for durability. Concrete is non structural and does not require special inspection.

2. Slump Limit: 3 inches, plus or minus 1 inch.

3. Cement Content: 520 pounds per cubic yard concrete.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.

1. Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.

3.4 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation / Expansion Joints : Install joint-filler strips at locations as shown on the drawings, and as follows:

1. Beginning and end of curves in curbs and curbs and gutter assemblies, and at 60 feet on center.

2. At junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, building foundation slabs or footings.

3. At break with vertical plane at top and bottom of ramps.

4. Within 5’ of top of stair and bottom of stair.

5. Joint filler shall be shaped to fit the cross section of the concrete that is being placed.

6. Tool all edges adjacent to expansion material with maximum 1/8 inch radius tool.

7. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.6 CONCRETE PLACEMENT

A. Comply with ACI 301 for placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Do not add water to concrete during delivery, at Project site, or during placement.

D. Consolidate concrete with mechanical vibrating equipment.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

1. Apply to concrete surfaces exposed to public view,.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated:

1. Smooth-rubbed finish.
2. Grout-cleaned finish.
3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than

seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform according to ACI 301.

1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

3.11 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION 03 30 53

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Shop Drawings, Shop/Welder Certifications.

PART 2 - PRODUCTS

2.1 METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Slotted Channel Framing: Cold-formed steel channels complying with MFMA-4, 1-5/8 by 1-5/8 inches by 0.067-inch minimum thickness, hot-dip galvanized after fabrication.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.

2.3 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.

2.4 FABRICATION

A. General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.

B. Welding: Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth, with contour of welded surface matching those adjacent.

C. Comply with AWS for recommended practices in shop brazing. Braze behind finished surfaces without distorting or discoloring exposed side. Clean exposed brazed joints of flux, and dress exposed and contact surfaces.

D. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4-inch- minimum steel plate.

2.5 STEEL AND IRON FINISHES

A. Hot-dip galvanize steel fabrications at exterior locations.

B. Prepare uncoated ferrous metal surfaces to comply with SSPC-SP 3 and paint with a fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

2.6 HANDRAILS AND GUARDRAILS

A. Hot-dip galvanize all handrails and guardrails.

B. Comply with ASTM A384, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies

C. Develop shop drawings and plan the fabrication of the work as required to anticipate the hot-dip galvanizing process, and its possible impacts on the work, including, but not limited to:

1. Place welds near to and symmetrically around the neutral axis - align welds so shrinkage and opposing forces are balanced rather than all pulling in the same direction.

2. Weld the assembly from inside to outside to avoid high shrinking stresses.

3. Avoid the need to force, spring, or restrain components during welding.

4. Avoid over-welding and use as few weld passes as possible.

5. Continuously weld thick sections; however, thin sections may benefit from staggered welding. For staggered welding of 1/8 in or lighter material, weld centers should be closer than 4 in.

6. Steel thicknesses should vary as little as possible throughout the assembly.

7. Consult with the galvanizer to consider length variations of the assembly and plan for thermal expansion conditions. Consult with the galvanizer to coordinate maximum lengths the work may need to be cut into prior to the galvanizing process.

8. Design drainage/venting holes per ASTM A385 and maximize drainage for hollow sections.

9. Arrange products flat and free from external forces during the cool-down phase. Use additional supports underneath the mid-section of products to prevent sagging.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide anchorage devices and fasteners where needed to secure items to in-place construction.

B. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation, with edges and surfaces level, plumb, true, and free of rack.

C. Fit exposed connections accurately together to form hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers.

D. Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

E. Anchor bollards in concrete and fill solidly with concrete, mounding top surface.

END OF SECTION 055000

SECTION 055113 – STAIR NOSING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product data and color samples.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. National Guard Products Inc. Safety Tread Stair Nosing # 3231, 3” wide by ½” tall, continuous hook anchor design.

2.2 PERFORMANCE REQUIREMENTS

A. Coefficient of friction .94 dry, .86 wet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete." Install abrasive nosings with anchors fully embedded in concrete.

END OF SECTION 055113

SECTION 055123 – STAIR TREADS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product data and color samples.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. National Guard Products Inc. Stair Nosing w/ Renovation Tread Model 3511, 1-3/8" x 11". Furnished drilled and countersunk for screws, specify screws and anchors required for mounting to existing concrete stair when ordering.

2.2 PERFORMANCE REQUIREMENTS

A. Coefficient of friction .94 dry, .86 wet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Level worn stairs with quick-setting leveling compound. Apply construction adhesive to the underside of tread. Secure tread in place and allow the adhesive to cure properly before using the stairs.

END OF SECTION 055123

SECTION 05 70 00 SKATE DETERRENT CLEATS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color/finish charts.

PART 2 - PRODUCTS

2.1 Skateboard deterrent cleat.

A. 6061-T6 Aluminum, clear anodized, chamfered profile to match formed concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. (2) offset blind holes for manufacturer’s pins, anchored in impact-resistant two-part epoxy.

B. Set units level and true to line and anchor securely in place.

C. Do not attach at joint lines.

D. Correct deficiencies in or remove and reinstall installations that do not comply with requirements.

END OF SECTION 05700

SECTION 077253 - SNOW GUARDS

PART 1 - SUMMARY

1. Provide a snow retention system on all specified roof locations consisting of cast aluminum pad style snow guards. System shall be adhesively fastened to the roof.
2. Coordinate the work with the installation of the metal roofing system.
3. Provide necessary adhesives sealant compatible with roofing material and intended for outdoor rooftop conditions.

PART 2 - PRODUCTS

1. Ice-Brake brand Cast aluminum snow guards as manufactured by East Coast Roof Specialties, Winsted, CT. telephone 860-379-9072.

2. Model SG2 (small) manufactured from 319 Alloy Aluminum Manufacturer's standard noncorrosive metal.
3. Finish: Powder coat
4. Color: Blue, as selected by architect from manufacturer’s powder coated stock colors.

SUBMITTAL

A. Submit manufacturer’s specification, cut sheets and installation instructions.

PART 3 – INSTALLATION

A. Engage the services of an installer experienced in the installation of metal roofing and snow retention systems.

B. Comply with architectural drawings for locations of snow guards.

C. Spacing and layout shall take into consideration roof-pitch and snow-load criteria in the project’s geographical location.

D. Snow guard locations shall be in accordance with manufacturer’s recommendations. A minimum of two rows, spaced as recommended by manufacturer shall be installed.

E. Adhesive: DuraSil by Chemlink, compatible with roofing material

F. Roof surface shall be properly cleaned prior to application of adhesives.

G. Weather and temperature shall be taken into account when installing adhesives to ensure proper set-up of adhesive compounds.

END OF SECTION 077253

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color Samples.

B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.

2.2 MISCELLANEOUS MATERIALS

A. Provide sealant backings of materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

D. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 1193.

B. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

END OF SECTION 079200

SECTION 08 7100 DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following, but is not necessarily limited to:

1. Door Hardware.
2. Gate Hardware.
3. Thresholds, gasketing and weather-stripping.

1.03 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)

A. 2016 California Building Code, CCR, Title 24.

B. BHMA – Builders' Hardware Manufacturers Association

C. DHI – Door and Hardware Institute

D. NFPA - National Fire Protection Association.

1. NFPA 80 - Fire Doors and Other Opening Protectives
2. NFPA 105 - Smoke and Draft Control Door Assemblies

E. UL - Underwriters Laboratories.

1. UL 10C - Fire Tests of Door Assemblies
2. UL 305 - Panic Hardware

F. WHI - Warnock Hersey Incorporated

G. SDI - Steel Door Institute

1.04 SUBMITTALS & SUBSTITUTIONS

A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.

B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Submit six (6) copies of schedule organized vertically into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:

1. Include a Cover Sheet with;
   a. Job Name, location, telephone number.
   b. Architects name, location and telephone number.
   c. Contractors name, location, telephone number and job number.
   d. Suppliers name, location, telephone number and job number.
   e. Hardware consultant's name, location and telephone number.

2. Job Index information included;
   a. Numerical door number index including; door number, hardware heading number and page number.
   b. Manufacturers' names and abbreviations for all materials.
   c. Explanation of abbreviations, symbols, and codes used in the schedule.
   d. Mounting locations for hardware.
   e. Clarification statements or questions.
   f. Catalog cuts and manufacturer’s technical data and instructions.

3. Vertical schedule format sample:

Heading Number 1 (Hardware group or set number – HW -1)						
			(a) 1 Single Door #1 - Exterior from Corridor 101		(b) 90°	(c) RH
				(d) 3' 0"x7' 0" x 1-3/4" x (e) 20 Minute (f) WD x HM		
(g) 1	(h)	(i) ea		(j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) ½ TMS	(m) 626	(n) IVE
2	6AA	1 ea		Lockset - ND50PD x RHO x RH x 10-025 x JTMS	626	SCH

(a) - Single or pair with opening number and location. (b) - Degree of opening (c) - Hand of door(s) (d) - Door and frame dimensions and door thickness. (e) - Label requirements if any. (f) - Door by frame material. (g) - (Optional) Hardware item line #. (h) - Keyset Symbol. (i) - Quantity. (j) - Product description. (k) - Product Number. (l) - Fastenings and other pertinent information. (m) - Hardware finish codes per ANSI A156.18. (n) - Manufacture abbreviation.

D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.

E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

F. Furnish as-built/as-installed schedule with close-out documents, manufacturers’ installation and adjustment and maintenance information.

1.05 QUALITY ASSURANCE

A. Obtain each type of hardware from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Responsible for detailing, scheduling and ordering of finish hardware.
2. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.

C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.

B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.

C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.

D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.

1.07 WARRANTY

A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:

1. Two (2) years.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

1.09 PRE-INSTALLATION CONFERENCE

A. Convene a pre-installation conference at least one week prior to beginning work of this section.

B. Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, Key District Personnel, and Project Inspector.

C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review District's keying standards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Item	Manufacturer	Acceptable Substitutes
Thresholds	Zero	Pemko, National Guard
Seals & Bottoms	Zero	Pemko, National Guard

2.02 MATERIALS

A. Thresholds: As Scheduled and per details.

1. Thresholds shall not exceed ¼” in height vertical or 1/2" in height with a beveled surface of 1:2 maximum slope.
2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 “Thermal and Moisture Protection”.
3. Use ¼” fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5.

2.03 FINISHES

A. To match existing door hardware, unless otherwise noted.

2.04 FASTENERS

A. All exposed fasteners shall have a phillips head.

B. Finish of exposed screws to match surface finish of hardware or other adjacent work.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.

B. Use the templates provided by hardware item manufacturer.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Set thresholds for exterior doors in full bed of butyl-rubber sealant.

E. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.

3.03 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surface soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.04 HARDWARE LOCATIONS

A. Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

3.05 FIELD QUALITY CONTROL

A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

3.06 SCHEDULE

A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.

B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.

C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

Manufacturers Abbreviations (Mfr.)

ZER	=	Zero International	Thresholds, Gasketing & Weather-stripping

END OF SECTION

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Extra Materials: Deliver to Owner 1 gallon of each color and type of finish-coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

A. MPI Standards: Provide materials that comply with MPI standards.

B. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.

C. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Paint exposed surfaces, new and existing, unless otherwise indicated.

1. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

C. Apply paints according to manufacturer's written instructions.

1. Use brushes only where the use of other applicators is not practical.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

END OF SECTION 099113

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and Samples.

PART 2 - PRODUCTS

2.1 SIGNS, GENERAL

A. Regulatory Requirements: Comply with applicable provisions in the California Building Code.

B. All signage must be field inspected after installation (2016 CBC 11b-703.1.1.2).

2.2 PANEL SIGNS

A. Interior Panel Signs: Matte-finished opaque acrylic with adhesively applied vinyl film copy with square-cut edges and rounded corners.

1. Finishes and Colors: As selected from manufacturer's full range.
2. Tactile Characters: Characters and Grade 2 Braille with contrasting colors.

2.3 MATERIALS

A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

B. Plastic Laminate: High-pressure laminate engraving stock with face and core in contrasting colors.

C. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils with pressure-sensitive adhesive backing, suitable for exterior applications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs where indicated or directed by Architect. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

B. Wall-Mounted Signs:

1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes.

END OF SECTION 101400

SECTION 129300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color sample.

PART 2 - PRODUCTS

2.1 SITE FURNISHINGS

A. Seating Manufacturer: Tree Top Products, 222 State Street, Batavia IL 60510 1-866-511-5642, info@treetopproducts.com treetopproducts.com

1. Models: “The City” Series surface-mounted plastic-coated steel benches, # 2CI2630 (8’ length) and # 2CI2639 (10’ length).

2.2 INSTALLATION

A. General: Anchor site furnishings securely, positioned at locations and elevations indicated.

END OF SECTION 129300

SECTION 22 1113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water service, fire-service mains and combined water service and fire-service mains.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

C. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

4. Conform to applicable regulations of the California Plumbing Code for installation of water, sanitary sewer and gas systems.

1.4 DEFINITIONS

A. EPDM: Ethylene propylene diene terpolymer rubber.

B. LLDPE: Linear, low-density polyethylene plastic.

C. PA: Polyamide (nylon) plastic.

D. PE: Polyethylene plastic.

E. PP: Polypropylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. RTRF: Reinforced thermosetting resin (fiberglass) fittings.

H. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1. Wiring Diagrams: Power, signal, and control wiring for alarms.

C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Construction Manager and Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Construction Manager's and Owner's written permission.

1.9 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

A. Ductile-Iron Pipe: AWWA C151, with push-on-joint or mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Fittings shall have a pressure class of 250 psi.

3. Pipe and Fittings shall be mortar lined per AWWA C104 and asphalt coated (1 mil thick), or epoxy coated in accordance with AWWA C550.

4. Glands and Gaskets and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

5. Flanged Ductile-Iron Pipe with Ductile: AWWA C115, ductile- or gray-iron threaded flanges.

6. Bolts and Studs: ASTM A307, 60,000 PSI Tensile Strength.

2.2 PE PIPE AND FITTINGS

A. PE, AWWA Pipe: AWWA C901 and be made from compounds having the standard code designation PE 3408 and shall have a pressure rating not less than 200 psig.

1. PE, tubing shall be Eagle 3408, Inerstate PE3408, Performance Pipe 5100 Ultra-Line, Westflex Gold Label 3408, or approved equal.

2. PE, Fittings shall be brass compression type fittings with a pressure rating not less than 200 psig. Stainless steel insert stiffeners from the same manufacturer shall be used at all compression joints.

2.3 PVC PIPE AND FITTINGS

A. PVC, AWWA Pipe: AWWA C900, Class 200, with bell end with gasket, and with spigot end.

1. Comply with UL 1285 for fire-service mains if indicated.

2. PVC Fabricated Fittings: AWWA C900, Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket, ASTM F477 in each bell.

3. Joint Restraint Devices: Unibell B-13, Standard Performance Specification for use with PVC Pipe.

2.4 SPECIAL PIPE FITTINGS

A. Restrained Joints:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. EBAA Iron, Inc. Series 1100HD and Series 1700
      b. U.S. Pipe and Foundry Company, “Field-Lok” gaskets or MF Field Lok restraints.
      c. Wedge-type restrainer glands – Sigma “One-Lok”, EBAA “Megalug” or EBAA “ Megaflange”

2.5 JOINING MATERIALS

A. Refer to Division 22 Section "Common Work Results for Plumbing" for commonly used joining materials.

B. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer as approved by jurisdictional authority, unless otherwise indicated.

2.6 PIPING ACCESSORIES AND SPECIALTIES

A. Refer to project drawings and Utility District Standards for all piping accessories and specialties, including:

   a. Curb ball valves
   b. Corporation ball valves
   c. Couplings
   d. Meters
   e. Meter Boxes
   f. Pipe Supports
   g. Service Saddles
   h. Dielectric Fittings

2.7 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Mueller 2360 Series
      b. Mueller 2361 Series
      c. American Flow Control 500 Series
      d. American Flow Control 2500 Series
      e. No equals or substitutes will be allowed.

   2. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:

      a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.

         1) Standard: AWWA C509.
         2) Minimum Pressure Rating: 250 psig.

3) End Connections: Push on or mechanical joint.
4) Interior Coating: Complying with AWWA C550.
5) Exterior Coating: Exterior surfaces and wet interior surface shall be coated with polymide-cured epoxy per NSF Standard 61 and AWWA C550
6) Disk or body shall be rubber coated.
7) Stem, stem nuts, glands, and bushings shall be of bronze, with O-ring seals.
8) Actuators shall be 2-inch square operating nuts, turning counter-clockwise to open.

2.8 VALVE AND WATER SYSTEM ACCESSORIES AND SPECIALTIES

A. Refer to project drawings and Utility District Standards for all valve accessories and specialties, including:

a. Valve boxes
b. Valve marking stakes
c. Stem Extensions
d. Blowoff Assemblies
e. Air Valve Assemblies
f. Detector Check Valves
g. Corporation Valves
h. Reduced-Pressure-Principle Backflow Preventers
i. Double-Check, Backflow-Prevention Assemblies

2.9 WATER METERS

A. Water meters will be furnished and installed by utility company. The contractor shall be responsible for performing all other work required.

2.10 WATER METER BOXES AND VAULTS

A. Refer to project drawings and Utility District Standards for all water meter box and vault requirements. All meter boxes and vaults shall have metal lids with H-20 loading, marked “WATER”, with bolting mechanisms and shall be furnished with bolts to secure the lid.

2.11 FIRE HYDRANTS

A. Refer to project drawings and Utility District Standards for all specifications for fire hydrants.

B. Dry-Barrel Fire Hydrants:
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
a. Waterous Pacer Model No. WB67DDP. No equals or substitutes will be accepted.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

E. Underground water-service piping 3” and smaller shall be the following:
   1. PE, AWWA C901 pipe; with brass compression type fittings.

F. Underground Fire-Service-Main Piping and Water-Main Piping 4 inch to 12 inch shall be any of the following:

   1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
   2. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 200 fabricated fittings; and gasketed joints.

3.3 PIPING INSTALLATION

A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.

B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

C. All Hot tapping of existing mains shall be performed by the Public Utility District.

D. Direct tapping of water mains shall not be permitted. Double strap service saddles shall be used for all service connections.

E. Comply with NFPA 24 for fire-service-main piping materials and installation.

   1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
   2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.

G. Install PE pipe according to ASTM D 2774 and ASTM F 645.

H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

I. Bury domestic water piping with depth of cover over top at least 30 inches or at minimum depth of cover as shown on plans, whichever is greater. Fire main and fire laterals shall have 30" min. cover in all areas and 36" depth of cover under driveway and pavement areas.

J. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

K. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

L. Sleeves are specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."

M. Mechanical sleeve seals are specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."

N. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

O. See Division 21 Section "Water-Based Fire-Suppression Systems" for fire-suppression-water piping inside the building.

P. See Division 22 Section "Domestic Water Piping" for potable-water piping inside the building.

3.4 JOINT CONSTRUCTION

A. See Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

3.5 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.

E. MSS Valves: Install as component of connected piping system.

F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.6 DETECTOR-CHECK VALVE INSTALLATION

A. Install in heated enclosure aboveground.

B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

C. Support detector check valves, meters, shutoff valves, and piping as required by Water District.

3.7 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.8 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C 891.

3.9 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. AWWA Fire Hydrants: Comply with AWWA M17.

C. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.10 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. See Division 22 Section "Common Work Results for Plumbing" for piping connections to valves and equipment.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.11 FIELD QUALITY CONTROL

A. Contractor shall submit to the Water District a written Testing and Disinfection plan that addressed the proposed steps and procedures to be utilitized. The plan shall be submitted a minimum of five working days prior to commencement of the procedures. The plan shall comply with appropriate jurisdictional requirements.

B. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

C. Pressure Testing: Refer Public Utility District Standards.

D. Flushing and Disinfection: Refer to Public Utility District Standards.

E. Hydrostatic Tests: Refer to Public Utility District Standards.

F. Prepare reports of testing activities.

3.12 IDENTIFICATION

A. Install continuous underground, detectable warning tape during backfilling of trench for underground water-distribution piping. Locate as shown on the drawings.

END OF SECTION 22 11 13

SECTION 22 1313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.
6. Encasement for piping.
7. Manholes.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Expansion joints and deflection fittings.
2. Backwater valves.

B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

C. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

D. Field quality-control reports.

1.4 REFERENCES

A. Organization and Trade Standards
1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

4. Conform to applicable regulations of the California Plumbing Code, Part for installation of water, sanitary sewer and gas systems.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 GRAVITY SEWER PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:

1. Pipe and Fittings: PVC SDR-35 shall conform to ASTM D 3034 for diameters from 4” to 15” and ASTM F 679 for 18” to 24”, with integral-bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D 3212.

B. PVC Pressure Piping (used for deep pipe):

1. Pipe and Fittings: PVC C900 and C905 shall conform to AWWA C900 and C905. Pipe shall be supplied with integral-bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D 3139.

C. Ductile Iron Pipe

1. Ductile Iron Pipe shall conform to and meet the requirements of ANSI/AWWA C151/A21.51. It shall be the thickness class required for supporting the imposed loads and shall be CL 51 or greater. Joints shall conform to ANSI/AWWA C111/ A21.11.

2.2 NONPRESSURE-TYPE TRANSITION COUPLINGS

A. Push-on gasket joints and fittings may be used except where otherwise required by THE PUBLIC UTILITY DISTRICT

B. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

C. Sleeve Material shall be approved by TDD prior to installation, and as follows:

1. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

D. Unshielded, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Bond Seal
b. Fernco Inc.
c. Indiana Seal
d. or approved equal.

3. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

E. Shielded, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Bond Seal
b. Fernco Inc.
c. Indiana Seal
d. or approved equal.

3. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

F. Ring-Type, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. Bond Seal
   b. Fernco Inc.
   c. Indiana Seal
   d. or approved equal.

3. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

G. Nonpressure-Type, Rigid Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   a. Romac
   b. Bond Seal Anti Shear
   c. Fernoc Anti Shear
   d. Indiana Seal Anti Shear
   e. Or approved equal

3. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.3 PRESSURE-TYPE PIPE COUPLINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cascade Waterworks Mfg.
2. Dresser, Inc.
3. Ford Meter Box Company, Inc. (The); Pipe Products Div.
4. JCM Industries, Inc.
5. Romac Industries, Inc.
6. Smith-Blair, Inc.; a Sensus company.
7. Victaulic Depend-O-Lok, Inc.
8. Viking Johnson..

C. Tubular-Sleeve Couplings: AWWA C219, with center sleeve, gaskets, end rings, and bolt fasteners.

D. Metal, bolted, sleeve-type, reducing or transition coupling, for joining underground pressure piping. Include 350-psig minimum pressure rating and ends of same sizes as piping to be joined.

E. Center-Sleeve Material: Manufacturer's standard.

F. Gasket Material: Natural or synthetic rubber.

G. Metal Component Finish: Corrosion-resistant coating or material.

2.4 EXPANSION JOINTS AND DEFLECTION FITTINGS

A. Ductile-Iron, Flexible Expansion Joints:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. EBAA Iron, Inc.
b. Romac Industries, Inc.
c. Star Pipe Products..

3. Description: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 350-psig minimum working pressure and for offset and expansion indicated.

B. Ductile-Iron Expansion Joints:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Dresser, Inc.
b. EBAA Iron, Inc.
c. JCM Industries, Inc.
d. Smith-Blair, Inc.; a Sensus company.

3. Description: Three-piece assembly of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include rating for 350-psig minimum working pressure and for expansion indicated.

C. Ductile-Iron Deflection Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. EBAA Iron, Inc.

3. Description: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include rating for 350-psig minimum working pressure and for up to 15 degrees of deflection.

2.5 BACKWATER VALVES

A. Cast-Iron Backwater Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Josam Company.
    b. Smith, Jay R. Mfg. Co.
    c. Tyler Pipe.
    d. Watts Water Technologies, Inc.
    e. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

3. Description: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.
4. Horizontal type; with swing check valve and hub-and-spigot ends.
5. Combination horizontal and manual gate-valve type; with swing check valve, integral gate valve, and hub-and-spigot ends.
6. Terminal type; with bronze seat, swing check valve, and hub inlet.

B. PVC Backwater Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Canplas LLC.
    b. IPS Corporation.
    c. NDS.
    d. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
    e. Sioux Chief Manufacturing Company, Inc.
    f. Zurn Light Commercial Products Operation; Zurn Plumbing Products Group.

3. Description: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

2.6 CLEANOUTS

A. Cast-Iron Cleanouts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. J.R. Smith or equal, 4240/37 series with cast iron lid, tractor type, set flush with final surface in landscape areas, ½" below finish surface in asphalt areas. "SEWER" shall be stamped on the lid.

b. Boxes shall be constructed of steel reinforced concrete.

2. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

B. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, of length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: Internal rubber seal shall be installed as specified by THE PUBLIC UTILITY DISTRICT. The internal rubber seal and seal extensions shall be as manufactured by Cretex Specialty Products, or approved equal. The seals and extensions shall have a minimum thickness of 3/16 inches and shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. The bands used form compressing the seal and extension against the manhole shall be fabricated from 16 gauge stainless steel conforming to ASTM A240 type 304, any screws or bolts or nuts used on this band shall be stainless steel conforming to ASTM F593, Type 304.
8. External Manhole/Vault Seals: Exterior manhole walls shall be sealed with a liquid cold-applied waterproofing membrane system such as Sonneborn HLM 5000®, or equivalent. Exterior joints shall be sealed with an elastomeric based external joint wrap such as Henry RUB'R-NEK®, or equivalent.
9. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
10. Steps: Individual FRP steps, FRP ladder, or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
11. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
12. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Designed Precast Concrete Manholes:

1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.

2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
3. Joint Sealant: Internal rubber seal shall be installed as specified by THE PUBLIC UTILITY DISTRICT. The internal rubber seal and seal extensions shall be as manufactured by Cretex Specialty Products, or approved equal. The seals and extensions shall have a minimum thickness of 3/16 inches and shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. The bands used form compressing the seal and extension against the manhole shall be fabricated from 16 gauge stainless steel conforming to ASTM A240 type 304, any screws or bolts or nuts used on this band shall be stainless steel conforming to ASTM F593, Type 304.
4. External Manhole/Vault Seals: Exterior manhole walls shall be sealed with a liquid cold-applied waterproofing membrane system such as Sonneborn HLM 5000®, or equivalent. Exterior joints shall be sealed with an elastomeric based external joint wrap such as Henry RUB'R-NEK®, or equivalent.
5. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
6. Steps: Individual FRP steps, FRP ladder, or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
7. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
8. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

D. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser, with 4-inch- minimum-width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

E. Manhole-Cover Inserts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. FRW Industries; a Syneco Systems, Inc. company.
    b. Knutson Enterprises.
    c. L. F. Manufacturing, Inc.
    d. Parson Environmental Products, Inc.

3. Description; Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.
4. Type: Solid.

2.7 CONCRETE

A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

a. Invert Slope: 2 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 8 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves,

and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 2 percent unless otherwise indicated.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install piping with 30” minimum cover.
4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
5. Install hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
6. Install ductile-iron, gravity sewer piping according to ASTM A 746.
7. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
8. Install PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 1668.
9. Install PVC corrugated sewer piping according to ASTM D 2321 and ASTM F 1668.
10. Install PVC profile sewer piping according to ASTM D 2321 and ASTM F 1668.
11. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
12. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Install force-main, pressure piping according to the following:

1. Install piping with restrained joints at tee fittings and at horizontal and vertical changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
2. Install piping with 30” minimum cover.
3. Install ductile-iron pressure piping according to AWWA C600 or AWWA M41.
4. Install ductile-iron special fittings according to AWWA C600.
5. Install PVC pressure piping according to AWWA M23 or to ASTM D 2774 and ASTM F 1668.
6. Install PVC water-service piping according to ASTM D 2774 and ASTM F 1668.

H. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:

1. Hub-and-spigot, cast-iron soil pipe.
2. Hubless cast-iron soil pipe and fittings.
3. Ductile-iron pipe and fittings.
4. Expansion joints and deflection fittings.

I. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
3. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
4. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
5. Join ABS sewer piping according to ASTM D 2321 and ASTM D 2751 for elastomeric-seal joints.
6. Join PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
7. Join PVC corrugated sewer piping according to ASTM D 2321.
8. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
9. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
10. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
11. Join dissimilar pipe materials with nonpressure-type, flexible or rigid couplings.

B. Join force-main, pressure piping according to the following:

1. Join ductile-iron pressure piping according to AWWA C600 or AWWA M41 for push-on joints.
2. Join ductile-iron special fittings according to AWWA C600 or AWWA M41 for push-on joints.
3. Join PVC pressure piping according to AWWA M23 for gasketed joints.
4. Join PVC water-service piping according to ASTM D 2855.
5. Join dissimilar pipe materials with pressure-type couplings.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

    a. Unshielded flexible or rigid couplings for pipes of same or slightly different OD.
    b. Unshielded, increaser/reducer-pattern, flexible or rigid couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

2. Use pressure pipe couplings for force-main joints.

3.4 MANHOLE INSTALLATION

A. General: Install manholes complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Install FRP manholes according to manufacturer's written instructions.

D. Form continuous concrete channels and benches between inlets and outlet.

E. Set tops of frames and covers ½” below finished surface of manholes that occur in pavements. Set tops 6” above finished surface elsewhere unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.6 BACKWATER VALVE INSTALLATION

A. Install horizontal-type backwater valves in piping manholes or pits.

B. Install combination horizontal and manual gate valves in piping and in manholes.

C. Install terminal-type backwater valves on end of piping and in manholes. Secure units to sidewalls.

3.7 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.8 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 22 Section "Sanitary Waste and Vent Piping."

B. Connect force-main piping to building's sanitary force mains specified in Division 22 Section "Sanitary Waste and Vent Piping." Terminate piping where indicated.

C. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
    c. Connection to existing manholes walls shall be made per THE PUBLIC UTILITY DISTRICT requirements.

4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Connect to grease oil and sand interceptors specified in Division 22 Section "Sanitary Waste Interceptors."

3.9 CLOSING ABANDONED SANITARY SEWER SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:

1. Remove manhole and close open ends of remaining piping.
2. Remove top of manhole down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Division 31 Section "Earth Moving."

3.10 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.

1. Use detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.11 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:

    a. Fill sewer piping with water. Test with pressure of at least 8-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
    b. Close openings in system and fill with water.
    c. Purge air and refill with water.
    d. Disconnect water supply.
    e. Test and inspect joints for leaks.
    f. Allowable leakage for mainline shall not exceed 350 gallons per mile per day per inch diameter of pipe. (see THE PUBLIC UTILITY DISTRICT requirements for laterals)

6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Test plastic gravity sewer piping according to THE PUBLIC UTILITY DISTRICT requirements.

7. Mandrel Testing: Test sanitary sewerage according to requirements of authorities having jurisdiction, and the following:

    a. Test plastic gravity sewer piping according to THE PUBLIC UTILITY DISTRICT requirements.

8. Television Tests: Provide Television Testing of each section of sewer pipeline in accordance with THE PUBLIC UTILITY DISTRICT and the requirements of authorities having jurisdiction.

9. Manholes and Grease Interceptors: Test all manholes and grease interceptors for leakage according to requirements of authorities having jurisdiction, and the following:

    a. Water test per THE PUBLIC UTILITY DISTRICT requirements.

    b. Vacuum test per THE PUBLIC UTILITY DISTRICT requirements.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.12 CLEANING

A. Clean dirt and superfluous material from interior of piping.

END OF SECTION 22 13 13

SECTION 260010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Table of Contents, Division 26 - Electrical:

SECTION NO.	SECTION TITLE
260010	BASIC ELECTRICAL REQUIREMENTS
260519	BUILDING WIRE AND CABLE
260526	GROUNDING AND BONDING
260543	UNDERGROUND DUCTS AND STRUCTURES
260553	ELECTRICAL IDENTIFICATION
262413	SWITCHBOARDS
262816	OVERCURRENT PROTECTIVE DEVICES
265600	EXTERIOR LIGHTING

B. Work included: This Section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 01.

1. Quality assurance.
2. Definition of terms.
3. Submittals.
4. Coordination.
5. Record documents.
6. Operation and maintenance manuals.
7. Excavation.
8. Rough-in.
9. Electrical installation.
10. Cutting, patching, painting and sealing.
11. Field quality control.
12. Cleaning.
13. Project closeout.

C. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete and operable installation.

1. General and supplementary conditions: Drawings and general provisions of Contract and Division 01 of the Specifications, apply to all Division 26 Sections.
2. Earthwork: Include trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, in-grade pull boxes, vaults, lighting pole foundations, etc. Refer to Division 31, Earthwork.

3. Concrete Work: Include forming, steel bar reinforcing, cast-in- place concrete, finishing and grouting as required for under ground conduit encasement, light pole foundations, pull box slabs, vaults, housekeeping pads, etc. Refer to Division 03, Concrete.

D. Work furnished and installed under another Division requiring connections under this Division includes but is not limited to:

1. Irrigation controller(s). (Line voltage only)

1.02 QUALITY ASSURANCE

A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:

1. California Electric Code (CEC).
2. California Building Code (CBC).
3. California Fire Code (CFC).
4. California Mechanical Code (CMC).

D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing Materials
CBM	Certified Ballast Manufacturers
ETL	Electrical Testing Laboratories
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IPCEA	Insulated Power Cable Engineer Association
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories

E. All base material shall be ASTM and/or ANSI standards.

F. All electrical apparatus furnished under this Section shall conform to NEMA standards and the NEC and bear the UL label where such label is applicable.

1.03 DEFINITION OF TERMS

A. The following list of terms as used in the Division 26 documents shall be defined as follows:

1. "Provide": Shall mean furnish, install and connect unless otherwise indicated.
2. "Furnish": Shall mean purchase and deliver to Project site.
3. "Install": Shall mean to physically install the items in-place.

4. "Connect": Shall mean make final electrical connections for a complete operating piece of equipment.
5. "As directed": Shall be as directed by the Owner or their authorized Representative.

1.04 SUBMITTALS

A. Format: Furnish submittal data in PDF format for each Specification Section with a table of contents listing materials by Section and paragraph number.

B. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 01.

C. Each submittal shall be labeled with the Specification Section Number and shall be accompanied by a cover letter or shall bear a stamp stating that the submittal has been thoroughly reviewed by the Contractor and is in full compliance with the requirements of the Contract Documents. Cover letters shall list in full the items and data submitted. Failure to comply with this requirement shall constitute grounds for rejection of data.

D. All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments. Resubmittal packages will not be reviewed unless accompanied by this cover letter. Failure to include this cover letter will constitute rejection of the resubmittal package.

E. Substitutions:

1. All requests for substitutions shall conform to the general requirements and procedure outlined in Division 01.
2. Where items are noted as "or equal," a product of equal design, construction and performance will be considered. Contractor must submit to the Engineer all pertinent test data, catalog cuts and product information required substantiating that the product is in fact equal to that specified. Only one substitution will be considered for each product specified.
3. Manufacturers' names and model numbers used in conjunction with materials, processes or equipment included in the Contract Documents are used to establish standards of quality, utility and appearance. Materials, processes or equipment, which in the opinion of the Engineer is equal in quality, utility and appearance, will be approved as substitutions to that specified.
4. Whenever any material, process or equipment is specified in accordance with a Federal specification, an ASTM standard, an ANSI specification, UL rating or other association standard, the Contractor shall present an affidavit from the Manufacturer certifying that the product complies with the particular standard specification. When requested by the Engineer, support test data to substantiate compliance shall be submitted by the Contractor at no additional cost.
5. Substitutions shall be equal, in the opinion of the Architect/Engineer, to the specified product. The burden of proof of such shall rest with the Contractor. When the Architect/Engineer in writing accepts a substitution, it is with the understanding that the Contractor guaranteed the substituted article or material to be equal to the one specified and dimensioned to fit within the construction. Approved substitutions shall not relieve

the Contractor of responsibilities for the proper execution of the Work or from any provisions of the Specifications.

6. The Contractor shall be responsible for all expenses in connection with the substitution materials, processes and equipment, including the effect of the substitution on the Contractor, Subcontractor's or other Contractor's Work. No substitution of material, processes or equipment shall be permitted without written authorization of the Architect/Engineer. Any assumptions on the acceptability of a proposed substitution prior to acceptance by the Engineer are at the sole risk of the Contractor.

1.05 COORDINATION

A. Discrepancies:

1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 01, prior to the Bid Opening to allow the issuance of an Addendum.

2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.

B. Project conditions:

1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities and the conditions in which the Electrical Work will take place. Verify all existing conditions in the field. No allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.

2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.

3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.

C. Preparation:

1. Drawings:

a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.

b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic within the constraints of the symbology applied.

1.06 RECORD DOCUMENTS

A. Provide Project Record Drawings as described herein:

1. Drawings shall fully represent installed conditions including correct conduit and wire sizing as well as routing and revised fixture schedule listing Manufacturers and products actually installed. Contractor shall record all changes in the Work during the course of construction on blue or black line prints. These prints shall be made subject of monthly review by the Owner's Representative to ascertain that they are current. If not current monthly payments may be withheld.

2. Record Drawings shall be the transfer of information on these prints to AutoCad files of the original Drawings by a professional draftsperson. The construction documents will be provided for the Contractor's use in reproducing at their cost.the construction documents via computer aided drafting (CAD) process. A set of CAD files of the electrical documents will be provided to the Contractor in Autocad format.

3. A single set of half size prints of the Record Drawings shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made and the Contractor shall provide the following:

a. One set of full size prints.

b. One set of half size prints.

c. PDF files of Drawings.

1.07 OPERATION AND MAINTENANCE MANUALS

A. Prior to Project closeout furnish to the Owner, six (6) hard back 3-ring binders containing all bulletins, operation and maintenance instructions, part lists, service telephone numbers and other pertinent information as noted in each Section all equipment furnished under Division 26. Binders shall be indexed into Division Sections and labeled for easy reference. Bulletins containing more information than the equipment concerned shall be properly stripped and assembled.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 ROUGH-IN

A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.

B. Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.

C. Refer to equipment specification in Divisions 22 through 33 for rough-in requirements.

3.02 ELECTRICAL INSTALLATION

A. Preparation, sequencing, handling and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:

1. Shop Drawings prepared by Manufacturer.

2. Verify all dimensions by field measurements.

3. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
4. Install systems, materials and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
5. Install systems, materials and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
6. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
7. Coordinate electrical systems, equipment and materials installations with other building components.
8. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
9. Conform to the National Electrical Contractor's Association "Standard of Installation" for general installation practice.

3.03 CUTTING, PATCHING, PAINTING AND SEALING

A. Structural members shall in no case be drilled, bored or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

3.04 FIELD QUALITY CONTROL

A. General testing requirements:

1. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer’s tolerances and is installed in accordance with design Specifications.
2. Tests and inspections shall determine suitability for energization.
3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.

B. Tests: In addition to specific system test described elsewhere, tests shall include:

1. Lighting control circuits: Test lighting circuits for correct operation through their control devices. The new fixtures are connecting to existing control systems, which shall be tested.

C. Testing safety and precautions:

1. Safety practices shall include the following requirements:
   a. Applicable State and Local safety operating procedures.
   b. OSHA.

c. NSC.

d. NFPA 70E.

2. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required ungrounded by test procedure.

D. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.

E. Notify Owner one week in advance of any testing.

F. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.

G. Include all test results in the maintenance manuals.

3.05 CLEANING

A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt and debris.

C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 PROJECT CLOSEOUT

A. Special tools: Provide one of each tool required for proper operation and maintenance of the equipment provided under this Section. All tools shall be delivered to the Owner at the Project completion.

B. Keying: Provide two keys for each lock furnished under this Section and turn over to Owner.

END OF SECTION

SECTION 260519 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Building wire.
2. Wiring connections and terminations.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Federal Specifications (FS):

FS J-C-30A;	Cable and Wire, Electrical (Power, Fixed Installation).
FS W-S-610C;	Splice Conductor.
FS HH-I-595C;	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic.

2. Underwriters Laboratories, Inc. (UL):

UL 44;	Thermoset-Insulated Wires and Cables.
UL 83;	Thermoplastic-Insulated Wires and Cables.
UL 486A & B;	Wire Connectors.
UL 486C;	Splicing Wire Connectors.
UL 486D;	Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
UL 493;	Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
UL 510;	Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
UL 1581;	Reference Standard for Electrical Wires, Cables and Flexible Cords.

3. National Electrical Manufacturer Association (NEMA):

NEMA WC-5;	Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
NEMA WC-7;	Cross-Linked Thermosetting Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

4. Institute of Electrical and Electronic Engineers (IEEE):

IEEE 82; Test Procedure for Impulse Voltage Tests on Insulated Conductors.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.
4. Final test results.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Building wire:
   a. Cerrowire
   b. General Cable
   c. Southwire Company
   d. Stabiloy (aluminum only)
   e. United Wire and Cable
2. Wiring connectors and terminations:
   a. 3M Company.
   b. Ideal.
   c. Blackburn-Holub.
   d. Burndy.
   e. Thomas & Betts Corp.
   f. Beau Barrier.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 BUILDING WIRE

A. Conductor material:

1. ***Provide annealed copper for all wire, conductor and cable, unless otherwise indicated.***
2. Copper wire AWG #8 and larger shall be stranded, unless otherwise indicated.
3. Copper wire AWG #10 and smaller may be solid or stranded as best suited for the installation.

B. Insulation material:

1. All insulated wire, conductor and cable shall be 600 volt rated unless otherwise noted on the Drawings.
2. Thermoplastic-insulated building wire: NEMA WC 5.
3. Rubber-insulated building wire: NEMA WC 3.
4. Copper feeders and branch circuits larger than #6 AWG: Type THW, XHHW or dual rated THHN/THWN.
5. Copper feeders and branch circuits #6 AWG and smaller: Type TW, THW, XHHW or dual rated THHN/THWN.
6. Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

2.03 METAL-CLAD CABLE (MC)

A. MC cable shall not be used on this project

2.04 WIRING CONNECTIONS AND TERMINATIONS

A. Bolted pressure connectors: Provide wide range-taking connectors with cast bronze compression bolts, designed for parallel taps, tees, crosses or end-to-end connections.

B. Electrical spring wire connectors:

1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
2. Self-striping pigtail and tap U-contact connectors shall not be used.

C. Compression type terminating lugs:

1. Provide tin-plated copper high-compression type lugs for installation with hand or hydraulically operated circumference-crimping tools and dies as stipulated by the lug Manufacturer or as indicated on Drawings. Notch or single point type crimping is NOT acceptable.
2. Two hole, long barrel lugs shall be provided for size (4/0) and larger wire where terminated to bus bars. Use minimum of three crimps per lug, on sizes where possible.

D. Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7 mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000 volts suitable for temperatures from minus 18 degrees C to 105 degrees C. Federal Spec. HH-I-595, Scotch 33+ or equal minimum.

E. Insulating resin:

1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.

2. Use resin with a set up time of approximately 30 minutes at 21.1 degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.

F. Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed using tool supplied by Manufacturer of ties.

G. Wire lubricating compound:

1. UL listed for the wire insulation and conduit type and shall not harden or become adhesive.

2. Shall not be used on wire for isolated type electrical power systems.

H. Bolt termination hardware:

1. Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.

2. Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.

3. Flat washers shall be steel or silicon bronze, Type A plain standard wide series, confirming to ANSI B27.2. SAE or narrow series shall not be used.

4. Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.

5. Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following values:

a. 1/4" bolt - 125 amps

b. 5/16" bolt - 175 amps

c. 3/8" bolt - 225 amps

d. 1/2" bolt - 300 amps

e. 5/8" bolt - 375 amps

f. 3/4" bolt - 450 amps

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

A. All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.

B. Feeders and branch circuits in wet locations shall be rated 75 degree C.

C. Feeders and branch circuits in dry locations shall be rated 90 degree C.

D. Minimum conductor size:

1. Provide minimum AWG #12 for all power and lighting branch circuits.

2. Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated.

E. Color coding:

1. For 120/208 volt, 3 phase, 4 wire systems:
   a. Phase A - Black
   b. Phase B - Red
   c. Phase C - Blue
   d. Neutral - White
   e. Ground - Green
2. For 277/480 volt, 3 phase, 4 wire systems:
   a. Phase A - Brown
   b. Phase B - Orange
   c. Phase C - Yellow
   d. Neutral - Gray
   e. Ground - Green
3. Switch leg individually installed shall be the same color as the branch circuit to which they are connected, unless otherwise noted.
4. Travelers for 3-way and 4-way switches shall be a distinct color and pulled with the circuit switch leg or neutral.

3.03 WIRING METHODS

A. Install wires and cables in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Install all single conductors in raceway system, unless otherwise noted.

C. Parallel circuit conductors and terminations shall be equal in length and identical in all ways.

D. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

E. Provide #10 AWG pig tails on all 20A and 30A wiring devices served by #8 AWG conductors and larger.

F. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle with tie wrap each neutral with its associated phase conductor where more than one neutral is present in a conduit.

G. Install cable supports for all vertical feeders in accordance with the NEC Article 300. Provide split wedge type fittings, which firmly clamp each individual cable and tighten due to cable weight.

H. Neatly form, train and tie the cables in individual circuits. For panelboards, cabinets, wireways, switches and equipment assemblies.

I. Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.

J. Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.

3.04 WIRING INSTALLATION IN RACEWAYS

A. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical Work likely to injure conductors has been completed. Pull all conductors into a raceway at the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.

B. Completely mandrel all underground or concrete encased conduits prior to installing conductors.

C. Completely and thoroughly swab raceway system before installing conductors.

D. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than AWG #1.

E. Wire pulling:

1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use rope made of nonmetallic material for pulling feeders.

3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.

4. Pull in together multiple conductors or cables in a single conduit.

F. Install and test all cables in accordance with Manufacturer's instructions and warranty.

3.05 WIRE SPLICES, JOINTS AND TERMINATION

A. Join and terminate wire, conductors and cables in accordance with UL 486A, C, NEC and Manufacturer's instructions.

B. Thoroughly clean wires before installing lugs and connectors.

C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

D. Splices and terminations shall be made mechanically and electrically secure.

E. Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.

F. Terminate wires in Terminal Cabinets, relay and contactor panels, etc. using terminal strip connectors.

G. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.

H. Install cable ties and maintain harnessing.

I. Encapsulate splices in exterior outlets, pullboxes and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.

J. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as the feed conductor. Form conductor prior to cutting and provide at least six (6) inches of tail and neatly packed in box after splice is made up.

K. Branch circuits (#10 AWG and smaller):

1. Connectors: Solderless, screw-on, reusable spring pressure cable type, 600 volt, 105-degree C. with integral insulation, approved for copper conductors.
2. The integral insulator shall have a skirt to completely cover the stripped wires.
3. The number, size and combination of conductors as listed on the Manufacturers packaging shall be strictly complied with.

L. Feeder circuits: (#6 to 750 MCM)

1. Join or tap conductors from #6 AWG to 750 MCM using bolted pressure connectors or insulate mechanical compression (hi-press) taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of the joint.
2. Terminate conductors from size #6 AWG to 750 MCM copper using bolted pressure or mechanical compression lugs in accordance with Manufacturer recommendation or as specified elsewhere.
3. Field installed compression connectors for cable sizes 250 MCM and larger shall have not less than two clamping elements or compression indents per wire.
4. Insulate splices and joints with materials approved for the particular use, location, voltage and temperature. Insulate with not less than that of the conductor level that is being joined.

M. Termination hardware assemblies:

1. AL/CU lugs connected to aluminum plated or copper buss, shall be secured using a steel bolt, flat washer (two per bolt), Belleville washer and nut.
2. Copper lugs connected to copper bus, shall be secured using silicon bronze alloy bolt, flat washer (two per bolt), Belleville washer and nut.
3. The crown of Belleville washers shall be under the nut.
4. Bolt assemblies shall be torque to Manufacturer recommendation. Where manufacture recommendation are not obtainable, the following values shall be used:
    a. 1/4" - 20 bolt at 80-inch pounds torque.
    b. 5/16" - 18 bolt at 180-inch pounds torque.
    c. 3/8" - 16 bolt at 20-foot pounds torque.
    d. 1/2" - 13 bolt at 40-foot pounds torque.
    e. 5/8" - 11 bolt at 55-foot pounds torque.
    f. 3/4" - 10 bolt at 158-foot pounds torque.

3.06 IDENTIFICATION

A. Refer to Section 260553: Electrical Identification for additional requirements.

B. Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.

C. Color code conductors size #8 and larger using specified phase color markers and identification tags.

D. Provide all terminal strips with each individual terminal identified using specified vinyl markers.

E. In manholes, pullboxes and handholes, provide tags of the embossed brass type and also show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.07 FIELD QUALITY CONTROL

A. Prefunctional testing:

1. Visual and mechanical inspection:

a. Compare cable data with Contract Documents.

b. Inspect exposed sections of wires and cables for physical damage and proper connections.

c. Verify tightness of accessible bolted connections with calibrated torque wrench in accordance with Manufacturer's published data.

d. Inspect compression applied connectors for correct cable match and indention.

e. Verify visible cable bend meet or exceed ICEA and Manufacturer's minimum allowable bending radius.

f. If cables are terminated through window type current transformers, make an inspection to verify neutral and ground conductors are correctly placed for operation of protective devices.

g. Ensure wire and cable identification has been installed as specified herein.

2. Electrical testing:

a. Contractor shall perform feeder and branch circuit insulation test after installation and prior to connection to utilization devices such as fixtures, motors or appliances. Testing shall be conducted on all the circuits on this project.

b. Perform insulation-resistance test using megohm meter with applied potential of 1000V DC for a continuous duration of 60 seconds. Test conductors phase-to-phase and phase-to-ground. Conductors shall test free from short-circuit and ground faults.

c. Perform continuity test of all feeder and branch circuits to ensure correct cable connections. Test all neutrals for improper grounds.

d. Contractor shall furnish instruments, materials and labor for these tests.

3. Test values: Investigate resistance values less than 50 megohms.

4. Furnish test results in typewritten report form for review and inclusion in the operation and maintenance manuals.

END OF SECTION

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Power system grounding.
2. Site lighting grounding.
3. Electrical equipment and raceway grounding and bonding.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 467;	Grounding and Bonding Equipment.

2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

IEEE No. 142;	Recommended Practice for Grounding of industrial and Commercial Power Systems.
IEEE No. 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

1.03 SYSTEM DESCRIPTION

A. Except as otherwise indicated, the complete electrical installation including the neutral conductor, metallic conduits and raceways, boxes, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically indicated or specified.

B. Resistance:

1. Resistance from the main switchboard ground bus through the ground electrode to earth shall not exceed 5 OHMS unless otherwise noted.
2. Resistance from the farthest panelboard, switchboard, etc. ground bus through the ground electrode to earth shall not exceed 20 OHMS

1.04 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Ground Rods:

a. Weaver.

b. Erico "Cadweld" Products, Inc.

2. Ground Wells:

a. Christy Concrete Products, Inc.

b. Forni Corp.

3. Ground Bushings, Connectors, Jumpers and Bus:

a. O-Z/Gedney.

b. Thomas & Betts Corp.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GROUND CONDUCTORS

A. Refer to Specification Section 260519: Building Wire and Cable for conductor specifications.

B. General purpose insulated:

1. UL approved and code sized copper conductor, with dual rated THHN/THWN insulation, color identified green.

2. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non-aging, plastic tape in accordance with NEC/CEC.

C. Bonding pigtails: Insulated copper conductor, identified green, sized per code and provide with termination screw or lug. Provide solid conductors for #10 AWG or smaller and stranded conductors for #8 AWG or larger.

2.03 DRIVEN (GROUND) RODS

A. Copper clad steel, minimum 3/4-inch diameter by 8 feet long, unless otherwise noted.

2.04 GROUND WELL BOXES FOR GROUND RODS

A. Precast concrete box nominal 9" throat diameter x 14" deep with light duty concrete cover for non-traffic areas or steel plate for traffic areas. Cover shall be embossed or engraved with "GROUND ROD".

2.05 INSULATED GROUNDING BUSHINGS

A. Plated malleable iron or steel body with 150 degree Centigrade molded plastic insulating throat and lay-in grounding lug.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of grounding system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. Equipment bonding/grounding:

1. Provide a NEC/CEC sized insulated copper ground conductor in all 120VAC through 600 VAC feeder and branch circuit distribution conduits and cables.

B. Site lighting grounding: Bond all metallic light poles and bollards. Provide ground rods where indicated on the Drawings.

END OF SECTION

SECTION 260543 - UNDERGROUND DUCTS AND STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Underground conduits and ducts.
2. Duct banks.
3. Handhole and pullboxes.
4. Vaults
5. Excavation, trenching and backfill.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1. Division 31 - Earthwork: General requirements for Excavation and Backfill and related items for ducts, manholes, pullboxes and handholes.
2. Division 03 - Cast-in-place concrete: Protective envelope for ducts.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Federal Specifications (FS):

FS W-C-1094A;	Conduit and Conduit Fittings Plastic, Rigid.

2. American Concrete Institute (ACI):

ACI 318;	Building Code Requirements for Structural Concrete

3. American Society for Testing And Materials (ASTM):

ASTM C31;	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C39;	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C172;	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C192;	Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231;	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C478;	Specification for Precast Reinforced Concrete Manhole Sections
ASTM C805;	Test Method for Rebound Number of Hardened Concrete

ASTM C857;	Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
ASTM C858;	Specification for Underground Precast Concrete Utility Structures
ASTM C877;	Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections
ASTM C891;	Practice for Installation of Underground Precast Concrete Utility Structures
ASTM C990;	Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1037;	Practice for Inspection of Underground Precast Concrete Utility Structures
ASTM C1064;	Standard Test Method for Temperature of Freshly Mixed Concrete
ASTM C1231;	Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinder
ASTM C1611;	Standard Test Method for Slump Flow of Self-Consolidating Concrete

4. Underwriters Laboratories, Inc. (UL):

UL 651;	Schedule 40 and 80 Rigid PVC Conduit.

5. National Electrical Manufacturer Association (NEMA):

NEMA TC 2;	Electrical Plastic Tubing and Conduit.
NEMA TC 3;	PVC Fittings for use with Rigid PVC Conduit.

1.03 DEFINITIONS

A. Duct: Electrical conduit and other raceway, either metallic or nonmetallic, used underground embedded in earth.

B. Duct bank: Two or more conduits or other raceway installed underground in same trench.

C. Handhole: An underground junction box in a duct or duct bank.

D. Vault: An underground utility structure, large enough for a person to enter, connecting with ducts to afford facilities for installing, operating and maintaining equipment and wiring.

1.04 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.

2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.

3. Submit Manufacturer's installation instructions.

4. Complete bill of material listing all components.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

C. Precast concrete vaults shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete units similar to that indicated in the project specifications or drawings for at least 10 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Underground precast concrete utility structures:
    a. Oldcastle Enclosure Solutions.
    b. Jensen Precast.
2. Conduits, ducts and fittings:
    a. Prime Conduit.
    b. JM Eagle.
    c. Cantex.
    d. Occidental Coating Company (OCAL).

B. Substitution: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 CONDUIT AND DUCT

A. Rigid non-metallic conduit (PVC):

1. Conduit:
    a. Rigid polyvinylchloride, schedule 40 or 80 conforming to NEMA TC2 and UL 651. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.
2. Fittings: Couplings, adaptors, transition fittings, bell ends, etc., shall be molded PVC, slip on and solvent weld type. Schedule 40 or 80 conforming to NEMA TC 3.

B. Duct supports: Rigid PVC spacers selected to provide minimum duct spacing and concrete cover depths, while supporting ducts during concrete pour.

C. Duct sealing compound: Non-hardening, safe for human skin contact, not deleterious to cable insulation, workable at temperatures as low as 35 degree F, withstands temperature of 300 degrees F without slump and adheres to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, cable sheaths and jackets, etc.

2.03 PULLBOXES AND HANDHOLES

A. Construction: High densities precast reinforced concrete box, extension, base and cover. Furnish box with end and side knockouts and non-settling shoulders. Cover shall have tamper-proof hold-down bolts and two lifting eyes.

B. Size: As indicated on the Drawings.

C. Cover markings: Covers shall read "LIGHTING" or "SIGNAL" as appropriate.

D. Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

2.04 VAULTS

A. Precast concrete: Concrete mix and reinforcing placement shall be in accordance with ACI 318. Design tops and wall structures for AASHTO H20 highway loading, with 30 percent loading added for impact. Walls shall withstand all soil pressures, taking into consideration the soil encountered and ground water level present at the Project site. Assume ground water level three feet below ground surface unless a higher water table is indicated in soils report.

B. Construction:

1. Monolithic or modular assembled sections.
2. Assembled sections shall have mating edges with tongue and groove joints. Joints shall firmly interlock adjoining components and provide waterproof junctions. Seal joints watertight using preformed plastic strip conforming to FS SS-S-210.
3. Provide lifting devices cast into units for proper handling of units.
4. Identify all structures with Manufacturer's name embedded in or otherwise permanently attached to an interior wall face.
5. Include concrete knockout panels for conduit entrance and sleeve for ground rod.

C. Size and dimensions: As indicated on Drawings.

D. Accessories:

1. Frames and covers: Cast iron with cast-in legend "ELECTRIC" or "SIGNAL" as appropriate. Machine cover-to-frame bearing surfaces. Doors shall be secured with tamperproof bolts.
2. Sump frame and grate: Comply with FS RR-F-621, Type VII for frame and Type I for cover.
3. Pulling eyes in walls: Eyebolt with reinforcing bar fastening insert. 2-inch diameter eye, 1-inch by 4-inch bolt. Working load embedded in 6-inch, 4000-PSI concrete: 13,000 pounds minimum tension.
4. Pulling and lifting irons in floor: 7/8-inch diameter, hot-dipped galvanized, bent steel rod, stress relieved after forming and fastened to reinforced rod. Exposed triangular opening. Ultimate yield strength: 40,000 pounds shear and 60,000 pounds tension.
5. Bolting inserts for cable stanchions: Flared, threaded inserts of non-corrosive, chemical resistant, nonconductive thermoplastic material; 1/2-inch internal diameter by 2-3/4 inch deep, flared to 1-1/4 inch minimum at base. Tested ultimate pull-out strength: 12,000 pounds minimum.
6. Expansion anchors for installation after concrete is cast: Zinc-plated carbon steel wedge type with stainless-steel expander cup 1/2-inch bolt size, 5,300 pound rated pull-out strength and 6800 pound rated shear strength minimum.
7. Cable stanchions: Hot-rolled, hot-dipped, galvanized "T" section steel, 2 - 1/4 inches size, punched with 14 holes on 1-1/2 inch centers for cable arm attachment.
8. Cable arms: 3/16-inch thick hot-rolled, hot-dipped galvanized sheet steel pressed to channel shape, approximately two 12-inches wide by 14-inches long and arranged for secure mounting in horizontal position at any position on cable stanchions.

9. Cable support insulators: High glaze, wet-process porcelain arranged for mounting on cable arms.
10. Ground rods: Solid copper, 3/4-inch diameter by 10-feet length.
11. Ground wire: Stranded bare copper conductor, #6 AWG.

2.05 CONSTRUCTION MATERIALS

A. Mortar: Conform to ASTM C270, Type M, except for quantities less than 2.0 Cu. Ft., where packaged mix complying with ASTM C387, Type M may be used.

B. Concrete: Conform to Division 03: Cast-in-place concrete for concrete and reinforcing.

1. Strength: 3,000-PSI minimum 28-day compressive strength.
2. Aggregate for duct encasement: 3/8-inch maximum size.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of duct and manhole installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 EARTHWORK

A. Excavation and backfill: Conform to Division 31, Earthwork.

B. Excavation for underground electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.

1. Excavate, by hand, areas within drip-line of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

C. Trenching: Excavate trenches for electrical installation as follows:

1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both sides of raceways and equipment.
2. Excavate trenches to depth indicated or required.
3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

D. Backfilling and filling: Provide a minimum of 3” of sand below, on the sides and on the top of the conduits.

3.03 CONDUIT AND DUCT INSTALLATION

A. Install duct lines in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Application:

1. Direct burial ducts: Schedule 40, minimum 24-inches below finished grade.

2. Below roads and paved surfaces:

a. Schedule 80, minimum 36-inches below finished grade.

3. Penetrations of building and equipment slabs: Schedule 80.

C. Slope duct to drain towards handholes and away from building and equipment entrances. Pitch not less than 4-inches per 100-feet. Curved sections in duct lines shall consist of long sweep bends with a minimum radius of 25-feet in the horizontal and vertical directions. The use of manufactured bends is limited to building entrances and equipment stub-ups.

D. Make joints in ducts and fittings watertight according to Manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in the same plane.

E. Terminate duct lines at handholes with end bells spaced 10-inches on center for 5-inch ducts and varied proportionately for other duct sizes. Change from regular spacing to end-bell spacing 10-feet from the end bell without reducing duct line slope and without forming trap in the line.

F. Separation between direct buried duct lines shall be 3-inches minimum for like systems and 6 inches minimum between power and signal ducts.

G. For direct burial installations install continuous warning strip of heavy gage plastic imprinted "electrical ducts below", approximately 12-inch wide at 12-inches above ducts.

H. Mandrel all ducts upon completion of installation and prior to pulling cables.

3.04 HANDHOLE AND PULL BOX INSTALLATION

A. Install handholes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Handholes shall be installed flush with finished grade or surface. Install on a level 6-inch bed of well-tamped gravel or crushed stone.

C. Orientation of handholes shall be coordinated in advance with Landscape Architect and arranged to minimize connecting duct bends and deflections.

3.05 VAULT INSTALLATION

A. Install precast assembly in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Install cast iron frame and cover. Set frames in paved areas and traffic ways flush with finished grade. Set other frames 1-inch above finished grade.

C. Units shall be installed on a level 12-inch bed of well-tamped gravel or crushed stone.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms and insulators, as required for installation and support of cable and conductors and as indicated.

3.06 FIELD QUALITY CONTROL

A. Testing: Demonstrate capability and compliance with requirements upon completion of installation of underground duct and structures.

1. Duct integrity: Rod ducts with a mandrel 1/4-inch smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove the obstructions and retest.

3.07 CLEANING

A. Pull brush through full length of ducts. Use round bristle brush with a diameter 1/2-inch greater than internal diameter of duct.

B. Clean internal surfaces of handholes and vaults. Remove foreign material.

END OF SECTION

SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Electrical equipment nameplates.
2. Panelboard directories.
3. Wire and cable identification.
4. Buried electrical line warnings.
5. Junction box identification.
6. Inscribed device coverplates.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1. Division 09: Painting.

1.2 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein.
2. Schedules for nameplates to be furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Conduit and wire markers:
   a. Thomas & Betts Corp.
   b. Brady.
   c. Griffolyn.
2. Inscription Tape:
   a. Kroy.
   b. Merlin.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 NAMEPLATES

A. Type NP: Engraved, plastic laminated labels, Signs and Instruction Plates. Engrave stock melamine plastic laminate 1/16-inch minimum thickness for signs up to 20 square inches or 8 inches in length; 1/8 inch thick for larger sizes. Engraved nameplates shall have white letters and be punched for mechanical fasteners.

B. Color and letter height as specified in Part 3: Execution.

2.3 PANELBOARD DIRECTORIES (400 AMP OR LESS)

A. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panel door.

B. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left hand side and even numbered circuits down the right hand side. Multi-section panelboards shall have continuous consecutive circuit numbers, i.e. Section 1 (circuit numbers 1-42), Section 2 (circuit numbers 43-84), Section 3 (circuit numbers 85-126).

2.4 WIRE AND TERMINAL MARKERS

A. Provide self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips. Blank markers shall be inscribed using the printer or pen recommended by Manufacturer for this purpose.

2.5 CONDUCTOR PHASE MARKERS

A. Colored vinyl plastic electrical tape, 3/4" wide, for identification of phase conductors. Scotch 35 Brand Tape or equal.

2.6 UNDERGROUND CONDUIT MARKER

A. 6-inch wide, yellow polyethylene tape, with continuous black imprinting reading "Caution - Buried Electric Line Below".

2.7 INSCRIBED DEVICE COVERPLATES

A. Coverplate material shall be as specified in Section 262726: Wiring Devices.

B. Methods of inscription: (Unless otherwise noted)

1. Type-on-tape:

a. Imprinted or thermal transfer characters onto tape lettering system.

b. Tape trimmer.

c. Matte finish spray-on clear coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of identification device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 NAMEPLATES

A. Installation:

1. Degrease and clean surfaces to receive nameplates.

2. Install nameplates parallel to equipment lines.

3. Secure nameplates to equipment fronts using machine screws.

B. Provide type 'NP' color coded nameplates that present, as applicable, the following information:

1. Equipment or device designation:

2. Amperage, KVA or horsepower rating, where applicable.

3. Voltage or signal system name.

4. Source of power or control.

C. Nameplates for power system distribution equipment and devices are to be black.

D. Nameplates for signal systems equipment and devices are to be black except as follows:

1. Fire alarm and life safety - Red.

2. Security/card access/CCTV systems - Green.

3. Clock, intercom, sound, MATV, CATV - Blue.

E. Minimum letter height shall be as follows:

1. For panelboards, etc.: ½ inch letters to identify equipment designation. Use ¼ inch letters to identify voltage, phase, wires, etc.

2. For individual circuit breakers, switches and motor starters in switchboards use 3/8-inch letters to identify equipment designation. Use 1/8-inch letters to identify all other.

3. For individual mounted circuit breakers, disconnect switches, enclosed switches and motor starters use 3/8-inch letters to identify equipment designation. Use 1/8" letters to identify all other.

4. For transformers use 1/2 inch letters to identify equipment designation. Use ¼ inch letters to identify primary and secondary voltages, etc.

5. For equipment cabinets, terminal cabinets, control panels and other cabinet enclosed apparatus use 3/8-inch letters to identify equipment designation.

3.3 PANELBOARD DIRECTORIES (400 AMP OR LESS)

A. Provide typewritten directories arranged in numerical order denoting loads served by room number or area for each circuit.

B. Verify room numbers or area designation with Project Manager.

C. Mount panelboard directories in a minimum 6" x 8" metal frame under clear plastic cover inside every panelboard.

3.4 WIRE AND CABLE IDENTIFICATION

A. Provide wire markers on each conductor in panelboards, pull boxes, outlet and junction boxes and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on equipment Manufacturer's Shop Drawings for control wiring.

B. Provide colored phase markers for conductors as noted in Section 260519: Building Wire and Cable. Apply colored, pressure sensitive plastic tape in half-lapped turns for a distance of 3 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markings by taping.

3.5 UNDERGROUND CONDUIT MARKERS

A. During trench backfilling, for exterior underground power, signal and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

3.6 JUNCTION BOX IDENTIFICATION

A. The cover of junction, pull and connection boxes for both power and signal systems, located above suspended ceilings and below ceilings in non-public areas, shall be clearly marked with a permanent ink felt pen. Identify the circuit(s) (panel designation and circuit numbers) contained in each box, unless otherwise noted or specified.

3.7 INSCRIBED DEVICE COVERPLATE

A. General:

1. Lettering type: Helvetica, 12 point or 1/8" high.
2. Color of characters shall be black.
3. Locate the top of the inscription ½” below the top edge of the coverplate.
4. Inscription shall be centered and square with coverplate.

B. Application:

1. Provide inscribed coverplates for devices as outlined below:
   a. Receptacles.
   b. Multi-ganged (four or more) switch arrangement.
   c. Special purpose switches, i.e. projection screens, shades, exhaust fans, etc.
   d. Telecommunication outlets.
2. Type-on-tape installation:
   a. Tape shall be trimmed to the height of the letters.
   b. Trim tape length to 1/4 inch back from each edge of coverplate.
   c. Contractor hands shall be clean or covered with surgical type glove prior to application of tape. Tape installations with visible fingerprints or smudges will not be acceptable.

END OF SECTION

SECTION 262413 - SWITCHBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Main service switchboard.
2. Distribution switchboards (800 amps and greater).
3. Outdoor enclosure and accessories.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1. Division 03: Cast-in-place concrete. Equipment housekeeping pad.
2. Division 09: Painting. Touch-up of painted surfaces.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Federal Specifications (FS):

FS W-C-375;	Circuit Breakers, Molded Case, Branch Circuit and Service.

2. American National Standards Institute, Inc. (ANSI):

ANSI C12;	Code for Electricity Metering.
ANSI C37.5;	Current and Potential Transformers.
ANSI C39.1;	Electrical Analog Indicating Instruments.
ANSI C57.13;	Requirements for Instrument Transformers.

3. Underwriters Laboratories, Inc. (UL):

UL 486E;	Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
UL 489;	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
UL 869A;	Service Equipment.
UL 891;	Dead-Front Switchboards.

4. National Electrical Manufacturer Association (NEMA):

NEMA AB1;	Molded Case Circuit Breakers.
NEMA PB 2;	Deadfront Distribution Switchboards.
NEMA PB 2.1;	General Instruction for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or less.
NEMA SG5;	Power Switchgear Assemblies.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.

2. Shop Drawings to include:

a. Front, plan and side view elevations with overall dimensions.

b. Conduit entrance locations and requirements.

c. Nameplate legends; size and number of bus bars per phase, neutral and ground.

d. Switchboard instrument details and accessories.

e. Electrical characteristics including voltage, frame size and trip rating and withstand ratings.

3. Outdoor weatherproof equipment enclosure and accessories.

4. Furnish structural calculations for equipment anchorage as described in Section 260010: Basic Electrical Requirements.

5. Submit Manufacturer's installation instructions.

6. Complete Bill of Material listing all components.

7. Final test results.

8. Warranty.

B. Dimensions and configurations of switchboards shall conform to the space allocated on the Drawings. The Contractor shall submit a revised layout if equipment furnished varies in size from that indicated on Drawings for the Engineer's approval.

C. Service entrance switchboard utility metering sections shall be submitted to the local electrical utility company for approval prior to submission to the Engineer. A letter of acceptance from utility company shall be included in submittal package.

1.04 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. A detailed explanation of the operation of the system.

2. Instructions for routine maintenance.

3. Pictorial parts list and part numbers.

4. Pictorial and schematic Electrical Drawings of wiring systems, including operating and safety devices, control panels, instrumentation and annunciators.

5. Telephone numbers for the authorized parts and service distributors.

6. Include all service bulletins and torque Specifications for all terminations.

7. Final testing report.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Switchboard components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner. Components shall be properly packaged in factory-fabricated containers and mounted on shipping skids.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with NEMA PB2.1 and Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

A. Units and components offered under this Section shall be covered by a ***1*** year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.08 EXTRA MATERIAL

A. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. ABB/ General Electric.
2. Eaton.
3. Industrial Electric Mfg.
4. Siemens.
5. Square D.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 SWITCHBOARDS - GENERAL

A. Enclosure:

1. Each switchboard shall consist of a dead front, completely metal enclosed self-supporting structure. Construction shall consist of vertical sections of the universal frame type bolted together and braced with self-tapping bolts. Sides, top and rear shall be covered with captive-bolt fastened steel plates having formed edges all around. Front plates shall be sectionalized and removable. All plates shall be fabricated from 12 gage steel and shall have die-formed edges all around. The switchboard frame shall be suitable for use

as floor sills in indoor installations. Corners shall be reinforced with rigged gussets internal and external to the structural members. .

2. Switchboards shall have depth as required to house all equipment contained within it. Switchboard shall be constructed so that the back and front of all sections align. Construction of the board shall allow maintenance of incoming line terminations, device connections and all bus bolted connections.
3. All devices shall be accessible and removable from the front unless rear access is indicated on the Drawings.
4. Provide necessary hardware to permit locking every overcurrent protective device handle in the "OFF" position.
5. Provide hinged access doors to all termination, meter and relay compartments with knurled and slotted large head captive-bolts. The design shall allow access to compartments without tools and without removing any panels.
6. Furnish cable pull sections or top cable pull boxes where indicated on the Drawings complete with cable tie down supports. Where cable pull section or pull boxes contain utility service cables, provide utility acceptable sealing means.
7. Switchboard shall be suitable for use as service entrance equipment and be labeled in accordance with UL requirements.
8. Utility metering compartment section shall be fabricated to meet all utility company requirements. Where separate vertical section is required for utility metering, match and align with switchboard enclosure.

B. Bus assembly and terminations:

1. The switchboard bussing shall be highly conductive silver-plated copper with sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements.
2. Bus arrangement shall be Phase A-B-C-N left-to-right, top-to-bottom and front-to-rear as viewed from the front. Horizontal and vertical bus ampere rating shall be uniform from end-to-end.
3. All bussing to and from an overcurrent protective device shall be rated to the frame sizing, not the trip rating.
4. Where "SPACE" is indicated in the switchboards, cross connectors and mounting hardware shall be installed to match the frame size ampere rating noted on the Electrical Drawings. All "SPACES" shall be ready for installation of overcurrent protective devices at a future time.
5. Shipping splits and provisions for future bus extension shall be provided with necessary bus splices.
6. Each switchboard shall contain a full length, bottom/front located copper ground bus that is securely connected to each vertical section. Ground bus shall be sized in accordance with UL 891, Table 25.1.
7. Termination lugs: High compression circumference crimped type rated for use with aluminum/copper conductors.
8. Switchboards shall be fully rated for a minimum of 65,000 AIC
9. Neutral bus shall be 100 percent rated unless otherwise indicated on the Drawings.
10. Main service switchboards:

a. Removable neutral link: Provide removable bolted bus section for the purpose of disconnecting the ground circuit conductor from the premises wiring at the supply side of the service in accordance with CEC article 230-75.

b. Main bonding jumper: Connection between the grounded circuit conductor and the equipment ground conductor at the supply side of the service. Size in accordance with CEC table 250-94 or 12-1/2% of the area of the largest phase conductor in accordance with CEC article 250-79(c).

C. Switching and overcurrent protective devices:

1. Refer to Section 262816: Overcurrent Protective Devices.

2. Main overcurrent protective devices(s) shall be fixed mounted molded case breaker with interrupting rating and frame and trip ratings as indicated on Drawings.

3. Feeder overcurrent protective device(s) shall be fixed mounted, molded case breaker with frame and trip rating as indicated on Drawings.

4. Devices interrupting rating shall match that of switchboard for which the device is installed.

5. Devices shall be manually operated unless shunt trip and/or electrically operated devices are indicated on Drawings.

D. Instrumentation and controls:

1. Switchboards shall have a digital meter unit (DMU). DMU shall be Electro Industries Shark 200 (CAT# SHARK200-60-10-V6-D2-RO1S-1NP100S) with communications software or Engineer approved equal. Control power shall be derived internally.

2. Meter potential circuits shall be fused. Potential transformers if required for the monitoring devices shall be provided with fuses in the primary.

3. Meter current circuits shall have shorting terminal blocks between the meter and the current transformers. Current transformers shall be ring type (one per phase) with ratio, thermal, and mechanical ratings coordinated with the application and protection.

4. Instrument transformer accuracy per IEEE C57.13.6:

a. Current transformers must maintain 0.3% accuracy from 5% rated current through rating factor at rated burden.

b. Voltage transformers must maintain 0.15% accuracy from 90%-110% of rated voltage.

5. All internal devices (relays, transformers, etc.) shall be tagged as to rating and function with permanently fastened engraved nameplates.

6. Control and signal circuits: Control devices, i.e.: contactors, relays, time clocks, etc. shall be mounted in a separate compartment that is fully barrier from the overcurrent protective device compartments. Control devices shall be accessible through a separate hinged cover panel.

7. Relays: All relays shall be industrial control grade with a "ON" indicating neon light, hold down springs, minimum of 10 amp rated contacts and a minimum of four form C contacts. Relays used for control power transfer shall have 20 amp rated contacts. Do NOT use paralleled relays for relays with greater than 4 poles; use relays with the required number of poles. This is to prevent the situation where one relay fails and half of the intended function is lost; which could be dangerous.

E. Refer to Electrical Drawings for the following:

1. Mounting style; voltage; terminal lug size, location and quantity; bus ampacity; interrupting capacity of bus and overcurrent protective devices, quantity, poles and rating of overcurrent protective devices. Note that the AIC value noted on the Drawings for distribution equipment is the minimum rating of all components; values are in RMS symmetrical amps.

2. If indicated on the Electrical Drawings, provide contactors, relays, time clocks, etc. mounted within switchboard.

F. Miscellaneous requirements:

1. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left hand side and even numbered circuits down the right hand side.

2. Nameplates: Engraved nameplates shall be provided for each device and all "SPACES" located in the switchboard. An engraved nameplate shall also be provided indicating the switchboard designation. See Section 260553: Electrical Identification for requirements.

3. All control wires shall be labeled with wire markers and referenced to the control wiring diagrams. Provide colored wires with colored stripes to facilitate trouble-shooting and locating both ends of wires. Do not use wires with all the same wire color. Use fork, crimp type terminations on all control wires.

4. Provide a test block and plugs for voltage and current monitoring at each main switch. Provide engraved legend plates to indicate function of each test point.

5. Vertically mounted mains shall have the operating handle in the up position when energized.

G. Weatherproof outdoor enclosure and accessories:

1. Provide a NEMA 3R non-walk-in type weatherproof housing with hinged lockable access doors. Each section shall have a minimum of 13-inch deep vestibule. Provide a latch for each door to ensure adequate closing pressure to seal against harmful weather.

2. The weatherproof housings shall be provided with lifting eyes.

H. Finish:

1. Five step zinc phosphate pre-treatment, one coat of rust inhibiting dichromate primer and one coat of baked-on enamel finish, ANSI 61 (light gray).

2. A seven step spray wash, electroplate primer with final baked-on enamel finish; ANSI 61 (light gray) is an acceptable finish alternative.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of switchboard installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

A. Ensure all conduit stub-ups for bottom entry into switchboard are in place and located as required per Shop Drawings.

B. Embed in concrete two (2) 4-inch minimum channel iron sills, front and back edges of equipment, arranged per Manufacturer's recommendations. Install sills flush in finished surface in contact with equipment mounting frame.

3.03 INSTALLATION

A. Install switchboards in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Handling, storage, installation and energize of switchboards shall be carried out in accordance with latest edition of NEMA Publications PB 2.1.

C. Freestanding switchboards shall be accurately aligned, leveled and bolted in place on full-length channels securely fastened to concrete floor.

D. Switchboards shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.

E. Provide mounting hardware brackets, bus bar drilling and filler pieces for all unused spaces.

F. "Train" interior wiring; bundle and clamp, using specified plastic wire wraps specified under Section 260519: Building Wire and Cable.

G. Replace any panel pieces, doors or trims having dents, bends, warps or poor fit that may impede ready access, security or integrity.

H. Conduits terminating in concentric, eccentric or oversized knockouts at switchboards shall have ground bushings and bonding jumpers installed interconnecting all such conduits and the switchboards.

I. Check and tighten all bolts and connections with a torque wrench using Manufacturer's recommended values.

J. Visually inspect switchboards for rust and corrosion if signs of rust and corrosion are present, board shall be restored to new condition or replaced.

K. In damp and wet locations mount switchboard with a minimum 1 inch of air space between enclosure and the wall or other supporting material.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's field service: Contractor shall arrange and pay for the services of a factory-authorized service representative to supervise the initial start-up, testing and adjustment of the switchboard.

B. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements. Testing Agencies objectives shall be to:

1. Assure switchboard installation conforms to specified requirements and operates within specified tolerances.

2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.

3. Prepare final test report including results, observations, failures, adjustments and remedies.

4. Apply label on switchboard upon satisfactory completion of tests and results.

5. Verify ratings and settings and make final adjustments.

C. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.

D. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.

E. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.

F. Prefunctional testing:

1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.

2. Visual and mechanical inspection:

a. Compare nameplate information and connections to Contract Documents.

b. Inspect for physical damage, defects alignment and fit.

c. Verify appropriate anchorage, required clearances and correct alignment.

d. Inspect doors, panels and sections for paint, dents, scratches, fit and missing hardware

e. Check tightness of all control and power connections.

f. Check that all covers, barriers and doors are secure.

g. Verify correct barrier installation.

h. Verify that relays and overcurrent protective devices meet Drawing, power system study and specified requirements.

i. Perform mechanical operational tests in accordance with Manufacturer's instructions.

j. Exercise active components.

k. Inspect control power and instrument transformers.

l. Inspect insulators for evidence of physical damage or contaminated surfaces.

3. Electrical tests:

a. Perform resistance tests through bus joints with low-resistance ohmmeter. Joints that cannot be directly measured due to permanently installed insulation wrap shall be indirectly measured from closest accessible connection.

b. Perform insulation-resistance tests on each bus section, phase-to-phase and phase-to-ground, at 1000V DC for 60 seconds. Investigate resistance values less than 50 megohms.

c. Perform over-potential test on each bus section, each phase-to-ground with phases not under test grounded, in accordance with Manufacturer’s published data. Test voltage shall be applied for 60 seconds.

d. Perform insulation-resistance tests at 1000V DC for 60 seconds on control wiring. Do not perform this test on wiring connected to solid-state components.

e. Perform current injection tests on the entire current circuit in each section of switchgear.

1) Perform current tests by primary injection, where possible, with magnitudes such that minimum of 1.0 amp flows in secondary circuit.

2) Where primary injection is impractical, utilize secondary injection with minimum current of 1.0 amp.

3) Test current at each device.

f. Perform tests on all instrument transformers in accordance with Manufacturer's written instructions.

g. Determine accuracy of meters and instruments per Manufacturer's instructions.

h. Perform the following tests on control power transformers:

1) Perform insulation-resistance test. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.

2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage. Confirm potential at all devices.

3) Verify correct secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.

i. Potential transformer circuits:

1) Perform insulation-resistance tests. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.

2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage.

3) Verify secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.

j. Ground resistance:

1) Measure system neutral-to-ground insulation-resistance with neutral disconnect link temporarily removed. Replace neutral disconnect link after test.

2) Measure insulation-resistance of control wiring at 1000 VDC for 60 seconds. Refer to Manufacturer's instruction for devices with solid-state components

k. Test overcurrent protection devices per Section 262816: Overcurrent Protective Devices.

4. Test values:

a. Bolt torque levels shall be in accordance with Manufacturer's requirements.

b. Compare bus connection resistances to values of similar connections.

c. Insulation-resistance values for bus, control wiring and control power transformers shall be in accordance with Manufacturer's published data. Values of insulation resistance less than Manufacturer's minimum levels should be investigated. Over-potential tests should not proceed until insulation-resistance levels are raised above minimum values.

d. Insulation shall withstand the over-potential test voltage applied.

e. Determine contact resistance in microhms. Resistance values shall not exceed high limit of normal range as indicated in Manufacturer's published data.

f. System neutral-to-ground insulation shall be a minimum of one megohm.

G. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation, the Contractor shall bear all costs incurred by the necessity for retesting including test equipment, transportation, subsistence and the Engineer's hourly rate.

H. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

I. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies and remedies. Test report shall be included in the operation and maintenance manuals.

3.05 CLEANING

A. Prior to energizing of switchboard the Contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

B. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of switchboard per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt and debris.

C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 TRAINING

A. Factory authorized service representative shall conduct a 4 hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance and testing of equipment with both classroom training and hands-on instruction.

B. Contractor shall schedule training with a minimum of 7 days advance notice.

END OF SECTION

SECTION 262816 - OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Molded case circuit breakers.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Federal Specification (FS):

FS W-C-375; Circuit Breakers, Molded Case, Branch Circuit and Service.

2. Underwriters Laboratories, Inc. (UL):

UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.

3. National Electrical Manufacturer Association (NEMA):

NEMA AB 1; Molded Case Circuit Breakers.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Describe product operation, equipment and dimensions and indicate features of each component.
3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
4. Provide factory certification of trip characteristics for each type and rating of circuit breaker.
5. Provide current let-through and melting time information for each type and rating of fuses.
6. Confirmation in writing of compliance with Arc Energy Reduction per CEC Article 240.87.
7. Submit Manufacturer's installation instructions.
8. Complete bill of material listing all components.
9. Warranty.

1.04 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. A detailed explanation of the operation of the system.
2. Instructions for routine maintenance.
3. Parts list and part numbers.
4. Telephone numbers for authorized parts and service distributors.
5. Final testing reports.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

A. Units and components offered under this Section shall be covered by a ***1*** year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Circuit breakers:
   a. ABB/ General Electric.
   b. Eaton.
   c. Siemens.
   d. Square D.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 MOLDED CASE CIRCUIT BREAKERS

A. Branch and feeder circuit breakers shall be molded case, bolt on and trip indicating.

B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.

C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings.

D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.

E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.

F. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.

G. All terminals shall be dual rated for aluminum or copper wire.

H. Circuit breakers with frame ratings 100 amp and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100 amps shall be installed in distribution type panels.

I. Circuit breakers with frame ratings above 100 amps through 400 amps shall have solid state electronic trips with true RMS reading through the 13th harmonic with 1% accuracy, interchangeable trip via front accessible current plug, adjustable instantaneous and short time be rated as indicated on Drawings at the voltage indicated.

J. Circuit breakers with frame ratings above 400 amps through 1600 amps shall have microprocessor–based RMS sensing trip units with the following characteristics:

1. Interchangeable current rating plug or an adjustable trip setting to match the trip rating as indicated on Drawings.
2. Adjustable long time pick-up setting. Minimum of five settings from 50% to 100%.
3. Adjustable long-time delay setting. Minimum of three delay bands.
4. Adjustable short time pick-up setting. Minimum of five settings from 200% to 800%.
5. Adjustable short-time delay setting. Minimum of three delay bands with I2t IN and OUT curves.
6. Adjustable instantaneous pick-up setting. Minimum of five settings from 200% to 1000%. Where the instantaneous feature is omitted on the Drawings, the trip unit shall have an instantaneous override feature.
7. Zone selective interlocking (ZSI) for short-time delay and ground-fault delay trip functions, if indicated on the drawings.
8. LED status indication to show “health” of trip unit.
9. Three-phase ammeter, if indicated on the drawings.
10. Trip indication targets on overload, ground fault and short circuit, if indicated on the drawings.

K. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.

L. Spaces in the boards shall be able to accept any combination of 1, 2 or 3 pole circuit breakers as indicated. Provide all necessary bus, device supports and mounting hardware sized for frame, not trip rating.

M. Series rated breakers are not acceptable unless specifically noted on the Drawings.

N. Breaker shall be rated to operate in an ambient temperature of 40 degrees C.

O. For circuit breakers rated or can be adjusted to 1200 amps (or higher), provide zone selective interlocking (ZSI) with downstream protective devices, if indicated on the drawings. If ZSI is not indicated on the drawings, provide a key interlock maintenance mode switch and blue LED indicating lamp in the same section, which shall allow an operator to manually enable temporary protective device maintenance settings to reduce the arc flash energy level. Key shall be held captive when maintenance mode signal is disabled and removable when maintenance mode signal is enabled. Maintenance mode switch positions shall be labeled “Enabled” and “Disabled”. Blue indicating lamp shall be push-to-test type.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of overcurrent protective device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.

C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable CEC and NEMA standards for installation.

D. Circuit breakers serving "Fire Alarm Control Panel(s)" shall be red in color.

3.03 FIELD QUALITY CONTROL

A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:

1. Assure overcurrent protective device installation conforms to specified requirements and operates within specified tolerances.

2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.

3. Prepare final test report including results, observations, failures, adjustments and remedies.

4. Verify ratings and settings and make final adjustments.

B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.

C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.

D. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.

E. Prefunctional testing:

1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.

2. Visual and mechanical inspection:

a. Inspect for physical damage, defects alignment and fit.

b. Perform mechanical operational tests in accordance with Manufacturer's instructions.

c. Compare nameplate information and connections to Contract Documents.

d. Check tightness of all control and power connections.

e. Check that all covers, barriers and doors are secure.

3. Electrical tests:

a. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.

b. Test all circuit breakers with frame size 225 amps and larger in each panelboard, distribution board, switchboard, etc. unless otherwise noted via primary current injection testing. Testing shall verify the following:

1) Determine that circuit breaker will trip under overcurrent conditions, with tripping time in conformance with NEMA AB 1 requirements.

2) Circuit breaker pickup and delay measurements are within the manufacturers published tolerances for long time, short time, instantaneous, and ground fault.

3) For circuit breakers rated or can be adjusted to 1200 amps (or higher), confirm ZSI protection is acceptable or the maintenance mode switch is operational (enabled and disabled) with reduced pickup and delay measurements when enabled.

F. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

G. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies and remedies. Test report shall be included in the operation and maintenance manuals.

3.04 ADJUSTING

A. Adjust circuit breaker trip settings for coordination with other overcurrent protective devices in system.

B. Adjust circuit breaker trip settings for adequate protection from overcurrent and fault currents.

3.05 CLEANING

A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt and debris.

3.06 TRAINING

A. Factory authorized service representative shall conduct a *4* hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance and testing of equipment with both classroom training and hands-on instruction.

B. Contractor shall schedule training with a minimum of *7* days advance notice.

END OF SECTION

SECTION 265600 - EXTERIOR LIGTHING

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
   1. Site lighting fixtures.
   2. Diodes
   3. LED Drivers
   4. Pole standards.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
   1. Division 03: Cast-in-place concrete. Light pole foundations and backboxes.
   2. Division 05: Miscellaneous. Fittings, brackets, backing supports, rods, etc. as required for support and bracing of lighting fixtures.
   3. Division 09: Painting. Field painting of lighting fixtures.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
   1. Underwriters Laboratories, Inc. (UL):
      UL 66; Fixture Wire.
      UL 1598; Luminaires.
      UL 2108; Low Voltage Lighting Systems.
   2. Illumination Engineering Society of North America (IESNA):
      IESNA LM-79-2008; Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products.
      IESNA LM-80-2008; Approved Method for Measuring Lumen Maintenance of LED Light Sources.
   3. Restriction of Hazardous Substances in LED (RoHS):
      EU RoHS; Directive 2002/95/EC Restriction of Hazardous Materials.

1.3 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
   1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
   2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
   3. Independent Testing Laboratories, Inc. or approved equal, photometric test report for each luminaire type and lamp combination listed on the fixture schedule. Test reports shall be

based on Illuminating Engineering Society published test procedures and shall contain candlepower distribution curves in five lateral planes for fixtures with asymmetric distributions and fixture luminance data for vertical angles above 45 degrees from nadir.

4. Shop Drawings:
   a. Where noted in the Fixture Schedule, submit Shop Drawings of special mounting details, including fixture support, attachment methods, etc. Shop Drawings shall include plan and section views indicating all structural members being used for support.
5. Samples of fixture finish where "FINISH AS SELECTED BY THE ARCHITECT" is indicated on the Fixture Schedule. The Engineer or Architect must approve samples in writing prior to ordering. With each submitted sample provide the paint formula used to achieve the color finish.
6. Submit Manufacturer's installation instructions.
7. Complete bill of material listing all lighting fixtures and components.
8. Warranty.

1.4 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
   1. A detailed explanation of the operation of the system.
   2. Instructions for routine maintenance.
   3. Pictorial parts list and part numbers.
   4. Telephone numbers for the authorized parts and service distributors.

1.5 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Lighting fixtures shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to the City.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.7 WARRANTY

A. Units and components offered under this Section shall be covered by a 1 year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the City.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
   1. Lighting fixtures: Refer to Fixture Schedule.
   2. LEDs & LED drivers: As provided by the light fixture manufacturer, and meeting the requirements herein.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 FIXTURES

A. Refer to the fixture schedule on the plans.

B. Standard lumen output shall meet or exceed the State of California Title 24 Energy Code for high efficiency luminaries.

C. Luminaires shall not draw power in the off state. Luminaires with integral occupancy, motion, photo-controls, or individually addressable luminaires with external control and intelligence are exempt from this requirement. The power draw for such luminaires shall not exceed 0.5 watts when in the off state.

D. Luminaire manufacturers shall adhere to device manufacturer guidelines, certification programs, and test procedures for thermal management

E. Luminaires shall be fully accessible from below ceiling plane for changing drivers, power supplies and arrays

F. The finish of all fixtures and trim shall be submitted to and approved by the Architect prior to ordering.

G. All standard fixtures must bear UL label. Attaching of labels after delivery of fixtures is not acceptable.

H. All labels affixed to the fixture shall be in a location not visible from normal viewing angles.

I. Ferrous mounting hardware and accessories shall be finished using either a galvanic or phosphate primer/baked enamel process to prevent corrosion and discoloration of adjacent materials.

J. Fasteners shall be manufactured of galvanized steel.

K. Fixtures shall be free of light leaks and shall be designed to provide sufficient ventilation of lamps and ballasts, including vent holes where required.

L. All sheet metal Work shall be free from tool marks and dents and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. All intersections and joints shall be formed true and of adequate strength and structural rigidity to prevent any distortion after assembly. All surfaces shall be finished so as to eliminate all exposed sharp edges. All mitered corners or joints shall be accurately aligned with abutting intersecting members. Sheet metal Work shall be properly fabricated so that planes will not deform (i.e. become concave or convex) due to normal expected ambient and operating conditions.

M. Wiring channels and LED mountings shall be rigid and accurately constructed.

2.3 LIGHT EMITTING DIODES (LED):

A. Refer to the Fixture Schedule for size and type of LED lamps required.

B. All diodes shall come from the same manufacturer and carry the same bin number.

C. All diodes shall be tested and tuned for the optimal Kelvin color point.

D. Color correlated temperature: As shown on drawings

E. Minimum CRI (Color Rendering Index): 70

F. Diodes shall have a minimum life of 50,000 hours and maintain at least 70% of initial lamp lumens throughout this period.

G. LED fixture components shall be free of all toxic materials to include lead, cadmium and mercury, and shall be RoHS compliant.

H. Groups of three or more diodes in a single housing shall be tested for even distribution.

I. All LED fixtures shall have an IES formatted electronic photometric report.

J. Comply with IES LM-79-08 Approved Method for measuring lumen maintenance of LED light sources.

K. Comply with IES LM-80-08 Approved Method for electrical and photometric measurement of SSL product.

L. LED arrays shall be sealed, high performance, long life type; minimum 70% rated output at 50,000 hours.

M. LEDs shall be “Bin No. 1” quality.

N. The LED light source shall be fully dimmable with use of compatible dimmers switch designated for low voltage loads.

2.4 LED DRIVERS:

A. LED drivers shall be integral to fixture housing or remotely located, when specified, within 15 feet of diode assembly.

B. Drivers shall have a minimum life of 50,000 hours and maintain at least 70% of initial lamp lumens for that period.

C. Typical LED drivers shall be electronic, 0-10V dimming.

D. Drivers shall be solid state and accept 120 through 277 VAC at 60 Hz input.

E. Power Factor: 0.90 or higher.

F. Maximum driver case temperature not to exceed driver manufacturer recommended insitu operation.

G. Output operating frequency: 60Hz.

H. Interference: EMI and RFI compliant with FCC 47 CFR Part 15.

I. Total Harmonic Distortion Rating: 20% Maximum.

J. Meet electrical and thermal conditions as described in LM-80 Section 5.0. 7.

2.5 POLES

A. Wind-load strength: 80 mph and 1.3 gust factor for total support assembly, including pole, base and anchorage, where used, to carry the fixtures, supports and appurtenances at the indicated heights above grade without deflection or whipping.

B. Arm, bracket and tenon mount materials: Match the poles.

C. Mountings, fastenings and appurtenances: Corrosion-resistant components compatible with the poles and fixtures that will not cause galvanic action at contact points. Provide mountings that will correctly position the luminaire to provide the indicated light distribution.

D. Pole shafts: Provide straight steel poles, round or square as required by the luminaire.

E. Handhole: Provide handhole and cover near base of pole shaft for access to wiring compartment.

F. Grounding lug: Provide grounding lug for grounding conductor with access through handhole.

G. Pole bases: Anchor type with galvanized steel hold-down or anchor bolts, leveling nuts and bolt covers.

H. Steel poles: Steel tubing conforming to ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psi. Poles are 1-piece construction up to 40 feet in length and have access handhole in wall.

I. Pole-top tenons: Fabricated to support the fixture indicated and securely fastened to the pole top.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of site lighting fixture installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 INSTALLATION

A. Install lighting fixtures in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Contractor shall be responsible for all supports, hangers and hardware necessary for a complete installation.

C. Fixtures shall be plumb, level, and square, in straight lines and without distortion. Remedy light leaks that may develop after installation of recessed or enclosed fixtures.

D. Turn over Project with all lamps in new and operating condition. Lamps that are burned less than 100 hours at Project closeout are considered new.

3.3 IDENTIFICATION SYSTEM

A. All junction box coverplates for the lighting branch circuit system shall be clearly marked with permanent black ink felt pen identifying the branch circuit (both panel designation and circuit number) contained in the box.

3.4 INSTALLATION OF POLES

A. General: Store poles on decay-resistant treated skids at least 1 ft. above grade and vegetation. Support pole to prevent distortion and arrange to provide free air circulation.

B. Metal poles: Retain factory-applied pole wrappings until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

C. Pole installation: Use fabric web slings (not chain or cable) to raise and set poles.

3.5 CONCRETE FOUNDATIONS

A. Construct concrete foundations with 3000 pound, 28 day concrete conforming to Division 03, Section "Cast-In-Place Concrete." Comply with details and Manufacturer's recommendations for reinforcing, anchor bolts, nuts and washers.

B. Light pole bases shall have a sloped top for drainage; and, the exposed concrete shall be finished (sacked and patched).

3.6 FIELD QUALITY CONTROL

A. Visual and mechanical inspection:
   1. Inspect for physical damage, defects, alignment and fit.
   2. Perform operational test of each lighting fixture after installed, circuited and energized.
   3. Perform emergency operational test of all lighting fixtures connected to emergency circuiting by interrupting normal power source.

B. Contractor shall replace at no cost to the District all equipment which is found defective or do not operate within factory specified tolerances.

3.7 CLEANING

A. Clean all new lighting fixtures prior to Project closeout in accordance with Manufacturer's recommended materials and methods.

END OF SECTION

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities or abandoning site utilities in place.
7. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Division 01 Section "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion- and sedimentation-control measures.
2. Division 01 Section "Execution" for field engineering and surveying.
3. Division 02 Section "Structure Demolition" for demolition of buildings, structures, and site improvements.
4. Division 02 Section "Selective Structure Demolition" for partial demolition of buildings or structures.

1.3 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

1.4 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.

D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius equal to the diameter of the drip line unless otherwise indicated.

G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.5 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

D. Utility Locator Service: Notify Underground Services Alert (USA) for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches above the ground.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.
2. Owner will arrange to shut off indicated utilities when requested by Contractor.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches to 12 inches as required to remove all organic material in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31 10 00

SECTION 31 2000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Preparing subgrades for walks pavements turf and grasses and plants.
   2. Excavating and backfilling for buildings and structures.
   3. Drainage course for concrete slabs-on-grade.
   4. Subbase course for concrete walks pavements.
   5. Subbase course and base course for asphalt paving.
   6. Subsurface drainage backfill for walls and trenches.
   7. Excavating and backfilling trenches for utilities and pits for buried utility structures.
   8. Excavating well hole to accommodate elevator-cylinder assembly.

B. Related Sections:

   1. Division 01 Section "Construction Progress Documentation" for recording preexcavation and earth moving progress.
   2. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
   3. Division 03 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
   4. Divisions 21, 22, 23, 26, 27, 28, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
   5. Division 31 Section "Site Clearing" for site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.
   6. Division 31 Section "Dewatering" for lowering and disposing of ground water during construction.
   7. Division 31 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
   8. Division 32 Section "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
   9. Division 32 Section "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.
   10. Division 33 Section “Storm Utility Drainage Piping” and "Subdrainage" for installing underground drainage facilities and drainage structures.

C. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Construction Manager. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Site Rock: Solid mineral material with a volume in excess of 1/3 cubic yard capacity that cannot be removed by ripping with a Catapillar D9H or equivalent with a single shank ripping tooth, driven by an experienced operator, without drilling or blasting.

2. Trench Rock: Solid mineral material with a volume in excess of 1/6 cubic yard or solid material that cannot be removed with a Caterpillar 235 or equivalent, driven by an experienced operator, without drilling or blasting

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Geofoam.
4. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Warning Tape: 12 inches long; of each color.

C. Qualification Data: For qualified testing agency.

D. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698.

E. Blasting plan approved by authorities having jurisdiction.

F. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

G. Water Pollution Control Plan (WPCP) in conformance with 2016 California Green Building Standards Code (Nonresidential). WPCP shall be submitted prior to the start of construction. WPCP shall include minimum required Standard Construction Stormwater BMPs as provided in

Table 1-1 of the Caltrans Construction Site Best Management Practices Manual. BMP's shall conform to California Stormwater Quality Association (CASQA) BMP Handbook for Construction or Caltrans Construction Site Best Management Practices Manual.

1.6 QUALITY ASSURANCE

A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:

1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

C. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify "Underground Service Alert" (USA) for area where Project is located before beginning earth moving operations.

D. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Division 01 Section "Temporary Facilities and Controls," Division 31 Section "Site Clearing," are in place.

E. Do not commence earth moving operations until plant-protection measures specified in Division 01 Section "Temporary Tree and Plant Protection" are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Topsoil: Defined as the upper layer of organic soils to be stripped and removed in accordance with Geotechnical recommendations, after completion of clearing operations specified in Section 02230.

C. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

D. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

E. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

F. Base Course: Class 2 Aggregate Base in accordance with Caltrans requirements.

G. Trench Zone (1 foot above pipe to bottom of subgrade) Backfill Materials:
1. Type C - slurry cement backfill per Section 19-3.062, CalTrans Standard Specifications as approved by Owner and geotechnical engineer.
2. Type D - Select Backfill: On Site or imported non-expansive soils complying with Section 19, Caltrans Specification and geotechnical recommendations.
3. Type G – Use for all pipe in existing paved roadways. Pipe backfill from twelve inches above the top of the pipe to the asphalt subgrade shall be Class 2, conforming to Caltrans Specifications and placed at 95 percent relative compaction.

H. Bedding Materials
   1. Type A - Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
   2. Type B - Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; maximum particle size and volume of 1/2 inch and 18 percent respectively, with minimum Sand Equivalent value of 30 per California Test Method 217.
   3. Type E - Concrete Encasement: Class 480-C-2000 per Section 64-106, CalTrans Standard Specifications., as approved by Owner and geotechnical engineer.

I. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

J. Drainage Course: Narrowly graded mixture ofcrushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

L. Sand: ASTM C 33; fine aggregate.

M. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

   1. Survivability: Class 2; AASHTO M 288.
   2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
   3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
   4. Tear Strength: 56 lbf; ASTM D 4533.
   5. Puncture Strength: 56 lbf; ASTM D 4833.
   6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
   7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
   8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

   1. Survivability: Class 2; AASHTO M 288.
   2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
   3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
   4. Tear Strength: 90 lbf; ASTM D 4533.
   5. Puncture Strength: 90 lbf; ASTM D 4833.
   6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.

7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:

1. Portland Cement: ASTM C 150, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch nominal maximum aggregate size.
4. Foaming Agent: ASTM C 869.
5. Water: ASTM C 94/C 94M.
6. Air-Entraining Admixture: ASTM C 260.

B. Produce low-density, controlled low-strength material with the following physical properties:

1. As-Cast Unit Weight: 30 to 36 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
2. Compressive Strength: 80 psi, when tested according to ASTM C 495.

2.4 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

D. Implement Water Pollution Control Plan (WPCP) in conformance with 2016 California Green Building Standards Code (Nonresidential), State Regional Water Quality Control Board (RWQCB) requirements and the current edition of the CASQA California Storm Water Best Management Practice (BMP) Handbook for Construction Activity. Update plan as required. Contractor is required to prevent potential discharges and to reduce water pollution to the maximum extent practicable by implementing best management practices (BMPs). Minimum Required Standard Construction Stormwater BMPs are provided in Table 1-1 of the Caltrans Construction Site Best Management Practices Manual. Contractor shall install, monitor, maintain, or revise the selected BMPs to ensure their effectiveness."

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.

C. Groundwater levels shall be lowered to at least 5-feet below the lowest portion of the excavation; or as directed by Geotechnical Consultant.

D. Groundwater shall be discharged in accordance with the requirements of the Storm Water Pollution Prevention Plan.

E. Keep excavations and site construction area free from water.

F. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

1. Perform blasting without damaging adjacent structures, property, or site improvements.
2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction in accordance with geotechnical recommendations and without exceeding the following dimensions:

    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs-on-grade.
    f. 6 inches beneath pipe in trenches, and the greater of 12 wider than pipe or as required by the applicable utility jurisdiction.

3. Site areas receiving building structures, canopy structures, concrete structures, retaining walls, and structural fills:
    a. Excavate as required to remove existing colluvium/alluvium/uncompacted soils to a depth of 4.5 feet below existing grade or as directed by the Geotechnical Engineer. Excavate a minimum of five feet beyond edge of structure or footing.
    b. Excavate existing soils to a minimum depth of 2.0 feet or as directed by Geotechnical Consultant below existing grade or finished soil grade, whichever is lower.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

B. Excavate existing to a minimum depth of 1.0 feet below existing grade or finished soil grade, whichever is lower or as directed by the Geotechnical Engineer and recompact at 95% relative compaction with suitable material.

C. Excavate a minimum of two feet beyond paving edge.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls to 6 inches each side of pipe or conduit unless otherwise indicated or as required by applicable utility jurisdiction.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

E. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

A. Notify Materials Testing inspector when excavations have reached required subgrade.

B. If Materials Testing inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."

D. Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Place and compact initial backfill of bedding material, in accordance with agency requirements, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

H. Place and compact final backfill of satisfactory soil to final subgrade elevation.

I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

J. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Revise depth of layers in first paragraph below to suit Project.

B. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

C. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

D. Make grade changes gradual, blending slope into level areas. After completion of grading operation, proof roll earthwork areas. Repair low or spongy spots developed during rolling operation.

E. Use equipment and procedures outlined in Section 19, Caltrans Standard Specifications.

F. Place and compact materials in continuous layers not exceeding 6 inches compacted depth using methods which do not disturb or damage foundations, perimeter drainage and waterproofing systems, or utilities in trenches.

G. Rock encountered may be broken into material complying with fill characteristics, at Contractors option. Otherwise remove all rock exceeding specified fill dimensions from site.

H. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
   1. For utility trenches, compact each layer of initial and final backfill soil material at 90 percent relative compaction, when not located within pavement areas.
   2. All backfill supporting pavement or structural foundations shall be compacted to 95 percent relative compaction.
   3. All fill with heights greater than 10’ shall be compacted to 95 percent relative compaction.

3.15 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."

   1. Compact each filter material layer to 90 percent of maximum dry unit weight according to ASTM D 698.

B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

   1. Compact each filter material layer to 90 percent of maximum dry unit weight according to ASTM D 698.
   2. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.16 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course to required crown elevations and cross-slope grades.
4. Place subbase course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.17 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.18 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material and maximum lift thickness comply with requirements.
3. Determine, at the required frequency, that in-place density of compacted fill complies with Geotechnical Engineer recommendations and local agency requirements..

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing

subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
   1. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

   1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. All excess material including oversize rock that cannot be placed onsite shall be off-hauled to a permitted disposal site at the contractors expense.

END OF SECTION 31 20 00

TABLE 1-1

CONSTRUCTION SITE BMPs				
ID	**BMP NAME**	**APPROVED FOR STATEWIDE USE ON ALL PROJECTS [1]**	**APPROVED FOR USE ON A PROJECT-BY-PROJECT BASIS**	**MINIMUM REQUIREMENT**
TEMPORARY SOIL STABILIZATION				
SS-1	Scheduling	X		✓
SS-2	Preservation of Existing Vegetation	X		✓
SS-3	Hydraulic Mulch	X		✓[2]
SS-4	Hydroseeding	X		✓[2]
SS-5	Soil Binders	X		✓[2]
SS-6	Straw Mulch	X		✓[2]
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats	X		✓[2]
SS-8	Wood Mulching	X		
SS-9	Earth Dikes/Drainage Swales & Lined Ditches		X	
SS-10	Outlet Protection/Velocity Dissipation Devices		X	
SS-11	Slope Drains		X	
SS-12	Streambank Stabilization	X		
TEMPORARY SEDIMENT CONTROL				
SC-1	Silt Fence	X		✓[3]
SC-2	Sediment/Desilting Basin		X	
SC-3	Sediment Trap		X	
SC-4	Check Dam		X	
SC-5	Fiber Rolls		X	✓[3]
SC-6	Gravel Bag Berm		X	
SC-7	Street Sweeping and Vacuuming	X		✓
SC-8	Sandbag Barrier		X	
SC-9	Straw Bale Barrier		X	
SC-10	Storm Drain Inlet Protection		X	✓
WIND EROSION CONTROL				
WE-1	Wind Erosion Control	X		✓
TRACKING CONTROL				
TC-1	Stabilized Construction Entrance/Exit		X	
TC-2	Stabilized Construction Roadway		X	
TC-3	Entrance/Outlet Tire Wash		X	

[1] Implementation depends on applicability to a project

[2] The Contractor shall select one of the five measures listed or a combination thereof to achieve and maintain the contract's rainy season disturbed soil area (DSA) requirements

[3] The Contractor shall select one of the two measures listed or a combination thereof to achieve and maintain the contract's rainy season disturbed soil area (DSA) requirements"

TABLE 1-1

CONSTRUCTION SITE BMPs				
ID	**BMP NAME**	**APPROVED FOR STATEWIDE USE ON ALL PROJECTS [1]**	**APPROVED FOR USE ON A PROJECT-BY-PROJECT BASIS**	**MINIMUM REQUIREMENT**
NON-STORM WATER MANAGEMENT				
NS-1	Water Conservation Practices	X		
NS-2	Dewatering Operations	X		
NS-3	Paving and Grinding Operations	X		
NS-4	Temporary Stream Crossing	X		
NS-5	Clear Water Diversion	X		
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting	X		✓
NS-7	Potable Water/Irrigation	X		
NS-8	Vehicle and Equipment Cleaning	X		✓
NS-9	Vehicle and Equipment Fueling	X		✓
NS-10	Vehicle and Equipment Maintenance	X		✓
NS-11	Pile Driving Operations	X		
NS-12	Concrete Curing	X		
NS-13	Material and Equipment Use Over Water	X		
NS-14	Concrete Finishing	X		
NS-15	Structure Demolition/Removal Over or Adjacent to Water	X		
WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL				
WM-1	Material Delivery and Storage	X		✓
WM-2	Material Use	X		✓
WM-3	Stockpile Management	X		✓
WM-4	Spill Prevention and Control	X		✓
WM-5	Solid Waste Management	X		✓
WM-6	Hazardous Waste Management	X		
WM-7	Contaminated Soil Management	X		
WM-8	Concrete Waste Management	X		
WM-9	Sanitary/Septic Waste Management	X		✓
WM-10	Liquid Waste Management	X		

[1] Implementation depends on applicability to a project

[2] The Contractor shall select one of the five measures listed or a combination thereof to achieve and maintain the contract's rainy season disturbed soil area (DSA) requirements

[3] The Contractor shall select one of the two measures listed or a combination thereof to achieve and maintain the contract's rainy season disturbed soil area (DSA) requirements"

SECTION 31 5000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Sections:

1. Division 01 Section "Construction Progress Documentation" for recording preexisting conditions and excavation support and protection system progress.
2. Division 01 Section "Temporary Facilities and Controls" for temporary utilities and support facilities.
3. Division 31 Section "Dewatering" for dewatering system for excavations.

C. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 PERFORMANCE REQUIREMENTS

A. Furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.

1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Monitor vibrations, settlements, and movements.

B. The Contractor is solely responsible for all bracing and shoring. The Contractor shall forward their application for shoring to the California Division of Industrial Safety for their review. Contractor's application shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a Civil Engineer registered in California.

C. If an application for a shoring permit is required, no excavation in trench section or around structures shall proceed until the approved shoring plan has been received by the Engineer.

1.4 SUBMITTALS

A. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

B. Other Informational Submittals:

1. Photographs or Videotape: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.
2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.5 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:

a. Geotechnical report.
b. Existing utilities and subsurface conditions.
c. Proposed excavations.
d. Proposed equipment.
e. Monitoring of excavation support and protection system.
f. Working area location and stability.
g. Coordination with waterproofing.
h. Abandonment or removal of excavation support and protection system.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Construction Manager's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
2. The geotechnical report is included elsewhere in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 GENERAL SHORING REQUIREMENTS

A. Due to granular nature of onsite soil, caving and sloughing of trench sidewalls is expected to occur. In accordance with OSHA requirements, utility trenches in excess of 5 feet in depth that are not properly sloped back shall be shored with bracing equipment and shall be adequately supported in place with walers and braces. Fill voids between sheathing and trench wall with pea gravel.

B. Excavations shall be accomplished between previously placed sheathing and bracing in those areas where sidewall stabilization is required. The required bracing and sheathing will be installed prior to excavating below braced elevation.

C. Material which is salvaged from the trench and stockpiled for later use as backfill, shall be stored a minimum distance of 10 feet, but no less than 3 times the trench depth from the edge of the excavation.

D. Sheathing shall be withdrawn only after backfill above the pipe has proceeded to a height equal to or greater than 3/4 of the excavation depth. Bottom cross bracing and walers may be left in place upon removal of the sheathing. Backfill shall be brought to the level of the cross-braces before these are removed.

E. Install and extract the sheathing in a manner which will not disturb the line, grade, backfill compaction or operation of the utility being installed or adjacent utilities and improvements.

3.3 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.4 TIEBACKS

A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

3.5 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

END OF SECTION 31 50 00

SECTION 32 1216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt paving overlay.
5. Asphalt surface treatments.
6. Pavement-marking paint.
7. Traffic-calming devices.
8. Imprinted asphalt.

B. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

C. Related Sections:

1. Division 02 Section "Structure Demolition" for demolition, removal, and recycling of existing asphalt pavements, and for geotextiles that are not embedded within courses of asphalt paving.
2. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
3. Division 32 Sections for other paving installed as part of crosswalks in asphalt pavement areas.
4. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants and fillers at paving terminations.
5. Division 32 Section "Pavement Marking" for striping and pavement marking.

1.3 DEFINITION

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
2. Job-Mix Designs: For each job mix proposed for the Work.

B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. Samples: For each paving fabric, 12 by 12 inches minimum.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each paving fabric, 12 by 12 inches minimum.
2. Each type and color of preformed traffic-calming device.

E. Qualification Data: For qualified manufacturer and Installer.

F. Material Certificates: For each paving material, from manufacturer.

G. Material Test Reports: For each paving material.

1.5 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

QUALITY ASSURANCE

B. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction..

C. Installer Qualifications: Imprinted-asphalt manufacturer's authorized installer who is trained and approved for installation of imprinted asphalt required for this Project.

D. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

E. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the local agency for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

F. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

    a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
    b. Review condition of subgrade and preparatory work.
    c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
    d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials 55 deg F for water-based materials, and not exceeding 95 deg F.

C. Imprinted Asphalt Paving: Proceed with coating imprinted pavement only when air temperature is at least 50 deg F and rising and will not drop below 50 deg F within 8 hours of coating application. Proceed only if no precipitation is expected within two hours after applying the final layer of coating.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Fine Aggregate: Per Caltrans Standard Specifications, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

C. Aggregate Base: Class 2, 3/4" maximum grading , conforming to Standard Specs. Section 26, placed at 95% relative compaction.

D. RECYCLED MATERIALS FOR USE AS AGGREGATE BASE:
1. Where noted on the plans, recycled materials may be used for aggregate base. Recycled materials shall consist of reclaimed asphalt and existing aggregate base material. Aggregate gradation for reclaimed asphalt must be 2-1/2” minus blended mix of pulverized asphalt and existing base. No SE, R-Value or Durability Index testing will be performed for recycled material. In-place Processing shall consist of self-propelled pulverizing unit that breaks up and crushes the existing asphalt concrete (average depth of 2-2-1/2 in) and underlying granular material (average depth of 2-3-1/2 in) to a total maximum depth of 4-6 in and thoroughly mix the materials, then stockpile and screen material as necessary to reuse. The depth of processing shall be closely monitored to avoid cutting into subbase to avoid contaminating the reclaimed asphalt. All compaction and final thickness criteria pertaining to placement of Base Course shall apply.
2. The upper section of Aggregate Base in all pavement areas shall include 3” min. section of new Class 2 Aggregate Base.

E. Mineral Filler: Per Caltrans Standard Specifications, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Hot Mix Asphalt (HMA) shall conform to Section 39 of the General Specifications and the following: ASPHALT CONCRETE SHALL BE 1/2" MAX. MED. (TYPE B) AGGREGATE, PG 64-16 ASPHALT BINDER IN ACCORDANCE WITH CALTRANS STANDARD SPECS. SECTION 39, 93, AND 94. ASPHALT CONCRETE SHALL BE COMPACTED T0 95% RELATIVE COMPACTION WITH AN AIR VOIDS RATIO OF 3% TO 10%. Unless otherwise requested by the Contractor and approved by the Engineer, HMA shall be placed in accordance with section 39-3 "Method Construction Process" of the Caltrans Standard Specifications. All HMA placed, whether new roadway or overlay, shall be matched to grade with an Aggregate Base shoulder. This shoulder backing shall be a minimum of 1' (one foot) wide or match the project plans, whichever is greater.

B. Prime Coat: Asphalt emulsion prime coat complying with Caltrans requirements.

C. Tack Coat: Per Caltrans Standard Specifications requirements, emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

D. Fog Seal: Per Caltrans Standard Specifications requirements emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

E. Water: Potable.

F. Undersealing Asphalt: ASTM D 3141, pumping consistency.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Sand: Per Caltrans Standard Specifications requirements.

C. Paving Geotextile: AASHTO M 288, nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

D. Joint Sealant: Per Caltrans Standard Specifications requirements, hot-applied, single-component, polymer-modified bituminous sealant.

E. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

F. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length.

2.4 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: Per Caltrans Standard Specifications requirements.
3. Surface Course: Per Caltrans Standard Specifications requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 2 inches.
2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Transport milled hot-mix asphalt to asphalt recycling facility.
7. Keep milled pavement surface free of loose material and dust.

3.3 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.

3. Spread mix at minimum temperature of 250 deg F.
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

D. Provide positive slope toward drainage facilities.

3.7 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints as shown on Drawings or as required by the District.
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927, but not less than 94 percent nor greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 ASPHALT CURB / DIKE

A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at minimum temperature of 250 deg F.

1. Asphalt Mix: Same as pavement surface-course mix.

B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.10 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

C. Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch of height indicated above pavement surface.

D. Positive slope for drainage: Provide minimum slope of 1% toward drainage facilities with no ponding areas. Pavement finish surface shall be flush with drainage inlet frame and grate or adjacent concrete surfaces where surface drainage is being concentrated.

3.11 SURFACE TREATMENTS

A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.

B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.

1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.12 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal..

3.13 WHEEL STOPS

A. Install wheel stops in bed of adhesive as recommended by manufacturer.

B. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

    a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
    b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.15 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION 32 12 16

SECTION 32 1313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Driveways.
2. Roadways.
3. Parking lots.
4. Curbs and gutters.
5. Walks.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete” and “Miscellaneous Cast-in-Place Concrete" for general building applications of concrete.
2. Division 32 Section "Decorative Concrete Paving" for stamped concrete other than detectable warnings.
3. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

C. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.

D. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:

1. Exposed Aggregate: 10-lb Sample of each mix.

E. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

F. Qualification Data: For qualified ready-mix concrete manufacturer.

G. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

H. Material Test Reports: For each of the following:

1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

I. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.

B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

E. ACI Publications: Comply with ACI 301 unless otherwise indicated.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches. Include full-size detectable warning.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:

a. Concrete mixture design.
b. Quality control of concrete materials and concrete paving construction practices.

2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete paving subcontractor.
e. Manufacturer's representative of stamped concrete paving system used for detectable warnings.

1.7 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Recycled Content: Provide steel reinforcement with an average recycled content of steel so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from galvanized-steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.

E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

F. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.

G. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.

H. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.

I. Plain-Steel Wire: ASTM A 82/A 82M, galvanized.

J. Deformed-Steel Wire: ASTM A 496/A 496M.

K. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, deformed.

L. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.

M. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain-steel bars.

N. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

O. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

P. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

Q. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

R. Zinc Repair Material: ASTM A 780.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: Per Caltrans Specifications.

B. Normal-Weight Aggregates: Per Caltrans, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Exposed Aggregate: Per Caltrans Specifications, selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate.

D. Water: Potable and complying with ASTM C 94/C 94M.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS - Per Caltrans Specifications

2.5 RELATED MATERIALS

A. Joint Fillers: Per Caltrans Specifications in preformed strips.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: Per Caltrans Specifications, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirement.

E. Chemical Surface Retarder: Per Caltrans Specifications, water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

2.6 DETECTABLE WARNING MATERIALS

A. Detectable Warning Products: All truncated dome detectable warning products shall comply with Federal Access Board requirements and State of California Building Code, latest edition.

2.7 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Per Caltrans Specifications and Manual for Traffic Control Devices.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 25 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

    a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 SPECIAL FINISHES

A. Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in paving surface as follows:

1. Immediately after float finishing, spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of

the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.

4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

B. Seeded Exposed-Aggregate Finish: Immediately after initial floating, spread a single layer of aggregate uniformly on paving surface. Tamp aggregate into plastic concrete and float finish to entirely embed aggregate with mortar cover of 1/16 inch.

1. Spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.
3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions and as follows:

1. Uniformly spread per Caltrans Specifications of dampened, slip-resistive aggregate over paving surface in two applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over paving surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.
3. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
4. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

3.9 DETECTABLE WARNINGS

A. Blockouts: Form blockouts in concrete for installation of detectable paving units specified in Division 32 Section "Unit Paving".

1. Tolerance for Opening Size: Plus 1/4 inch, no minus.

B. Detectable Warnings: Install detectable warning products as part of a continuous concrete paving placement and according to manufacturer's written instructions.

3.10 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.11 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.12 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal..

3.13 WHEEL STOPS

A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.

B. Securely attach wheel stops to paving with not less than two galvanized-steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd., 5000 sq. ft. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no

compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.15 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 FENCE COMPONENTS

A. Fabric: Hot-dip galvanized steel, 2-inch mesh.
   1. Selvage: Knuckled on both selvages.

B. Posts and Rails: Hot-dip Galvanized-steel pipe complying with ASTM F 1043 requirements for heavy industrial fence.

C. Tension Wire: Hot-dip galvanized steel, ASTM F 1664.

D. Fittings and Accessories: Hot-dip galvanized steel, ASTM F 626, and as follows:

   1. Post and Line Caps: Provide weathertight cap for each post. Provide line post caps with loop to receive tension wire or top rail.
   2. Post Brace Assembly: Same material as top rail with 3/8-inch diameter rod and adjustable tightener.
   3. Bottom and Center Rail: Same material as top rail with cap on each end.

E. Gate Posts, Swing Gates, and Accessories: ASTM F 900, same metal and finish as posts and rails, with Hot-dip galvanized steel hardware and accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fence to comply with ASTM F 567.

B. Setting Posts: Set posts in holes approximately 4 inches above bottom of excavation. Align posts vertically and align tops.

END OF SECTION 323113

SECTION 32 80 00

IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Description of requirements for materials, fabrications and installation of irrigation system and associated accessory items, as indicated on Drawings, and as necessary to complete the installation, operate efficiently and provide full coverage of planted areas.

1.3 RELATED SECTIONS

A. Section 32 90 00: Landscape Planting.

1.4 QUALITY ASSURANCE

A. Firm with a minimum of four years of successful experience in projects of similar scope.

B. Comply with all applicable laws, codes and regulations. In the event of conflict, the most stringent requirement shall govern.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer’s specification, data and installation instructions for review prior to fabrication of work.

B. Instructions to Owner: After system has been completed, instruct Owner's representative in complete operation and maintenance of the system, and furnish Owner with two copies of complete manual of operating instructions and certificates of warranty of irrigation equipment.

C. Record Drawings:

1. During installation of irrigation system, keep daily record drawings of all changes in equipment, pipe, or valve locations. Upon completion of Project, furnish Architect with one set of record drawings on transparent paper of all irrigation plans; and one for owner's records.
2. Show all water lines, valves, controllers and stub-outs. In the event any work is not installed as indicated on the Drawings, such work shall be corrected and dimensioned accurately from the building walls on record drawings.

D. Operating Equipment and Extra Stock:

1. Other Equipment: provide 2 keys per automatic controller; provide 1 swivel hose ell, 1 couple key, and 1 locking key for every 4 quick coupling valves.

1.6 SITE CONDITIONS

A. Contractor to arrange site visit with Owners Representative and Construction Manager to determine existing conditions, including access to site, condition of existing irrigation system to remain, pressure and flow at irrigation point of connection and the nature and extent of existing improvements, nature of materials to be encountered and other factors that may affect Work of this Section.

B. Additional compensation resulting from alleged ignorance of local conditions, and their effect upon the cost of the Work, will not be approved.

1.7 WARRANTY

A. All workmanship and materials herein shall be guaranteed for one year from date of final written acceptance. Contractor is not responsible for vandalism or theft during this period, after final release from maintenance period. Contractor shall maintain system in perfect working order for one year from date of completion by the Contractor, without cost to the Owner.

B. Fill and repair all depressions and replace all necessary planting due to the settlement of irrigation trenches for one year following completion and acceptance of the job.

PART 2 - PRODUCTS

2.1 MATERIALS

C. Main Lines, Laterals and Drip Line: As listed on Drawings

D. Connections between Mains and Electric Control Valves: Schedule 40 PVC (threaded both ends) nipples and fittings.

E. Quick Couplers, Gate Valves, Electric Control Valves, Backflow Preventer and Controller : As listed on Drawings.

F. Control Wire: Copper with UL approval for direct burial, size #14-1, color other than white. Common ground wire shall have white insulating jacket. Splices shall be made using dry splice connectors (i.e. Pentite DS-100 with DS-300 sealant).

G. Boxes for Electric Control Valves: Thermoplastic valve locking access boxes.

H. Drip irrigation equipment as indicated on plans.

I. Miscellaneous Products:
   1. Solvent Cement: Of make and type approved by manufacturer of pipe fittings.
   2. Pipe Joint Compound: Non-hardening, non-toxic materials for use on threaded connections in water carrying pipe.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect site improvements from damage, including curbs and walks. Notify Architect immediately in the event that piping, electrical conduit or other underground utilities not shown on the Drawings are encountered in the excavation. Utilities, conduits, and piping, whether indicated on the Drawings or not, shall be protected to keep them safely in service. Any damage that occurs as a result of Contractor's operations shall be repaired to the satisfaction of Architect hereunder at no additional cost to Owner. Organize location of sleeves with other trades as required.

B. Rough final grades indicated on Drawings shall be achieved prior to commencing work under this Section. Placement of topsoil must be completed as per the EARTHWORK Section. Notify Project Inspector of irregularities if any. At completion of irrigation work, trenches shall be returned to finish grades indicated on Drawings.

C. The Contractor shall take field measurements for this work and be responsible for same. Report any major discrepancy between plan and field dimensions to the Architect.

3.2 INSTALLATION

A. Protect work and materials from damage during construction and storage. Store materials in neat manner.

B. Layout work in accordance with diagrammatic drawings. Contractor shall be liable for full and complete coverage of all irrigated areas to the satisfaction of Architect and shall make any necessary minor adjustments to better suit field conditions at no additional costs to Owner.

C. Run pipe and control wires in common trenches. Snake pipe in trench to allow for expansion and contraction. Make trenches side enough to allow minimum of 6 inches between parallel pipe lines. No stacking of pipe within trench will be allowed.

D. Mainline shall have minimum eighteen (18) inches cover; laterals twelve (12) inches minimum cover.

E. Restore surfaces, existing or newly constructed to original condition. Do not cut sidewalks.

F. Avoid or restore utilities, if damaged, to original condition. It is the Irrigation System Installer's responsibility to locate all utilities prior to proceeding with work.

G. Assemble pipe free of dirt and pipe scale. Coat both male and female ends of pipe and fittings with solvent. Insert seat and end of socket. Hold joints still for thirty (30) seconds and wipe excess solvent from pipe and fittings. Cure joint at least thirty (30) minutes before handling and at least twenty-four (24) hours before allowing water in pipe.

H. Field threading of plastic pipe is not permitted.

I. All threaded joints shall be made up with pipe joint compound applied to male threads only.

J. Thoroughly flush main lines before installing Electric Control Valve as per Drawings. Install in the general location shown and where practical in shrub planter areas. Place no closer than 12 inches to walk edges, building walls or fences.

K. Tie control wire in bundles with pipe wrapping tape at twenty (20) foot intervals and allow slack for contractions. Loop a minimum of two (2) feet of extra wire in each valve box. Connections and sealing shall be with dry splice connectors.

L. Automatic controller shall be wall-mount installation per manufacturer's recommendations. Connect control wires to controller in sequential arrangement.

M. Test lines under full pressure and repair faulty joints with all new materials.

N. Backfilling shall occur only after piping has been inspected and approved by Architect.

1. Backfill with clean native soil free of all material injurious to pipe. Selected fill dirt or sand shall be used if soil conditions are rocky. In rocky areas, the trenching depth shall be two (2) inches below the normal trench depth to allow for this bedding. The fill dirt or sand shall be used in filling four (4) inches above the pipe. Compact to ninety (90) percent of original soil density. Dress off areas to finish grade and remove excess soil.
2. Repair any settlement or adjustments in pipes or valves to proper level or function of system.

O. Tests:

1. Notify Architect three (3) days in advance of testing.
2. Center load pipe with all fittings exposed.
3. Apply the following test after welded plastic pipe joints have cured at least twenty-four (24) hours:
    a. Test main line hydrostatically at full pressure. Visually inspect for leaks and retest after correcting defects. Lines will be approved if test pressure is maintained for 12 hours.

P. Inspection: Irrigation System shall be subject to inspections at any and all times by authorized representatives of Owner.

- END OF SECTION -

- SECTION 32 90 00 -

LANDSCAPE PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Description of requirements for materials, equipment and appliances to complete landscape planting work, as indicated on Drawings, and as necessary to complete the installation. Work includes, but is not limited to, the following:

1. Finish grading.
2. Soil preparation and fertilization.
3. Furnishing and Installation of plants shown on Drawings.
4. Staking and guying of trees as shown on Drawings.
5. Protection, maintenance and warranty as specified.
6. All other work specified in this Section and/or amendments thereto, and all other labor and materials reasonably incidental to satisfactory completion of this Work including clean up of site.

1.3 RELATED SECTIONS

A. Section 32 80 00 - Irrigation System

1.4 QUALITY ASSURANCE

A. Qualifications: Contractor or an experienced foreman shall be present at all times during installation.

B. Verification: The Contractor shall obtain verification from the Project Inspector for the following work, prior to start and/or continuance of work;

1. Demolition and rough grade

2. Irrigation system has been installed for complete coverage as specified in Section 32 80 00 prior to planting.
3. Soil Preparation has been completed and all amendments have been incorporated prior to planting.
4. Maintenance period shall not begin until after a meeting with Landscape Architect, Architect and Owner. Contractor shall request Project Inspector to set up meeting.

1.5 SUBMITTALS

A. Submit under provisions of Submittal Section.

B. List of Materials: Complete list of materials proposed for use on the project.

C. Samples: Submit samples as specified for soil conditioner, decomposed granite and mulch.

D. Soils Tests: Contractor shall arrange and coordinate the taking of six soils tests by a Soils Plant Laboratory retained and paid by the Contractor. Locations and methods shall be as directed by the Architect. No planting shall be started until the Contractor has met recommendations from the Soils Plant Laboratory and verified by the Architect.

1.6 SITE CONDITIONS

A. Contractor to arrange a site visit with Owners Representative and Construction Manager to determine existing conditions, including condition of existing landscape to remain, access to site and the nature and extent of existing improvements upon adjacent public and private property, nature of materials to be encountered and other factors that may affect Work of this Section. Notify Architect in writing of any variations from dimensions or conditions shown, prior to beginning work.

B. Perform planting operations only when weather and soil conditions are suitable in accordance with locally accepted practice. No planting shall take place during extremely hot, dry, windy or freezing weather.

1.7 CERTIFICATION

A. Verification of actual amounts of materials delivered for use on site (copies of shipping receipts) shall be submitted to Architect for the following:
1. Fertilizer.
2. Soil amendments.
3. Bark mulch.
4. All plant materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All materials herein specified and shown on the Drawings shall be of the highest quality available and meet the requirements specified. Architect will accept materials equal in quality upon written approval.

B. Fertilizer:
   1. Osmocote slow release fertilizer (17-7-12) for soil preparation.
   2. Agriform 21 gram tablets (20-10-5) for planting pits.
   3. Best (16-20-0) for lawn areas

C. Soil Amendments:
   1. Well-rotted sawdust, 0.7 percent nitrogen- stabilized.
   2. Oyster Shell Lime
   3. Humate
   4. Dr. Earth Soil Ammendment

D. Mulch: Fir, Pine or redwood untreated bark chips, dark in color, 1/2 inch to 3/4 inch diameter. Submit sample to Architect for approval.

E. Tree Stakes: Copper napthenate treated, 2 inches diameter, lodgepole pine tree stakes, pointed at one end; length as required.

F. Tree Ties: "Cinch Tie" or equal.

G. Plant Materials:
   1. Plant materials shall be supplied in sizes indicated in Plant Schedule. Container stock shall be well established in container and roots shall not have grown beyond limits of the container, nor shall they be root-bound. All plants shall have normal or average branching system and shall be first-class representatives of their species in appearance of healthy, vigorous growth. Plants shall be free of pests, disease and disfiguring injury.
   2. All plant materials delivered to site must conform to specifications of Federal, State and County laws requiring inspection for plant diseases and insect infestations. Inspection certificates required by law must accompany each shipment invoice, and when plant materials arrive at the site.
   3. Plants delivered to site shall be adequately protected from sun and wind during delivery and when stockpiled on site prior to planting. They shall be watered properly to maintain vigorous healthy growth. Any plant material with wilted or burned leaves may be rejected.
   4. Substitutions are not permitted except on proof that plant specified is not available from any known source. No substitutions shall be made without first obtaining Architect's approval. Requests for substitution must be submitted in writing, at least 30 days prior to planting.

5. Architect shall have the right to reject plants during the progress of the work for size, condition of top structures, conditions of root structures, defects or injuries or nonconformity to Specifications. Rejected plants shall be removed immediately from the site.
6. Notify Architect one week prior to anticipated delivery of plant materials, to arrange inspection procedure.

H. Herbicide: Eptam Treflan, Roundup or approved equal as commercially available for use as necessary for specified weeds, and shall be used by methods not harmful to groundcover, trees or shrubs, according to manufacturer's instructions. Apply as per manufacturer's instructions.

I. Top soil: fertile, friable soil of loamy character with an amount of organic matter normal to the area. It shall be reasonably free of weeds, refuse, roots, heavy or stiff clay, stones larger than 1" in diameter, sticks, brush, litter, and other deleterious substances. Imported topsoil shall be subject to inspection and testing by the Owner or his designated representative at the source of supply prior to delivery to the project site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Landscape work shall not begin until all construction adjacent to planting areas has been completed and until irrigation systems have been installed and verified.

B. Contractor shall apply for and secure all required permits.

C. Contractor is to verify location of existing utilities prior to excavation and be responsible for protection of existing utilities within construction area. Any damage that occurs as a result of work in this Section shall be repaired to the satisfaction of Architect.

D. Protection of Property:
1. Protect Owner's property and adjacent property from injury or loss. All damage to existing property (buildings, utilities, retaining walls, etc.) or planting caused by Contractor during his operation or as a result of malfunction of installed work during warranty period shall be repaired at Contractor's expense.
2. Cause minimum interference with workmen, materials, or equipment of other trades on the Project.

3.2 CLEARING OF VEGETATION

A. If live perennial weeds exist on site at beginning of work, spray with a non-selective systemic contact herbicide as recommended and applied by a licensed landscape pest control advisor and applicator. Leave intact for at least 15 days.

B. After treatment, remove all existing weeds by grubbing or mowing off all plant parts at least 1/4 inch below surface of soil over entire areas to be planted.

3.3 SOIL PREPARATION

A. All areas to be planted shall be weeded and cleared of all debris and rocks larger than one (1) inch in diameter. Rototil to minimum depth of twelve inches until soil is loose and friable. Top four inches shall be cleared of all stones, debris, etc., larger than one inch in diameter that are brought to the surface as a result of cultivation.

B. The following amendments and rates of application are specified for bid purposes only. Upon receipt of soil analysis report, a change order will be issued, if revision to the soil treatment is necessary: In all planted areas, spread the following amendments per one thousand square feet:
   1. 50 lbs. Oyster Shell Lime
   2. 50 lbs. Humate
   3. 50 lbs. Dr. Earth Soil Ammendment
   4. 6 yards well rotted compost

C. Incorporate thoroughly with soil as described above.

D. Backfill Mix for Shrubs and Trees: One part soil amendment and two parts topsoil, thoroughly mixed. Include Agriform tablets at the following rates:
   1. 1 tablet per 1 gallon plant
   2. 3 tablets per 5 gallon plant
   3. 4 tablets per 15 gallon plant

3.4 FINE GRADING

A. Ensure proper drainage for all planted areas with all lines smooth and even. Adhere to drawings.

B. Ensure that finish grades of groundcover shall be two inches below surface of paved areas.

C. Adjust sprinkler heads one inch above finish grade, flag all sprinkler heads in preparation for areas to receive sod or hydroseed.

3.5 PLANTING

A. General: Planting shall take place after all construction, walks, irrigation and soil preparation has taken place and been verified.

B. Trees and Shrubs:
   1. No planting shall occur under unfavorable weather or when the soil is excessively wet.
   2. All canned stock shall be removed carefully from containers. Do not lift plant by the trunk or stems.

3. All planting pits for trees and shrubs shall be as indicated in tree and shrub planting details on Drawings.
4. Set plants in center of pit, in vertical position, so that crown of plant will be two inches above finish grade after allowing for watering and settling, and shall bear same relationship to finish grade that it did to soil surface in place of growth. Do not fill above crown of plant.
5. Water thoroughly after planting.
6. Guy or stake and tie all trees as detailed on Drawings. All stakes shall be vertical. Stakes shall be located in direction of the prevailing wind.

C. Groundcovers:
1. Planting of groundcovers from liners or flats shall take place after all trees and shrubs have been planted.
2. Space plants equally and uniformly at spacing indicated on plant list.
3. Provide fertilizer (Osmocote) to planting pits per manufacturer's instructions.
4. Carefully maintain even finished grade to ensure surface drainage, with ridges and depressions removed.
5. All groundcover to be watered well immediately after planting.

3.6 WEED CONTROL

A. After completion of all planting in shrub and ground cover areas, and one complete watering, an initial application of weed control can be made, following manufacturer's instructions. Treflan may be applied at the rate of two pounds per 1000 square feet. Roundup may be used on any noxious weeds in successive treatments until roots are destroyed, and tops then removed. Excessive watering may decrease the effectiveness of weed control.

3.7 MULCHING

A. Apply over all shrub and ground cover areas to a minimum depth of three inches after planting and initial weed control is completed.

3.8 PROTECTION OF PLANTING

A. Protect all areas and plants against trespassing and from damage at all times. If any plants are injured, they shall be treated or replaced as required by Architect. No work shall be executed in or over prepared plant areas or adjacent to planting without proper safeguard protection.

3.9 GENERAL CLEAN-UP:

A During progress of the Work, site shall be kept in reasonably clean, neat condition, free from accumulation of cans, surplus matter, and waste materials. Upon completion of work; properly remove all equipment, dispose of waste, refuse, or debris resulting from this work, and leave premises in neat and clean condition. All planting areas shall be neatly dressed and finished and all walks, paved areas and the like flushed clean to satisfaction of Architect.

3.10 GENERAL INSPECTION:

A. After all phases of this Section are complete, a general inspection will be held. Architect shall be informed at least five (5) days prior to completion and a suitable date and time arranged for such inspection.

B. If, after the inspection, Architect is of the opinion that all work has been performed in accordance with the Drawings and Specifications, he/she will give Contractor written notice to begin maintenance and warranty period.

C. Work requiring corrective action, in the judgment of Architect, shall be performed within ten (10) working days.

3.11 PERIOD OF MAINTENANCE:

A. The Landscape Maintenance Period shall continue for a minimum of sixty (60) calendar days.

B. All trees, shrubs and groundcover which are a part of this contract shall be kept at optimum growing conditions by watering, weeding, insect and pest control, replanting, fertilizing, mowing, cultivating, repairing stakes and ties, restoring and replacing dead or dying material, pruning as directed, maintaining proper grades of plants and providing any other reasonable operations of maintenance and protection required for successful completion of the Project.

C. Contractor shall check all irrigation systems weekly for proper operation. Set and program automatic controllers for seasonal water requirements.

D. Improper maintenance or possible poor condition of any planting at the termination of the scheduled maintenance period may cause postponement of the final completion date of the Contract. The Contractor shall continue the Maintenance until all work is acceptable.

3.12 FINAL INSPECTION

A. Final inspection shall conclude the maintenance period. Architect shall be informed at least seven (7) working days prior to the time and date the work is ready for final inspection in order that he/she may arrange suitable time and date for such inspection.

B. If, after the inspection, Architect is of the opinion that all work has been performed in accordance with the Specifications and that all the plant materials are in satisfactory growing condition, he will give Contractor written notice of acceptance and the end the maintenance period.

C. Work requiring corrective action or replacement, in the judgment of the Architect, shall be performed within ten (10) working days after Final Inspection. Corrective work and materials replacement shall be made in accordance with the Drawings and Specifications, and shall be made at no additional cost to Owner.

3.13 WARRANTY

A. Contractor shall guarantee the survival of all plant materials as indicated below, with the guarantee period commencing upon written notice of final acceptance by Owner and Architect.

Item	Guarantee Period
15 gallon (and larger) Trees and Shrubs	180 days
5 gallon (and smaller) Shrubs	90 days

B. Architect may reject any plant material which is diseased, dead or in a state of decline, during installation until final acceptance. Immediately replace dead or rejected material. The same is true for the warranty period unless negligence by Owner or Owner's representative can be established, through field inspection by Architect and consultation with the parties involved. All replacements shall be of like kind as originally planted, and shall also be guaranteed for the same amount of time, as the original would have been. All replacement work, including all planting, staking, etc., as originally specified, shall be at no additional cost to Owner.

END OF SECTION

SECTION 32 94 00 - PAVEMENT MARKING

PART 1 - GENERAL

1 SECTION INCLUDES

A Pavement marking for vehicular traffic control and direction on asphalt and concrete surfaces.

B Pavement marking for pedestrian areas.

2 SUMMARY

A Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

B Related Sections

1 Section 321216 - Asphalt Paving.

2 Section 321313 - Concrete Paving.

3 REFERENCES

A *State of California, Department of Transportation (CalTrans), Standard Specifications,* latest edition, as adopted by local jurisdictional authority, including all amendments.

B California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

C City and/or County Public Improvement and Engineering Standards, current edition ~ for all work within public roadway. Refer to Encroachment Permit for additional requirements.

4 SUBMITTALS

A Materials List/Shop Drawing:

1 Provide complete list of proposed materials for Architect's review.

2 Provide Shop Drawing diagrams of graphics proposed for use in pavement marking, including proposed size and location.

PART 2 - PRODUCTS

1 DESIGN CRITERIA

A All improvements shall be constructed per the referenced standards, the improvement drawings, and as specified in this section.

B Where criteria shown on drawings or specified in this specification exceed that of the referenced standards, the more stringent criteria shall apply.

2 PAVEMENT MARKING PAINT

A Product Characteristics:

1 Provide paint specifically formulated for use as pavement marking in automobile, pedestrian traffic and play court areas, and as required by jurisdictional authority.

2 Provide striping in size and multiple colors as selected by Architect, and as follows:

a At all pavement markings associated with accessibility for the disabled, provide Federal Blue 15090 per FS 595B color as defined in Title 24, Part 2, CCR, 4 inch width. Provide accessible aisle markings at 36 inches on center.

b Provide red color at fire lane curbs as shown on the plans.

c Provide white striping at parking space markings, 4 inch width.

d Provide directional arrows, white color, size as shown on drawings.

e Provide glass beads for all lane and centerline stripe in accordance with Caltrans Standard Specifications.

e Provide a minimum of four colors in deep saturated hues at play court paving graphics. Provide striping with 2 inch width, unless noted otherwise.

3 Paint products shall comply with *Section 91, CalTrans Standard Specifications,* for "rapid-dry" type paints. Paint manufacturer shall provide written certification of conformance to standard.

4 Thermoplastic stripes and pavement markings shall comply with *Section 84, Caltrans Standard Specifications.*

PART 3 - EXECUTION

1 SURFACE CONDITIONS

A Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B Verify pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

C In the event of discrepancy, immediately notify the Architect.

D Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

2 PREPARATION

A Secure the Architect's approval of graphics design and layout prior to start of application, including compliance with accessibility standards of Title 24.

B Secure Fire Marshal approval of all striping and marking of curbs, pavement, and related signage.

C Verify that concrete curing compound and asphalt seal coat compound has become completely inert prior to painting. Remove paint by approved means for those areas where compound is still active.

3 INSTALLATION

A Using proper masking, stencils, and application equipment recommended for the purpose by the manufacturer of the approved paint, apply the approved paint in strict accordance with its manufacturer's recommendations and *Section 84 of the CalTrans Standard Specifications*.

B Provide minimum of two coats of paint at all striping, curbing, and related markings, in dry mil thickness as defined in *Section 84, CalTrans Standard Specifications,* Vary color of first coat slightly.

C Coatings installed on asphalt paving shall be applied in thin, light coats to avoid peeling.

D A minimum of ten (10) days shall elapse between seal coat application and pavement marking on asphaltic concrete.

E Repaint markings damaged by construction traffic.

F Install fire lane curb markings at locations required by Fire Marshal.

G Install markings within 1/2 inch tolerance. Maintain width to a tolerance of plus/minus 1/4 inch.

H Thermoplastic stripes and pavement marking installation shall be provided in conformance with *Section 84, Caltrans Standard Specifications*.

END OF SECTION

SECTION 33 4100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure transition couplings.
3. Cleanouts.
4. Drains.
5. Encasement for piping.
6. Manholes.
7. Channel drainage systems.
8. Catch basins.
9. Stormwater inlets.
10. Stormwater detention structures.
11. Pipe outlets.

B. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

3. Local jurisdictional and agency engineering and public works regulations and standards.

4. California Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" current edition.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Catch basins stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.
3. Stormwater Detention Structures: Include plans, elevations, sections, details, frames, covers, design calculations, and concrete design-mix reports.

C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

D. Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Construction Manager no fewer than 4 days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 Polyethylene Pipe

A. HDPE Pipe:

1. Corrugated exterior with smooth interior, comply with Section 64 Caltrans Standard Specifications.

2.2 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
   1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

2.3 MANHOLES

A. Standard Precast Concrete Manholes, per Caltrans Specifications and the following:

   1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
   2. Diameter: 48 inches minimum unless otherwise indicated.
   3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
   4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
   5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
   6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
   7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
   8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
   9. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
   10. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
   11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Designed Precast Concrete Manholes, per Caltrans Specifications and the following:

   1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
   2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
   3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
5. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
6. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers, per Caltrans Specifications and the following:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

2.4 CONCRETE

A. General: Cast-in-place concrete according to Caltrans Specifications, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

   a. Invert Slope: 2 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

   a. Slope: 8 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.5 CATCH BASINS

A. Standard Precast Concrete Catch Basins, per Caltrans Specifications and the following:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
8. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Designed Precast Concrete Catch Basins: Per Caltrans Specifications and the following: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for joint sealants.

1. Joint Sealants: ASTM C 990, bitumen or butyl rubber.
2. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
4. Steps: Individual FRP steps; FRP ladder; or ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
5. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

C. Frames and Grates: Per Caltrans Specifications and the following: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 24 by 24 inches minimum unless otherwise indicated.

2. Bicycle proof grates shall be used.
3. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.6 STORMWATER INLETS, per Caltrans Specifications and the following:

A. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to Caltrans Specifications.

B. Gutter Inlets: Made with horizontal gutter opening according to Caltrans Specifications.

C. Include heavy-duty frames and grates.

D. Frames and Grates: Heavy duty, bicycle proof according to Caltrans Specifications.

2.7 STORMWATER DETENTION STRUCTURES, per Caltrans Specifications, Manufacturers Guidlines and the following:

A. Stormwater Detention Structures: Stormtech SC-740 stormwater storage system with traffic loading; of depth, shape, dimensions, and appurtenances indicated.
1. Foundation: Increase thickness of the chamber foundation in accordance with site soils bearing capacity and chamber cover height as required per manufacturers recommendations. The chamber foundation is the clean, crushed, angular stone placed between the subgrade soils and the feet of the chamber..
2. Chamber Row Separation: StormTech SC-740 chambers must have a minimum 6" space between the feet of adjacent parallel chamber rows.
3. Backfill: Clean, crushed, angular stone shall be placed below, between and above chambers with acceptable gradations, depth and thickness as shown on the construction drawings and per manufacturer’s guidelines.

B. Polypropylene (PP) Corrugated Stormwater Collection Chambers, Underground Detention Structures: Conform to the requirements of the American Society of Testing Materials (ASTM) F 2418 "Standard Specification for Polypropylene (PP) Corrugated Stormwater Collection Chambers". Products shall conform to American Association of State Highway and Transportation Officials (AASHTO) HS20 live load requirements per LRFD Bridge Design Specifications.

C. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."

2.8 PIPE OUTLETS, per Caltrans Specifications and the following:

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

B. Riprap Basins: Broken, irregularly sized and shaped, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control."

1. Average Size: NSSGA No. R-3, screen opening 2 inches.
2. Average Size: NSSGA No. R-4, screen opening 3 inches.
3. Average Size: NSSGA No. R-5, screen opening 5 inches.

C. Filter Stone: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. FS-2, No. 4 screen opening, average-size graded stone.

D. Energy Dissipaters: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. A-1, 3-ton average weight armor stone, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
3. Install piping with 36-inch minimum cover.
4. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
5. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
6. Install PE corrugated sewer piping according to ASTM D 2321.
7. Install PVC profile gravity sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:
1. Ductile-iron pipe and fittings.
2. Expansion joints and deflection fittings.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:
   1. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
   2. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
   3. Join ABS sewer piping according to ASTM D 2321 and ASTM D 2751 for elastomeric-seal joints.
   4. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
   5. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
   6. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

   1. Use Medium-Duty, top-loading classification cleanouts in all areas except pavement areas.

   2. Use Extra-Heavy-Duty, top-loading classification cleanouts in roadway or parking areas.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

   1. Use Medium-Duty, top-loading classification cleanouts in all areas except pavement areas.

   2. Use Extra-Heavy-Duty, top-loading classification cleanouts in roadway or parking areas.

B. Embed drains in 4-inch minimum concrete around bottom and sides.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers with tops flush with pavement surface.

E. Assemble trench sections with flanged joints.

F. Embed trench sections in 4-inch minimum concrete around bottom and sides.

3.6 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush 0.5 inch below finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.7 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

C. Set drain frames and covers with tops flush with pavement or adjacent concrete surface.

3.8 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipaters at outlets, as indicated.

3.9 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.10 CHANNEL DRAINAGE SYSTEM INSTALLATION

A. Install with top surfaces of components, except piping, flush with finished surface.

B. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.

C. Embed channel sections and drainage specialties in 4-inch minimum concrete around bottom and sides.

D. Fasten grates to channel sections if indicated.

E. Assemble channel sections with flanged or interlocking joints.

F. Embed channel sections in 4-inch minimum concrete around bottom and sides.

3.11 STORMWATER DISPOSAL SYSTEM INSTALLATION

A. Chamber Systems: Excavate trenches of width and depth, and install system and backfill according to chamber manufacturer's written instructions. Include storage and leaching chambers, filtering material, and filter mat.

B. Piping Systems: Excavate trenches of width and depth, and install piping system, filter fabric, and backfill, according to piping manufacturer's written instructions.

3.12 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."

B. Connect force-main piping to building's storm drainage force mains specified in Division 22 Section "Facility Storm Drainage Piping." Terminate piping where indicated.

C. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

a. Unshielded flexible couplings for same or minor difference OD pipes.
b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

2. Use pressure-type pipe couplings for force-main joints.

3.13 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 6-inch- thick, concrete bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.
2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Division 31 Section "Earth Moving."

3.14 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use warning tape or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.15 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.
b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
b. Option: Test plastic piping according to ASTM F 1417.
c. Option: Test concrete piping according to ASTM C 924.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.16 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 33 41 00

SECTION 33 4600 - SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Perforated-wall pipe and fittings.
2. Drainage conduits.
3. Drainage panels.
4. Geotextile filter fabrics.

B. Construct in accordance with Organization and Trade Standards of the authority having jurisdiction and in the presence of a representative of that agency.

1.3 REFERENCES

A. Organization and Trade Standards

1. State of California, Department of Transportation (CalTrans), Standard Specifications as adopted by local jurisdictional authority, latest edition, including amendments.

2. Local jurisdictional and agency engineering and public works regulations and standards.

1.4 SUBMITTALS

A. Product Data:

1. Drainage conduits, including rated capacities.
2. Drainage panels, including rated capacities.
3. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:

1. NPS 6 and Smaller: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
2. NPS 8 and Larger: ASTM F 667; AASHTO M 252, Type CP; or AASHTO M 294, Type CP; corrugated; for coupled joints.
3. Couplings: Manufacturer's standard, band type.

B. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

2.2 DRAINAGE CONDUITS

A. Single-Pipe Drainage Conduits: Prefabricated geocomposite with perforated corrugated core molded from HDPE complying with ASTM D 3350 and wrapped in geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. Advanced Drainage Systems, Inc.

2. Nominal Size: 12 inches high by approximately 1 inch thick.

   a. Minimum In-Plane Flow: 30 gpm at hydraulic gradient of 1.0 when tested according to ASTM D 4716.

3. Nominal Size: 18 inches high by approximately 1 inch thick.

   a. Minimum In-Plane Flow: 45 gpm at hydraulic gradient of 1.0 when tested according to ASTM D 4716.

4. Filter Fabric: PP geotextile.
5. Fittings: HDPE with combination NPS 4 and NPS 6 outlet connection.
6. Couplings: Corrugated HDPE band.

B. Mesh Fabric Drainage Conduits: Prefabricated geocomposite with plastic-filament drainage core wrapped in geotextile filter fabric. Include fittings for bends and connection to drainage piping.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. Colbond Inc.

2. Nominal Size: 6 inches high by approximately 0.9 inch thick.

   a. Minimum In-Plane Flow: 2.4 gpm at hydraulic gradient of 1.0 when tested according to ASTM D 4716.

3. Filter Fabric: Nonwoven geotextile made of PP or polyester fibers or combination of both. Flow rates range from 120 to 200 gpm/sq. ft. when tested according to ASTM D 4491.

C. Ring Fabric Drainage Conduits: Drainage conduit with HDPE rings-in-grid pattern drainage core, for field-applied geotextile filter fabric. Include fittings for bends and connection to drainage piping.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Invisible Structures, Inc.

2. Nominal Size: 18 inches high by 1 inch thick.

    a. Minimum In-Plane Flow: 82 gpm at hydraulic gradient of 1.0 when tested according to ASTM D 4716.

3. Nominal Size: 36 inches high by 1 inch thick.

    a. Minimum In-Plane Flow: 164 gpm at hydraulic gradient of 1.0 when tested according to ASTM D 4716.

4. Filter Fabric: Comply with requirements for flat geotextile filter fabric specified in Part 2 "Geotextile Filter Fabrics" Article.

2.3 DRAINAGE PANELS

A. Molded-Sheet Drainage Panels: Prefabricated geocomposite, 36 to 60 inches wide with drainage core faced with geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. American Wick Drain.
    b. Cosella-Dorken Products, Inc.
    c. Eljen Corporation.
    d. Greenstreak.
    e. JDR Enterprises, Inc.
    f. Midwest Diversified Technologies Incorporated.
    g. TenCate Geosynthetics.
    h. Trace-LINQ Inc.

2. Drainage Core: Three-dimensional, nonbiodegradable, molded PP.

    a. Minimum Compressive Strength: 15,000 lbf/sq. ft. when tested according to ASTM D 1621.
    b. Minimum In-Plane Flow Rate: 15 gpm/ft. of unit width at hydraulic gradient of 1.0 and compressive stress of 25 psig when tested according to ASTM D 4716.

3. Filter Fabric: Nonwoven needle-punched geotextile, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with the following properties determined according to AASHTO M 288:

    a. Survivability: Class 2.
    b. Apparent Opening Size: No. 60 sieve, maximum.
    c. Permittivity: 0.2 per second, minimum.

4. Filter Fabric: Woven geotextile fabric, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation less than 50 percent; complying with the following properties determined according to AASHTO M 288:

a. Survivability: Class 2.
b. Apparent Opening Size: No. 60 sieve, maximum.
c. Permittivity: 0.2 per second, minimum.

5. Film Backing: Polymeric film bonded to drainage core surface.

B. Mesh Fabric Drainage Panels: Prefabricated geocomposite with drainage core faced with geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Colbond Inc.

2. Drainage Core: Open-construction, resilient, plastic-filament mesh, approximately 0.4 inches thick.

a. Minimum In-Plane Flow Rate: 2.4 gpm/ft. of unit width at hydraulic gradient of 1.0 and normal pressure of 25 psig when tested according to ASTM D 4716.

3. Filter Fabric: Nonwoven geotextile of PP or polyester fibers or combination of both. Flow rates range from 120 to 200 gpm/sq. ft. when tested according to ASTM D 4491.

C. Net Fabric Drainage Panels: Prefabricated geocomposite with drainage core faced with geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. GSE Lining Technology, Inc.
b. JDR Enterprises, Inc.
c. Strata Systems, Inc.

2. Drainage Core: Three-dimensional, PE nonwoven-strand geonet, approximately 0.25 inches thick.

a. Minimum In-Plane Flow Rate: 5 gpm/ft. of unit width at hydraulic gradient of 1.0 and normal pressure of 25 psig when tested according to ASTM D 4716.

3. Filter Fabric: Nonwoven geotextile of PP or polyester fibers or combination of both. Flow rates range from 120 to 200 gpm/sq. ft. when tested according to ASTM D 4491.

D. Ring Fabric Drainage Panels: Drainage-core panel for field application of geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Invisible Structures, Inc.

2. Drainage Core: Three-dimensional, HDPE rings-in-grid pattern, approximately 1 inch thick.

a. Minimum In-Plane Flow Rate: 40 gpm/ft. of unit width at hydraulic gradient of 1.0 and normal pressure of 25 psig when tested according to ASTM D 4716.

2.4 SOIL MATERIALS

A. Soil materials are specified in Division 31 Section "Earth Moving."

2.5 WATERPROOFING FELTS

A. Material: Comply with ASTM D 226, Type I, asphalt-saturated organic felt.

2.6 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.

B. Structure Type: Nonwoven, needle-punched continuous filament.

1. Survivability: AASHTO M 288 Class 2.
2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

B. If subdrainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.

C. Verify that drainage panels installed as part of foundation wall waterproofing is properly positioned to drain into subdrainage system.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.3 FOUNDATION DRAINAGE INSTALLATION

A. Place impervious fill material on subgrade adjacent to bottom of footing after concrete footing forms have been removed. Place and compact impervious fill to dimensions indicated, but not less than 6 inches deep and 12 inches wide.

B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.

D. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive or tape.

E. Install drainage piping as indicated in Part 3 "Piping Installation" Article for foundation subdrainage.

F. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.

G. After satisfactory testing, cover drainage piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.

H. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.

I. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.

J. Install drainage panels on foundation walls as follows:

1. Coordinate placement with other drainage materials.
2. Lay perforated drainage pipe at base of footing. Install as indicated in Part 3 "Piping Installation" Article.
3. Separate 4 inches of fabric at beginning of roll and cut away 4 inches of core. Wrap fabric around end of remaining core.
4. Attach panels to wall beginning at subdrainage pipe. Place and secure molded-sheet drainage panels, with geotextile facing away from wall.

K. Place backfill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Final backfill to finish elevations and slope away from building.

3.4 UNDERSLAB DRAINAGE INSTALLATION

A. Excavate for underslab drainage system after subgrade material has been compacted but before drainage course has been placed. Include horizontal distance of at least 6 inches between drainage pipe and trench walls. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.

B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.

D. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive or tape.

E. Install drainage piping as indicated in Part 3 "Piping Installation" Article for underslab subdrainage.

F. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.

G. After satisfactory testing, cover drainage piping with drainage course to elevation of bottom of slab, and compact and wrap top of drainage course with flat-style geotextile filter fabric.

H. Install horizontal drainage panels as follows:

1. Coordinate placement with other drainage materials.
2. Lay perforated drainage pipe at inside edge of footing.
3. Place drainage panel over drainage pipe with core side up. Peel back fabric and wrap fabric around pipe. Locate top of core at bottom elevation of floor slab.
4. Butt additional panels against other installed panels. If panels have plastic flanges, overlap installed panel with flange.

3.5 RETAINING-WALL DRAINAGE INSTALLATION

A. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

B. Place supporting layer of drainage course over compacted subgrade to compacted depth of not less than 4 inches.

C. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive or tape.

D. Install drainage piping as indicated in Part 3 "Piping Installation" Article for retaining-wall subdrainage.

E. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.

F. After satisfactory testing, cover drainage piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.

G. Place drainage course in layers not exceeding 3 inches in loose depth; compact each layer placed and wrap top of drainage course with flat-style geotextile filter fabric.

H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.

I. Install drainage panels on wall as follows:

1. Coordinate placement with other drainage materials.
2. Lay perforated drainage pipe at base of footing as described elsewhere in this Specification. Do not install aggregate.
3. If weep holes are used instead of drainage pipe, cut 1/2-inch- diameter holes on core side at weep-hole locations. Do not cut fabric.
4. Mark horizontal calk line on wall at a point 6 inches less than panel width above footing bottom. Before marking wall, subtract footing width.
5. Separate 4 inches of fabric at beginning of roll and cut away 4 inches of core. Wrap fabric around end of remaining core.
6. Attach panel to wall at horizontal mark and at beginning of wall corner. Place core side of panel against wall. Use concrete nails with washers through product. Place nails from 2

to 6 inches below top of panel, approximately 48 inches apart. Construction adhesives, metal stick pins, or double-sided tape may be used instead of nails. Do not penetrate waterproofing. Before using adhesives, discuss with waterproofing manufacturer.

7. If another panel is required on same row, cut away 4 inches of installed panel core and wrap fabric over new panel.
8. If additional rows of panel are required, overlap lower panel with 4 inches of fabric.
9. Cut panel as necessary to keep top 12 inches below finish grade.
10. For inside corners, bend panel. For outside corners, cut core to provide 3 inches for overlap.

J. Fill to Grade: Place satisfactory soil fill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

3.6 LANDSCAPING DRAINAGE INSTALLATION

A. Provide trench width to allow installation of drainage conduit. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.

B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.

D. Install drainage conduits as indicated in Part 3 "Piping Installation" Article for landscaping subdrainage with horizontal distance of at least 6 inches between conduit and trench walls. Wrap drainage conduits without integral geotextile filter fabric with flat-style geotextile filter fabric before installation. Connect fabric sections with adhesive or tape.

E. Add drainage course to top of drainage conduits.

F. After satisfactory testing, cover drainage conduit to within 12 inches of finish grade.

G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.

H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.

I. Fill to Grade: Place satisfactory soil fill material over drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

3.7 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

1. Foundation Subdrainage: Install piping level and with a minimum cover of 36 inches unless otherwise indicated.
2. Underslab Subdrainage: Install piping level.
3. Plaza Deck Subdrainage: Install piping level.

4. Retaining-Wall Subdrainage: When water discharges at end of wall into stormwater piping system, install piping level and with a minimum cover of 36 inches unless otherwise indicated.
5. Landscaping Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches unless otherwise indicated.
6. Lay perforated pipe with perforations down.
7. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Install thermoplastic piping according to ASTM D 2321.

3.8 PIPE JOINT CONSTRUCTION

A. Join perforated PE pipe and fittings with couplings according to ASTM D 3212 with loose banded, coupled, or push-on joints.

B. Join perforated PVC sewer pipe and fittings according to ASTM D 3212 with loose bell-and-spigot, push-on joints.

C. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.9 BACKWATER VALVE INSTALLATION

A. Comply with requirements for backwater valves specified in Division 33 Section "Storm Utility Drainage Piping."

B. Install horizontal backwater valves in header piping downstream from perforated subdrainage piping.

C. Install horizontal backwater valves in piping in manholes or pits where indicated.

3.10 CLEANOUT INSTALLATION

A. Comply with requirements for cleanouts specified in Division 33 Section "Storm Utility Drainage Piping."

B. Cleanouts for Foundation Retaining-Wall and Landscaping Subdrainage:

1. Install cleanouts from piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
2. In vehicular-traffic areas, use NPS 4 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 18 by 18 by 12 inches deep. Set top of cleanout flush with grade.
3. In nonvehicular-traffic areas, use NPS 4 PVC pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches deep. Set top of cleanout 2 inches above grade.

4. Comply with requirements for concrete specified in Division 03 Section "Cast-in-Place Concrete" and Division 03 Section "Miscellaneous Cast-in-Place Concrete."

C. Cleanouts for Underslab Subdrainage:

1. Install cleanouts and riser extensions from piping to top of slab. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
2. Use NPS 4 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout flush with top of slab.

3.11 CONNECTIONS

A. Comply with requirements for piping specified in Division 33 Section "Storm Utility Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect low elevations of subdrainage system to building's solid-wall-piping storm drainage system.

C. Where required, connect low elevations of foundation underslab subdrainage to stormwater sump pumps. Comply with requirements for sump pumps specified in Division 22 Section "Sump Pumps."

3.12 IDENTIFICATION

A. Arrange for installation of green warning tapes directly over piping. Comply with requirements for underground warning tapes specified in specified in Division 31 Section "Earth Moving."

1. Install PE warning tape or detectable warning tape over ferrous piping.
2. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.13 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

B. Drain piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.14 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 33 46 00